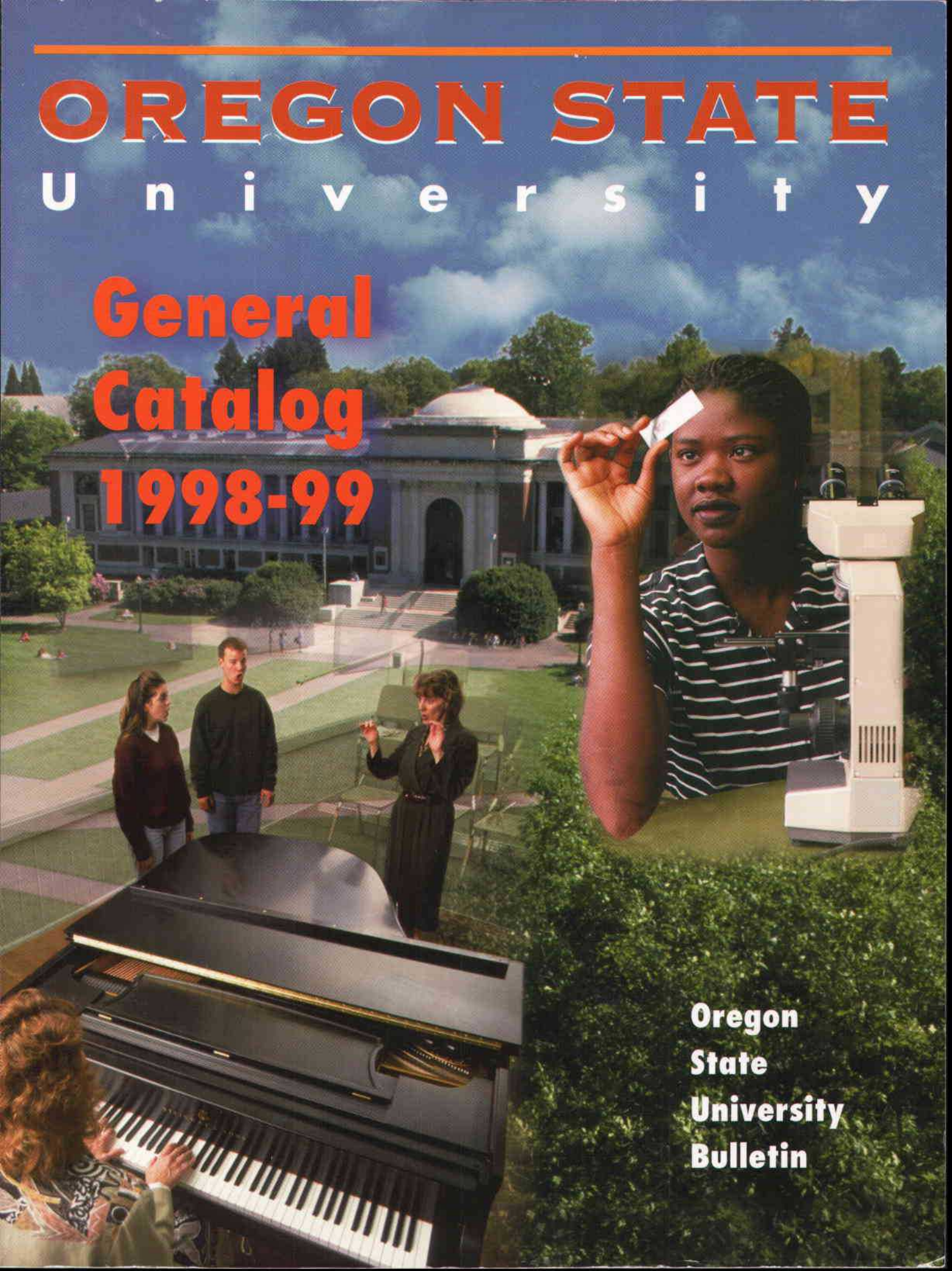
# OREGON STATE
## University

# General Catalog 1998-99



Oregon State University Bulletin

OREGON
STATE
UNIVERSITY

**Please note**
Admitted students receive a copy of the OSU *General Catalog* when they first enroll. The Catalog may also be purchased for $6.00 per copy from the OSU Book Store or the Registrar's Office.

The OSU *Graduate Catalog* is available free to prospective graduate students from the Graduate School Office. It may also be purchased for $4.00 per copy from the OSU Book Store.

Other Sources of information about Oregon State University include the *Summer Term Bulletin,* distributed by the Summer Term Office; 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 Information, call:
(541) 737-0123 or 737-1000

Admission Information, call:
(541) 737-4411

**Oregon State University**
**Bulletin (USPS 411-520)**
**Number 258 April 1998**
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Every effort has been made to ensure the accuracy of information in the *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 for 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.

Printed on recycled paper.

# OREGON STATE UNIVERSITY

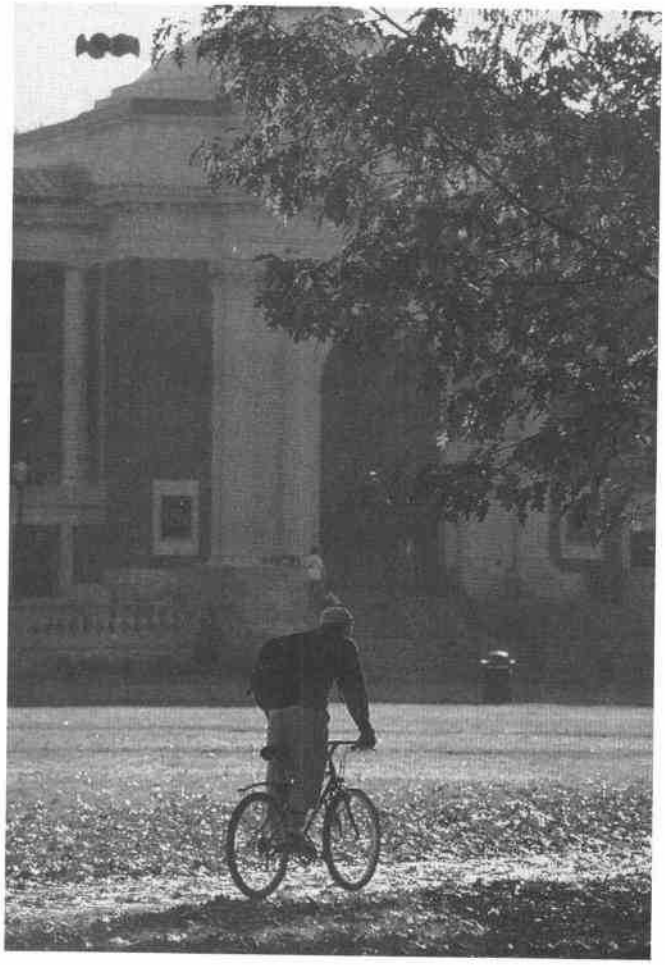
## Open your mind to the possibilities . . .

***Oregon State University*** **is known throughout the state, the nation, and the world for the excellence of its programs and the quality of its people. That reputation means employers, graduate schools, and professional schools rightfully expect quality when they receive applications from OSU students.**

**Oregon State University has earned its reputation through a commitment to helping students prepare for the rest of their lives. That means educating them for a career, of course, but it also means much more.**

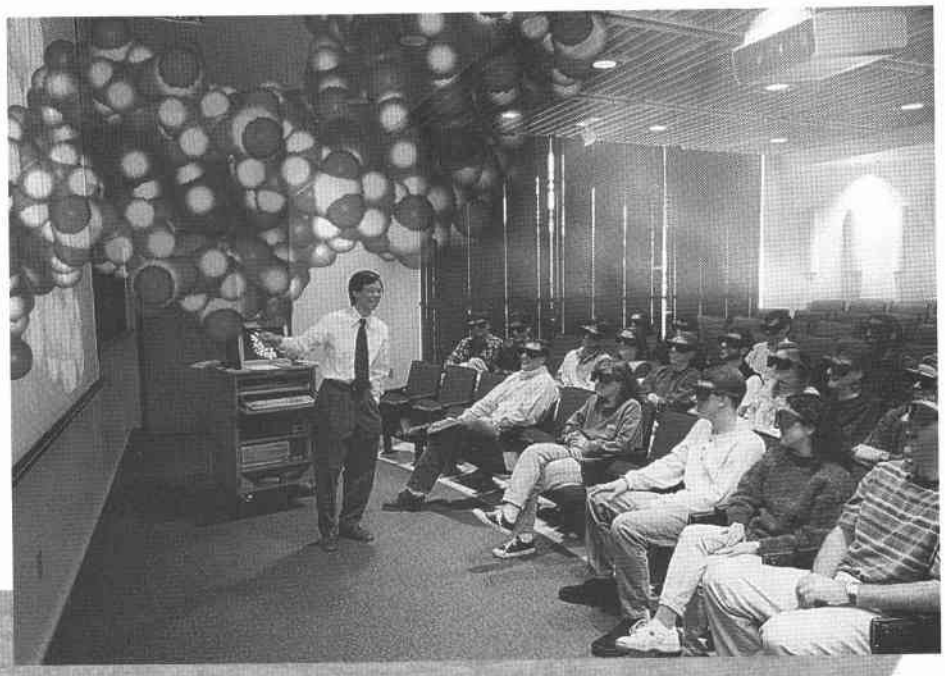
**We want our students to have the analytical and critical thinking skills to become productive members of society, and we also want them to develop interpersonal skills and a general knowledge of the arts, humanities, and sciences that will allow them to appreciate life.**

***Here are a few of the reasons Oregon State University is so highly regarded:***



## OSU is a top tier university

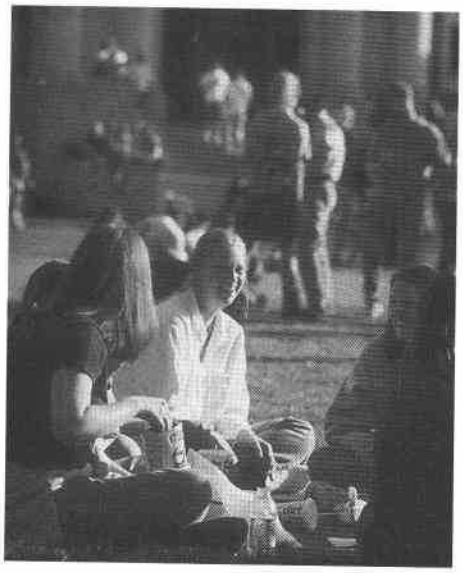
- OSU is the only Oregon school and one of just 88 nationwide to receive the ***Carnegie Foundation's highest rating for education and research***—a prestigious mark of commitment that puts us in the company of schools such as Harvard, Yale, MIT, and Stanford.
- Oregon State receives ***more research grant funds*** annually than the rest of the Oregon University System schools combined.
- With the completion of the $40 million ***Valley Library expansion*** project in December 1998, OSU has a 340,000-square-foot state-of-the-art facility for library and information services.
- In addition to its wide range of strong undergraduate programs, Oregon State offers ***master's degree programs in 80 majors and doctoral*** or ***professional degrees in 59 majors.***
- Oregon State was recently named by the American Productivity and Quality Center as the top college or university in North America for providing ***electronic services*** to students.
- Oregon State University attracts more than ***1,200 international students*** from nearly ***100 countries.***
- More ***employers recruit*** at Oregon State than any other college or university in Oregon.



## OSU provides a compelling learning experience

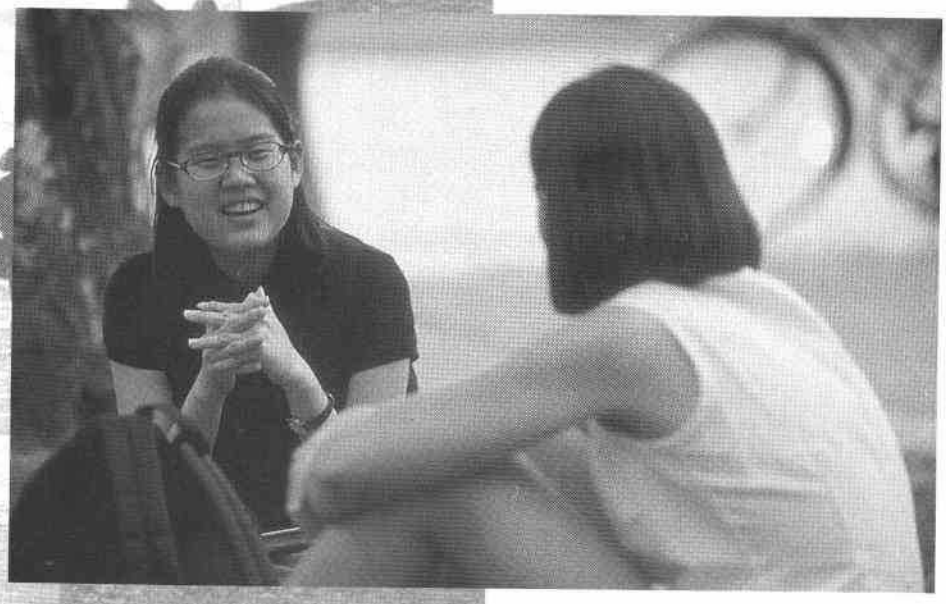
- By developing skills and knowledge in writing, critical thinking, cultural diversity, the arts, science, literature, lifelong fitness, and global awareness, our ***Baccalaureate Core*** ensures that OSU graduates are well prepared for life as well as a career.
- The ***University Honors College*** offers a small college atmosphere within the larger university. Small classes, highly motivated students, and close interaction with outstanding faculty members provide an outstanding academic atmosphere.
- ***International Studies degree*** and ***Study Abroad*** programs allow undergraduate students in any field to add an international component to their education.

- ***Internships*** allow students to gain on-the-job experience, college credit, and often a paycheck, while working for employers in their fields of career interest.
- We offer a ***hands-on education*** with many opportunities for undergraduate research using ***state-of-the-art equipment.***
- Students have access to more than ***2,000 computers*** in labs around campus, and all residence hall rooms are on-line for students who have their own computers. In addition, ***high tech facilities*** such as our ***3-D stereographic classroom*** and a ***multimedia classroom,*** allow students to experience the latest technology.



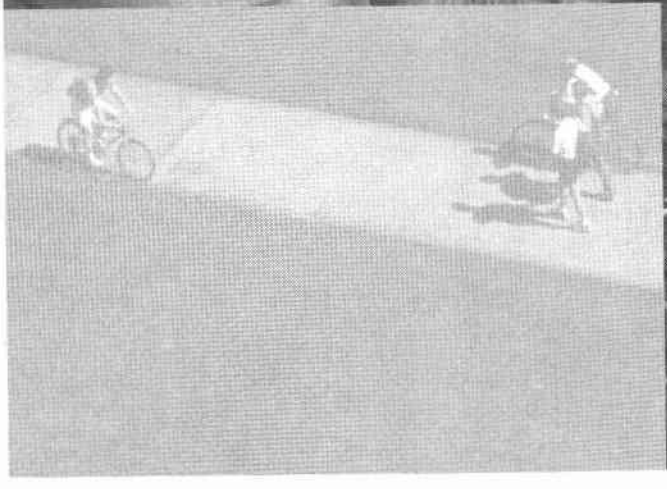
## Students come first at OSU

- ***OSU CONNECT,*** a five-day orientation program before the start of fall term, helps students adjust to campus life. Activities include a barbecue with President Risser, discussion groups with students and professors, midnight movies, and many other activities that help students connect to the university and to Corvallis.
- Our ***First-Year Experience*** program offers a variety of small group experiences for first-year students to interact with faculty and other students, easing the transition to OSU.
- The ***University Exploratory Studies Program*** allows students to explore a variety of disciplines before deciding on an academic major.
- 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.
- Our ***minority education offices, 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.
- ***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.
- Oregon State is the only college or university in the state that offers ***ROTC programs*** for all four services—Army, Navy, Air Force, and Marines.
- With more than ***300 student organizations,*** plus ***club, intramural,*** and ***Pac-10 Conference sports,*** students have no trouble keeping busy at OSU.



## The State of Oregon is OSU's campus

- Once part of OSU, you're always part of OSU. Through our ***Alumni College***, you can take additional undergraduate classes at any time without ever having to reapply for admission.
- ***OSU Statewide*** offers an extensive range of distance education services and on-site bachelor's degree programs throughout Oregon.
- Through the ***OSU Extension Service***, the University has a presence in all 36 Oregon counties.
- Corvallis is an ideal ***university town*** of 50,000 people, offering a wide range of community, religious, dining, shopping, and cultural opportunities. And the city is within an hour or two of the ***Oregon Coast, the snow-capped Cascade Mountains, and Portland***—Oregon's largest city.



# Table of Contents

## FALL TERM, 1998

Preregistration – for currently enrolled students
*May-June, 1998*

Summer Orientation and Advising Program (SOAP)) for new students
*Late June and July*

Continuous Registration and Schedule Adjustment
*August and September*

OSU CONNECT (New student orientation, advising and registration for students not participating in SOAP)
*September 22-27, Tuesday-Sunday*

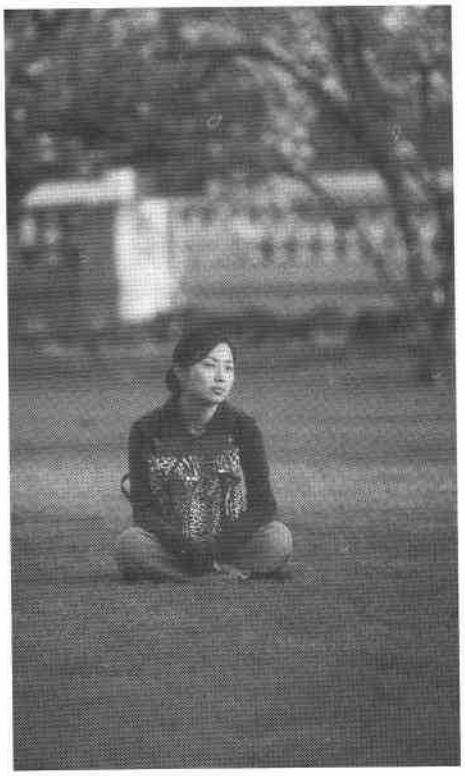
Classes Begin
*September 28, Monday*

Late Registration and Add/Drop
*Begins September 28, Monday*

Thanksgiving Vacation
*November 26-29, Thursday-Sunday*

Finals Week
*December 7-11, Monday-Friday*

End of Fall Term
*December 11, Friday*



## WINTER TERM, 1999

Preregistration Activities–for continuing students
*November-December*

Orientation and Registration for new students
*Prior to the term*

Classes Begin
*January 4, Monday*

Late Registration and Add/Drop
*Begins January 4, Monday*

Martin Luther King, Jr. Day
*January 18, Monday*

Finals Week
*March 15-19, Monday-Friday*

End of Winter Term
*March 19*

## SPRING TERM, 1999

Preregistration activities for continuing students
*February-March*

Orientation and Registration for new students
*Prior to start of term*

Classes Begin
*March 29, Monday*

Late Registration and Add/Drop
*Begins March 29*

Memorial Day
*May 24, Monday*

Finals Week
*June 7-11, Monday-Friday*

End of Spring Term
*June 11, Friday*

Commencement
*June 13, Sunday*

## THE UNIVERSITY

Oregon State University provides diverse educational opportunities through the undergraduate and graduate programs of its 12 colleges and two schools. The University is typified by a variety of academic choices which include studies in scientific, technological, interdisciplinary, and professional as well as liberal arts fields. A Land Grant, Sea Grant, and Space Grant university with beginnings in the 1850s, OSU is now home to some 14,300 undergraduate and graduate students, representing about 100 countries, every state in the nation and every county in the state of Oregon. In addition to its regular educational programs, the University conducts extensive research programs, administers the Extended Education Service in Oregon counties, and maintains branch agricultural experiment stations at several locations throughout the state. Further research is done by the University at its Astoria Seafood Laboratory and at Yaquina Bay in Newport, where the OSU Mark O. Hatfield Marine Science Center is located.

## GUIDING PRINCIPLES

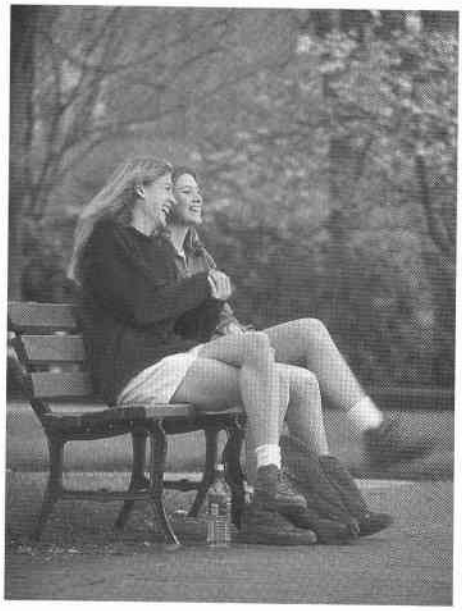
Students are our most important clients. The quality and completeness of their education is our top priority.

***We have the responsibility to students, staff, and faculty to help them grow personally and professionally.***

***We have a responsibility to society to contribute to its social, aesthetic, and economic well-being.***

Our social responsibility extends to offering informed criticism even when that criticism may not be well received, and we maintain an internal environment that will nurture this important contribution.

Flexibility, change, and constant improvement are essential to our continued success.



In instruction, research, and service activities, we honor and impart principles of academic honesty, freedom, and integrity.

Diversity is a key to our success. Not only are our doors open to men and women alike without regard to race, ethnicity, personal belief, disability, or sexual preference; we also have a moral obligation to open the doors wider for any groups that are underrepresented or that have suffered from discrimination.

## MISSION

Oregon State University serves the people of Oregon, the nation, and the world through education, research, and service.

Oregon State extends its programs throughout the world and is committed to providing access and educational opportunities to minorities and to challenged and disadvantaged students.

Oregon State has an inherent commitment to provide a comprehensive array of high quality educational programs in the sciences, liberal arts, and selected professions. The University encourages students, both on and off campus, to develop an enriched awareness of themselves and their global environment.

Through research, Oregon State extends the frontiers of knowledge in the sciences, liberal arts, and in all aspects of natural, human, and economic resources. Oregon State contributes to the intellectual development and the economic and technological advancement of humankind.

As a Land Grant, Sea Grant, and Space Grant university, Oregon State has a special responsibility for education and research enabling the people of Oregon and the world to develop and utilize human, land, atmospheric, and oceanic resources. Unique programs of public service throughout Oregon supplement campus-based University teaching and research.

## GUIDELINES

The highest aspiration of a university is to free people's minds from ignorance, prejudice, and provincialism and to stimulate a lasting attitude of inquiry. Oregon State University shares this aspiration with universities everywhere.

Accordingly, Oregon State University accepts the charge of the Oregon State Board of Higher Education that it provide a general education for its students so "that they will acquire the knowledge, skills, and wisdom for (a) personal development and enrichment, particularly through arts and letters; (b) responsible participation in a democratic society; (c) an understanding of the scientific methodology which has wrought a revolution in the ways of knowing and the extent and application of knowledge; and (d) an understanding of other cultures and natures as well as our own."

Oregon State University's basic goal is to create a better academic environment for the intellectual and humane development of the men and women of the academic community and to maintain OSU as a center in which the freedoms to think, to learn, to relate, to experiment, and to develop standards of criticism and excellence are encouraged.

## ACCREDITATION

Oregon State University is accredited by the Commission on Colleges of the Northwest Association of Schools and Colleges. The University is authorized to offer undergraduate- and graduate-level certificates, baccalaureate, master, doctorate, and first professional degrees by the Oregon State Board of Higher Education.

In the College of Science, the Chemistry degree program is approved by the American Chemical Society. The College of Business is accredited by the American Assembly of Collegiate Schools of Business.

The College of Forestry is accredited by the Society of American Foresters and the Society of Wood Science and Technology. In the College of Agricultural Sciences, the Rangeland Resources program is accredited by the Society for Range Management.

The Chemical, Civil, Computer, Electrical and Electronics, Industrial, Manufacturing, Mechanical, and Nuclear Engineering baccalaureate programs in the College of Engineering are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. The Construction Engineering Management program is accredited by the American Council for Construction Education.

In the College of Home Economics and Education the baccalaureate program in Home Economics is accredited by the Council for Professional Development of the American Association of Family and Consumer Sciences. The Dietetic option in Nutrition and Food Management is approved by the American Dietetic Association. The School of Education is accredited by the National Council for Accreditation of Teacher Education for preparation of elementary and secondary teachers. The Teacher Education program (MAT) is accredited by the Oregon Teacher Standards and Practices Commission. The Counseling program is accredited by the Council of Accreditation of Counseling and Related Education Programs.

In the College of Health and Human Performance, the Environmental Health program is accredited by the National Environmental Health Science and Protection Accreditation Council, the Athletic Training option under the Exercise and Sport Science program is accredited by the Commission on Accreditation of Allied Health Programs, the Health Care Administration program is accredited by the Association of University Programs in Health Administration, the Occupational Safety option in Environmental Health and Safety is appredited by the Engineering

Accreditation Commission of the Accreditation Board for Engineering and Technology, the Health Education program is accredited by the National Council for Accreditation of Teacher Education and the American Association for Health Education, the Health Promotion and Education program is accredited by the Society for Public Health Education, Inc. and the American Association for Health Education, and the Public Health program is accredited by the Council on Education for Public Health.

The College of Pharmacy is accredited by the American Council on Pharmaceutical Education, and the College of Veterinary Medicine by the American Veterinary Medical Association: Council on Education.

The Student Heath Service office is accredited by the American Association for Ambulatory Health Care.

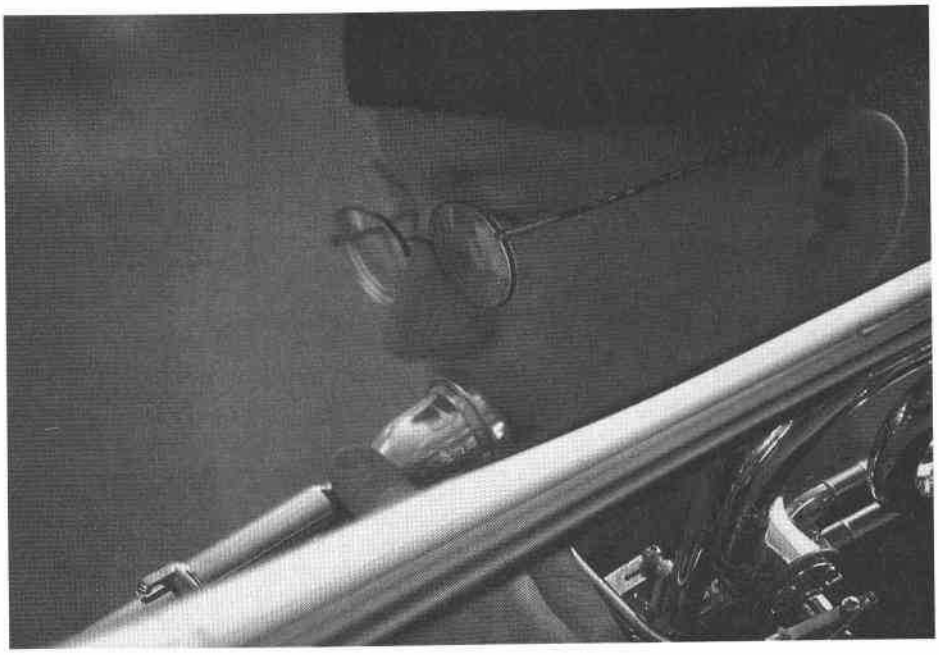
## HISTORY

From its first days as a small private college 139 years ago, Oregon State University has developed into the major research and teaching institution it is today.

OSU's roots go back to 1858, with the founding of an academy incorporated as Corvallis College. 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.

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

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 that assumption of 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.

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 also was 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, and the College of Oceanography was created (as a school) in 1972 (now the College of Oceanic and Atmospheric Sciences). The College of Health and Physical Education (now the College of Health and Human Performance) 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 is now a unit within the College of Home Economics and Education. In 1995 the Honors College was established.

Presidents of the institution since its founding are (1) William A. Finley, 1865-72; Joseph Emery, 1872 (acting); (2) Benjamin L. Arnold, 1872-92; John D. Letcher, 1892 (acting); (3) John M. Bloss, 1892-96; (4) Henry B. Miller, 1896-97; (5) Thomas M. Gatch, 1897-1907; (6) William Jasper Kerr, 1907-32; George Wilcox Peavy, 1932-34 (acting); (7) George Wilcox Peavy, 1934-40; (8) Frank Llewellyn Ballard, 1940-41; Francois Archibald Gilfillan, 1941-42 (acting); (9) August Leroy Strand, 1942-61; (10) James Herbert Jensen, 1961-69; Roy Alton Young, 1969-70 (acting); (11) Robert William MacVicar, 1970-1984; (12) John V. Byrne, 1984-1995; (13) Paul G. Risser, 1996-present.

# Summary of Enrollment and Degrees



## Enrollment by Curriculum and Class, Fall Term 1997

| Curriculum | Fresh | Soph | Junior | Senior | Undergrad Postbac | Undergrad Special | Undergrad Total | Grad/Prof | Total |
|---|---|---|---|---|---|---|---|---|---|
| *Liberal Arts and Sciences* | | | | | | | | | |
| College of Liberal Arts | 403 | 443 | 609 | 629 | 52 | 52 | 2,188 | 92 | 2,280 |
| College of Science | 466 | 350 | 388 | 460 | 53 | 27 | 1,744 | 488 | 2,232 |
| TOTAL Liberal Arts and Sciences *(excluding duplicates)* | 869 | 793 | 997 | 1,089 | 105 | 79 | 3,932 | 580 | 4,512 |
| *Professional Curricula* | | | | | | | | | |
| College of Agricultural Sciences | 196 | 206 | 255 | 252 | 52 | 5 | 966 | 307 | 1,273 |
| College of Business | 358 | 324 | 367 | 405 | 28 | 33 | 1,515 | 81 | 1,596 |
| College of Engineering | 634 | 410 | 449 | 651 | 72 | 17 | 2,233 | 451 | 2,684 |
| College of Forestry | 96 | 80 | 80 | 105 | 6 | 5 | 372 | 154 | 526 |
| College of Health and Human Performance | 161 | 154 | 163 | 225 | 16 | 6 | 725 | 131 | 856 |
| College of Home Economics and Education | 142 | 163 | 177 | 218 | 27 | 10 | 737 | 391 | 1,128 |
| College of Oceanic and Atmospheric Sciences | — | — | — | — | — | — | — | 82 | 82 |
| College of Pharmacy | 44 | 54 | 74 | 204 | 63 | 0 | 439 | 42 | 481 |
| College of Veterinary Medicine | — | — | — | — | — | — | — | 80 | 80 |
| Graduate School | — | — | — | — | — | — | — | 446 | 446 |
| University Exploratory Studies Program | 340 | 84 | 24 | 14 | 0 | 1 | 463 | — | 463 |
| TOTAL Professional Colleges | 1,971 | 1,475 | 1,589 | 2,074 | 264 | 77 | 7,450 | 2,165 | 9,615 |
| TOTAL Students *(excluding duplicates)* | 2,840 | 2,268 | 2,586 | 3,163 | 369 | 156 | 11,382 | 2,745 | 14,127 |

## Summary of Degrees Conferred 1996-97

| | |
|---|---|
| Doctor of Education | 13 |
| Doctor of Pharmacy | 6 |
| Doctor of Philosophy | 166 |
| Doctor of Veterinary Medicine | 36 |
| **TOTAL Doctorate Degrees** | 221 |
| Master of Agriculture | 7 |
| Master of Arts | 19 |
| Master of Arts in Interdisciplinary Studies | 34 |
| Master of Arts in Teaching | 77 |
| Master of Business Administration | 43 |
| Master of Education | 46 |
| Master of Engineering | 2 |
| Master of Forestry | 0 |
| Master of Public Health | 12 |
| Master of Science | 405 |
| **TOTAL Master's Degrees** | 645 |
| Bachelor of Arts | |
| College of Agricultureal Science | 1 |
| College of Business | 41 |
| College of Engineering | 1 |
| College of Home Economics and Education | 1 |
| College of Liberal Arts | 197 |
| College of Science | 7 |
| Bachelor of Science | |
| College of Agricultural Sciences | 243 |
| College of Business | 284 |
| College of Engineering | 348 |
| College of Forestry | 57 |
| College of Health and Human Performance | 173 |
| College of Home Economics and Educaton | 198 |
| College of Liberal Arts | 350 |
| College of Pharmacy | 90 |
| College of Science | 307 |
| Bachelor of Fine Arts | |
| College of Liberal Arts | 16 |
| Honors Baccalaureate in Arts | |
| College of Business | 1 |
| College of Liberal Arts | 3 |
| Honors Baccalaureate in Science | |
| College of Business | 1 |
| College of BHome Economics and Education | 1 |
| College of Liberal Arts | 3 |
| College of Science | 4 |
| **TOTAL Bachelor's Degrees** | 3,327 |
| **TOTAL DEGREES CONFERRED 1996-97: 3,193** | |
| Students receiving: 1 degree | 3,031 |
| 2 degrees | 81 |

## Enrollment by Gender and Term, 1996-97

| Term | Men | Women | Total |
|---|---|---|---|
| Summer Session, 1996 | 1,889 | 1,907 | 3,802 |
| Fall Term, 1996 | 7,590 | 6,194 | 13,784 |
| Winter Term, 1997 | 7,297 | 5,941 | 13,239 |
| Spring Term, 1997 | 6,822 | 5,641 | 12,464 |
| Summer Session, 1997* | 1,927 | 1,980 | 3,922 |
| Fall Term, 1997 | 7,700 | 6,427 | 14,127 |
| *Percentage (Fall Term 1997)* | *54.5* | *45.5* | |

*Incudes 6 no response

| Source of Student, Fall Term | 1995 | 1996 | 1997 |
|---|---|---|---|
| New Freshmen | 2,034 | 1,824 | 1,984 |
| Transfer Students | 1,820 | 1,994 | 1,790 |
| Other Admits | 463 | 444 | 613 |
| Returning Students | 569 | 635 | 664 |
| Continuing Students | 9,275 | 8,887 | 9,076 |

## Full-Time/Part-Time, Fall Term, 1997

| | Full-time | Part-time | Total |
|---|---|---|---|
| Undergraduate | 10,481 | 901 | 11,382 |
| Graduate | 2,085 | 660 | 2,745 |
| TOTAL | 12,565 | 1,561 | 14,127 |
| *Percentage* | *88.9* | *11.1* | |

## Graduation Rates (Entering Freshmen)

| Class | % 4 Years | % 5 Years | % 6 Years | % 7 Years |
|---|---|---|---|---|
| 1989-90 | 26.2 | 54.5 | 62.4 | 65.9 |
| 1990-91 | Msg | Msg | Msg | Msg |
| 1991-92 | 25.9 | 54.1 | — | — |
| 1992-93 | 25.5 | — | — | — |

## Geographic Origin (Residency) Fall Term, 1997

| | Number | Percent |
|---|---|---|
| Oregon | 10,637 | 75.3 |
| U.S. (plus Territories and Possessions) | 2,357 | 16.7 |
| International | 1,133 | 8.0 |
| TOTAL | 14,127 | 100.0 |

*Source: OSU Office of Academic Affairs*

## ORGANIZATION OF THE UNIVERSITY

The **President** is the chief executive officer of the University, appointed by the **Oregon State Board of Higher Education**, and 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.

The academic programs of Oregon State University are divided among twelve **colleges**, and the **Graduate School**, each with a **dean** or **director** responsible for all faculty, staff, students, and programs.

The twelve colleges are the College of Agricultural Sciences, College of Business, College of Engineering, College of Forestry, College of Health and Human Performance, College of Home Economics and Education, College of Liberal Arts, College of Oceanic and Atmospheric Sciences, College of Pharmacy, College of Science, the College of Veterinary Medicine, and the University's Honors College.

Colleges are divided into **departments** administered by a **department head** or **chair**. 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 *General Catalog* are offered throughout the year (at a variety of sites) by the Oregon State University Office of Continuing Higher Education. A list of currently offered courses is available from that office. In addition, **Summer Session** is directed by the **Office of Academic Affairs**. Courses offered during Summer Session are published each year in the *Summer Session Bulletin*.

This 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 *Schedule of Classes*.

The *Graduate Catalog* describes the requirements for graduate degrees and policies that pertain to graduate students and their individual programs. A summary of graduate programs, general regulations, and the Graduate School is provided in the *General Catalog*.

## DEFINITIONS

The following terms are used throughout the catalog or by advisers.

**Academic Year**—The time period containing the academic terms Fall, Winter, and Spring (currently September 15 through June 15).

**Adviser**—A faculty member appointed by the department or college to advise students through their college experience.

**BA Degree**—The Bachelor of Arts 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 Department of Foreign Languages and Literatures as equivalent to that attained at the end of the second year course in the language.

**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.

**Blanket Numbered Courses**—Reserved number courses such as 401/501/601. See Reserved Number Course.

**Certificate Program (Undergraduate)**—A specified interdisciplinary program of study leading to an official certificate and notation on the transcript. A certificate program draws from more than one department, rather than a single department (as with most minors). The certificate program must be taken in conjunction with a formal degree program.

**Course**—An organized unit of instruction or research. Types include lectures, recitations, laboratories, discussions, internships, clerkships, reading and conference, independent study, and other categories of courses.

**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—in and out of class—of work. For example, each hour of class lecture is generally expected to require two hours of work out of class. One credit hour would be given for a lecture course that met for one 50 minute period each week. One credit is typically given for a laboratory course that meets for 2 to 3 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.

**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.

**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 which included the following: (1) institutional general education requirements (i.e., Baccalaureate Core); (2) major area of study requirements; and (3) may include minor, supporting area, or elective requirements. The conditions and conferral of the award are governed by the faculty and ratified by the Oregon State Board of Higher Education.

**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. The conditions and conferral of the award are governed by the faculty and ratified by the Oregon State Board of Higher Education.

**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 (example, D.V.M. in Veterinary Medicine). The conditions and conferral of the award are governed by the faculty and ratified by the Oregon State Board of Higher Education.

**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. The conditions and conferral of the award are governed by the faculty and ratified by the Oregon State Board of Higher Education.

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

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

**Grade Point Average**—Total number of grade points received for grades divided by total number of credits attempted. A 4 point grade scale is used at OSU.

**Graduate Area of Concentration**—Subdivision of a major or minor in which a strong graduate program is available. Areas of concentration may be shown on the program of study but are not listed on the transcript.

**Graduate Major**—Area of specialization, approved by the State Board of Higher Education, in which students may qualify for a graduate degree.

**Graduate Minor**—A graduate academic area that clearly supports the major.

**Lower Division Courses**—Course offerings at a level of preparation usually associated with freshmen and sophomore students.

**Interdisciplinary**—A term that refers to a course or program that integrates concepts, knowledge, or faculty from several fields of study.

**Major (Undergraduate)**—The undergraduate major is an extensive program of study in a designated subject area. Majors require at least 36 credits, 24 of which must be in upper divison coures.

**Minor (Undergraduate)**—A secondary field of specialized study which 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 in upper division courses.

**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**—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 Course

**402/502/602:** Independent Study Course

**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**—Courses designed to give the student fundamental mathematical, communication, and fitness competence.

**Synthesis Courses**—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 "quarter"). Summer term is generally an 8- or 11-week session during the summer.

**Upper Division Courses**—Course offerings at a level of preparation usually associated with junior or senior students.

**Waive**—This term refers to decisions of advisers 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 adviser.

**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.

## READING A COURSE DESCRIPTION

The elements of a typical course description found under department headings in the colleges that follow are illustrated by the political science course below:

**PS 422H/PS 522. INTERNATIONAL LAW (3).** Theories and historical development of international law, problems in development classic cases. PREREQ: PS 101, PS 202, or PS 205 or PS 206. CROSSLISTED as ANTH 422/ANTH 522. (NC)

**Designator: (PS)** an abbreviation representing the department offering the course. PS indicates that the course is offered through the Department of Political Science.

**Number: (422)** indicates the level of the course; this is an upper division, undergraduate course. 400-level courses (PS 422) are offered for undergraduate credit, while the 500-level course (PS 522) is offered at the graduate level. (See Course Numbering System.)

**Letter Suffix: (PS 422H)** When a letter follows the course number, the letter indicates that there is something special about the course that students should know. For instance, PS 422H would be an honors course.

**Title:** (INTERNATIONAL LAW)

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

**Graduate Credit:** All courses numbered at the 500 or 600 level may be taken for graduate credit. Courses numbered 500-599 are generally taken by masters candidates and courses numbered 600-699 are taken by doctoral candidates.

**Course Description: (Theories and historical development of classic cases.)** A brief description of what will be taught in the course.

**PREREQ: (PS 101, PS 102, or PS 205 or PS 206)** the background necessary for successful performance in a course. Students may attempt a course without having prerequisites if they have obtained the consent of the instructor to do so. If consent is not obtained, then students who have not fulfilled published prerequisites may be disenrolled from the course during the first week of classes. Occasionally a course will have a COREQ, usually indicating a course to be taken simultaneously with the course described. REQ: a requirement for that course.

**CROSSLISTED:** (CROSSLISTED as ANTH 422/ANTH 522) means the same course is also offered through another department; course numbers, titles, descriptions, and prerequisites are the same for both courses.

**DUAL LISTING:** (PS 422A/PS 522) means the course is offered at both the upper division and graduate level. Students wanting undergraduate credit take the course at the 4xx number, and students wanting graduate credit take the course at the 5xx number. Students taking the course for graduate credit will be assigned extra work and/or have their work graded against a higher standard.

**(NC):** Area study requirement for students majoring in the College of Liberal Arts. Four symbols are used in the college to indicate courses which may be used to fulfill requirements in each of the areas:

**(FA)** Fine arts

**(H)** Humanities

**(NC)** Non-western culture

**(SS)** Social studies

## COURSE NUMBERING SYSTEM

Throughout the State System of Higher Education, courses follow this basic course numbering system:

**0-99.** Noncredit or credit courses of a remedial, terminal, or semiprofessional nature not applicable toward degree requirements.

**100-299.** Lower division courses.

**300-499.** Upper division courses.

**500-599.** Graduate courses offered primarily in support of master's degree level courses but which are also available for doctoral level credit. Undergraduates of superior scholastic achievement may be admitted on approval of instructor and department head concerned, and they 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 which may be applied toward a professional degree (such as D.V.M.) but not toward other graduate degrees (such as Ph.D.).

**800-899.** In-service courses aimed at practicing professionals in the discipline. These courses may not be applied to graduate nor professional degree programs.

# Admission to Oregon State

*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 and admission applications for undergraduate, postbaccalaureate, non-degree, and graduate students are available from the Office of Admission & Orientation.
Location: 104 Kerr Administration
Telephone: (541) 737-4411
Toll free: (800) 291-4192
FAX: (541) 737-2482
World Wide Web: http://osu.orst.edu (select "Prospective Students")
Code for SAT, ACT, or AP reports: 4586

## FRESHMAN ADMISSION

### WHEN TO APPLY

The application and fee must be *postmarked* by the respective deadline.

| TERM OF ENTRY | APPLICATION DEADLINE |
|---|---|
| Summer 1998 | March 1, 1998 |
| Fall 1998 | March 1, 1998 |
| Winter 1999 | December 1, 1998 |
| Spring 1999 | March 1, 1999 |
| Summer 1999 | March 1, 1999 |
| Fall 1999 | March 1, 1999 |

**These deadlines are subject to change without notice as circumstances demand.**

### THE ADMISSION PROCESS

Take your completed application and the $50 **nonrefundable** application fee for those applying for Summer Session '98 and beyond to your high school counselor. Ask the counselor to attach an official high school record and mail everything to the Office of Admission & Orientation in the envelope provided. Be sure to affix sufficient postage.

You may also apply via the World Wide Web. OSU's home page can be found at **osu.orst.edu.** To access admissions information, select "Prospective Students." To complete an online admission application, "Admissions Online."

Telefax (FAX) credentials are considered official if faxed directly from the high school with a cover page. Our FAX number is (541) 737-2482. Portfolios, video tapes, essays and personal interviews are not required of applicants.

### EVALUATION PROCESS

Admission to Oregon State University is selective and competitive. Successful completion of all minimum admission requirements guarantees admission to the University.

All course work taken from the 9th grade through high school graduation is used in the GPA calculation.

Complete applications are first reviewed to confirm successful completion of the 14 high school subject requirements. Then we check for SAT I or ACT scores. For those who qualify for admission on GPA & subject requirements, there is no minimum SAT I or ACT score requirement. The *most recently* reported test scores are on the Letter of Admission. Applicants are notified of their admission status on a rolling basis.

### SELECTION PROCESS

OSU gives primary consideration to the quality and quantity of courses completed in high school. OSU expects that the most rigorous or advanced level of course work available will be pursued. At least three solid subjects (such as English, science, mathematics, foreign languages, etc.) should be scheduled for the senior year.

### MINIMUM REQUIREMENTS FOR ADMISSION CONSIDERATION

#### Grade-Point Average

A GPA of at least 3.00 guarantees admission when other requirements are met.

**Alternative to GPA:** Applicants who do not meet the minimum high school GPA requirement will be considered on a combination of high school GPA, strength of high school courses taken, and SAT I/ACT test scores.

#### College Preparatory Subject Requirements

Entering freshmen must complete the following subjects **by high school graduation:**

**English (4 units)**
4 years study of English language, literature, speaking, listening, and writing, with emphasis on and frequent practice in writing expository prose

**Mathematics (3 units)**
1 year algebra
2 additional years of college preparatory mathematics. **Regardless of the pattern of math courses or the number of years of math taken, the math course work must culminate at the algebra II (or equivalent) or higher level to meet the math requirement**

**Social Studies (3 units)**
1 year of U.S. history
1 year of global studies (world history, contemporary world cultures, geography, modern problems, etc.)
1 years of social studies elective (government, economics, religion, psychology, etc.)

**Science (2 units)**
**1 year each** of two different preparatory sciences such as biology, chemistry, physics, or earth and physical science. One year laboratory experience recommended.

**Foreign Language (2 units)**
May be met by:
- completing two years of the same high school-level foreign language,
- earning a grade of C- or higher in the third year of high school-level foreign language,
- completing two terms of a college-level foreign language with a grade of C- or better, or
- earning a satisfactory score on an approved assessment of foreign language proficiency (contact the Office of Admission & Orientation for details).

Note: Students who graduated from high school prior to 1997 may replace the foreign language requirement with 2 units of other college preparatory courses, including advanced-level vocational-technical courses.

**ROBERT BONTRAGER**
*Director of Admissions & Orientation*

**ROBIN BROWN**
*Associate Director*

**JAMES DAY**
*Associate Director*

**JENNIFER KUZEPPA**
*Associate Director*

**MICHELE SANDLIN**
*Associate Director*

**LUIS JUAREZ**
*Assistant Director*

**STEVE MASSOTT**
*Assistant Director*

**KRISTI MAY**
*Asssistant Director*

**WILLIAM SMART**
*Assistant Director*

**PAULETTE LAIL**
*Program Coordinator*

**AIMEE THOMPSON**
*Admission Counselor*

**BLAKE VAWTER**
*Admission Counselor*

#### ALTERNATIVES TO SUBJECT REQUIREMENTS

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

1. Earning a 1410 (recentered) total score on three SAT II Subject Tests (English, Math level I or II, and a third test of choice)

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 I) 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.

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

#### High School Graduation

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

**Graduates of nonstandard or unaccredited high schools** or home schooled students will be eligible for admission by achieving:

1. A minimum composite score of 1070 (recentered) on the SAT I or 23 on the ACT-Enhanced

AND

2. A total score of 1410 (recentered) on three SAT II Subject Tests (English, Math level I or II, and a third test of choice).

#### GED STUDENTS

Students who have not earned a high school diploma and are applying for admission on the basis of GED scores qualify by achieving:

1. A minimum average score of 58

AND

2. A minimum score of 40 on each of the five GED tests.

#### OLDER STUDENTS

Applicants who graduated from high school prior to 1987 must present SAT, SAT-I, or ACT scores and meet the minimum grade-point average requirement for entering freshman. The high school subject requirements are waived.

#### PETITION FOR ADMISSION BY EXCEPTION

Students who believe they may not meet the admission requirements are encouraged to submit a handwritten essay explaining their circumstances with their application. Letters of recommendation are also helpful. Students not approved for admission will be provided with information about the petition procedure. Deadlines are in effect each term for appeals. For additional information, write or call the OSU Office of Admission & Orientation.

#### ADVANCED STANDING CREDIT

Oregon State University awards ungraded credit for achievement on certain College Board Advanced Placement (AP) examinations. Information pertaining to specific AP credit policies are available in high school counseling centers or may be obtained from the OSU Office of Admission & Orientation. OSU's college code is 4586 for those wishing to have their scores sent. Advanced standing credit may also be granted for scores of 5 or higher on the International Baccalaureate (IB) Higher Level examinations (not subsidiary exams). Official IB certificates are required in order for credit to be awarded.


## TRANSFER ADMISSION

#### WHEN TO APPLY

The application and $50 fee must be *postmarked* by the deadline and applicants *must be fully eligible* for consideration by the deadline. This requires that official transcripts be received at OSU from each college or university attended.

| Term of Entry | Application Deadline |
|---|---|
| Summer 1998 | May 1, 1998 |
| Fall 1998 | MAY 1, 1998 |
| Winter 1999 | November 1, 1999 |
| Spring 1999 | March 1, 1999 |
| Summer 1999 | May 1, 1999 |
| Fall 1999 | May 1, 1999 |

**These deadlines are subject to change without notice as circumstances demand.**

#### CRITERIA FOR GUARANTEED ADMISSION

**U.S. Citizens and Permanent Residents:**

- 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 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.
- Minimum cumulative GPA of 2.25
  College-level, transferable credits only are counted in those accepted in the GPA computation (vocational-technical course grades are not included)
- Grade of C- or better earned in the following courses:
  a. College-level writing beginning with WR 121 (English Composition) or equivalent
  b. Mathematics course with course content of College Algebra for which the prerequisite is Intermediate Algebra
  c. 2 terms of the same of foreign language in college will be required of those high school graduates of the class of 1997 who did not complete 2 units (years) of foreign language while in high school
- Eligibility to return to most recent college or university attended
- 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 of 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 the school with a cover page. Our FAX number is (541) 737-2482.

OSU accepts in transfer all 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 by the Office of Admission & Orientation after the official letter of admission.

Persons transferring to OSU from a community or junior college may have up to 108 term credits (72 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.

OSU's academic regulations on the acceptance of vocational or technical courses. Students with such courses should contact the Office of Admission & Orientation.

#### PETITION FOR ADMISSION BY EXCEPTION

Students who do not meet admission requirements may petition for admission by exception. For further information, write or call the Office of Admission & Orientation. Deadlines for appeals are in effect for each quarter.

#### Acceptance of credit from a two-year institution (OSU Academic Regulation 2):

Proposed Change in Academic Regulation 2.

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 in an Oregon or other accredited community college up to 108 lower-division credits. A student who has completed 108 lower-division credits must obtain approval of a petition in advance before completing additional lower division work at a two-year institution if credit for such additional work is to count toward graduation. Transfer credits and grades are not used in calculating the OSU cumulative GPA. Students who hold the Associate of Arts or other transfer degrees or who have 90 or more credits accepted in transfer will be granted junior standing. 1 Students who have received Associate of Arts degrees from Oregon community colleges will be considered to have met the Perspectives and Skills (except WIC) areas of the Baccalaureate Core. They must complete the upper division Synthesis areas of the Core. Students transferring from approved institutions of higher education ordinarily will be given Baccalaureate Core credit in the Perspectives and Skills areas on a course-by-course basis for work that is judged to be equivalent in content. They must complete upper division Synthesis courses.

b. Transfer of Vocational-Technical Course Credits: A maximum of 108 quarter credit hours (72 semester credit hours) may be transferred from an accredited two-year or community college to OSU. A maximum of 12 quarter credit hours (8 semester credit hours) of vocational-technical course work applicable in an associates 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 108 quarter credit total.

c. Transfer of Equivalent Vocational-Technical Course Credits: Lower division credit for specific vocational-technical community college courses may be awarded for equivalent OSU course work when equivalency is validated by the OSU department offering the equivalent course work. **This may be above the 12 quarter credit hours of general electives (graded as Pass) allowed when a student** is **admitted to OSU**. Community college course work is not equivalent to upper division OSU course work. Equivalent credit will be awarded only upon the recommendation of the appropriate department and college, and approval by the Academic Requirements Committee. If the vocational-technical community college course and the equivalent OSU course vary in credits, the number of course credits that may be granted will be the lesser of the two. These course credits will count as part of the 108 credits defined in paragraph 2a above. OSU departments offering courses which have been identified as equivalent to designated community college vocational-technical courses shall review the equivalency annually and forward a dated list of the equivalent community college courses to the Academic Requirements Committee.

### ADMISSION AS A NON-DEGREE STUDENT

Non-degree enrollment status is designed for those students who wish to take courses but do not wish to pursue a degree or a specific post-baccalaureate credential. In some instances non-degree students may not meet regular admission requirements. Non-degree students are part-time students who are expected to enroll in no more than eight (8) credits a term. If you wish to enroll for more than 8 credits a term, you need to apply for regular admission.

Non-degree enrollment status requires no formal admission process, has no requirements for entrance and no admission application fee is charged. Requests are made at the Registrar's Office or by calling the Registrar's Office at 541737-4331*. Approval is granted for a specific term. If you are unable to attend and wish to enroll later, please contact the Registrar's Office.

Non-degree students are given grades, reviewed according to the University standards of good academic progress, and provided with academic records.

Non-degree students who wish to seek full admission and pursue a degree may do so by filing either the undergraduate application for admission or graduate application for admission. In either case the admission application fee is required. Successful enrollment as a non-degree student does not guarantee regular admission. Credits earned while enrolled under non-degree undergraduate status will be applied to your record, if applicable to a degree, upon formal admission.

Non-degree Graduate students please note: If during the course of your studies you decide to seek admission to a specific degree program, please be aware that any credits taken as a non-degree student may or may not be applicable for that degree, depending upon a variety of factors, your chosen program and the policies of the Graduate School. Graduate students are further advised that at least 30 graduate credits must be completed after full admission as a degree seeking graduate student, regardless of the number of credits previously earned while in non-degree status. Close communication with the Graduate School is encouraged.

Non-degree students follow the registration procedures and policies as outlined in the Schedule of Classes. The Schedule of Classes is available at the Registrar's Office, 102 Kerr Administration or may be accessed through the WEB (http://osu.orst.edu). Registering students are expected to obtain a Student Identification card, through the ID Center in the Memorial Union.

Tuition and fees for non-degree students enrolled in less 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 tuition and fees be assessed at the same rates as for regular students and full admission as a regular student.

### ADMISSION FOR INTERNATIONAL UNDERGRADUATES AS NON-DEGREE STUDENTS

International students must apply for non-degree admission through the Office of Admission and Orientation. The non-degree international undergraduate student category is designed to aid the enrollment of a student who at the time of application is not planning to complete degree requirements at OSU, but is qualified for regular admission. Based on your VISA status you may be required to maintain a full-time course load of 12 quarter credits or more while attending OSU (which may include ELI courses). Please see Admission of International Students for further information on admission requirements.

### 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 adviser.

## Admission of Postbaccalaureate Students

### OSU Baccalaureate Students

Students whose baccalaureate degrees were from OSU may enroll in the "Alumni College" by reactivating their records for additional degrees and credentials by reporting to the Registrar's Office. Statuses are reactivated to the academic programs under which students were last enrolled. Students will then need to seek permission for the new credentials by using the Declaration of Subsequent Credentials Form.

If the student is seeking a credential only, the course work will be reflected on the non-degree academic level. After the student has completed their credential, the course work will be moved to the undergraduate academic level.

If the student is seeking a degree, the course work will be reflected on the post bacc academic level.

Opportunities available - subsequent degrees, majors, options, minors & certificates.

### Non-OSU Baccalaureate Students

Students whose baccalaureate degrees were not from OSU may apply for post-baccalaureate admission through the Office of Admission and orientation. Applicants for consideration must meet the same application deadline and GPA requirements as transfers. The GPA is computed on the first baccalaureate degree plus any subsequent credit earned. Applicants must include a statement of objectives of 150-200 words with their application. An application fee will be charged. Academic departments may impose additional requirements.

The course work of admitted students will be reflected on the post-baccalaureate academic level.

Opportunities available - subsequent degree, minor, certificate.

## 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 School for further information on advanced degree, postbaccalaureate, and nondegree, graduate student status. Also see Graduate Admission Procedure.

## Admission of International Students

An international student is admitted according to standards established for each country by the admissions committee. International applicants must (a) be qualified to enter a university or graduate school in his or her own country; (b) have achieved a superior scholastic record; and (c) have a score of 550 or more on the Test of English as a Foreign Language (TOEFL).

Conditional admission may be granted to undergraduate students with TOEFL scores from 450 to 549, or to graduate students with scores from 500 to 549. Such conditional admission requires (a) on-campus testing of English language proficiency prior to enrollment, (b) compliance with a specified plan for English and academic course work during each quarter until such time as the student qualifies for nonconditional admission. Appeals from the specified plan are made to the head adviser at the undergraduate level and to the Graduate School at the graduate level.

Exceptions to the English proficiency test requirement are: (a) applicants from English speaking countries such as Canada, United Kingdom, etc., (b) graduate applicants who have finished a previous college degree in an English speaking country, (c) those who have completed English course work or taken other tests deemed to be equivalent to the required minimum score on the TOEFL.

A student with less than a four-year bachelor's degree, or with a diploma, certificate, or title not accepted by OSU as equivalent to a bachelor's degree, may apply for undergraduate admission but may not enter the Graduate School.

All records in a foreign language must include the originals accompanied by a certified English translation. A complete description of all schooling from primary or elementary school to present level of training is needed to permit better understanding of academic preparation. A GPA of 2.25 (undergraduate) and grades of "A" or "B" (graduate) are necessary on work accepted in transfer from an American college or university.

## 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.

## Admission from Voc-Tec or Institutions with Accreditation Not Recognized by OSU

Admission from an unaccredited or vocational-technical institution is determined by the appropriate admissions committee. Students admitted from voc-tec or unaccredited colleges will be admitted based on high school freshman admission requirements. Please contact the Office of Admission and Orientation.

## Credit for Military Experience

Veterans of the U.S. Armed Forces are granted physical education and/or ROTC credit but do not receive college credit for service schooling, USAFI tests, or courses. Application should be made to the veterans' clerk (Registrar's Office) during the first term of attendance at Oregon State University.

## Placement Examinations

*High school seniors* planning to enter OSU must take the SAT I or the ACT. (See Admission.) These tests provide academic advisers with valuable information about students' educational development, abilities, and aptitudes.

New freshmen are required to take the Math Placement Test. Also, 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 contact the OSU Department of Foreign Languages and Literatures at 541-737-2146.

Other placement examinations may be required in certain majors.

## Registration Procedures

Once admitted to Oregon State University, students are eligible for course registration. Registration periods, with published dates, are set aside each term. Complete registration instructions, procedures, and deadlines are detailed in the *Schedule of Classes*, available on campus. A student is officially registered and eligible to attend classes only when all procedures have been completed, including payment of tuition and fees.

In addition to the basic information regarding registration, the *Schedule of Classes* is an essential source document to the student for the academic calendar, fee schedule, academic and other student regulations and procedures, and final examination schedule, as well as for the listing of courses offered each term.

## Reenrollment

Undergraduate students who wish to reenroll in the University after an absence may do so providing they were eligible to reenroll their last term of attendance. Students who have been absent *4 or more terms*, not including summer terms, should contact the Registrar's Office to reactivate their records. All others may proceed with registration following the registration instructions in the current *Schedule of Classes*.

Reenrolling students who have attended another college or university since their last term at OSU are required to report that enrollment at the time of reentry. Official transcripts must be forwarded to the Office of the Registrar. Students with transfer work less than 2.0 GPA are reminded of the graduation requirements which stipulates that an overall 2.0 GPA is needed in all college work.

All reenrolling students are reminded of their responsibility to update any outdated records information. Current addresses will be needed. Contact the Office of the Registrar for changes to records.

## University Graduation Requirements

Current graduation requirements are printed each year in the "Academic Regulations and Procedures" section of the *Schedule of Classes*, 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 *Schedule of Classes* each year for the most up-to-date information about OSU requirements and procedures.

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

## The Baccalaureate Experience

Oregon State University is a Land Grant University with a mission that includes a strong commitment to undergraduate education. Central to this commitment is the establishment of an intellectual environment that encourages the formation of the essential characteristics of the educated person—curiosity, rigorous observation, critical thinking, tolerant understanding, and a commitment to lifelong learning. The diverse academic programs in each of the distinctive colleges are unified by common expectations for the achievement of the baccalaureate degree.

Graduates with a baccalaureate degree from Oregon State University should be able not only to appreciate the intrinsic value of human knowledge, but also to use it to engage in both scientific and philosophical inquiry. Critical thinking and problem solving, integrating knowledge from a wide range of fields, are essential components of the degree. Oregon State University graduates should also possess intellectual curiosity, understanding of diverse cultural heritages, and a proper regard for different values, ideas, and cultures.

The baccalaureate degree includes:

a) Baccalaureate Core
b) an in-depth study in at least one major; and
c) individual elective courses.

Minors are available in many areas and are required in certain programs. Students should check departmental requirements.

## The Baccalaureate Core

The Baccalaureate Core emphasizes writing, critical thinking, cultural diversity, the arts, sciences, literature, lifelong fitness, and global awareness. Included are 48 credits plus a writing intensive course in the major. The course *categories* are listed below. ***Individual courses are listed later in this section.***

### Baccalaureate Core Requirements

#### Skills (15)

*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.*

Writing I (3)
Writing II (3)
Writing III/Speech (3)
Mathematics: MTH 105 or higher level mathematics (3)
Fitness (3)
WIC (Writing Intensive Course, upper division, included in credits for major)

#### Perspectives (27)

*No more than two courses from any one department may be used to satisfy the Perspectives area of the core.*

Physical Science (including lab) (4)
Biological Science (including lab) (4)
Plus choice of additional physical or biological science (including lab)
Western Culture (3)
Cultural Diversity (3)
Literature and the Arts (3)
Social Processes and Institutions (3)
Difference, Power, and Discrimination (3)

#### Synthesis (Upper Division) (6)

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

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

#### Total (48) + WIC

## 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.

## Total Credits

A baccalaureate degree program with one or more majors must be at least 180 total credits. Many baccalaureate degree programs require more credits. Departments should be contacted for the most up-to-date information.

## Upper Division Courses

A minimum of 60 credits of the total number (must be in courses numbered 300 and/or 400). (Courses numbered 500 or 600 may also be counted in the 60-credit upper division requirement, but they may not simultaneously be counted for graduate degree requirements.) At least 24 upper division credits must be taken in the major.

## Grade Point Average (GPA)

Students must attain a minimum cumulative OSU GPA of 2.00.

## 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.

a. Academic Warning: Students with a term GPA below 2.0 will be placed on Academic Warning.
b. Academic Probation: Students who have completed two or more terms 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. 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.

## Academic Residence Requirement

Candidates for undergraduate degrees must earn their last 45 credits in course work offered by OSU or 45 of the last 60 credits if authorized by the student's dean.

A minimum of 15 credits of upper division credits must be taken in the student's major from courses regularly listed in the OSU *General Catalog* or *Schedule of Classes*.

Credits earned through certain designated programs such as a foreign study program sponsored by the Oregon University System or an OSU off-campus degree program (approved by OUS) may be used in fulfilling the academic residence requirement. Credits earned by special examination may not be used to meet the residence requirement. A student must be enrolled at OSU in regular standing, not as a "special admit," before undertaking academic work to satisfy academic residence. For more information, students should consult their advisers.

## Degree Candidates

To become a candidate for a degree a student must have achieved senior standing and must make formal application for the degree. The student must file an application with the registrar two terms preceding the term in which he or she expects to complete requirements for a degree.

## Reenrolling Students

Reenrolling 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. Reenrolling students are also reminded that individual retention and reenrollment standards of specific colleges may be in effect.

### TRANSFER CREDIT FOR BACCALAUREATE CORE (GENERAL EDUCATION) COURSES

Decisions on transfer courses meeting specific Baccalaureate Core or 1988-90 General Education requirements will be made by the Office of Admission and Orientation in consultation with the Faculty Senate and Undergraduate Academic Programs. Some requirements may be met by advanced placement. For more information, contact the Office of Admission and Orientation. Articulation tables for Baccalaureate Core courses can be found on the Web at http://osu.orst.edu/dept/admindb/arttable/scr1140-arttab.htm.

## APPROVED BACCALAUREATE CORE COURSES

The Oregon State University Baccalaureate Core will continually be enriched. It emphasizes creative 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 the Writing Intensive Course (WIC)

## SKILLS COURSES (15)

**Writing I (3)**
WR 121 English Composition (3)

**Writing II (3)**
HC 199 Honors Writing (3)
LS 201 Writing for Media (3)
PHL 121 Reasoning and Writing (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 (3)
WR 327 Technical Writing (3)
WR 330 Understanding Grammar (3)
WR 341 Poetry Writing (3)

**Writing III (3)**
Any Writing II courses listed above not taken to satisfy Writing II requirement or,
COMM 111 Public Speaking (3)
COMM 114 Argument and Crit Discourse (3)
COMM 114H. Argument and Crit Discourse (3)
COMM 218 Interpersonal Communication (3)

**Mathematics (3)**
MTH 105 Introduction to Contemporary Mathematics (or higher level math) (3)

**Fitness (3)**
HHP 231 Lifetime Fitness for Health (3)

**Plus WIC course (Writing Intensive Course, upper division, included in credits for major)**

## PERSPECTIVES COURSES (27)

No more than two courses from any one department may be used by a student to satisfy the *Perspectives* category of the core.

**Physical Science (with lab) (4)**
CH 122, CH 123 General Chemistry (5,5)
CH 201, CH 202 Chemistry for Engineering Majors (3,3)
CH 221, 222, 223 General Chemistry (5,5,5)
CH 224, CH 225, CH 226 Honors General Chemistry (5,5,5)
CH 224H, CH 225H, CH 226H. Honors General Chemistry (5,5,5)
GEO 101 The Solid Earth (4)
GEO 102 The Surface of the Earth (4)
GEO 103 Exploring the Deep: Geog of World's Oceans (4)
GEO 103H Exploring the Deep: Geog of World's Oceans (4)
GEO 201 Earth System Science (4)
GEO 201H. Earth System Science (4)
GEO 202 Physical Geology (4)
GEO 202H. Physical Geology(4)
GEO 203 Evolution of Planet Earth (4)
GEO 203H. Evolution of Planet Earth (4)
OC 103 Exploring the Deep: Geog of World Oceanography (4)
OC 103H. Exploring the Deep: Geog of World Oceanography (4)
PH 104 Descriptive Astronomy (4)
PH 106 Perspectives in Physics (4)
PH 201, PH 202, PH 203 General Physics (5,5,5)
PH 205 Solar System Astronomy (4)
PH 206 Stars and Stellar Evolution (4)
PH 207 Galaxies, Quasars, and Cosmology (4)
PH 211, PH 212, PH 213 General Physics with Calculus (4,4,4)

**Biological Science (with lab) (4)**
ANS 121 Introduction to Animal Sciences (4)
BB 351 Elementary Biochemistry (5)
BI 101, BI 102, BI 103. General Biology (4,4,4)
BI 211, BI 212, BI 213 Prin of Biology (4,4,4)
BI 211H, BI 212H, BI 213H. Prin of Biology (4,4,4)
BOT 101 Botany: A Human Concern (4)
FOR 240 Forest Biology (4)
MB 230 Introductory Microbiology (4)
Plus choice of second course in Physical or Biological Sciences (with lab)

**Western Culture (3)**
ANTH 312. Peoples of the World-Europe (3)
ART 204, ART 205, ART 206 Introduction to Art History—Western (3,3,3)
ECON 319 Economic History & Development of the U.S. (4)
ENG 110 Introduction to Film Studies (3)
ENG 125 Film Comedy (3)
ENG 201, ENG 202, ENG 203 Shakespeare (3,3,3)
ENG 204, ENG 205, ENG 206 Survey of English Literature (3,3,3)
ENG 205H. Survey of English Literature (3)
ENG 207, ENG 208, ENG 209 Literature of Western Civilization (3,3,3)
ENG 207H. Literature of Western Civilization (3)
ENG 215 Classical Mythology (3)
ENG 253, ENG 254, ENG 255 Survey of American Literature (3,3,3)
ENG 317, ENG 318, ENG 319 The American Novel (3,3,3)
ENG 319H. The American Novel (3)
FR 331, FR 332, FR 333 French Culture and Society Since the Revolution (3,3,3)
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, GER 332 German Culture (3,3)
HST 101, HST 102, HST 103 History of Western Civilization (3,3,3)
HST 101H, HST 102H, HST 103H. History of Western Civilization (3,3,3)
HST 201, HST 202, HST 203 History of the United States (3,3,3)
HST 201H, HST 202H, HST 203H. History of the United States (3,3,3)
MUS 105 Sound and Silence (3)
PHL 150 Great Ideas (3)
PHL 201 Introduction to Philosophy (4)
PHL 205 Ethics (4)
PHL 205H. Ethics (4)
PHL 207 Political Philosophy (4)
PHL 220 World Views and Values in the Bible (4)
PHL 230 Christianity & Western Culture (4)
PHL 301, PHL 302, PHL 303 History of Western Philosophy (4,4,4)
PHL 360 Philosophy and the Arts (4)
PHL 365 Law in Philosophical Perspective (4)
PS 206 Introduction to Political Thought (4)
RUS 231, RUS 232, RUS 233 Russian Culture (3,3,3)
SPAN 331, SPAN 332, The Cultures of Spain and Portugal (3,3)
SPAN 336, SPAN 337, Latin American Culture (3,3)
TCS 200 Twentieth Century Realities: The U.S. (3)
TCS 201 Twentieth Century Dreams: The U.S. (3)

**Cultural Diversity (3)**
ANTH 210 Comparative Cultures (3)
ANTH 210H. Comparative Cultures (3)
ANTH 311, ANTH 313, ANTH 314, ANTH 315, ANTH 316, ANTH 317, ANTH 318, ANTH 319 Peoples of the World (3,3,3,3,3,3,3,3)
ART 207 Indigenous Art of the Americas (3)
CHN 331, CHN 332, CHN 333 Chinese Culture (3,3,3)
ENG 210, ENG 211, ENG 212, ENG 213 Lit of the World (3,3,3,3)
ENG 360 Native American Literature (3)
ES 101 Introduction to Ethnic Studies (3)
ES 211 Survey of Chicano/a-Latino/a American Studies (3)
ES 231 Asian American Studies I: First & Second Generations (3)
ES 241 Survey of American Indian/Alaskan Natives to 1778 (3)
ES 242 Survey of American Indian/Alaskan Natives 1778-1871 (3)
ES 243 Survey of American Indian/Alaskan Natives 1871 to present (3)
GEO 105 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)
HST 320 Ancient Near East (3)
HST 350, HST 351 Modern Latin America (3,3)
HST 381, HST 382 History of Africa (3,3)
HST 387, HST 388 Islamic Civilization (3,3)
HST 391, HST 392 East Asia (3,3)
HST 485 Politics and Religion in the Modern Middle East (3)

JPN 331, JPN 332, JPN 333 Japanese Culture (3,3,3)
MUS 108 Music Cultures of the World (3)
NFM 216 Food in Non-Western Culture (3)
PHL 160 Quests for Meaning: World Religions (4)
PHL 311, PHL 312, PHL 313 History of Non-Western Religious Ideas (4,4,4)
PHL 315 PreColumbian Philosophy (4)
PHL 371 Philosophies of China (4)
RUS 231, RUS 232, RUS 233 Russian Culture (3,3,3)

**Literature and the Arts (3)**
ART 101 Introduction to the Visual Arts (4)
ART 204, ART 205, ART 206 Intro to Art History—Western (3,3,3)
ART 260 Developments in Photography (3)
ENG 104, ENG 105, ENG 106 Introduction to Literature (3,3,3)
ENG 104H. Introduction to Literature (3)
ENG 110 Introduction to Film Studies (3)
ENG 201, ENG 202, ENG 203 Shakespeare (3,3,3)
ENG 204, ENG 205, ENG 206 Survey of English Literature (3,3,3)
ENG 205H. Survey of English Literature (3)
ENG 207, ENG 208, ENG 209 Literature of Western Civilization (3,3,3)
ENG 207H. Literature of Western Civilization (3)
ENG 210, ENG 211, ENG 212, ENG 213 Literature of the World (3,3,3,3)
ENG 215 Classical Mythology (3)
ENG 221 African American Literature (3)
ENG 245 The New American Cinema (3)
ENG 253, ENG 254, ENG 255 Survey of American Literature (3,3,3)
ENG 260 Literature of American Minorities (3)
ENG 265 Films for the Future (3)
ENG 275 The Bible as Literature (3)
ENG 275H. The Bible as Literature (3)
ENG 317, ENG 318, ENG 319 The American Novel (3,3,3)
ENG 319H. The American Novel (3)
ENG 362 Women's Voices in American Literature (3)
ENG 374 Modern Short Story (3)
ES 234 Introduction to Asian American Literature (3)
MUS 101 Music Appreciation I Survey (3)
MUS 102 Music Appreciation II (3)
MUS 103 Music Appreciation III Great Composers (3)
MUS 107 Folk Music of North America (3)
MUS 121 Literature and Materials of Music (3)
RUS 232 Russian Culture (3)
TA 147 Introduction to Theatre (3)
TA 330, TA 331, TA 332 History of the Theatre (3,3,3)

**Social Processes and Institutions (3)**
ANTH 110 Intro to Cultural Anthropology (3)
AREC 250 Intro to Environ Econ & Policy (3)
ECON 201 Intro to Microeconomics (4)
ECON 201H.. Intro to Microeconomics (4)
ECON 202 Intro to Macroeconomics (4)
ECON 202H. Intro to Macroeconomics (4)
H 225 Social and Individual Health Determinants (3)
HDFS 240 Human Sexuality (3)
HOEC 201 Individual and Family Development (3)
PS 200 Introduction to Political Science (4)
PS 201 Introduction to United States Government and Politics (4)
PS 201H. Introduction to United States Government and Politics (4)
PSY 201, PSY 202 General Psychology (3,3)
SOC 204 Introduction to Sociology (3)
SOC 205 Institutions and Social Change (3)
WS 223 Women: Self and Society (3)
WS 224 Women: Personal and Social Change (3)

**Difference, Power, and Discrimination (3)**
AG 301 Ecosystem Science of Pacific NW Indians (3)
AIHM 270 Fashion and Society (4)
ANTH 345 Biological & Cultural Construction of Race (3)
ANTH 451 Sociolinguistics (3)
COMM 269 Social Effects of Offensive Communication (3)
ECON 383 The Economics of Discrimination (4)
ENG 220 Topics in Difference, Power, and Discrimination (3)
ENG 260 Literature of American Minorities (3)
ENG 420 Studies in Difference, Power, and Discrimination (3)
ES 212 Survey of Chicano/a-Latino/a Studies II (3)
FW 240 Multicultural Perspectives in Natural Resources (3)
HDFS 443 U.S. Families: Gender, Race, and Class (3)
HST 201, HST 202, HST 203 History of the United States (3,3,3)
HST 201H, HST 202H, HST 203H. History of the United States (3,3,3)
PHL 280 Ethics of Diversity (4)
PHL 280H. Ethics of Diversity (4)
PHL 380 Mirrors of the Self: The Body (3)
PS 363 Gender and Race in American Political Thought (4)
PS 363H. Gender and Race in American Political Thought (4)
PS 375 The Civil Rights Movement & Policies (4)
SOC 206 Social Problems and Issues (3)
SOC 312 Sociology of the Family (3)
SOC 360 Population Trends and Policy (3)
SOC 426 Social Inequality (3)
SOC 430 Gender and Society (3)
TA 360 Multicultural American Theatre (3)
TCS 200 Twentieth Century Realities: The U.S. (3)
WS 223 Women: Self and Society (3)
WS 414 System of Oppression in Women's Lives (3)
WS 499 Topics (3)
Z 346 Sociobiology and Power (3)

## SYNTHESIS COURSES (6)

The two courses used to fulfill the *Synthesis* requirement may not be in the same department.

**Contemporary Global Issues (3)**
ANTH 380 Cultures in Conflict (3)
ANTH 462 Minority Cultures of China (3)
ANTH 482 World Food & the Cultural Implications of International Agricultural Development (3)
ANTH 483 Medical Anthropology (3)
ANTH 484 Wealth & Poverty (3)
ANTH 487 Language in Global Context (3)
ANTH 488 Business & Asian Culture (3)
AREC 351 Natural Resource Management (4)
AREC 433 International Ag Development (3)
AREC 461 Agricultural and Food Policy Issues (4)
BI 301 Human Impacts on Ecosystems (3)
BI 306 Environmental Ecology (3)
BI 306H. Environmental Ecology (3)
COMM 446 Communication in International Conflict & Disputes (3)
ENG 414 Criticism, Culture and World Community (3)
ENG 416 Power and Representation (3)
ENG 457 Comparative Literature: Colonialism/Postcolonialism (3)
ENG 497 International Women's Voices (3)
FE 456 International Forestry (3)
FOR 365 Issues in Natural Resources Conserv (3)
FOR 456 International Forestry (3)
FW 325 Global Crises in Resource Ecology (3)
GEO 300 Environmental Conservation (3)
GEO 308 Global Change & Earth Sciences (3)
GEO 350 Population Geography (3)
H 312 AIDS and Sexually Transmitted Diseases in Modern Society (3)
HDFS 450 Families & Quality of Life in the Developing World (3)
HDFS 471 The World Consumer (3)
HST 317 Why War: A Historical Perspective (3)
HST 342 Christianity in Russia (3)
HST 385 Regional Conflict in Global Context (3)
HST 465 American Diplomatic History (3)
HST 485 Politics & Relig in Mod Middle East (3)
MB 390 The World According to Microbes (3)
NFM 415 Global Food Resources and Nutrition (3)
PHL 443 World Views and Environmental Values (3)
PS 345 The Politics of Developing Nations (4)
PS 455 The United States as Viewed from Abroad (4)
RNG 468 International Rangeland Resource Management (3)
SOC 480 Environmental Sociology (3)
TCS 300 World Community in the Twentieth Century: Development (3)
TCS 301 World Community in the Twentieth Century: Underdevelopment(3)
WS 480 International Women (3)

**Science, Technology, & Society (3)**
AG 492 Technology Transfer in Agriculture (3)
ANS 315 Contentious Social Issues in Animal Agriculture (3)
ANS 485 Consensus & Natural Resource Issues (3)
ANTH 330 Evolution of People, Technology, and Society (3)
ANTH 432 The Archaeology of Domestication & Urbanization (3)
ANTH 481 Natural Resources & Community Values (3)
AREC 352 Environmental Economics and Policy (3)
ART 367 History of Design (3)
BB 331 Intro to Molecular Biology (3)
BI 300 Plagues, Pests, and Politics (3)
BI 333 Understanding Environmental Problems (3)
BI/BOT 489 Analysis of Environmental Issues (3,3)
BI/BOT 489H. Analysis of Environmental Issues (3,3)
CE 356 Technology & Environmental Systems (3)
CE 356H. Technology & Environmantal Systems (3)
CH 374 Technology, Energy, and Risk (3)
CS 391 Social & Ethical Issues in Computer Science (3)
CSS 335 Water Resource Science (3)
CSS 335H. Water Resource Science (3)
CSS 395 World Soil Resources (3)
ECON 352 Environmental Economics & Policy (3)
ENG 415 Industrialism and the English Novel (3)
ENT 300 Plagues, Pests and Politics (3)
FP 460 Wood as a Resource for Housing (3)
FST 421 Food Law (3)
GEO 300 Environmental Conservation (3)
GEO 306 Minerals, Energy, Water & the Environment (3)
GEO 380 Earthquakes in the Pacific NW (3)
GEO 411 Development of Geologic Thought (3)
H 445 Occupational Health (3)
HORT 485 Consensus and Natural Resources (3)
HST 481 Environmental History of the U.S. (3)
HSTS 411, HSTS 412, HSTS 413 History of Science (3,3,3)
HSTS 414 History of TwentiethCentury Science (3)
HSTS 415 Theory of Evolution and Foundation of Modern Biology (3)
HSTS 417 History of Medicine (3)
HSTS 418 Science and Society (3)
HSTS 419 Studies in Scientific Controversy: Method and Practice (3)
HSTS 421 Technology and Change (3)
HSTS 425 History of the Life Sciences (3)
NE 319 Societal Aspects of Nuclear Technology (3)
NFM 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)
PHAR 321 Science & Culture of Cosmetics (3)
PHL 325 Scientific Reasoning (4)
PHL 340 Science, Policy, and Society (4)
PHL 444 Biomedical Ethics (4)
PHL 447 Research Ethics (3)
PS 476 Science and Politics (4)
PS 485 Consensus and Natural Resources (3)
RNG 477 Agroforestry (3)
SOC 456 Science and Technology in Social Context (3)
SOC 485 Consensus and Natural Resources (3)
WS 340 Gender and Science (3)
Z 345 Introduction to Evolution (3)
Z 348 Human Ecology (3)

## APPROVED WRITING INTENSIVE COURSES (WIC)

The WIC course must be taken in the major. See Schedule of Classes for Specific Sections

**College of Agricultural Sciences**
AG 421 Leadership Development (3)
ANS 420 Ethical Issues in Animal Agriculture (3)
ANS 431 Horse Production Systems (3)
ANS 433 Poultry Meat Production Systems (3)
ANS 434 Egg Production Systems (3)
ANS 437 Adv Sheep Production Systems (3)
ANS 440 Dairy Production Systems (3)
ANS 444 Beef Production Systems (3)
AREC 461 Agricultural & Food Policy Issues (4)
BRR 403 Thesis (4)
CSS 315 Nutrient Management and Cycling (4)
CSS 480 Case Studies in Cropping System Management (4)
FST 423 Food Analysis (5)
FW 481 and FW 482. Wildlife Ecology plus Senior Project (3, 2)
FW 497 Aquaculture (3)
HORT 311 Plant Propagation (4)
HORT 351 Greenhouses & Controlled Environments for Crops (4)
HORT 418 Golf Course Maintenance (4)
HORT 480 Case Studies in Cropping System Management (4)
RNG 403 Senior Thesis (3)

**College of Business**
BA 469 Strategic Mgmt and Business Policy (4)

**College of Engineering**
CE 321 Civil Engineering Materials (4)
CHE 414 Chemical Engineering Laboratory (3)
CS 361 Fundamentals of Software Engineering (4)
ECE 441, ECE 442, ECE 443 Engineering Design Projects (2,2,2)
ENVE 321 Environmental Engineering Fundamentals (4)
IE 497/IE 498 Industrial Engineering Analysis and Design (3,3)
ME 451 Mechanical Laboratory (4)
NE 484/RHP 484 Applied Radiation Safety (3)

**College of Forestry**
FOR 460 Forestry Policy (4)
FP 411, FP 412, FP 413 Forest Products Project I, II, III (2,1,2)

**College of Health and Human Performance**
EXSS 415 Motor Control & Movement Dysfunction (3)
EXSS 450 Orthopedic Physical Assessment (4)
EXSS 481 Analysis of Critical Issues in Exercise and Sport Science (3)
H 430 Health Policy Analysis (3)
H 434 Health Care Law and Regulation (3)
H 440 Environmental Health (3)
H 476 Planning Health Programs (4)
H 482 Problems and Research in Safety (3)
College of Home Economics and Education
AIHM 345 Interior Professional Practices & Procedures (3)
AIHM 370 Textile and Apparel Market Analysis (4)
AIHM 378 Consumer Housing (3)
HDFS 461 Program Development and Evaluation (4)
NFM 416 Cultural Aspects of Foods (3)
NFM 419 Human Nutrition Laboratory (2)

**College of Liberal Arts**
AMS 407 Seminar (3)
ANTH 370 Family, Gender & Generation (3)
ART 301 Writing in Art and Design (3)
ART 323 Graphic Design/Typography II (3)
ART 368 History of Photography (3)
ART 411 Contemporary Issues in Art (3)
ART 412 Contemporary Issues in Design (3)
COMM 418 Interpersonal Communication Theory & Research (3)
COMM 422 Small Group Communication Theory and Research (3)
COMM 430 Theoretical Issues in Communication Inquiry (3)
COMM 432 Gender and Communication (3)
COMM 456 Rhetoric: 500 B.C. to 500 A.D. (3)
COMM 458 Rhetoric: 500 A.D. to 1900 (3)
COMM 459 Contemporary Theories of Rhetoric (3)
COMM 464 Rhetorical Criticism (3)
ECON 328 Introduction to Economic Research (4)
ENG 407 Seminar (3)
ENG 431 John Milton (3)
ENG 445 Studies in Nonfiction (3)
ENG 452 Studies in Film (3)
ENG 470 Studies in Poetry (3)
ENG 480 Studies in Literature, Culture, and Society (3)
FR 439 French: Francophone Studies (3)
GER 411 Fourth-Year German (3)
HST 407 Seminar (4)
HSTS 415 Theory of Evolution and Foundation of Modern Biology (3)
HSTS 417 History of Medicine ((3)
HSTS 418 Science and Society (3)
HSTS 419 Studies in Scientific Controversy: Method & Practice (3)
HSTS 425 History of the Life Sciences (3)
MUS 324, MUS 325, MUS 326 History of Western Music (3,3,3)
PHL 407 Seminar (3)
PS 414 Interest Groups (4)
PS 419 Topics in American Politics (4)
PS 429 Topics in Judicial Politics (4)
PS 459 Topics in International Relations (4)
PS 479 Topics in Public Policy & Public Administration (4)
PSY 430 Animal Behavior (4)
PSY 440 Cognition Research (4)
PSY 460 Advanced Social Research Methods (4)
PSY 470 Psychometrics and Psychological Testing (3)
PSY 480 Case Study Methods (4)
SOC 416 Conducting Social Research (3)
SPAN 438 Selected Topics in Luso-Hispanic Culture (3)
TA 330, TA 331, TA 332 History of the Theatre (3,3,3)
WR 411 Writing for Teachers (3)
WR 493 The Rhetorical Tradition and the Teaching of Writing (3)
WR 495 Literature, Composition, and Literacy (3)

**College of Pharmacy**
PHAR 432 Writing in the Pharmaceutical Sciences (2)

**College of Science**
BB 493 Biochemistry Laboratory (3)
BI 306 Environmental Ecology (3)
BI 333 Understanding Environmental Problems (3)
BI 371 Ecological Methods (3)
BI/BOT 489 Analysis of Environmental Issues (3)
BOT 341 and BOT 342 Plant Ecology/Writing About Plant Ecology (4,1)
CH 463 Experimental Chemistry II (3)
GEO 411 Development of Geologic Thought (3)
GEO 427 Volcanology (4)
GEO 462 Geosciences Field Methods (4)
GEO 463 Geophysics and Tectonics (4)
GEO 464 Seismic Reflection Interpretation (4)
MB 307 Critical Thinking & Experimentation in Microbiology (3)
MTH 333 Fundamental Concepts of Topology (3)
MTH 338 Non-Euclidean Geometry (3)
MTH 401 Research (3)
MTH 458 Numerical Solution of Ordinary Differential Equations (4)
MTH 473 History of Mathematics (3)
PH 401 Research and PH 403. Thesis (2,1)
Z 414 Scientific Communication for Biologists (2)

**University Honors College**
BI 306H. Environmental Ecology (3)
BI 489H. Analysis of Environmental Issues (3)
BOT 489H. Analysis of Environmental Issues(3)
ENG 407H. Seminar/Thoreau's Walden (1)

## OTHER GRADUATION REQUIREMENTS

### B.A. Degree Requirements

The Bachelor of Arts degree is conferred for broad and liberal education in humanities, arts, social science, and sciences. Requirements for the B.A. degree differ significantly from those for a Bachelor of Science degree (B.S.) in the same department. Many departments offer only one or the other of the two baccalaureate degrees. Check departmental curricula for detailed information. The B.A. degree requires foreign language proficiency equivalent to that attained at the end of the second year course in the language as certified by the Department of Foreign Languages and Literatures.

### Concurrent Baccalaureate Degrees

Students may concurrently earn two or more bachelor's degrees; for example, a B.A. or B.S. with the same or different major.

Students must a) meet the institutional, college, and departmental requirements of the curricula represented by the degrees; b) complete for each additional degree a minimum of 32 credits more than the requirements of the curriculum requiring the least number of credits; c) complete each additional 32 credits in residence.

### Subsequent Baccalaureate Degrees

A student who has previously earned a bachelor's degree from OSU may receive a second such degree if all requirements are met. The minimum of 32 credits may be completed at any time.

Students with a baccalaureate degree(s) from an accredited institution other than Oregon State University may be granted a baccalaureate degree from OSU upon satisfying the college, and departmental requirements of the curriculum represented by the degree. Such a student also may obtain concurrent degrees from Oregon State University by satisfying the requirements for concurrent degrees.

A student seeking a concurrent or subsequent baccalaureate degree(s) also must satisfy the University's residence requirements.

### Subsequent Credentials: Minors, Certificates, Options, and Majors

A student who has received a previous bachelor's degree from either OSU or another accredited university or college may be granted a subsequent minor or certificate by completing current requirements for a minor or certificate, receiving the dean's approval, achieving a minimum 2.0 OSU cumulative grade point average on work taken for the subsequent credential, and taking a minimum of 15 credits of OSU course work applied to the subsequent credential. A student who has received a previous bachelor's degree from OSU may be granted a subsequent option or major by completing current requirements for the option or major, receiving the dean's approval, achieving a minimum 2.0 cumulative grade point average on work taken for the subsequent credential, and taking a minimum of 15 credit hours of OSU course work applied to the subsequent credential.

### 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 and the 1998-99 *Graduate Catalog*. 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 GRADUATION

Students should consult with their adviser to check progress toward graduation requirements. Progress will be based on the formally declared major, options, minors, degree, and other applicable requirements. Applications should be obtained and filed in the Office of the Registrar two terms before expected graduation so progress can be monitored each term.

Once the application has been filed, the Office of the Registrar will audit and return two copies to the college each term—one for the adviser and one for the student. Students who wish to have minors or options shown on their transcript must indicate the minors or options they intend to complete when filing the application to graduate.

It is important that the student submit the application before the final quarter so he or she has time to complete any deficiencies *prior* to the last quarter.

Students who wish to change graduation dates after the first application must file the change in the Office of the Registrar *before* the final quarter.

Degrees are granted at the end of any quarter, and students are encouraged to attend the June Commencement exercises if they wish.

## DEGREES WITH DISTINCTION

Grade-point averages are computed on the basis of all work attempted at OSU. Graduates who have been in attendance at OSU for at least two years are awarded degrees with distinction as follows:

*Summa cum laude*—3.85-4.00 GPA
*Magna cum laude*—3.70-3.84 GPA
*Cum laude*—3.50-3.69 GPA

These distinctions are noted on diplomas.

*Minors:* U (Undergraduate); G (Graduate) *Certificates:* C *Degrees:* B (Bachelors); M (Masters); **MAIS** (Master of Arts in Interdisciplinary Studies); D (Doctorate)

■ Minors (Undergraduate and Graduate); ▲ Certificates; ❍ Options; ● Degrees

**AGR:** College of Agricultural Sciences; **BUS:** College of Business; **CLA:** College of Liberal Arts; **ENGR:** College of Engineering; **FOR:** College of Forestry; **GS:** Graduate School; **HEE:** College of Home Economics and Education; **HHP:** College of Health and Human Performance; **OC:** College of Oceanic and Atmospheric Sciences; **PHAR:** College of Pharmacy; **SCI:** College of Science; **VM:** College of Veterinary Medicine; **OSU:** interdisciplinary degree programs

| | | Minors | | Cert | Degrees | | | |
|---|---|---|---|---|---|---|---|---|
| **Majors/Minors/Certificates** | **College** | **U** | **G** | **C** | **B** | **M** | **MAIS** | **D** |
| Accounting[1] | BUS | | | ▲ | ❍ | | | |
| Actuarial Science | SCI | ■ | | | ❍ | | | |
| Adult Education | HEE | | ■ | | | ● | ● | |
| Advanced Mathematics Education | HEE/SCI | | | | | ● | | |
| Agricultural and Resource Economics | AGR | | ■ | | ● | ● | ● | ● |
| Agricultural Business Management | AGR | ■ | | | ● | | | |
| Agricultural Chemistry | AGR | | ■ | | | | ● | |
| Agricultural Economics | AGR | ■ | | | | | | |
| Agricultural Education | AGR | | ■ | | | ● | ● | |
| Agricultural Sciences | AGR | ■ | | | | | | |
| Agriculture | AGR | | ■ | | | ● | | |
| Agroforestry | FOR/OSU | | | | ❍ | | | |
| Air Force Studies | ROTC | ■ | | | | | | |
| American Studies | CLA | | | | ● | | | |
| Animal Products | AGR | | | | ❍ | | | |
| Animal Reproduction Development | OSU | | | | ❍ | | | |
| Animal Sciences | AGR | ■ | ■ | | ● | ● | ● | ● |
| Anthropology | CLA | ■ | ■ | | ● | | ● | |
| Apparel Design | HEE | | | | ● | | | |
| Apparel, Interiors, Housing, and Merchandising | HEE | | ■ | | | ● | ● | ● |
| Applied Anthropology | CLA | | ■ | | | ● | | |
| Applied Ethics | CLA | | | ▲ | | | | |
| Applied Exercise and Sport Science | HHP | | | | ❍ | | | |
| Applied Genetics | OSU | | | | ❍ | | | |
| Applied Health | HHP | ■ | | | ❍ | | | |
| Applied Health & Gerontology | | | | | ❍ | | | |
| Applied Mathematics | SCI | | | | ❍ | | | |
| Applied Physics | SCI | | | | ❍ | | | |
| Applied Visual Arts | CLA | | | | ● | | | |
| Archaeology/Physical Anthropology | CLA | | | | ❍ | | | |
| Arid Land Ecology | FOR/OSU | | | | ❍ | | | |
| Art | CLA | ■ | ■ | | ● | | ● | |
| Art History | CLA | | | | ❍ | | | |
| Athletic Administration | HHP | ■ | | | | | | |
| Athletic Training | HHP | | | | ❍ | | | |
| Atmospheric Sciences | OC | | ■ | | | ● | | ● |
| Beef | AGR | | | | ❍ | | | |
| Biochemistry and Biophysics | SCI/AGR | | ■ | | ● | ● | ● | ● |
| Biology | SCI | ■ | | | ● | | | |
| Biology Education[2] | HEE/SCI | | | | | ● | | |
| Biological Engineering | BS/ENGR | | | | | | | |
| Biophysics | SCI | | | | ❍ | | | |
| Bioresource Engineering | ENGR/AGR | | ■ | | | ● | | ● |
| Bioresource Research | OSU | | | | ● | | | |
| Biosystems Modeling | OSU | | | | ❍ | | | |
| Biotechnology | OSU | | | | ❍ | | | |
| Botany | SCI/AGR | ■ | | | ● | | | |
| Botany and Plant Pathology | SCI/AGR | | ■ | | | ● | ● | ● |
| Business Administration | BUS/FOR | ■ | ■ | | ● | ● | ● | |

| | | Minors | | Cert | Degrees | | | |
|---|---|---|---|---|---|---|---|---|
| **Majors/Minors/Certificates** | **College** | **U** | **G** | **C** | **B** | **M** | **MAIS** | **D** |
| Business Education | HEE | | | | | ● | | |
| Chemical Engineering | ENGR | | ■ | | ● | ● | | ● |
| Chemical Physics | SCI | | | | ❍ | | | |
| Chemistry | SCI | ■ | ■ | | ● | ● | | ● |
| Chemistry Education[2] | HEE/SCI | | | | | ● | | |
| Child and Adolescent Health | HHP | | | | ❍ | | | |
| Chinese | CLA | ■ | | | | | | |
| Choral Conducting | CLA | | | | ❍ | | | |
| Civil Engineering | ENGR | | ■ | | ● | ● | ● | ● |
| Civil Engineering-Forest Engineering | ENGR/FOR | | | | ● | | | |
| College Student Services Administration | GS | | ■ | | | ● | | |
| Communication | CLA | ■ | | | ❍ | | | |
| Communication Studies | CLA | ■ | ■ | | | | | |
| Community College Education | HEE | | ■ | | | | ● | |
| Community Health | HHP | ■ | ■ | | ❍ | | | |
| Comparative Veterinary Medicine | VM | | ■ | | | | | ● |
| Comprehensive (Mathematics) | SCI | | | | ❍ | | | |
| Computational Physics | SCI | | | | ❍ | | | |
| Computer Engineering | ENGR | | | | ● | | | |
| Computer Science | ENGR | ■ | ■ | | ● | ● | ● | ● |
| Construction Engineering Management | ENGR | | | | ● | | | |
| Counseling | HEE | | ■ | | | ● | ● | ● |
| Crop and Soil Science | AGR | | | | ● | | | |
| Crop Science | AGR | ■ | ■ | | ❍ | ● | ● | ● |
| Cultural Anthropology | CLA | | | | ❍ | | | |
| Cultural Resource Management | FOR | | | | ❍ | | | |
| Dairy | HEE | | | | ❍ | | | |
| Dietetics | HEE | | | | ❍ | | | |
| Early Childhood Education | HEE | | | | ❍ | | | |
| Earth Information Science and Technology | OSU | ■ | | | ❍ | | | |
| Earth Science | SCI | | | | ❍ | | | |
| Economics | CLA/AGR/FOR | ■ | ■ | | ● | ● | ● | ● |
| Education | HEE | | ■ | | | ● | ● | ● |
| Electrical and Computer Engineering | ENGR | | ■ | | | ● | | ● |
| Electrical and Electronics Engineering | ENGR | | | | ● | | | |
| Elementary Education[2] | HEE | | | | | ● | | |
| Elementary Education (Pre-M.A.T.) | CLA/SCI | | | | ❍ | | | |
| Engineering Physics | ENGR | | | | ● | | | |
| English | CLA | ■ | ■ | | ● | ● | ● | |
| Entomology | SCI/AGR | ■ | ■ | | ● | ● | ● | ● |
| Environmental Chemistry | OSU | | | | ● | | | |
| Environmental Engineering | ENGR | ■ | | | ● | | | |
| Environmental Geosciences | SCI | ■ | | | | | | |
| Environmental Health | HHP | ■ | | | ❍ | | | |
| Environmental Health and Safety | HHP | | | | ● | | | |

| Majors/Minors/Certificates | College | Minors U | Minors G | Cert C | Degrees B | Degrees M | Degrees MAIS | Degrees D |
|---|---|---|---|---|---|---|---|---|
| Environmental Health and Safety | HHP | | | | ● | | | |
| Environmental Health Management | HHP | | ■ | | | ● | ● | |
| Environmental Resource Interpretation | FOR | | | | ○ | | | |
| Environmental Sciences | OSU | ■ | ■ | | ● | | | ● |
| Equine | AGR | | | | ○ | | | |
| Equine Science | AGR | ■ | ■ | | | | | |
| Ethnic Studies | CLA | ■ | | | ● | | | |
| Exercise and Sport Science | HHP | | | | ● | | | |
| Family & Consumer Science | HEE | | ■ | | ○ | ● | | |
| Family Finance | HEE | | | | ○ | | | |
| Family Resource Management | HEE | | ■ | | | ● | ● | ● |
| Fermentation Science | AGR | | | | ○ | | | |
| Finance | BUS | | | | ○ | | | |
| Fine Arts | CLA | | | | ○ | | | |
| Fisheries and Wildlife | AGR | ■ | | | | | | |
| Fisheries/Business | AGR | | | | ○ | | | |
| Fisheries Science | AGR | | ■ | | ● | ● | ● | ● |
| Fishery Science | AGR | | | | ○ | | | |
| Fitness Program Management | HHP | | | | ○ | | | |
| Food Quality | OSU | | | | ○ | | | |
| Food Science | AGR | ■ | | | ○ | | | |
| Food Technology | AGR | ■ | | | | | | |
| Food Science and Technology | AGR | | ■ | | ● | ● | ● | ● |
| Food Systems Management | HEE | ■ | | | ○ | | | |
| Foods in Business | HEE | | | | ○ | | | |
| Foreign Languages and Literatures (French, German, Spanish) | CLA | | ■ | | | | ● | |
| Forest Biology | FOR | | | | ○ | | | |
| Forest Ecosystems | OSU/FOR | | | | ○ | | | |
| Forest Engineering | FOR | | ■ | | ● | ● | | ● |
| Forest Engineering-Civil Engineering | FOR/ENGR | | | | ● | | | |
| Forest Harvesting | FOR | | | | ○ | | | |
| Forest Management | FOR | ■ | | | ● | | | |
| Forest Products | FOR | ■ | ■ | | ● | ● | ● | ● |
| Forest Recreation Resources | FOR | ■ | | | ● | | | |
| Forest Resources | FOR | | ■ | | ○ | ● | ● | ● |
| Forest Science | FOR | | ■ | | | ● | ● | ● |
| Forest Soils | FOR | | | | ○ | | | |
| French | CLA | ■ | | | ● | | | |
| French Education | HEE | | | | | ● | | |
| General Agriculture | AGR | | | | ● | | | |
| General Anthropology | CLA | | | | ○ | | | |
| General Business | BUS | | | | ○ | | | |
| General Entomology | SCI | | | | ○ | | | |
| General Health Care Administration | HHP | | | | ○ | | | |
| General Mathematics | SCI | | | | ○ | | | |
| General Rangeland Resources | AGR | | | | ○ | | | |
| General Science | SCI | | ■ | | ● | | | |
| Genetics | SCI | | ■ | | | ● | | ● |
| Geography | SCI | | ■ | | ● | ● | ● | ● |
| Geological Engineering[3] | ENGR | | | | ● | | | |
| Geology | SCI | ■ | ■ | | ● | ● | ● | ● |
| Geophysics | OC/SCI | | ■ | | ○ | ● | | ● |
| Geosciences & Natural Res | OSU/FOR | | | | ○ | | | |
| German | CLA | ■ | | | ● | | | |
| German Education | HEE | | | | | ● | | |

| Majors/Minors/Certificates | College | Minors U | Minors G | Cert C | Degrees B | Degrees M | Degrees MAIS | Degrees D |
|---|---|---|---|---|---|---|---|---|
| Gerontology | HEE | | ■ | ▲ | | | | |
| Graphic Design | CLA | | | | ○ | | | |
| Health | HHP | | ■ | | | | | |
| Health and Safety Administration | HHP | | ■ | | | ● | ● | |
| Health Care Administration | HHP | | | | ● | | | |
| Health Education | HEE/HHP | | ■ | | | ● | ● | |
| Health Promotion and Education | HHP | | | | ● | | | |
| Health Science | HHP | ■ | | | | | | |
| History | CLA | ■ | ■ | | ● | | ● | |
| History of Science | CLA | | ■ | | | | ● | ● |
| Home Economics | HEE | | ■ | | | ● | | |
| Horticulture | AGR | ■ | ■ | | ● | ● | ● | ● |
| Horticultural Science | AGR | | | | ○ | | | |
| Housing Design | HEE | | | | ○ | | | |
| Housing Services | HEE | | | | ○ | | | |
| Housing Studies | HEE | | | | ● | | | |
| Human Development and Family Sciences | HEE | | | | ● | | | |
| Human Development and Family Studies | HEE | | ■ | | | ● | ● | ● |
| Human Performance | HHP | | ■ | | | ● | ● | ● |
| Individual and Family Development | HEE | | | | ○ | | | |
| Individual Studies | AGR/SCI | | | | ○ | | | |
| Industrial and Manufacturing Engineering | ENGR | | ■ | | ○ | ● | ● | ● |
| Insect Pest Management | SCI | ■ | | | | | | |
| Instrumental Conducting | CLA | | | | ○ | | | |
| Instrumental Performance | CLA | | | | ○ | | | |
| Integrated Science Education[2] | HEE/SCI | | | | | ● | | |
| Interdisciplinary Studies | GS | | ■ | | | | ● | |
| Interior Merchandising | HEE | | | | ● | | | |
| International | | | | | | | | |
| International Agricultural Development | AGR | ■ | | | | | ● | |
| International Business | BUS | | | | ○ | | | |
| International Studies | OSU | | | | ● | | | |
| Irrigation Engineering | ENGR | ■ | | | | | | |
| Japanese | CLA | ■ | | | | | | |
| Landscape Design | FOR | | | | ○ | | | |
| Language Arts Education[2] | HEE/CLA | | | | | ● | | |
| Latin American Affairs | CLA | | | ▲ | | | | |
| Law Enforcement | FOR | | | | ○ | | | |
| Liberal Studies | CLA | | | | ● | | | |
| Long Term Care Administration | HHP | | | | ○ | | | |
| Management | BUS | | | | ○ | | | |
| Management Information System | BUS | | | | ○ | | | |
| Manufacturing Engineering | ENGR | | | | ○ | | ● | |
| Marine Biology | SCU | | | | ○ | | | |
| Marine Resources | AGR | | | | ○ | | | |
| Marine Resource Management | OC | | ■ | | | ● | ● | |
| Marketing Education | HEE | | | | | ● | | |
| Marketing Management | BUS | | | | ○ | | | |
| Materials Science | ENGR | | ■ | | | ● | | |
| Mathematical Physics | SCI | | | | ○ | | | |
| Mathematical Sciences | SCI | ■ | | | ● | | | |
| Mathematics | SCI | ■ | ■ | | ● | ● | ● | ● |
| Mathematics Education | SCI/HEE | | ■ | | | ● | | ● |
| Mechanical Engineering | ENGR | | ■ | | ● | ● | | ● |

| Majors/Minors/Certificates | College | Minors U | Minors G | Cert C | Degrees B | Degrees M | Degrees MAIS | Degrees D |
|---|---|---|---|---|---|---|---|---|
| Medical Technology | SCI | | | | ● | | | |
| Merchandising Management | HEE | | | | ● | | | |
| Metallurgical Engineering[3] | ENGR | | | | ● | | | |
| Microbiology | SCI/AGR | ■ | ■ | | ● | ● | | ● |
| Military Science | ROTC | ■ | | | | | | |
| Mining Engineering[3] | ENGR | | | | ● | | | |
| Molecular and Cellular Biology | GS | | ■ | | | | ● | ● |
| Movement Studies in Disability | HHP | | ■ | | | ● | | |
| Multimedia | CLA/ENGR | ■ | | | | | | |
| Music | CLA | ■ | ■ | | ● | | ● | |
| Music Education[2] | HEE/CLA | | | | | ● | | |
| Music History & Composition | CLA | | | | ○ | | | |
| Native American Use of National Resources | FOR/OSU | | | | ○ | | | |
| Natural Resource Education | FOR | | | | ○ | | | |
| Natural Resources | OSU/FOR | ■ | | | | | | |
| Naval Science | ROTC | ■ | | | | | | |
| Nuclear Engineering | ENGR | ■ | ■ | | ● | ● | | ● |
| Numerical Analysis (Mathematics) | SCI | | | | ○ | | | |
| Nutrition | HEE | ■ | | | | | | |
| Nutrition and Food Management | HEE | | ■ | | ● | ● | ● | ● |
| Nutrition Science | HEE | | | | ○ | | | |
| Ocean Engineering | ENGR | | ■ | | | ● | | |
| Oceanography | OC | ■ | ■ | | | ● | | ● |
| Optical Physics | SCI | | | | ○ | | | |
| Peace Studies | CLA | | | ▲ | | | | |
| Pest Biology and Management | OSU | | | | ○ | | | |
| Pest Management | SCI | | | | ○ | | | |
| Piano Performance (Music) | CLA | | | | ○ | | | |
| Pharmacy | PHAR | | ■ | | ● | ● | | ● |
| Philosophy | CLA | ■ | ■ | | ● | | ● | |
| Photography | CLA | ■ | | | ○ | | | |
| Physical Activity and Development | HHP | | | | ○ | | | |
| Physical Education[2] | HEE/HHP | | ■ | | | ● | | |
| Physics | SCI | ■ | ■ | | ● | ● | ● | ● |
| Physics Education[2] | HEE/SCI | | | | | ● | | |
| Plant Growth and Development | OSU | | | | ○ | | | |
| Plant Physiology | GS | | ■ | | | ● | | ● |
| Political Science | CLA | ■ | ■ | | ● | | ● | |
| Poultry | AGR | | | | ○ | | | |
| Poultry Science | AGR | ■ | ■ | | | ● | ● | ● |
| Pre-Music Education | CLA | | | | ○ | | | |
| Pre-Therapy | HHP | | | | ○ | | | |
| Pre-Veterinary Medicine | AGR/SCI | | | | ○ | | | |
| Print Media | CLA/ENGR | ■ | | | | | | |
| Psychology | CLA | ■ | ■ | | ● | | ● | |
| Professional Technical Education[2] | HEE | | | | | ● | | |
| Public Administration | FOR | | | | ○ | | | |
| Public Education/Extension | AGR | | | | ○ | | | |
| Public Health | HHP | | ■ | | | ● | ● | ● |
| Pure Mathematics | SCI | | | | ○ | | | |
| Radiation Health Physics | ENGR | ■ | ■ | | ● | ● | | ● |
| Range Management | AGR/FOR | | | | ○ | | | |
| Range Science | AGR | | | | ○ | | | |
| Rangeland Resources | AGR | ■ | ■ | | ● | ● | ● | ● |
| Range/Forestry | AGR | | | | ○ | | | |
| Range/Soils | AGR | | | | ○ | | | |
| Range/Wildlife | AGR | | | | ○ | | | |
| Regional Studies | SCI | ■ | | | | | | |
| Resource Economics & Policy | AGR/FOR | ■ | | | ○ | | | |
| Resource Economics | AGR/FOR | ■ | | | ○ | | | |
| Resource & Environmental Economics | AGR | | | | ○ | | | |
| Resource Geography | SCI | ■ | | | | | | |
| Resource Planning | FOR | | | | ○ | | | |
| Resource Reuse & Waste Mgmt | OSU/FOR | | | | ○ | | | |
| Rural and Resource Planning | SCI | ■ | | | | | | |
| Russian | CLA | ■ | | | | | | |
| Russian Studies | CLA | | | ▲ | | | | |
| Science Education | SCI | | ■ | | | ● | | ● |
| Scientific and Technical Communication | CLA | | ■ | | | ● | ● | |
| Sheep | AGR | | | | ○ | | | |
| Sociology | CLA | ■ | ■ | | ● | | ● | |
| Soil Science | AGR | ■ | ■ | | ○ | ● | ● | ● |
| Spanish | CLA | ■ | | | ● | | | |
| Spanish Education | HEE | | | | | ● | | |
| Speech Communication | CLA | | ■ | | ● | | ● | |
| Statistics | SCI/AGR/FOR | | ■ | | ○ | ● | ● | ● |
| Sustainable Ecosystems | OSU | | | | ○ | | | |
| Teaching | HEE | | ■ | | | ● | | |
| Telemedia | CLA/ENGR | ■ | | | | | | |
| Technology Education | HEE | | | | ● | ● | | |
| Theatre Arts | CLA | ■ | | | ○ | | | |
| Tourism | FOR | | | | ○ | | | |
| Toxicology | AGR/OSU | | ■ | | ○ | ● | ● | ● |
| Turf and Landscape Management | AGR | | | | ○ | | | |
| Twentieth Century Studies | CLA | | | ▲ | | | | |
| Veterinary Medicine | VM | | | | | | | ● |
| Veterinary Science | VM | | ■ | | | ● | | |
| Visual Arts | CLA | ■ | | | | | | |
| Vocal Performance (Music) | CLA | | | | ○ | | | |
| Waste Quality | OSU/FOR | | | | ○ | | | |
| Water Resources | AGR | | ■ | | | | ● | |
| Wildland Ecology | AGR | | | | ○ | | | |
| Wildlife | FOR | | | | ○ | | | |
| Wildlife Science | AGR | | ■ | | ● | ● | ● | ● |
| Women Studies | CLA | ■ | ■ | ▲ | ○ | | ● | |
| Wood Engineering and Science | FOR | | | | ○ | | | |
| Wood Industry Management | FOR | | | | ○ | | | |
| Worksite Health Promotion | HHP | ■ | | | ○ | | | |
| Writing | CLA | ■ | | | | | | |
| Writing Education | CLA | | ■ | | | | | |
| Zoology | SCI | ■ | ■ | | ● | ● | | ● |

**Pre-Professional Health Programs:** ❑ Dental Hygiene; ❑ Dentistry; ❑ Medical Technology; ❑ Medicine; ❑ Nursing; ❑ Occupational Therapy; ❑ Optometry; ❑ Osteopathy; ❑ Pharmacy; ❑ Physical Therapy; ❑ Podiatry; ❑ Pre-physician Assistant; ❑ Pre-radiation Therapy; ❑ Veterinary Medicine.

**Standard Teaching Licensure** for in-service teachers is offered in the following areas: Agriculture Education, Biology Education, Business Education, Chemistry Education, Elementary Education, French Education, German Education, Health Education, Integrated Science Education, Lanuage Arts Education (English), Marketing Education, Mathematics Education (advanced), Music Education, Phsyical Education, Physics Education, Spanish Education, and Technology Education.

[1]Post-baccalaureate certificate.
[2]MAT Program
[3]Joint program with the University of Idaho.

# Fees and Residency Requirements

## Estimated Fee and Tuition Schedule (per term) for 1998-99

| Term credits | Resident undergrads | Nonresident undergrads | Resident graduate students | Nonresident graduate students |
|---|---|---|---|---|
| *Full-Time* | | | | |
| 12-18 credits | $1180.00 | $3,936.00 | — | — |
| 9-16 credits | — | — | $2,066.00 | $3,514.00 |
| *Overtime* | | | | |
| Each additional credit | 75.00 | 305.00 | 198.00 | 359.00 |

Graduate Assistants—Teaching or research assistants pay $260 a term plus $193 each overtime credit. Consult the Graduate School Office for full details.

**NOTE: These figures are estimates only. Fees and tuition for 1998-99 were not established at the time of publication; call the Office of Business Affairs for current rates.**

### Regular Tuition Fees

Students paying regular 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, including gymnasium suits and laundry service; the student newspaper; admission to some athletic events; and admission to concerts and lectures. No reduction in fees is made to students who may not wish to use these privileges. Staff and senior citizens do not receive these services.

### Matriculation Fee

When they enroll for their first term at OSU, new undergraduates will be charged a one-time fee of $80.00 to cover the cost of pre-enrollment services. These services include, but are not limited to, campus open houses, new student orientation programs, and special advising services for transfer and extension students.

### Advance Tuition Deposit

$200.00
New freshmen and transfer students should expect to make an advance tuition deposit as an indication of intent to enroll. Deposits are not refundable after the due date indicated on the "intent to enroll" form mailed to newly admitted freshmen and transfers (for Fall Term only).

#### Special Fees

(subject to change without notice)

*Application Fee* (nonrefundable), $50.00
Must accompany admission application.

*Late Registration Fee*
Students registering during the first two weeks of classes pay a late registration fee of $40.00. For registrations approved after the end of the late registration period, a late fee of $80 will be assessed. Also applies to part-time students.

*Return-of-Check Fee, $15.00*
If institutional charges are met by a check which is returned, a fee will be charged in the amount of $15.00.

*Change-of-Program Fee*
Drop or Withdraw, per course, $10.00
S-U change, per course, $10.00 change in course credits, $10.00
The student pays this fee for each change in his or her official program.

*Auditor's Fee*
Audit Courses are assessed instructional fees at the same rate as for credit courses.

*Reinstatement Fee, $25.00*
If for any reason a student has his or her registration canceled during a term for failure to comply with the regulations of the institution, but is later allowed to continue his or her work, the student must pay the reinstatement fee.

*Certification of Enrollment Fee, $3.00*
Per certification.

*Duplicate Schedule, $4.00*

*Readmission Fee, $15.00*
Required after absence of one year.

*Special Examination Fee*
Examination for credit, per exam $60.00

*Transcript Fee*, first copy, $5.00
Added copies at same time, $1.00.

*Staff Fee* (except staff auditors) per credit, $15.00
Staff members may register for courses at an $15-per-credit-hour rate. An employee whose appointment is equivalent to .50 or more may take up to 10 credits a term at this rate. Payment of fees entitles member to instructional and library privileges only. There is no refund for a staff member withdrawing from or dropping classes.

*Senior Citizen Fee:* Charge for special materials only. Persons 65 or older may attend class on a noncredit, space-available basis. Incidental fee privileges are not provided.

*Microfilming Doctoral Thesis* minimum, $45.00

*Individual Music Lesson Fee* (consult Department of Music) per term, $100.00 to $200.00

*Library Fines and Fees*
Overdue fine for circulating books - 25¢ per day;
Overdue fine for Reserve Book Room books - 25¢ per hour

Borrowers failing to return material within 60 days of the due date are charged the replacement cost of items, plus the amount of fine (maximum fine, $10.00 per item), plus a service fee of $6.00. 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.

*New Student I.D. Card Fee - $5.00*
Assessed of all new students who are eligible for a student I.D. card, their first term admitted, and who have not previously been assessed. Also assessed of all "Summer Only" students who have not been previously assessed.

*New Student Matriculation Fee - $50.00*
Assessed of all new degree-seeking undergraduate students beginning Fall 1995.

*Registration-In-Absentia Fee*
Same as regular fees in all classes.

### Determining Residency for Fee Purposes

In determining a student's residency, the OSU Office of Admissions follows the administrative rules of the State Board of Higher Education on residence classification, excerpted below.

#### Residence Classification Policy: Procedures

**Definitions**

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

1) "Domicile" denotes 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.

2) "Financially independent" denotes a person who has not been and will not be claimed as an exemption and has not received and will not receive financial

assistance in cash or in kind of an amount equal to or greater than that which would qualify him or her to be claimed as an exemption for Federal Income Tax purposes by another person except his or her spouse for the current calendar year and for the calendar year immediately prior to the year in which application is made.

3) A "dependent" is a person who is not financially independent.

**Determination of Residence (580-010-0030)**

1) For purposes of admission and instruction fee assessment, OSU classifies a student as Oregon resident or nonresident. In determining resident or nonresident classification, the primary issue is one of *intent*. If a person is in Oregon primarily for the purpose of obtaining an education, that person will be considered a nonresident. For example, it may be 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, immediately prior to the term for which Oregon resident classification is requested:
   a) Has established and maintained a domicile in Oregon of not less than 12 consecutive months; and
   b) Is primarily engaged in activities other than those of being a college student.
      i) A student may be considered primarily engaged in educational activities regardless of the number of credits for which the student is enrolled. However, a student who is enrolled for more than eight credits per semester or quarter shall be presumed to be in Oregon for primarily educational purposes.
      ii) Such period of enrollment shall not be counted toward the establishment of a bona fide domicile of one year in this state unless the student proves, in fact, establishment of a bona fide domicile in this state primarily for purposes other than educational.
3) An Oregon resident is also a person who is dependent on a parent or legal custodian who meets the Oregon residency requirements of these rules.
4) 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.
5) If institution records show that the residence of a person or the person's legal custodian upon whom the person is dependent is outside of Oregon, the person 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 person requesting the change.

**Residence Consideration Factors (580-010-0031)**

The following factors, although not necessarily conclusive or exclusive, have probative value in support of a claim for Oregon resident classification:

1) Primary engagement in activities other than those of a student and reside in Oregon for 12 consecutive months immediately prior to the beginning of the term for which resident classification is sought;
2) Reliance upon Oregon resources for financial support;
3) Domicile in Oregon of persons legally responsible for the student (OSSHE Rules);
4) Acceptance of an offer of permanent employment in Oregon; and
5) Ownership by the person of his or her living quarters in Oregon.

**The following factors, standing alone, do not constitute sufficient evidence to affect classification as an Oregon resident:**

1) Voting or registration to vote;
2) Employment in any position normally filled by a student;
3) Lease of living quarters;
4) Admission to a licensed practicing profession in Oregon;
5) Automobile registration;
6) Public records (birth and marriage records, Oregon driver's license);
7) Continuous presence in Oregon during periods when not enrolled in school;
8) Ownership of property in Oregon, or the payment of Oregon income or other Oregon taxes; or
   a) Domicile in Oregon of the student's spouse;

Reliance upon non-Oregon resources for financial support is an inference of residency in another state.

The resident classification of a dependent person shall be that of his or her parents or legal custodians, or, in case of divorce or other similar circumstances, the parent or legal custodian upon whom the person is financially dependent, unless the dependent has been in Oregon with the other parent or a legal custodian and established Oregon residency under these rules 12 months prior to the term for which Oregon resident classification is requested.

**Evidence of Financial Dependency (580-010-0033)**

In determining whether a student is financially dependent and whether his or her parent, or legal custodian has maintained a bona fide domicile in Oregon for one year, a student must provide:

1) Legal proof of custodianship;
2) Evidence of established domicile of parent or legal custodian;
3) Identification of the student as a dependent on the federal income tax return of the parents, or legal custodian.

Additional documentation to substantiate dependency during the current calendar year may be required at a later time if deemed necessary by the institution.

A student who provides evidence that he or she is a dependent of a parent or legal custodian who has maintained a one-year domicile in Oregon shall not be required to establish a one-year 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, armed services means officers and enlisted personnel of the United States Army, Navy, Air Force, Marine Corps, and Coast Guard.
2) Notwithstanding OAR 580-010-0030, members of the armed services and their spouses and dependent children who reside in this state while assigned duty at any base, station, shore establishment, or other facility, or 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, shall be considered residents for purposes of the instruction fee.
3) An Oregon resident entering the armed services retains Oregon residence classification until it is voluntarily relinquished.
4) An Oregon resident who has been in the armed services and assigned on duty outside of Oregon must return to Oregon within 60 days after completing service to retain classification as an Oregon resident.
5) A person who continues to reside in Oregon after separation from the armed services may count the time spent in the state while in the armed services 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 24 years of age, unmarried, enrolled in a full-time course of study in an institution of higher learning, and dependent on the member for more than one-half of his/her support.

**Residence Classification of Aliens (580-010-0040)**

An alien holding an immigrant visa or an A, E, G, H, I, K, L, N, R, NATO, TC, TN, TD, Visa, or granted refugee or political asylum status, or otherwise admitted for permanent residence in the United States is eligible to be considered an Oregon resident if OAR 580-010-0030 is otherwise satisfied. The

date of receipt of the immigrant visa, the date of approval of political asylum or refugee status, or the date of approval of lawful permanent residence, whichever is earlier, shall be the date upon which the 12 months and other residency requirements under OAR 580-010-0030 shall begin to accrue.

Notwithstanding any other rule, an alien possessing a nonimmigrant or temporary, (i.e., B, C, D, F, H, J, L, or M) visa cannot be classified as a resident.

#### Changes in Residence Classification (580-010-0041)

If an Oregon resident student enrolls in an institution outside of Oregon and later seeks to reenroll in an OSSHE institution, the residence classification of that student shall be reexamined and determined on the same basis as for any other person.

A person whose nonresident legal custodian establishes a permanent Oregon residence as defined in OAR 580-010-0030 during a term when the dependent is enrolled at an OSSHE institution, may register as a resident at the beginning of the next term.

Once established, classification as a resident continues so long as the student remains in a continuous academic year enrollment in the classifying institution.

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.

No OSSHE 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 OSSHE 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 the classification decision, appeal to the IRC. An aggrieved person may supply written statements to the IRC for its consideration in reviewing the case and may also make an oral presentation to the IRC. The decision of the IRC shall be final unless appealed.
4) A person dissatisfied with the IRC decision may, within ten (10) 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).

### 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.

#### Waiver of Nonresident Instruction Fee (580-10-081)

1) Notwithstanding the provisions of rule 580-10-080, the following nonresident students shall be permitted to pay instruction fees at the same rates as Oregon resident students.

### Enrollment of Spouse and Dependent Children (580-10-086)

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.

### Student Exchanges (580-010-085)

1 (a) Under the WICHE student exchange program, certification of students as Oregon residents for purposes of attending institutions not under board control or in other states shall be guided by rules set forth in Division 10. In order to be considered for WICHE certification, the student's completed application must be received by the certifying officer on or before October 15 of the year preceding admission. An application received after that date in an envelope postmarked not later than October 15 will be deemed to have been received on the 15th. Residency shall be determined as of the date of the application for WICHE certification, not as of the date of expected admission or registration to an institution.

(b) Persons applying for WICHE certification must be certified as Oregon residents and placed in ranked preference order within each program. Ranked preference order is determined by a score based on the grade point average of all college work plus .25 times the number of years of residence in Oregon up to a maximum of ten years.

2 (a) The department and separate institutions may enter into agreements with individual institutions in other states or other countries whereby resident students specified by name in the Oregon institutions may transfer to the other institution, and an equal number of students specified by name from the other institution may transfer to the Oregon institution with a reciprocal waiving of additional fees ordinarily assessed to nonresident students in both institutions.

## GRADING SYSTEM

### Grades

The grading system consists of twelve basic grades, A, A-, B+, B, B-, C+, C., C-, D+, D, D- and F. 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 (A-C-); U, unsatisfactory (D+-F), Aud-Audit.

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. If a student misses the final without notification and approval acceptable to the instructor, the instructor will report the grade that is appropriate for the requirments of the course. The instructor states the deficiency and the deadline for completing the missing work on the grade roster. The additional time awarded shall in no case exceed one calendar year. 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 instructor has the option of either submitting a substitute grade or allowing a permanent grade of I to remain on the student's record. The I grade will have no effect on the student's grade point average.

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, 3.7 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, .7 for each credit of D- grade, and 0 for each credit of F. Marks of I, W, P, N, 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 REGULATIONS

### Satisfactory Academic Standing (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. Students whose standings evidence a lack of satisfactory progress will be warned of this condition and advised to seek help from their academic advisors.

Academic Warning: Students with a term GPA below 2.0 will be placed on Academic Warning.

Academic Probation: Students who have completed two or more terms at O.S.U. and have an O.S.U. 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.

Academic Suspension: Students who are on Academic Probation and have a subsequent term GPA below a 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 privileges of the institution and of all organizations in any way connected to it, including any University recognized living group.

Suspended students will be considered for reinstatement to the University after two years or completion of a minimum of 24 quarter credits of transferrable 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 regulations on Satisfactory Academic Standing. Additionally, this committee has discretionary authority to grant exceptions and to develop guidelines for the administration of these regulations.

### 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

All students enrolled at Oregon State University are expected to follow certain basic regulations and policies that have been developed to govern the behavior of students as members of the University community. Policies, procedures and regulations 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 persons must treat all persons with dignity and respect in order for scholarship to thrive. These 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 OSU Web Site and outlined in detail in the OSU *Schedule of Classes* published every academic year.

## 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 their education records that are maintained by Oregon State University; the right to a hearing to challenge the contents of those records when they allege the records contain misleading or inaccurate information; the right to give their written consent prior to the release of their records to any person, agency, or organization other than University officials and certain authorized federal and state authorities. The Student Records Policy is printed in its entirety in the *Schedule of Classes*. Information about specific procedures is available upon request from the Office of the Registrar.

## PROGRESS STANDARDS FOR VETERAN STUDENTS

Oregon State University students who are receiving benefits from the Veterans Administration are subject to the Satisfactory Progress Standards as set forth in 38 U.S.C. section 1674, 1724, 1775, and 1776, in addition to those established by the University as published in the Academic Regulations. The following apply only to students who are receiving VA benefits including Reservists under Chapter 106:

1. Students must complete with a passing grade (A through D-, I, P, R, S) and an overall term grade-point average greater than 2.00 the following number of credits in courses specifically required for the student's major based upon the term's VA certification:

   *Undergraduate Students*
   Full-time—12 credits
   Three-quarter time—9 credits
   One-half time—6 credits

   *Graduate Students*
   Full-time—9 credits
   Three-quarter time—7 credits
   One-half time—5 credits

2. Students must complete all drop procedures within the first ten days of the term and withdrawal procedures within the first four weeks of each term. Students dropping or withdrawing must notify the Veteran's Clerk in the Registrar's Office and may be subject to the noncompliance provisions of the Satisfactory Progress Standards.

3. Students who do not meet the above provisions will be notified that they are on probation insofar as the Veterans Administration progress standards are concerned. If a student's deficiency is not corrected within two consecutive terms, the University will notify the Veterans Administration of his or her unsatisfactory progress.
4. Students who withdraw entirely from the University (except where there are circumstances beyond the control of the student) will not be subject to the two-term probationary period and will be reported immediately to the Veterans Administration as making unsatisfactory progress due to withdrawal. Recertification will be made when the student is granted readmission to the University.
5. Students determined as making unsatisfactory progress will be recertified upon obtaining the written approval of the VA Counseling Service or adjudicator at the VA's Portland regional office. A certificate of eligibility of such consent must be presented to the Veterans' Clerk. An exception to the above will exist for students who are suspended from the University and are granted reinstatement by the University's academic deficiencies committee.
6. Students dismissed from the University for unsatisfactory conduct will be reported as making unsatisfactory progress. Only upon rescission of the dismissal by the University will recertification be made.

*Oregon State University's financial aid program provides assistance and advice to students who would be unable to pursue their education at the University without such help. Scholarships, grants, loans, and part-time employment are available to meet the difference between what the student and the student's family could reasonably be expected to provide and the expected cost of attending OSU.*

Oregon State University administers a variety of financial aid programs to help you and your family meet the cost of higher education. ALL eligible students and parents can receive some type of financial assistance, regardless of the family's income and assets. Aid programs provided through the Financial Aid Office require the completion of the Free Application for Federal Student Aid (FAFSA). Most of our students receive some form of financial aid to help offset their expenses.

## Eligibility

To be eligible for financial aid, students must

* be a U.S. citizen or eligible noncitizen,
* be attending at least half-time and working towards a degree of certificate,
* be making satisfactory academic progress
* be registered with Selective Service (if required)
* not owe a refund on a Federal grant or be in default on a Federal educational loan, and
* have financial need (except for Federal Unsubsidized Direct Stafford/Ford Loans and Federal PLUS).

To determine your eligibility for specific programs, students are required to complete the Free Application for Federal Student Aid (FAFSA) each year. The application is sent to the Department of Education's Central Processing System who analyzes the information according to a method prescribed by Congress. A detailed financial analysis is then forwarded to Oregon State University.

Parent information is required for most undergraduate students because the U.S. Congress has said that families have the primary responsibility of funding college. Your dependency status is determined by answers to a series of questions on the FAFSA Application. Contact an OSU Financial Aid Adviser if you have concerns regarding your family situation.

If the information you provide indicates you are a dependent of your parents', your ability and your parents ability to contribute to your education is evaluated. Otherwise, only your resources are evaluated and if married, those of your spouse .

The major factors considered in the evaluation of your parent's ability to contribute are their income, net assets (excluding home and farm), household size, and number in college. To evaluate the amount you are expected to contribute, the analysis considers the amount you earned from work in the previous calendar year, (excluding work-study earnings) as well as a portion of assets including cash, savings, checking accounts, equity in real estate (excluding farm and home), stocks, bonds, trust funds and other securities. If you have dependent children, your student contribution will reflect an allowance for the additional expenses for your dependent children.

The amount that is figured from this needs analysis is called your Expected Family Contribution (EFC). This figure is then used in an equation to determine your financial need: Cost of Education minus your Expected Family Contribution (EFC) equals need.

Once your aid eligibility has been established, an award package is then designed to meet your financial need.

## Application Procedures

Students must apply for financial aid by completing the Free Application for Federal Student Aid (FAFSA) or the Renewal Application and list Oregon State University as one of their first six choices. (Title IV institutional code is 003210.) Only one type of application should be submitted. Renewal applications are mailed to students who applied for aid in the previous academic year. Entering freshman should obtain the FAFSA from their high school. Applications are also available at community colleges or universities in your area or by contacting the OSU Financial Aid Office.

Oregon State University requires financial aid applications to be completed and mailed between January 1 and February 1 by those students planning to enroll in school the following year beginning with summer term. Money is limited and deadlines are established to award financial aid funds. **By mailing your FAFSA on or before February 1**, you have the best chance of receiving consideration for all available aid programs. Aid applications mailed after this date are considered late and will be awarded limited funding based on availability.

All entering undergraduate and graduate students are required to apply for admission to the university before their financial aid application will be reviewed by the financial aid office.

When your aid application has been received and processed by the Department of Education Central Processing System, you will be mailed a Student Aid Report (SAR). The SAR will report the information from your aid application and your Expected Family Contribution (EFC). You need only submit this form to the OSU Financial Aid Office if you have made corrections to the information OR if you did not list Oregon State University on your original financial aid application and now you would like to request financial aid from OSU.

## Types of Financial Aid

Financial aid comes in several different forms: grants and scholarships, loans, and work-study. Applicants may be awarded a combination of several different aid programs to help finance their education .

Undergraduate students are eligible for grants, loans and Federal Work-study. Graduate and postbaccalaureate students are eligible for loans and Federal Work-

**Keith McCreight**
*Director*

**Emilio Vejil**
*Associate Director*

**Rebecca Martinez**
*Associate Director*

**Patti Brady-Glassman**
*Assistant Director*

**Nancy Van de Water**
*Assistant Director*

**Laurie Franklin**
*Financial Aid Adviser*

study. Graduate students should also apply through their departments for assistantships and/or research grants.

The provisions of all financial aid programs are subject to change without notice based on final determination of the regulations by the federal government and funding limits.

## GRANTS AND SCHOLARSHIPS

Funds that do not have to be repaid.

*All-Campus Scholarships*
These scholarships are need based awards administered by the OSU Financial Aid Office with eligible undergraduate students being considered for these awards during the financial aid process. The scholarships are based on a combination of financial need, academic merit, and a specified criteria for students who have completed fewer than 12 terms and submit the financial aid application (FAFSA) by February 1.

*Departmental Scholarships*
Each department on campus administers scholarship funds associated with its college and its programs of study. Scholarship committees within the college select recipients in accordance with the bequest of the donors. Students should contact their college or department directly for information and applications. Graduate students should contact their department for information on assistantships, fellowships and graduate scholarships.

*Federal Pell Grant*
The Federal Pell Grant is a need-based grant made by the federal government directly to 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. The Department of Education will send you a Student Aid Report (SAR) in approximately four weeks after the Free Application for Federal Student Aid (FAFSA) is filed which indicates if your are Pell eligible. The maximum award for 1997-98 was $2700.

*Federal Supplemental Educational Opportunity Grant (FSEOG)*
The FSEOG is a federal grant administered by the OSU Financial Aid Office. Funds are awarded to full-time undergraduates with Pell eligibility and exceptional financial need as determined by the institution. Award amount for 1997-98 was $600.

*Oregon State System of Higher Education Supplemental Tuition Waiver (SCW)*
The SCW is a state system tuition waiver program administered by the Oregon State Board of Higher Education. The program provides limited funds to full-time resident undergraduates to help offset tuition increases. Eligibility is limited to freshman and sophomore students with high financial need. Students receiving other tuition scholarships, waivers or grants are not eligible for the fee waiver. Award amount for 1997-98 was $1500.

*State of Oregon Need Grant*
The Need Grant is a state grant administered by the Oregon State Scholarship Commission (OSSC) and awarded to full-time undergraduate Oregon residents. Twelve terms of eligibility are possible based on need and allowable funding. This grant may be transferred to other eligible Oregon institutions. Award amount for 1997-98 was $1104.

## 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% , interest rate. The interest is paid by the government 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, postbaccalaureate 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. The maximum amount for undergraduates is $3,000 per academic year, up to a maximum of $15,000. Graduate students may borrow a maximum of $5,000 per academic year, up to a limit of $30,000 for both undergraduate and graduate study. 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 Offfice.

*William D. Ford Federal Direct Loan Program*
The following loans are awarded by the OSU Financial Aid Office to students on the basis of their financial aid application (FAFSA). Under this program, the loan funds come directly from the U.S. Government with a 4% administrative fee being taken from the amount of the loan prior to the funds being disbursed. The financial aid office mails the Direct Ford loan application to eligible students for processing.

*Federal Direct Subsidized Ford Loan*
This is a need-based federal loan at a variable interest rate capped at 8.25% for new borrowers. **The government pays the interest on the loan while the student is enrolled at least half-time** and repayment begins six months after graduation or withdrawal.

*Federal Direct Unsubsidized Ford Loan*
This is a non-need-based federal loan with the same interest terms as the subsidized Ford Loan. **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 or withdrawal.

The maximum yearly loan amount for any combination of Direct Subsidized and Unsubsidized Ford as set by the federal government and based on class rank are:
$2,625 for the first year of undergraduate study;
$3,500 for the second year of undergraduate study;
$5,500 per academic year for the remaining years of undergraduate study;
$8,500 per academic year for graduate students.

Independent undergraduate and graduate students are eligible to borrow an additional Federal Direct Unsubsidized Ford Loan amount. Students are awarded this loan upon request only. Dependent undergraduates may not borrow from this program unless an exception is made by a financial aid adviser due to their 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;
$10,000 per academic year for graduate students.

The total debt you can have outstanding from all Stafford/Ford loans combined is:
$23,000 as a dependent undergraduate;
$46,000 and 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. Parents are required to fill out a Direct PLUS Loan Application and Promissory Note which is mailed out by the OSU Financial Aid Offfice upon request. (It is not necessary to complete a FAFSA for this loan if no other aid assistance is being requested.)

It is a non-need-based loan at a variable interest rate capped at 9%. Interest is charged on the loan to the borrower from the date the first disbursement is made until the loan is paid in full. Repayment generally begins within 60 days after the final loan disbursement. A 4% administrative fee is deducted proportionately by the federal government each time a loan payment is made .

Parents may borrow up to the cost of attendance as determined by the university, minus any other financial aid the student may receive.

## FEDERAL WORK-STUDY PROGRAM (FWSP)

FWSP is a need-based federal program which is administered by the university to provide jobs for eligible students. Eligibility is limited to full-time students with exceptional financial need as determined by their FAFSA application. Students with FWSP

funds are assisted by the Financial Aid Office in locating employment on campus or at an approved site in the community to earn the amount of their award. Funds are paid out monthly on the basis of hours worked. Students are notified of their eligibility for Federal Work-Study on their financial aid award letter. Award maximum for 1997-98 was $1500.

## Other Financial Assistance

*Part-time Employment*
Part-time employment enables many students to pay rent or to earn spending money. The University Student Employment Service Center assist students in locating campus jobs and some off-campus job opportunities. The employment service is located in B008 Kerr Administration Building , (541) 737-2779. The Financial Aid Office also list some off-campus job opportunities on the bulletin board outside the office.

*Emergency Loans*
This is a short-term university loan program administered by the OSU Financial Aid Office to provide students temporary assistance with educational related expenses. Loan funds are made available to eligible students who are fully admitted and enrolled at least half-time. Students who owe the university an outstanding balance may not be eligible to receive an emergency loan. The loan is due back by the end of the term and is not available between terms. The loan is limited to $500 per term and has a 1% interest charge per month on the balance. Applications are available in the Financial Aid Office.

*Institutional Loans*
The OSU Financial Aid Offfice administers limited need-based institutional loans for educational purposes. Eligibility is limited to full-time students who have completed a financial aid application (FAFSA) and demonstrate need. Loan amounts vary and all institutional loans require an approved co-signer. Eligible students are referred to this loan program by a financial aid adviser.

## Aid Packages

After your eligibility for financial aid has been established, an award package is designed to meet your need. The Financial Aid Office attempts to meet the full need of each student whenever possible. The type of package you receive depends on your need, the maximum limits within individual aid programs, the availability of funding, as well as the receipt date of your aid application.

There are three types of financial aid funds: grants and scholarships; loans; and work-study. The policy at Oregon State University is first to award grants and scholarships when eligible and then loans and work-study.

Other resources such as grants and scholarships from outside agencies, ROTC awards, veteran's benefits, vocational rehabilitation assistance, graduate assistantships and fellowships, tuition waivers, room and board assistance, and outside loan assistance are also considered and included in your total aid package to meet your established need.

A student's aid package may be revised at any point during the academic year due to changes in funding; changes in your aid application; changes resulting from the verification process; enrollment changes; receipt of additional sources of funding; changes affecting your eligibility for awards; and to correct office error.

## Award Notification

Students whose aid application was sent by February I may expect to receive an initial award letter by approximately April 1 5th. Aid applications are then completed on a rolling basis by date of receipt with award notifications being sent out as files are completed.

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, sign, and return the award letter within 30 days. The signed award letter indicates the student has read and agrees to the terms of the award as outlined.

## Receipt of Aid Funds

Students are required to be registered and have their tuition and fees assessed before aid funds can be released. All approved financial aid funds are disbursed at the start of each term as a credit onto the student's billing account*. After ALL university billing charges have been paid, any excess funds will be refunded to the student. Student's may not request aid refunds if they have an outstanding account balance with the university.

Federal Work-study earnings are paid each month by check for the hours worked in the pay period.

Some private scholarship awards made available to students by check will be available at the OSU Business Office.

* First-year undergraduate students who are first time borrowers for a Federal Direct Ford loan will be credited their first loan payment 30 days AFTER the first day of the term.

## Expenses

Each year the OSU Financial Aid Office provides an estimate of cost for attending OSU using modest budgeting figures. The actual amount a student will spend depends upon their personal situation and lifestyle choices. This estimated cost of education figure is used to determine financial aid need.

The standard student budget includes tuition and fees, room and board, books and supplies, and miscellaneous personal expenses. OSU uses one standard budget for campus and off-campus living.

**1997-1998 Budget Figures**

| | Resident | Nonresident |
|---|---|---|
| Tuition and fees* | | |
| Undergraduate | $3,510 | $11,460 |
| Graduate | 6,012 | 10,230 |
| Room/Board | 4,851 | 4,851 |
| Books/Supplies | 852 | 852 |
| Misc/Personal | 2,148 | 2,148 |
| **Undergraduate Total** | **$11,361** | **$19,311** |
| **Graduate Total** | **13,863** | **$18,081** |

*Tuition and fees are set annually by the Oregon State Board of Higher Education after July 1, 1998.

Financial aid applicants are assigned the appropriate student budget. The standard student budget may be adjusted for cost associated with, the study resource fee assessed to Pharmacy, Engineering, and MBA students, and the origination fee for a student loan. Additional adjustments for child care cost for children 12 and under, medical, dental and/or commuting cost, students with disabilities, or study abroad programs may be considered by meeting with a financial aid adviser.

## Repayment Policy

Students who withdraw before completing the term for which they are enrolled, may be required to repay a portion of any money received from loans, grants or scholarships. Any money earned through Federal work-study employment is not to be repaid. The amount of repayment is based on your withdrawal date from Oregon State University.

Your aid money is considered to be in two categories: that which goes to pay for institutional charges (tuition and fees, campus room and board) and that which goes to pay for all other expenses. The latter category is the repayment portion that must be repaid.

The OSU Financial Aid Office, according to federal, state, and university regulations, calculates the amount that must be repaid to financial aid programs in the order indicated below:

Federal Direct Ford Loans
Federal Direct PLUS Loan
Federal Perkins Loan
Federal Pell Grant
Federal SEOG
Other federal, state, private, institutional funds

Once all financial aid programs have been repaid and all adjustment to charges have been finalized, students may request a refund.

The repayment of cash disbursement is as follows:

| Week of Classes | % Student Repays |
|---|---|
| 1 | 75 |
| 2 | 75 |
| 3 | 50 |
| 4 | 50 |
| 5 | 25 |
| 6 | 25 |
| 7-11 | 0 |

## STUDENT RESPONSIBILITIES

*Satisfactory Academic Prosress:*
All Financial aid recipients are expected to maintain satisfactory academic progress and to complete their degree requirements or educational objectives in a timely manner in order to continue to receive aid. Students are expected to complete the number of credit hours for the term for which they received financial aid funds. Most aid programs require full-time enrollment which is 12 credit hours per term for undergraduates or 36 hours for the academic year and 9 credit hours per term for graduate students or 27 credits for the year. The Financial aid year begins with summer term and ends with spring. Withdrawal and repeated courses do not count toward earned hours for any term. Letter grades of F, U, N, and I, do not apply toward satisfactory progress completion. Additionally, students must meet the University's academic regulations as outlined in this catalog under Academic regulations.

Students who fail to maintain satisfactory academic progress requirements face financial aid probation, denial of aid or both.

Should aid be withheld, students may petition in writing to the Financial Aid Office explaining why satisfactory academic progress has not been met. On the basis of the petition statement, supporting documents, and past academic progress history, a financial aid adviser will determine if an exception will be made to allow aid to continue. Decisions may be appealed first to the financial aid director, the financial aid committee and then to the Vice Provost of Academic Affairs.

*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 must report the following changes to the Financial Aid Office. You should expect a revision of your award in most cases.

* Additional financial assistance: scholarships, grants, loans, fee waivers, G.I. Bill, V.A. benefits and/or V.A. Voc. Rehab 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 your 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 attend an entrance interview prior to receiving the first disbursement of thier loan proceeds.

They are also required to attend an exit interview during their last term of attendance.

*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 as indicated: the Director of Financial Aid, the Financial Aid Appeals Subcommittee, and then the Vice Provost of Academic Affairs.

Many endowed scholarships and fellowships are available to students at Oregon State. In addition, individual colleges and departments may offer annual or unendowed scholarships. Students are encouraged to contact their college or department directly for scholarship application procedures and deadlines.

The scholarship criteria and amounts as listed are subject to change without notice. New scholarships are established on a continual basis. Students should also contact campus organizations or affiliates for additional scholarship resources.

## Office of Admission and Orientation

The scholarships listed below are administered by the Office of Admission and Orientation. Students may apply for each of these scholarships by completing the OSU Scholars Application available in the OSU Admissions Viewbook or at the OSU Web site. For additional information contact OSU Admissions at osu.orst.edu or (541) 737-6166

*Under-represented Minority Achievement Scholarships for Entering Freshman*
This scholarship covers mandatory undergraduate tuition and fees for up to 5 years. Applicants must be U.S. citizens, residents of Oregon, and graduate of Oregon high schools (or GED holders) who meet regular freshman admission requirements. The scholarship can only be applied towards a student's first baccalaureate degree. The awards are available to African American, Hispanic American and American Indian/ Alaska Native students.

*Under-represented Minority Achievement Scholarships for College Students*
This scholarship covers mandatory tuition for up to 3 years. Applicants must be U.S. citizens, residents of Oregon at the time of application, meet transfer admission requirements or be currently enrolled at a State System college or university, and have 24-36 quarter credit hours prior to the term of enrollment. The scholarship can only be applied towards a student's first baccalaureate degree or fifth year undergraduate program. The awards are available to African American, Hispanic American and American Indian/Alaska Native students. Application deadline can be as early as May 1.

*Oregon Laurels Scholarships*
Outstanding high school students are recognized with scholarships awarded up to four years. To be eligible students must have a minimum GPA of 3.75 and a minimum combined SAT score of 1100.

*Legacy Scholarships*
Outstanding students whose parent(s) graduated from OSU receive a one-year award.

*OSU Achievement Scholarships*
Outstanding high school students are recognized with scholarships awarded up to four years. Selection criteria include academic ability, leadership potential, and community involvement.

## Presidential Scholarships

Presidential Scholarships are privately-funded, merit-based annual awards.

The scholarships are awarded to first-year Oregon high school graduates with exceptional academic and leadership ability. To be eligible students must have a minimum GPA of 3.75 and a minimum combined SAT score of 1100.

*A-Dec, Inc. Presidential Scholarship*
*Alumni Assoc. Presidential Scholarship*
*Donald & Margaret Bailey Presidential Scholarship*
*Robert U. Baucke Presidential Scholarship Fund*
*Beckwith Presidential Scholarship*
*Delpha G. & Richard M. Brown Fund*
*Bower Presidential Scholarship*
*Burlingham Presidential Scholarship*
*Jim Castles Presidential Scholarship*
*Nancy Chandler Presidential Scholarship*
*Earle A. Chiles Memorial Scholarship*
*Virginia H. Chiles Memorial Scholarship*
*Ada A. Chipman Presidential Scholarship*
*M. Dale Chipman Memorial Presidential Scholarship*
*Susan Christensen Memorial Scholarship*
*D. Barton DeLoach Endowed Presidential Scholarship*
*E.G. Drew Memorial Scholarship*
*Russell & Myrta Ebbert Memorial Scholarship*
*Ellingson Presidential Scholarship*
*Emery Presidential Scholarship*
*Engineering Alumni Presidential Scholarship*
*Evans Presidential Scholarship*
*Fenner Presidential Scholarship*
*Fenner, Barnhisel, Willis & Barlow Scholarship*
*Roy and Sunnie Foy Presidential Scholarship Fund*
*James Gibson Presidential Scholarship*
*Frank B. Gordon Endowed Presidential Scholarship*
*Ray & Corky Grewe Presidential Scholarship*
*Betty Griffis Presidential Scholarship*
*Fred Hartung Presidential Scholarship*
*Franz Haan Presidential Scholarship*
*Hensley Scholarship Loan Fund*
*Hoyt Scholarship*
*Ed & Aurelia Hunt Presidential Scholarship*
*Roberta Mitchell Jansen Presidential Scholarship*
*Margaret L. Johnson Presidential Scholarship*
*Wm. C. Kirkpatrick Memorial Fund*
*Klamath First Federal Presidential Scholarship*
*Max & Annette Landon Presidential Scholarship*
*Laoteppitaks Presidential Scholarship*
*Eric Lindauer Presidential Scholarship*
*Linville Scholarship Fund*
*R.W. Lundeen Presidential Scholarship*
*Robert MacVicar Scholarship Fund*
*Malheur/Harney County Presidential Scholarship*
*Byram and Millicent Mayfield Scholarship*
*McClure Presidential Scholarship*
*Thomas & Margaret Meehan Presidential Scholarship*
*Meissner Memorial Presidential Scholarship*
*Alice E. Morris Presidential Scholarship*
*Ursel C. Narver Presidential Scholarship*
*Oliphant Presidential Scholarship*
*Charles Olsen Memorial Scholarship*
*Oregon State University Presidential Scholarship*
*OSU Student Foundation Presidential Scholarship*
*OSU Bookstores Presidential Scholarship*
*P.D. Ott Memorial Scholarship*
*Walther & Maxine Ott Presidential Scholarship*
*Florence Payton Memorial Scholarship*
*Milosh & Jeanne Popovich Presidential Scholarship*
*Proppe Presidential Scholarship*
*Robert Reisner Memorial Presidential Scholarship*
*Reynolds Presidential Scholarship*
*Wm. Ruegg Memorial Presidential Scholarship*
*H.J. & Grace Sandberg Presidential Scholarship*
*Arizona Sawyers Scholarship*
*Cecelia T. Shuttleworth Presidential Scholarship*
*John Arthur Smith Memorial Presidential Scholarship*
*Herb & Anita Summers Presidential Scholarship*
*Grace Tower Memorial Scholarship*
*Clifford and JoAnne Trow Presidential Scholarship*
*Tubbs Memorial Presidential Scholarship*
*U.S. National Bank Presidential Scholarship*
*Wal-Mart Competitive Edge Scholarship*
*Terry Watters Memorial Presidential Scholarship*
*Wells Fargo Bank of Oregon Presidential Scholarship*
*Windermere, Cronin, & Caplan Realty Group Inc.*
*Nellie Yerex Presidential Scholarship*

## College of Liberal Arts

The College of Liberal Arts and its thirteen departments award students over 40 scholarships per year.

Listed below are the College's general scholarships. For more information on the other specific awards, please contact the departments directly (Art Department or Music Department, for example).

*Dean's Scholarship in the Liberal Arts*
Funding equivalent to in-state tuition but open to both in-state and out-of-state students. Awarded on the basis of academic achievement to a junior enrolled in the College of Liberal Arts.

*William Q. Wick Memorial Scholarship*
$500 scholarship for a College of Liberal Arts undergraduate student with leadership abilities.

*James Hart Cook Memorial Scholarship*
For a senior majoring in English or Liberal Studies (language arts focus) interested in pursuing a Masters in Teaching.

*David Morgan Kiekel Memorial Scholarship*
For a College of Liberal Arts student who is also pursuing the International Degree.

**Art**
Most scholarships in the Department of Art require achievement in art and excellence as demonstrated by a portfolio of student work. Not every scholarship is awarded each year. Criteria generally include financial need. For more information, contact the Department of Art, 106 Fairbanks Hall.

*Art Department Faculty Award*

*Fine Art Award in Painting*

*Hollands Memorial Art Scholarship*

*Ida M. Matsen Memorial Art Scholarship*

*Matsen-Davidson Scholarship*

*Plinkiewisch Art Award*

*Norma Seibert Scholarship*

*Sponenburgh Travel Grant*

*Wayne Takami Memorial Scholarship*

*Julius M. Riddle Scholarship in Multimedia*

**Economics**

*Outstanding Senior Fellowship*
$100 is awarded annually to a senior economics major for outstanding academic performance in the field of economics.

*Intermediate Microeconomic Theory Fellowship*
$100 is awarded annually to the undergraduate student with the best performance in intermediate microeconomic theory (Econ 311-312).

*Intermediate Macroeconomic Theory Fellowship*
$100 is awarded annually to the undergraduate student with the best performance in intermediate macroeconomic theory (Econ 315-316).

*D. Barton DeLoach Distinguished Graduate Fellowship*
This fellowship is given to the outstanding graduate student proposing to work toward a master's or Ph.D. degree in economics, agricultural and resource economics, or forest resources. The recipient of this fellowship receives $15,000.

*Outstanding Graduate Student Award*
This award is given annually to the graduate student in the Department of Economics with the best academic performance. The recipient of this award receives $700.

*Emery Castle Graduate Award*
This award is given to all Ph.D. students in the Department of Economics who pass their core (theory and econometrics) examinations on their first attempt. The recipient of this award receives $100.

*D. Barton DeLoach Graduate Scholarship*
Awarded to a graduate research assistant or teaching assistant in one of the following departments: Agricultural and Resource Economics, Economics, or Forest Resources. The recipient is required to have some supervised teaching. The recipient of this scholarship receives $4000-$5000.

*Emery Castle Graduate Scholarship*
Awarded to the graduate student proposing to work toward a Master's or Ph.D. degree in Agricultural and Resource Economics, Economics, or Forest Resources. The recipient of this scholarship receives $2500.

**English**
Criteria for English Department scholarships generally based on academic performance, with a minimum GPA of 3.50 in English classes. Financial need not a factor. For more information, contact the Department of English, 240 Moreland Hall.

*Mary Jo Bailey Memorial Fellowship*
$100. Preference for women with the goal of teaching college-level English.

*Raleigh Clare Dickinson Memorial English Scholarship*
$500 for an outstanding English major based on extraordinary academic promise.

*Bernard Malamud Memorial Scholarship*
Approximately $500 awarded to a high school senior who shows exceptional talent in literature and writing, and intends to major in English at OSU.

*Mary Holaday Murray Scholarship in English*
$800 for freshman, sophomore, or junior based on extraordinary academic promise.

*Herbert Nelson Memorial Award*
$300 to a senior of outstanding promise as a high school English teacher.

*Sigurd H. Peterson Memorial Scholarship*
Full in-state tuition for a junior or senior with superior academic achievement.

*Robert Schwartz Essay Award*
$100 for best essay submitted as part of an English course

*Smith-Norris Essay Award*
$100 for best essay submitted in a writing course.

*Graduate Student Essay Award*
$100 for best graudate student essay.

*Roger Weaver Poetry Award*
$100 for best poems submitted to contest.

**Foreign Languages and Literatures**

*David Morgan Kiekel Memorial Scholarship*
The scholarship was established in 1995 to honor David Morgan Kiekel's interest in international education. A minimum of $200 awarded to an International Degree Student in the College of Liberal Arts.

*Sally Procious Malueg Scholarship*
The scholarship was established in 1995 to honor Sally Malueg, Associate Dean Emeritus of the College of Liberal Arts. A $500 award to a student intending to study in another country and specializing in foreign languages.

**History**
*Arthur E. Gravatt Award*
$800 in awards for up to two history majors whose seminar papers have the potential for publication.

*Robert Wayne Smith Book Award*
A $25 credit toward book purchase (other than textbooks) for as many as ten students. Awarded by the Department of History, in cooperation with OSU Bookstores. Selection honors authors of the best research papers or review essays submitted in history courses during the academic year.

**Music**

*Lois F. and Waite Rising Scholarship Fund*
This scholarship fund was started in 1990 by Lois F. Rising, a 1924 alum of OSU in Education. Mrs. Rising had a life-long interest in music and is a strong supporter of OSU and its Department of Music.

*Kathleen Byrne Freeman Scholarship Fund*
The Kathleen Byrne Freeman scholarship fund was established May 1992 in honor of OSU's President Emeritus John Byrne's mother. The recipient of this award shall be specializing in vocal music.

*Music Scholarship Fund*
This was the first endowed scholarship at OSU designated exclusively for music students. It was established through the donation of an anonymous donor. This fund is maintained by contributions from many donors. Funds have also come into the account from the sale of donated instruments.

*Dr. Helen E. Plinkiewisch Music Scholarship*
The Dr. Plinkiewisch Scholarship was established in 1995 to honor Lillian Jeffreys Petri. Scholarships are awarded primarily to music majors, although a number of awards will be made to outstanding musicians, irrespective of major. Awards will be made on the basis of musical and academic excellence.

*George Vernon Bolton, Jr., Memorial Scholarship*
The Bolton Scholarship fund was started in 1989 by Wayne R. Tate as a memorial to his friend Mr. Bolton. Mr. Bolton attended OSU in the early 1930s as a student in engineering or physics; he did not graduate from OSU. Students who are studying organ or piano have preference, but students in other areas are also eligible.

*Band, Choral Acitivities, OSU-Corvallis Symphony and Piano Activities*
Scholarships from these accounts are awarded at the discretion of the performance director.

*Captain Harry Beard Memorial Scholarship*
This scholarship was started in 1997 by alumn of the Oregon Agricultural College Cadet Band which Captain Beard ran from 1905 to 1947.

*The Shirley and John Byrne Music Scholarship*
This scholarship was established in 1996 by President Emeritus John Byrne and his wife Shirley.

*Robert F. Thurber Scholarship Fund*
This scholarship was started in 1997 by Don Thurber in memory of his son Rob. Rob, who died in 1996, had a degree in French Horn and was highly involved in music performance and in helping other young people develop their musical skills.

*Robert B. Walls Music Scholarship*
This scholarship was established in 1997 in memory of Robert B. Walls, professor Emeritus of the OSU Music Department, Director of the Choral Program, and former Chair of the department.

**Philosophy**
*Franklin J. Matchette Award*
$100 awarded each spring term by the Department of Philosophy to an undergraduate for excellence in the study of philosophy.

*Franklin J. Matchette Prize*
$100 presented each spring term by the Department of Philosophy for an outstanding undergraduate essay in philosophy.

*Student-Faculty Research Award*
Amount awarded varies. Students can be hired as research assistants for faculty research projects.

**Political Science**
*Rod and Joyce Chandler Scholarship*
Beginning Spring 1996, $1,000 awarded by the Political Science faculty to a rising junior with a declared major in Political Science. See the Department of Political Science, 307 Social Science Hall, for application details.

**Psychology**
*Psychology Scholar Award*
Quarterly award of $100 for books to junior or senior psychology major with a GPA of 3.50 or above. Recipient selected by department faculty.

**Sociology**
*Sociology Scholarship Awards*
Through the generous donations of the friends of the Department of Sociology, partial support may be available to deserving students in good academic standing. Contact the Sociology Department for additional information.

*William C. Jenne Award for Outstanding Scholarship.*
A $400 award for a Sociology major based on extraordinary academic performance and/or promise. Applications due early spring quarter and are available in the Sociology main office, 307 Fairbanks.

*Sociology Alumni Book Award*
Two $50 awards for books to Sociology majors. Awards are given for outstanding performance in the classroom or for service to the OSU community.

*Sociology Essay Award*
$100 for the best paper submitted by an undergraudate Sociology major as part of a Sociology course. This is a faculty initiated award.

**Speech Communication**
*D. Palmer Young Memorial Drama Scholarship*
Partial In-state tuition for one term (not necessarily awarded every year). Selection by the theater arts faculty, based on student's involvement in and commitment to the theater program, the apparent promise of continuing contribution, and financial need.

**Women Studies**
*Judy Mann DiStefano Memorial Scholarship*
$1500. Yearly award to an undergraduate enrolled in the Women Studies minor or certificate program; based on commitment to feminist ideals, community service or activism, need and achievement. Contact the Women Studies Program, 200 Social Science Hall.

*Sally Hacker Memorial Women's Research Fund*
Awarded only to undergraduate students at OSU, with preference given to returning women students in the College of Liberal Arts. Grants shall be to assist research related to women's issues and the dissemination of research results.

## COLLEGE OF SCIENCE

Unless otherwise stated below, students must have at least 30 credits at OSU to qualify. For additional information on science scholarships and application forms, contact the College of Science, Kidder Hall 128.

**Any Science Major**
*John M. Blanchard Memorial Scholarship*
$300 to an entering freshman with preference given to students from Sweet Home High School. Contact Sweet Home High School for more information and application form.

*G.V. Copson Memorial Scholarship*
Approximately $500 to a junior or senior with a GPA of at least 3.50 overall.

*Dean's Scholarship in the Natural Sciences*
Full resident tuition for a student in the College of Science with outstanding academic excellence.

*Margaret Dowell-Gravatt, M.D., Scholarship*
$1000 for a sophomore, junior, or senior majoring in microbiology, zoology, or prehealth, with first priority to female, ethnic minority. Financial need and minimum overall GPA of 2.50 and science GPA of 3.00 required.

*Jesse Hanson Scholarship*
Approximately 15 $500 scholarships to students with high scholarship, potential for success, unimpeachable character, service to the University through contributions to campus life.

*Walter Rudd and June Martin Scholarship*
To an outstanding new freshwoman in science or computer science.

*Powis Lee and Winifred Carloss Heitmeyer Scholarships*
Approximately 9 $1000 scholarships to science students with financial need who demonstrate an outstanding love of learning. Recipients must have completed at least one term at OSU and have at least a cumulative 3.0 GPA.

*Clara and Fred Horne Scholarship*
For an outstanding junior or senior.

*Andora J. Quinby Scholarship*
For Women in Physical Sciences ($1000).

**Biochemistry/Biophysics**
*Bend Research Scholarship*
$500 for an outstanding biochemistry/biophysics student from central Oregon.

**Biology**
*C.R. Herrick Memorial Scholarship*
$300 to a senior majoring in marine biology.

**Chemistry**
*William J. Ingram Memorial Fellowship*
$500 for a first-year graduate student based on scholarship, research progress, and progress on cumulative exams.

*Coleen Sprugeon Scholarship*
To an outstanding student in Chemistry.

**Entomology**
*Undergraduate Entomology Scholarship*
$250 to the top Entomology student.

**Geography**
*Christian Hunt Memorial Scholarship*
Scholarships of $500, $1,000 awarded annually to undergraduate students with a high degree of personal integrity, honesty, and respect of other people. Intended for students who cannot qualify for other assistance.

*Arthur Parenzin Undergraduate Geography Scholarship*
$2,000 per year for up to four years awarded to one incoming geography major.

*Arthur Parenzin Memorial Graduate Research Fellowships*
Three awards of $500 to graduate students in geography nearing completion of M.S. thesis or Ph.D. dissertation.

*Richard Highsmith Jr. Founders Fellowship*
$500 award to initiate M.S. research in geography.

*J. Granville Jensen Founders Fellowship*
$500 award to initiate M.S. research in geography.

**Geology**
*Samuel Evans, Jr. Memorial Scholarship*
Approximately $300 for a sophomore or junior who has demonstrated evidence of scholarship and professional motivation.

*Earl L. Packard Achievement Award*
$400 for a senior based on academic achievement and service to the Department and profession.

**Math**
*Paul Copson Memorial Scholarships*
Approximately 4 $500 scholarships to a junior or senior with good character and a minimum GPA of 3.50.

*Harry E. Goheen Memorial Book Award*
Approximately $300 to a junior or senior with first priority to under-represented minority students.

**Microbiology**
*Thomas R. Aspitarte Memorial Scholarship in Microbiology*
$450 for a junior or senior majoring in environmental microbiology.

*Helen A. Hays Women in Microbiology Scholarship*
First priority to undergraduate women.

*Mark H. Middlekauf Memorial Scholarship*
Full in-state tuition for approximately 8 juniors or seniors.

*Donald L. and Barbara G. Overholser Scholarship*
For outstanding junior (for senior year) as recommended by faculty and advisers.

*Joseph E. Simmons Memorial Scholarship*
Approximately one-half in-state tuition to approximately 6 juniors majoring in microbiology.

*Tartar Fellowship*
For graduate student in microbiology.

*Harriet M. Winton Scholarship*
To a microbiology student studying fish disease.

**Physics**
*Paul Copson Memorial Scholarship*
Approximately 4 $500 scholarships to a junior or senior with good character and a minimum GPA of 3.50.

**Predental Program**
*Kenneth Johnson Scholarship*
$500 for an outstanding predental student.

*Southern Willamette Valley Dental Society*
$500 for an outstanding predental student.

**Premedical Program**
All scholarships for students studying premed are based on financial need and a minimum GPA of 3.50.

*Alumni Physician Scholarship*
Approximately $1000 to a senior accepted to medical school.

*Ralph Bosworth Memorial Scholarship*
Approximately $1000 to a senior accepted to medical school.

*Augustin & Rita Gombart Medical Scholarship*
Approximately 3 $500 scholarships for a junior or senior.

*Haberman Premedical Scholarship*
To a junior premedical student with at least a 3.75 GPA & financial need.

*Alumni Physician Premedical Scholarship*
4 $500 scholarships for outstanding juniors or seniors.

**Preprofessional Program**
*Dora Krueger Memorial Scholarship*
A number of awards of approximately $750 each for sophomores, juniors, or seniors majoring in preveterinary medicine. Must have completed 75 credit hours at the close of winter term.

*James A. Riley, M.D. Health Occupations Scholarship, Corvallis Clinic Foundation*
To a junior or senior pursuing ahealth related profession; must have at least a 3.25 GPA.

**Statistics**
*Lyle D. Calvin Scholarship*
$1000 to a graduate student majoring in statistics.

*Ruth Krueger Scholarship*
$1000 to a graduate student majoring in statistics.

*Accu-Fab Fellowship*
$1000 to a graduate student majoring in statistics or operations research.

**Zoology**
*Wulzen-Kreuger Zoology Fellowship*
For a graduate student studying animal physiology.

## COLLEGE OF AGRICULTURAL SCIENCES

Agricultural Honors scholarships are for entering students with a record of leadership and high scholastic achievement. For additional information about Agricultural Honors scholarships or non-major specific Agricultural Sciences scholarships, contact Liz Webb, CAS Student Advancement, 137 Strand Ag Hall, (541) 737-2211.

**Any Agricultural Sciences Major**
*Leo Anderson, Jr. Memorial Scholarship in Extension Education*
For graduate or undergraduate students based on academic achievement, leadership skills, and experience in Extension related activities.

*Don Burlingham Memorial Scholarship*
For a junior or senior with financial need. Also based on qualities of citizenship, leadership, character, and participation in campus/community activities. Approximately full tuition.

*Frank Burlingham Memorial Agricultural Honors Scholarship*
Scholarships of $1000 offered to entering students. Preference for students from the Woodburn, Oregon area.

*Karla Chambers Leadership Agricultural Honors Scholarship*
For an Oregon high school graduate with high scholastic ability, record of demonstrated leadership, and interest in pursuing a career in agriculture. Approximately $1000.

*Wayne and Joann Chambers Scholarship*
For an Oregon high school graduate with demonstrated financial need and personal contribution to educational expenses. Student must be sophomore standing in Botany and Plant Pathology, Crop and Soil Science, General Agriculture or Horticulture. $1500.

*Paul Culbertson Memorial Scholarship*
Tuition paid for an undergraduate student with financial need. Preference for students from Jackson County, Oregon.

*Charles E. & Clara Marie Eckelman Memorial Scholarship*
Full-tuition and fees to juniors or seniors, with first priority to students majoring in food microbiology with an emphasis on the dairy industry. Equal weight for selection placed on scholastic performance; need; and qualities of citizenship, leadership, character, and participation in campus and community events. Five to seven scholarships, for students in the following departments: Microbiology, Food Science & Technology, Animal Sciences, and Agricultural & Resource Economics.

*Charles E. & Clara Marie Eckelman Memorial Fellowship*
$12,000 to graduate students, with first priority to students majoring in food microbiology with an emphasis on the dairy industry. Equal weight for selection placed on scholastic performance; need; and qualities of citizenship, leadership, character, and participation in campus and community events. Four fellowships, for students in the following departments: Microbiology, Food Science & Technology, Animal Sciences, and Agricultural & Resource Economics.

*EOU Oldfield Scholarship*
For students registered within the OSU Agricultural Program at Eastern Oregon University. For more information, contact Larry Larson, EOU.

*Eugene Fisher Agricultural Honors Scholarship*
Approximately $1000.

*H. H. Gibson Memorial Scholarship*
$500 for a freshman with financial need. Must be a graduate of an Oregon high school who has completed work in vocational agriculture.

*Walter J. and Florence J. Jaeger Undergraduate Scholarship*
For an entering freshman or transfer student with a sincere purpose and goal to work in some area of agriculture. Preference given to students from Gilliam County. Recipients eligible to receive the scholarship for 4 consecutive years if making satisfactory progress toward degree. Freshman year $750; sophomore year, $1,000; junior year, $1,250; senior year, $1,500.

*Jess Hanson Scholarship*
This can be awarded to an incoming freshman or an undergraduate within the College of Agricultural Sciences. Preference will be given to Benton County High School graduates.

*Malcolm Johnson Memorial Scholarship*
Approximately $1000 for a student from Crook, Deschutes, or Jefferson counties in central Oregon. Based on financial need, scholastic standing, and leadership.

*Robert D. Jones Continuing Venture Scholarship*
For a student enrolled in Crop and Soil Science within the College of Agricultural Sciences during their second year in the Agricultural Honors Scholarship Program. Preference given to students from the mid-Willamette Valley (Linn, Benton, Polk, and Marion counties), then to an Oregon high school graduates. Approximately $1,500.

*Lawrence E. Kaseberg Memorial Agricultural Honors Scholarship*
$1000 to an entering student who has clear potential for career advancement. Priority for student with GPA of 3.80 and above.

*Ursula Bolt Knaus Memorial Scholarship*
A number of scholarships totaling approximately $7,000 for undergraduate students in Agricultural Sciences.

*Earl Meier Memorial Dairy Science Scholarship*
Approximately $750 to a junior or senior with an interest in dairy production or dairy science.

*Paul and Frances Montecucco Scholarship*
For an entering student majoring in Horticulture. Preference given to applicants majoring in Food Science and Technology or Crop and Soil Science if no eligible Horticulture applicants apply. Approximately $1,000.

*Naumes Family Agricultural Honors Scholarship*
For an entering student. Approximately $1,000.

*Ben and Phyllis Newell Scholarship*
For student with sophomore standing with demonstrated financial need and personal contribution to educational expenses.

*O.M. Plummer Memorial Agricultural Honors Scholarship*
For entering students who have graduated from an Oregon high school. Preference given to students with an interest in animal sciences. Approximately $1,000-$1,500.

*Ben & Ethel Pubols Agriculture Memorial Scholarship*
For an undergraduate or graduate student in Agricultural Sciences.

*Dorothy & Harry A. Schoth Memorial Scholarship*
Approximately $200-$400. For juniors or seniors with financial need and a minimum 3.00 GPA.

*Clifford Smith Memorial Agricultural Honors Scholarship*
For entering students. Approximately $1,000.

*Loren J. Smith Memorial Agricultural Honors Scholarship*
$1000 to an entering student based on leadership.

*Herb & Anita Summers Agricultural Honors Scholarship*
For entering students. Approximately $1,000.

**Agricultural & Resource Economics**
Currently enrolled students are eligible to apply in March for the undergraduate scholarships. For additional information and application forms, contact Cheryl Kolbe, head advisor, AREC, Ballard Extension 200B.

*Agricultural Cooperative Council of Oregon Scholarship Award*
Junior or senior in agricultural economics with an interest in farm cooperatives and agricultural business management.

*LeRoy Breithaupt Memorial Scholarship*
For a junior or senior based on financial need, academic achievement, and overall University involvement.

*The Emery Castle Graduate Economics Scholarship*
Provides $2,500 to an outstanding graduate student in the Departments of Economics, Agricultural and Resource Economics, or Forest Resources.

*D. Barton DeLoach Distinguished Graduate Fellowship in Economics*
Provides $15,000 annually to a graduate student in one of the following departments: Agricultural and Resource Economics, Economics, or Forest Resources.

*William P. "Chip" Harris Memorial Scholarship*
For sophomore, junior, or senior residents of Benton County. Must have attended high school for at least two years in Benton County.

*Hollands Memorial Agricultural Economic Scholarship*
For undergraduate student, based on financial need, scholarship, good character, and U.S. citizenship.

*Robert Johnson Fellowship*
For a graduate student in agricultural and resource economics.

*D. Curtis Mumford Scholarship*
For sophomore with a minimum 3.00 GPA. Must be education goal-oriented, career focused, with evidence of academic good standing.

*Ermine & Norma Potter Memorial Scholarship*
Several scholarships for undergraduate students based on financial need, scholarship, and overall University involvement. Intended for students whose activities have made a contribution to the Department.

*Oregon Chapter: American Society of Farm Managers and Rural Appraisers Award*
$750 for a sophomore or junior in agricultural economics with an interest in farm management and rural appraising, high scholastic accomplishments, demonstrated leadership and service attitudes, and a resident of Oregon.

*Oregon Society of Farm Managers and Rural Appraisers Award*
$750 for a sophomore or junior in agricultural economics with an interest in farm management and rural appraising, high scholastic accomplishments, demonstrated leadership and service attitudes, and a resident of Oregon.

**Animal Sciences**
Information and Application forms are available in 112 Withycombe Hall.

*Charles M Fischer/Oregon Fryer Commission Scholarship*
$1,000 given to support a promising undergraduate student interested in Poultry Science. Recipient must maintain a 3.00 GPA.

*Jess Hanson Undergraduate and Graduate Poultry Scholarships*
Four $1,000 undergraduate scholarships (one for each class level) are awarded to promising students interested in Poultry Science. Incoming freshmen must be from Benton County high schools. A 3.00 GPA, one academic year in residence, and two letters of recommendation are required. Continuing students must maintain a 3.00 GPA to repeat. $5,000 is awarded to support a promising graduate student in Poultry Science who maintains a 3.00 GPA. The applicant must be a resident for one academic year, have two letters of recommendation, and meet the graduate requirements of both the Department and OSU.

*Hogg-Hubbard Fellowship*
$1,000 is provided for MS or PhD student with background and research relating to sheep. A BS in Agriculture from a university in the US is required.

*I.R. Jones Memorial Book Award*
The recipient receives a $100 credit at the OSU Bookstore to be used at his/her convenience. This book award is given to a sophomore, junior or senior in Animal Sciences, based on scholarship, leadership and participation in dairy activities.

*Parviz Kamangar Undergraduate and Graduate Scholarships*
One $3,000 scholarship provided to a promising undergraduate student in Animal Sciences (or three $1,000 scholarships). Financial need will be considered but will not be the deciding factor. Sophomores with 45 hours and maintaining a 3.00 GPA are eligible and it may be repeated. Also, $3,000 is awarded annually to assist either an MS or PhD student who exhibits commitment and promise in Animal Sciences and meets the graduate entrance requirements of both the Department and OSU.

*Larry Mirosh Memorial Scholarship*
Endowment was established in 1997 to recognize Larry W. Mirosh's dedication and service to the poultry program at Oregon State University, the Poultry industry, and the poultry 4-H and FFA youth programs. Larry was a valuable participant in the poultry science effort for many years, involving himself in all facets of the land-grant mission - teaching, research, and extension.
*Award*: $225
*Purpose/Requirements*: To attract new students who have 4-H or FFA backgrounds to the poultry program in the Animal Sciences Department. Recipient must be an incoming freshman who participated in 4-H and/or FFA poultry programs during or prior to high school and must demonstrate financial need.
*Class/GPA*: Freshman in poultry / 3.00 high school GPA
*Procedure*: Selected by the Department Head vis AnS Scholarship Committee.

*Oregon Beef Industry Scholarship (Oregon Cattlemen's Association & Oregon Beef Council)*
A $1,000 tuition scholarship is presented at OCA's annual meeting in late September. The recipient, a junior, should have an interest in beef production. Selection is based on scholarship, participation in departmental activities, and leadership ability.

*Pacific Egg and Poultry Association Undergraduate and Graduate Scholarships*
$750 is awarded to incoming freshmen and $1,500 awarded to sophomores, juniors, seniors, and graduate students to promote and support students studying poultry with the primary goal of contributing to the poultry industry after graduation. Awards are based on GPA, sincere interest in poultry, and need. PePa applications may be obtained in 304 Withycombe Hall in mid-January, and should be returned by February 15.

*Chester M. Wilcox Memorial Scholarship*
Either one or two graduate scholarships are given per year. They consist of $12,000 for MS and $14,000 for PhD students studying Poultry Science. Applicants must be US citizens and meet the graduate school and departmental graduate requirements.

**Crop & Soil Science**
For additional information and application form, contact Gerald Kling, key advisor, Crop & Soil Science, Ag and Life Sciences Bldg., 3005.

*L. L. Anderson, Jr. Memorial Scholarship in Soil Science*
For undergraduate students based on scholarship, leadership, and experience in Extension or possible future in Extension.

*M. Dale Chipman Memorial Scholarship*
For undergraduate students from Oregon or Idaho with financial need.

*J. Ritchie Cowan Memorial Fellowship*
For international graduate students with financial need whose interest is in agronomy.

*Crop & Soil Science Entering Freshman Scholarship*
For new freshmen students in Crop and Soil Science. $1,000 per year. Based on scholarship.

*Crop Science Scholarship*
For an undergraduate student in crop science.

*Wilson H. Foote Memorial Scholarship*
For an undergraduate student in crop science with financial need.

*Donald D. Hill Memorial Scholarship*
For an undergraduate student in crop science with financial need.

*Arthur King Memorial Scholarship*
Tuition plus $500 annual book allowance for sophomore, junior or senior, with financial need and a true love of the subject of crop and soil science.

*McGuire Crop Science Scholarship*
For an undergraduate student with financial need.

*Oregon Seed Growers League Scholarship*
For undergraduate student in Seed Technology or Crop and Soil Science.

*Oregon Seed Trade Association Scholarship*
For undergraduate student interested in seed production in Crop and Soil Science.

*Wilbur Powers Memorial Scholarship*
For undergraduate students in soil science.

*Robert H. Warrens Memorial Scholarship*
For Junior or Senior undergraduate student taking courses related to farm crops and soil conservation. Amount varies and is based on scholarship.

*William Kent Wiley, Jr. Memorial Scholarship*
For graduate student specializing in grass seed science. Based on need and scholarship.

*Timothy Wirth Memorial Scholarship*
For undergraduate student in Crop and Soil Science who graduated from Linn County secondary school programs and with rural farm background.

*John Flanagan Memorial Scholarship*
For undergraduate student in Crop & Soil Science. Based on financial need and Involvement in some aspect of seed Production, technology or science

*Stanley Starr Scholarship*
For undergraduate student in Crop & Soil Science. Based on need and scholarship.

**Fisheries Science & Wildlife Science**
For additional information and application forms, contact Charlotte Vickers, Fisheries Science & Wildlife Science, Nash Hall 104.

*Roland E. Dimick Memorial Scholarship*
$500 for a sophomore based on freshman year academic performance.

*Hugo Krueger Fellowship*
$1000 to a graduate student for research associated with fish physiology.

*H. E. Mastin Memorial Scholarship*
Three scholarships of $1000 to entering freshmen based on academic performance and financial need.

*Bill Wick Scholarship*
$1000 to an undergraduate based on scholarship and leadership abilities.

*Thomas G. Scott Achievement Fund: graduate fellowship*
$1500 to recognize research potential in graduate students.

*Bob and Phyllis Mace Watchable Wildlife Scholarship*
Two scholarships of $1000 to undergraduates and postbaccalaureate students based on need and leadership.

*Memorial Mentorship*
$3000 to an undergraduate with a strong interest in entering the working world upon graduation; based on scholarship and leadership.

*Chan Schenck Conservation Scholarship (Multnomah Hunters and Anglers Club)*
$600 junior or seniors in Wildlife or Fisheries Science.

*Bill Schaffer Memorial Scholarship (Multnomah Hunters and Anglers Club)*
$400 junior or senior in Wildlife or Fisheries Science.

*William R. Conchi Memorial Scholarship (Oregon Bugs and Panfish Club)*
$500 junior or senior in Fisheries Science with an interest in warm water fishes.

*Vivian Schriver-Thompson Scholarship*
$250 to a junior or senior Wildlife student from Oregon.

*Old Mill Yacht Club Fellowship*
$500 to a Fisheries graduate student studying coastal fisheries.

*Austin Hamer Scholarship*
$1,000 to a junior or senior in Wildlife Sciences with a 2.5-3.0 GPA and evidence to excel in the field.

*Oregon Council of the Federation of Fly Fishers Graduate Fellowship*
$1,000 to a graduate student in fisheries studying native Oregon fishes.

*Southern Oregon Flyfishers Association Scholarship*
Two $1,000 awards to juniors or senior in fisheries science.

**Food Science & Technology**
For additional information and application forms, contact Dan Farkas, key advisor, Food Science & Technology, Wiegand Hall 100.

*Paul Krumperman Memorial Scholarship*
$750 to a recent transfer student in Food Science & Technology.

*Oregon Dairy Industries Memorial Scholarship*
Scholarships of approximately $500-$750 to undergraduate or graduate students based on financial need and demonstrated interest in dairy foods.

*Clifford E. Samuels Memorial Award*
$750 to the outstanding freshman based on a combination of scholarship, activities, and professional interest.

*Don Welp Memorial Scholarship*
$1500 to a graduate or undergraduate student. Priority consideration given to sons and daughters of members of OSU's Alpha Theta Chapter of Phi Kappa Theta Fraternity, who graduated from OSU prior to 1975.

*Ernest Wiegand Memorial Award*
$750 to the outstanding senior based on scholarship, leadership activities, and professional interests/development. $500 to the outstanding graduate teaching assistant.

**General Agriculture/Agricultural Education**
For additional information and application form, contact Lee Cole, lead advisor, General Agriculture/Agricultural Education, Strand Ag Hall 112.

*Fisher Graduate Fellowship in Agricultural Science and Technical Education*
For a student enrolled in the Agricultural Education Teacher Certification Masters Program through the College of Agricultural Sciences.

*Gary McKenzie Agricultural Scholarship*
For an undergraduate student, with priority to freshman. First preference for FFA members from a Eugene, Oregon high school. Must have interest in technical agriculture and show performance, character, and leadership through FFA projects.

*R.M. Wade Agricultural/Education Scholarship*
For an outstanding student enrolled in the Agriculture Education Program.

**Horticulture**
Along with other criteria, horticulture scholarships are based on financial need. For additional information and application forms, contact Anita Green, Key Adviser, Department of Horticulture, ALS 4155.

*Rolland Beglau Memorial Scholarship*
$500 for an undergraduate student, with first consideration to individuals who have an Oregon farm background, 4-H, or FFA horticulture experiences. A love and enthusiasm for the production of vegetables and fruit crops are the foremost criteria.

*Wilbur Burkhart Memorial Scholarship*
For an undergraduate student with an interest in horticulture.

*Endicott Farms Undergraduate Scholarship*
A $500 award for a student majoring in horticulture with an emphasis in vegetables. Selection criteria are financial need and promise.

*Bruce Faddis Memorial Scholarship*
In-state tuition for up to three terms for a senior pursuing a career as a golf course superintendent. Must have significant practical experience at golf courses and demonstrate a commitment to the industry via activities in and out of classes, and have involvement with turf projects at the Lewis-Brown farm.

*General Dillingham Produce Industry Scholarship*
A $1000 award to a junior or senior full-time student intending to enter the fresh fruit and vegetable industry in an area between production and marketing. The award is based on sincerity of purpose, character, leadership, scholastic record, and financial need. Help provided to obtain employment between junior and senior years.

*Golf Course Superintendent's Association of America Scholarship*
This is a national scholarship available to students pursuing careers as golf course superintendents. Selection is based on scholastic achievement, work experience, and verified financial need. Finalists go to the International Golf Show and interview in person to determine the final award.

*Grow and Show Garden Club*
One or more awards limited to juniors and seniors in horticulture. Need to show evidence of ability, promise, and need.

*Jane Kerr Pratt Memorial Scholarships*
Various awards made available through funds from Oregon Community Foundation. Based on graduate of U.S. high school, academic achievement, need, and interest in landscape design, propagation and/or use of native plant materials.

*Ezra J. Kraus Memorial Scholarship*
One or more scholarships to undergraduate students studying ornamental horticulture. Based on ability, promise, and reasonable need.

*Ezra J. Kraus Memorial Fellowship*
$1500 to a graduate student studying ornamental horticulture. Based on financial need, scholastic merit, and professional potential.

*McMinnville Women's Garden Club Scholarship*
One scholarship in the amount of $250 given to a junior or senior from Yamhill County majoring in horticulture.

*Multnomah Chapter DAR Scholarship*
*Ruth Rose Richardson Park Memorial Award*
A $1000 award established by the Multnomah Chapter Daughters of the American Revolution, to be awarded annually to a student of sophomore, junior, or senior standing enrolled in horticulture or landscape design.

*National Council of State Garden Clubs, Inc.*
$3500 awarded to encourage study of horticulture, floriculture, landscape design, conservation, forestry, botany, agronomy, plant pathology, environmental control, city planning, land management and allied subjects. Only one applicant per state; 20 total awarded.

*AGR-EVO Turf Scholarship*
$1000 scholarship to a senior interested in becoming a golf course superintendent. Preference is given to students with good academic records, extensive work experience, and demonstrated involvement in the turf program at OSU.

*Northwest Turfgrass Association Scholarship*
$1000 scholarship awarded annually to students pursuing careers in the turf industry. Preference is given to students with strong academic records, a history of industry involvement, and potential to become industry leaders.

*OSU Horticulture Club Scholarship*
$1000 awarded based on financial need and Horticulture Club and community involvement. Must be an undergraduate in horticulture and have a minimum 2.25 GPA.

*Oregon Federation of Garden Clubs Scholarship*
One or more awards for an Oregon resident sophomore or upper division student majoring in ornamental and landscape horticulture. Awarded on the basis of excellence in scholarship, personal qualifications, and financial need.

*Oregon Golf Course Superintendent's Association (OGCSA) Scholarship*
A $500+ scholarship awarded to students of junior standing or higher pursuing careers as golf course superintendents. Preference given to students with strong academic records and extensive golf course work experience. First priority for members of OGCSA who have worked for a member of the organization.

*Oregon Horticultural Society*
Scholarships to undergraduate students in horticulture or related fields. Preference is given to horticulture majors. Recipients selected by the Oregon Horticultural Society Scholarship Committee.

*Oregon Nurserymen's Foundation Scholarships*
These scholarships are offered with the intent to encourage students to enter and complete their academic studies in ornamental horticulture, and then to enter the nursery industry as qualified employees of fellow nursery professionals. *Bill Egan Memorial Award:* $500 to a student majoring in horticulture with emphasis on greenhouse/floriculture areas. Preference will be given to family members and employees of the OAN Greenhouse Chapter. *Clackamas Chapter Award:* $850 to a student beginning college studies in an ornamental horticulture field. *Emerald Empire Chapter Award:* $500 to a third year or higher college student majoring in horticulture, landscape architecture or landscape construction, who also graduated from an Oregon high school. Preference will be given to a student from the Emerald Empire/Eugene area. *Martin Holmanson Memorial Award:* $500 to a college junior or senior student majoring in ornamental horticulture. *Joseph B. Klupenger Award:* $550 to a student majoring in ornamental horticulture who plans to work in the ornamental industry either as an employee or as a family member of a business. *Mt. Hood Chapter Award I and II:* $1000 each to a college student majoring in ornamental horticulture. Preference will be given to applicants from nursery areas east of Portland. *Nursery Employee Award:* $500 to a college student in ornamental horticulture who is employed by an OAN member firm. *Nurserymen's Foundation Award:* $1000 to a student majoring in the field of horticulture. *Nurserymen's Memorial Award:* $1000 to a graduate student research project pertaining to ornamental horticulture. *Patio Alliance Award:* $1000 to a college student majoring in the turf and landscape management area. *Retail Chapter Award I:* $1000 to students majoring in ornamental horticulture and related fields. Preference will be given to students who are a son/daughter of an OAN member retailer, or one of their employees. *Retail Chapter Award II:* $1000 to college students majoring in ornamental horticulture and related fields. *Retail Chapter Award III:* $1000 to a student majoring in ornamental horticulture and related fields.

*James H. Weatherspoon Viticulture Fellowship*
To supplement graduate research assistantships to candidates conducting thesis research in viticulture.

**Microbiology**
For additional information and application form, contact the Department of Microbiology, 220 Nash Hall.

*Thomas R. Aspitarte*
For undergraduate students studying environmental microbiology.

*Charles Eckelman*
Approximately $10,000 per year for two to four years will be awarded to a graduate student in the College of Agricultural Sciences, Department of Microbiology in dairy research. Is awarded every two to four years.

*P. R. Elliker*
$1,000 is awarded to a Microbiology student studying food safety. This award is granted every other year.

*Helen Alford Hays*
Awarded to undergraduate students with a satisfactory academic standing.

*Mark H. Middlekauf*
Usually full in-state tuition for five or six outstanding undergraduate microbiology majors.

*Donald and Barbara Overholser*
Approximately $200 awarded to one undergraduate outstanding Microbiology junior every other year.

*Joseph E. Simmons*
Approximately one-half in-state tuition for two worthy and promising students in microbiology per school year.

*Tartar Fellowship*
For graduate students in microbiology.

*Harriet M. Winton*
Approximately $700 awarded to one graduate student in the study of diseases of fish.

**Rangeland Resources**
For more information contact William Krueger, Strand Ag Hall 202.

*Dillard H. & Anastasia M. Gates Graduate Scholarship in Rangeland Management*
To help with students' personal and professional growth. First priority for Ph.D., then M.S.

*L.A. McClintock Farm Scholarship*
For outstanding student in rangeland resources.

## COLLEGE OF BUSINESS

**General Business**

*Glenn L. Jackson Memorial Scholarship*
Awarded annually to incoming freshman based on high school GPA, SAT scores, and leadership activities. Renewable for four years.

*Helen Mae Cropsey Memorial Scholarship*
Is awarded annually to College of Business students for their senior year based on scholastic achievement and potential for future success in business. First preference will be given to a woman.

*Marshall & Melissa Dawes Scholarship*
Is awarded annually to College of Business students for their senior year based on scholastic achievement and financial need.

*Edna M. Jesseph Endowed Scholarship*
Is awarded annually to junior or senior College of Business students based on financial need and potential for future success in business.

*Joe D. Lewis Scholarship*
Is awarded annually to College of Business sophomores, juniors, or seniors based on academic achievement and financial need.

*Jane Goodale Mann Memorial Scholarship*
Is awarded annually to College of Business students based on financial need and potential for future success in business.

*Louise Jackman Orner Memorial Scholarship*
Is awarded annually to College of Business students for their junior or senior year based primarily on academic achievement. Candidates must also be Oregon residents and graduates from an Oregon high school, with a minimum 3.00 cumulative grade-point average from course work completed at OSU. First preference will be given to a woman.

*Harley and Brigitte Smith Scholarship*
Is awarded annually to College of Business students for their senior year who plan to establish a career in residential investment/income property (apartments, condos or single-family rental property).

*Bertha W. Stutz Scholarship*
Is awarded annually to a sophomore, junior or senior in the College of Business based on academic achievement and financial need with special consideration to applicants who are long-time residents of Benton County. First preference will be given to a woman.

**Accounting**
*Arthur Andersen and Company Scholarship*
Selection by the accounting faculty based primarily on scholarship and professional promise.

*Beta Alpha Psi Scholarship*
Recipient must be a current member of Beta Alpha Psi. Fifty percent based on service to Beta Alpha Psi, twenty-five percent to scholastic standing, and twenty-five percent to participation and community activities and projects.

*Chevron Scholarships*
For juniors or seniors. Selection by the accounting faculty based primarily on scholarship and professional promise.

*Coopers and Lybrand Scholarship*
Awarded annually to student(s) who will be entering their senior year. Selection will be made by the accounting faculty based upon the following criteria: graduation from an Oregon high school; demonstrated interest in becoming a member of the profession of certified pubic accountants; overall grade-point of 3.20 or greater at the time of application; and broad, well-rounded background in on-and off-campus extracurricular activities.

*Deloitte and Touche Scholarship*
Awarded annually to student(s) entering their senior year. Selection by the accounting faculty based primarily on scholarship and extracurricular activities.

*Deloitte and Touche Scholarship*
Awarded annually to student(s) entering their junior year. Selection by the accounting faculty based primarily on scholarship and extracurricular activities.

*Faler Scholarship*
Selection by the accounting faculty based primarily on scholarship and professional promise.

*Price Waterhouse Scholarship*
For student(s) entering their senior year (or final year as a post-baccalaureate student). Selection will be made by the accounting faculty based upon the following criteria: scholastic achievement - student should have an overall cumulative grade-point-average of 3.50 in all business and accounting courses and a minimum 3.20 university cumulative grade-point-average; extracurricular activities with a clear demonstration of leadership capability; and professional promise in the field of public accounting.

*Stover Neyhart & Company Scholarship*
For student(s) entering their senior year. Selection by the accounting faculty based primarily on scholarship and professional promise.

**Family Business**

*Richard T. Harris Memorial Family Business Scholarship*
Is awarded annually to a College of Business student who is a member of a family that owns or operates a family business and has a continuing interest in family business management. Minimum GPA 3.0. Demonstrated leadership qualities and involvement in extra-curricular programs.

*Reser Family Scholarship*
Is awarded annually to a College of Business student who is a member of a family business and has a continuing interest in family business mangement. The student must be a U.S. citizen and have demonstrated academic achievement and leadership.

*Wentworth Family Business Scholarship*
Is awarded annually to College of Business students for their junior or senior year who demonstrate an interest in family business.

*W. A. Woodard Foundation Scholarship*
Is awarded annually to College of Business students for their junior or senior year who demonstrate an interest in family business.

**Management Information Systems**

*Andersen Consulting Scholarship*
Is awarded annually to outstanding College of Business students entering their senior year with an option of Management Information Systems. Awarded on the basis of scholastic achievement, demonstrated leadership, dedication to MIS, and good communication skills. Selection will be made by the MIS faculty.

*MIS Advisory Council Scholarships*
Is awarded to College of Business students entering their junior year with an option of Management Information Systems. Awarded on the basis of scholastic achievement, demonstrated leadership, dedication to MIS, and good communication skills. Selection will be made by the MIS faculty.

**Master of Business Administration**

*Maureen Leary Brown Memorial MBA Scholarship*
Is awarded annually to a student admitted to the MBA Program in the College of Business. Student must have achieved an undergraduate GPA of 3.25 (on a 4.0 scale). First preference will be given to a woman.

**Scholarships Not Administered Through the College of Business**
Other scholarships may become available throughout the year for which College of Business students are eligible. These will be announced on the Scholarship Bulletin Board which is located in the hallway of Bexell Hall, adjacent to Room 212.

## COLLEGE OF ENGINEERING

For additional information on general engineering scholarships and application forms, contact the College of Engineering, Head Adviser, 151 Batcheller Hall .

**Any Engineering Major**

*Inez J. Belknap Memorial Scholarship*
$1000 to an undergraduate or graduate student with financial need.

*Boeing Scholarship*
$1,500 to an undergraduate junior or senior student with high academic achievement and financial need.

*Ralph A. Chapman Memorial Scholarship*
To a sophomore, junior, or senior based on scholastic achievement, qualities of leadership, outstanding characteristics of citizenship, and financial need.

*Cockeram Family Tau Beta Pi Scholarship*
To an undergraduate or graduate student who is a member of Tau Beta Pi.

*George Gleeson Memorial Scholarship*
$1000 to an undergraduate student.

*Pete Im Memorial Scholarship*
$1000 to an undergraduate or graduate student with financial need and a minimum GPA of 2.57.

*Longview Fibre Scholarship*
$1,500 to a sophomore, junior or senior based on scholastic achievement, a marked degree of ability in their chosen field, and financial need.

*Robert V. Mrazek Memorial Scholarship*
$1000 to an undergraduate student, with preference given to high academic achievers who have overcome constraints imposed by family or personal circumstances.

*Peck Scholarship*
$1,000 to a freshman based on scholastic achievement.

*PEO Scholarship*
$1,000 to an Oregon high school graduate based on financial need and scholastic achievement.

*Norman W. Pettijohn Scholarship*
$1500 to a freshman who is a graduate of Vernonia High School. Based on capacity to understand math and sciences, and motivation to succeed in college. Distributed by OSU Foundation.

*June & Truxton Ringe Engineering Scholarship*
$1000 to a junior or senior who is a resident of Oregon or Washington. Also based on financial need.

*Tau Beta Pi Engineering Scholarship*
Three scholarships of $500 to a sophomore, a junior, and a senior. Based on academic performance. Contact the president of Tau Beta Pi. Must be a TBP member.

*Alfred J. Trommershausen Scholarship*
For graduate of Newberg High School, Newberg, Oregon, who has demonstrated outstanding academic and leadership achievement.

*Young Scholarship*
$750 to a junior or senior based on above average scholastic achievement and financial need.

**Bioresource Engineering**
Bioresource Engineering scholarships are based on both scholarship and extra-curricular activities. Financial need is not a factor. For additional information, contact the Department of Bioresources Engineering, 116 Gilmore Hall.

*Myron G. Cropsey Agricultural Engineering Scholarship*
For undergraduate or graduate students.

*Ralph N. Lunde Memorial Scholarship*
For undergraduate or graduate students.

*Jefferson B. Rodgers Scholarship*
For undergraduate or graduate students.

*Wade Rain Irrigation Scholarship*
For undergraduate or graduate students.

**Chemical Engineering**
For additional information and application form, contact the Department of Chemical Engineering, 103 Gleeson Hall. (email: mail@che.orst.edu, web: http://www.che.orst.edu).

*American Institute of Chemical Engineers (A.I.Ch.E.) Scholarship*
Based on academic performance.

*Chemical Engineering Scholarship*
Based on academic performance.

*Chevron Scholarship*
Based on academic performance.

*Lloyd Covert Memorial Chemical Engineering Scholarship*
Based on academic performance.

*James & Billie Hickman Scholarship*
Based on academic performance.

*Gayle Nichols Memorial Scholarship*
For a junior or senior based on academic performance.

*Paper Industry Management Assn (P.I.M.A.) Engineering Scholarship*
Based on academic performance.

*Robert Proctor/Chevron Scholarship*
Based on academic performance.

*Alan Selker Memorial Scholarship*
Based on academic performance.

*Roy A. Strandberg Memorial Scholarship*
Based on academic performance.

*Technical Association of the Pulp & Ppaper Industry (T.A.P.P.I.) Scholarship*
Based on academic performance.

*Charles E. Wicks Scholarship*
Based on academic performance.

**Civil, Construction, and Environmental Engineering**
For additional information and application form, contact Sandy Jameson unless noted otherwise below, Department of Civil Engineering, 201 Apperson Hall.

*AGC Student Chapter Scholarship*
For AGC Student Chapter members. Contact Jan Strombeck, 111 Apperson.

*Daniel Applegate Memorial Scholarship*
Support to be given an undergraduate and/or graduate student who meets the following criteria: Active enrollment in the civil engineering curriculum, maintain a 2.5 or higher GPA, demonstrate financial need, participation in extracurricular activities such as professional societies.

*Harlan E. Brown Memorial Scholarship*
$250-$500 to an undergraduate student based on financial need, minimum GPA of 3.00, and creativity in problem solving.

*Jay and Gladys Blair Endowed Scholarship*
$500-750 with first preference to a student from the Northwest. For an outstanding and deserving student enrolled in the transportation curriculum.

*Carl E. Carlson Memorial Scholarship*
To assist needy students in the Civil Engineering Department.

*Coral Sales/Daniels Scholarship*
Six awards of $500 to juniors, seniors, and graduate students based on outstanding leadership qualities and participation in extra-curricular activities. One award to both male and female in Civil Engineering and Construction Engineering Management at each grade level. Contact Jan Strombeck, 111 Apperson.

*Otto & Marie Hermann Memorial Scholarship*
$1000-$1500 to a senior based on outstanding characteristics and qualities of citizenship, and an interest in construction.

*Glenn Holcomb Memorial Scholarship*
$500-$1500 to a junior or senior with an interest in structural engineering and a minimum GPA of 3.00.

*Fred Madigan Scholarship Fund*
$1000-$1500 to be given to one or more deserving undergrduate students who are enrolled in the Department of Civil Enginering.

*Jim McCall Memorial Scholarship*
$750-$1000 for a senior in CE/CEM. Minimum GPA of 3.00.

*Don C. Phillips Memorial Scholarship*
$1000-$1800 to a senior or graduate student specializing in environmental engineering.

*Col. Robert Gilmore Scott Memorial Scholarship*
$600-$1000. Approximately 25 scholarships awarded annually to juniors and seniors with financial need and a minimum GPA of 3.00.

*Lilo and Richard Smith Endowed Transportation Scholarship*
$600-$1500 award to be given to a student with particular interest in traffic engineering and traffic safety. Must retain a 3.00 or better GPA.

*Clyde and Mary Spencer Endowed Scholarship in Construction Engineering Management*
$750-$1000 award given to Undergraduate or Graduate majoring in Construction Engineering Management. Student must be in good standing.

*Kenneth Spies Memorial Scholarship*
$750-$1000 to a senior intending a career in environmental engineering.

*Edward Worth Memorial Scholarship*
$750-$1500 for a senior with a demonstrated interest in geotechnical engineering.

**Electrical & Computer Engineering**
Electrical & Computer Engineering scholarships are based on academic performance, financial need, career goals. Freshman Scholarships are due by March 1st. Applications are sent to Oregon high schools. All of the other scholarships will be open for application in March. The deadline is generally the beginning of April. For additional information and a application form, contact the Department of Electrical & Computer Engineering, 220 ECE.

*Richard Earnheart Scholarship*
For a junior or senior.

*Douglas Engelbart Scholarship*
For a junior or senior.

*John F. Engle Memorial Scholarship*
For student who specializes in electrical power engineering during senior year. First priority to graduates of Benson High School, Portland.

*Grant S. Feikert Memorial Scholarship*
For a junior or senior.

*Lawrence Fisher Memorial Scholarship*
$1000-$1500 for a junior, senior, or graduate student studying electrical power or power generation engineering.

*Donald Guinn Scholarship*
For a junior or senior with preference for under-represented minority and female students.

*Ursula Bolt Knaus Memorial Scholarship*
Full in-state tuition for a junior or senior.

*Rexwell D. Miller Memorial Scholarship*
To benefit graduate students and undergraduate students in electrical engineering.

*Wesley Nishimura Memorial Scholarship*
Awarded to the top junior in ECE.

*Theodore Ritter Work Scholarship*
To incoming freshmen who are Oregon residents.

**Industrial & Manufacturing Engineering**
Scholarships based on academic performance. For additional information and application form, contact Sabah Randhawa, Department of Industrial & Manufacturing Engineering, 118 Covell Hall.

*Clayton K. Dart Memorial Scholarship*
$1000 to a graduate or undergraduate student.

*Garrard-Peters Memorial Scholarship*
$500 to a junior or senior.

*James Riggs Memorial Scholarship*
$1000 to an undergraduate professional program student who is an Oregon high school graduate.

*Tom and Carmen West Scholarship*
$1000 to a undergraduate who is an Oregon high school graduate.

**Mechanical Engineering**
Scholarships based on academic performance. For additional information and application form, contact the Department of Mechanical Engineering, Rogers Hall 204.

*Memorial Scholarships:*
Michael Teramura Memorial Scholarship, for ME student at OSU, based on merit, first consideration to students from Oregon.

Robert Zaworski Memorial Scholarship, based on merit and international education programs.

Clarence A. Calder Memorial Scholarship, for freshman ME student at OSU, based on merit, graduation from Oregon high school, first consideration toward recruiting women into the program. If these criteria cannot be met, it may be awarded to an upper classman with high academic performance.

Proctor Chevron Scholarship, based on merit and greatest benefit to the department as determined by the Department Head.

Bernhard F. Kieffer Memorial Scholarship, for undergraduate or graduate student in metallurgy, metallurgical engineering, or a similar technical degree.

Faculty Memorial scholarship (may not be awarded every year), based on merit.

Louis B. Slegel Memorial Scholarship (may not be awarded every year), for OSU ME graduate student in the design area, based on merit.

*Company Scholarships* (may not be awarded every year):

Chevron Scholarship, based on merit, junior or senior standing, US citizen or permanent resident.

ESCO Scholarship, based on merit, undergraduate female ME student at OSU.

**Nuclear Engineering**
Scholarships based on academic performance, financial need, extracurricular activities and career goals. For additional information contact Andrew C. Klein, Department of Nuclear Engineering, 116 Radiation Center. (email: nuc_engr@ne.orst.edu, web: http://www.ne.orst.edu).

*John Grund Memorial Engineering Scholarship*
$1400-$1600 to a junior or senior with evidence of interest in safety issues related to the peaceful uses of nuclear energy.

*Karl Hornyik Memorial Scholarship.*
$500-$600 to a junior or senior nuclear engineering or radiation health physics student.

## COLLEGE OF FORESTRY

Scholarships based on academic performance. Students' prior coursework and background must indicate interest and potential for success in their chosen forestry field. For additional information contact the College of Forestry, 140 Peavy Hall.

**Any Forestry Major**
*Robert Aufderheide Memorial Scholarship*
$1000 to support an outstanding undergraduate student in forestry who shows scholarship and financial need. Awarded every third year.

*Autzen Scholarship*
$4000 for an outstanding undergraduate majoring in forestry.

*Bob and Beverley Cooper Forestry Scholarship*
$500 to a student transferring from the forestry program at Central Oregon Community College.

*George M. Cornwall Memorial Scholarship*
$1000 for an undergraduate student, with priority to seniors.

*Joe Crahane Memorial Scholarship*
Two scholarships of $2000 to freshmen, with preference to top entering students from Oregon.

*Gordon A. & Priscilla E. Duncan Scholarship*
Five scholarships at $1000 to juniors or seniors with financial need.

*Henry Fang Scholarship*
$750 to an undergraduate or graduate student.

*Floyd Hart Memorial Scholarship*
$2000 to a senior with financial need.

*Kenneth and Karen Jones Graduate Fellowship*
$2000 for a student doing research in alternative silviculture systems.

*Forestry Legacy Scholarship*
Three scholarships at $1000 to undergraduate or graduate students.

*Harold "Bud" Freres Memorial Scholarship*
$3000 to freshman with financial need. First priority to a graduate of a Stayton, Oregon area high school.

*James Girard, Jr. Memorial Scholarship*
$500 every third year awarded to a freshman.

*Jay B. Hann, Jr. Scholarship*
To an undergraduate forestry student with financial need.

*W.F. McCulloch Memorial Scholarship*
$1000 to an undergraduate student.

*Green Peter Hoo Hoo Scholarship*
$3000 for a student interested in pursuing a career in the forest industry.

*Kurt Jon Peterson Memorial Scholarship*
$1000 for an undergraduate student, with preference for Oregonians.

*Walter A. Gruetter, Jr. Memorial Forestry Fellowship*
$500 to a graduate student, with first priority for female.

*Lance and Pat Hollister Scholarship*
$500 for a forestry student from a disadvantaged background.

*W.R. Randall Memorial Scholarship*
$1500 to a undergraduate student with financial need.

*Janet K. Ayer Sachet Scholarship*
One award to woman of junior or greater standing majoring in forestry with perference to Forest Management or Forest Products students.

*Durward F. Slater Memorial Scholarship*
Two scholarships of $600 for juniors or seniors based on good character, sincerity of purpose, high scholarship, and potential for success.

*C. Wylie Smith III Memorial Scholarship*
Two scholarships of $2700 to juniors or seniors with preference to students from the Coos County area.

*John R. Snellstrom Memorial Scholarship*
Two scholarships of $1000 to juniors whose interest lies in forestry as a career.

*T.J. & Margaret O. Starker Memorial Scholarship*
$1000 to an undergraduate student based on personal integrity, scholarship, financial need, and commitment to forestry as a chosen career.

*Dorothy D. Hoener Memorial Fellowship*
Ten scholarships at $4200 to undergraduate students and five fellowships at $3000 to graduate students based on professional potential, academic achievement, need for graduates in students' area of interest, and financial need.

*Eduardo Ruiz Landa Founder's Fund*
For forestry graduates from Medellin, Columbia or other forestry or natural resource graduates from other schools in Columbia, Cuba, Ecuador, Chile, Peru, or Panama. Provides round-trip airfare from home country to OSU once, tuition and fees, room and board, books, supplies, and other expenses.

*Charles Lord Memorial Forestry Scholarship*
$3000 to an undergraduate student.

*Mary J.L. McDonald Memorial Fellowship*
Three fellowships at $2000 to support graduate students in forestry.

*Arnold & Vera Meier Memorial Education Fellowship*
$2500 for a top graduate student in forestry.

*Alfred W. Moltke Memorial Fellowship*
Five fellowships at $3000 to support top graduate students in forestry.

*Everald E. Nelson Fellowship*
One or two fellowships to graduate students of high scholastic standing in the field of forestry.

*Albert Powers Memorial Scholarship*
In-state tuition to an undergraduate student, with preference to Oregon residents who show professional potential.

*Aon Risk Services Scholarship*
$1,000 to an outstanding forestry senior.

*Jack & Lila Saubert Scholarship*
$2000 for a graduate or undergraduate student.

*Schutz Family Education Fellowship*
Two fellowships of $2100 to support graduate education.

*Joseph Strehle Scholarship Award*
$500 for a worthy forestry student

*Vance P. & Dorothy D. Shugart Forestry Scholarship*
Five scholarships of $1800, with two to seniors, one to junior, one to sophomore, and one to freshman. For Oregon residents with good moral character in the upper one-third of their class.

**Forest Engineering**

*Oregon Logging Conference Scholarships*
Three scholarships of $1,500 for Oregon residents with preference to those majoring in forest engineering.

*H.F. Scritsmeier Scholarship*
One at $1500 for an outstanding forest engineering upper division student.

*Lucille D. & Faye H. Stewart Fellowship*
$5000-$10000 to top graduate students doing research in forest engineering.

**Forest Products**

*Plywood Pioneers Association Scholarship*
$1,000 to a forest products student interested in pursuing a career in the plywood industry.

*Portland Hoo Hoo Club Scholarship*
$1000 to an undergraduate student.

**Forest Resources**

*Harold A. Dahl Memorial Scholarship*
$500 to an undergraduate pursuing a career in Silviculture and/or majoring in forest management.

*John R. Dilworth Memorial Fellowship*
$1000 to a graduate student.

*Robert F. Keniston Memorial Scholarship*
$500 to a junior or senior in forest management.

*Catherine Cox Merriam Scholarship*
$750 to an undergraduate student, with first priority to women and Native-Americans whose career interests lie in forest resource management.

*Rex Wakefield Memorial Scholarship*
$500 to a top undergraduate with financial need from a rural Oregon high school.

*David Wolfson Memorial Scholarship*
$250 to an undergraduate student with financial need.

**Forest Science**

*Lu Alexander Graduate Fellowship*
For graduate students in forest mensuration and biometrics.

*Catherine Bacon Memorial Graduate Fellowship*
$500 to a graduate student in the Department of Forest Science with first preference for female.

*Lu Berger Fellowship*
$500 for a student in the Department of Forest Science who is in financial need.

*James H. Dukes, Jr. Graduate Fellowship*
$500 for a returning doctoral student in forest ecology in the Department of Forest Science.

*Harry and Mildred Fowells Fellowship*
$1000 for a student in forest science doing research on tree physiology and/or genetics.

*Bob Tarrant Fellowship*
$500 for student studying hardwood silviculture or hardwood-related ecology in the Department of Forest Science.

## COLLEGE OF HEALTH & HUMAN PERFORMANCE

For more information contact Dean's Office, 123 Women's Building, 737-3256.

**Any Health & Human Performance Major**

*Walter Adrion Memorial Education Scholarship*
$500 to a junior with demonstrated excellence in wellness, having exemplary wellness habits, and involvement in student activities. Minimum GPA of 3.00

*Dean's Health & Human Performance Scholarship*
$500 to sophomores and above on the College's Dean's List who show outstanding leadership and service.

*Clair Langton Memorial Scholarship*
$100 to a junior with minimum 3.25 GPA who has demonstrated leadership and potential for future achievements.

*Margaret Frances McGinnis Scholarship*
For undergraduate student with first preference for a female who is a graduate of an Oregon high school.

*James A. Riley, M.D. Health Occupation Scholarship*
$1,500 to a junior with minimum 3.25 GPA who has expressed a desire for a career in a health-related profession.

*Art Koski Travel Grant*
Awarded to a Junior student in good standing to travel to the national conventions of either Public Health or Exercise and Sport Science. The recipient should demonstrate a record of high academic achievement and show promise for an outstanding career in her/his chosen field.

*Midge Cramer Scholarship*
$500 awarded to an incoming freshman graduating from a Benton County high school with preference given to Crescent Valley or Corvallis High School graduates. Applicants will be judged on their aptitude for success in their chosen field and financial need.

**Exercise & Sport Science**
*Eva Seen Memorial Scholarship*
In-state tuition to a senior with minimum GPA of 3.25. First priority to women preparing to teach physical education. Also based on contributions to campus and community life, demonstrated leadership quality, harmonious development of mind and body, good character, and potential for future achievement.

**Public Health**
*Carl L. Anderson Memorial Scholarship*
$500 to a junior or senior who demonstrates proficiency in both written and verbal communication, and has demonstrated leadership and professional commitment through campus and community services. Minimum GPA of 3.25.

*Walter G. Thorsell Memorial Scholarship*
$500 to a junior or senior Oregon resident studying Occupational Safety & Health. Financial need considered only if otherwise equally qualified candidates.

*Life Care Scholarship*
2-$2000 awards to a Junior or Senior student fully admitted in the Health Care Administration program.

*American Colldge of Health Care Administrators (Oregon Chapter)*
2-$500 scholarships awarded to Junior or Senior student fully admitted in the Health Care Administration program. A minimum GPA of 2.85 is required. Preference will be given to a student who plans a career in long-term care.

*United Seniors of Oregon*
$1000 awarded to a Junior in good standing with a minimum GPA of 3.00 who has expressed a desire for a career in long term care.

*Oregon Environmental Health Scholarship*
Awarded to an undergraduate or graduate student in the Department of Public Health with an emphasis in environmental health. The student will demonstrate financial need and interest in becoming a trained professional in the environmental health workforce. $ varies.

## COLLEGE OF HOME ECONOMICS AND EDUCATION

**Education**
For additional information on Education fellowships and application form, contact Lance Haddon, Assistant Director of Student Service, School of Education, 109 Education Hall.

*Chaplin and Rieke Memorial Fellowship*
$500 for a graduate student in teacher education with financial need and a minimum GPA of 3.50 in the last two quarters of undergraduate study .

*Clayton K. Dart Memorial Fellowship*
Three $600 awards for graduate students in a vocational/technical program who have financial need.

*Scott Henderson Memorial Fellowship*
$350 to a student pursuing a master's degree in developmental education.

*Elwood J. Keema Education Fellowship*
$700 for a graduate student pursuing a Master of Arts in Teaching degree.

*Gene Lytle Memorial Education Fellowhip*
$250 to a graduate student with financial need who is pursuing a Master of Arts in Teaching degree.

*Fred K. Thompson Memorial Scholarship*
For students in the field of education.

**Home Economics**
For additional information on Home Economics scholarships and fellowships, contact Dr. Sandra A. Helmick, Associate Dean, College of Home Economics & Education, 114 Milam Hall.

**Any Home Economics Major**
*Phyllis H. Ballou Scholarship*
$700 to an undergraduate student in home economics with financial need.

*Nancy Chandler Memorial Scholarship*
Three $800 awards to students enrolled in the College of Home Economics & Education based on financial need and high scholarship.

*Leone Elliott Covert Scholarship*
Two $500 awards given on the basis of scholarship and potential leadership to a freshman in home economics.

*Ruth Gill-Hammond Graduate Fellowship for Minority Students*
Two fellowships of $2500 for American minority students pursuing a master's or doctoral degree in home economics based on scholarship and need.

*Betty Hawthorne Memorial Fellowship*
For graduate student with definite plans for a professional career.

*Jackson County Home Extension Scholarship*
One scholarships of $1500. First preference to a Jackson County female in home economics with financial need and high scholarship; preference to sophomores, juniors, and seniors (freshmen may be considered).

*Grace A. Johnson Memorial Scholarship*
One scholarship of $150 to sophomores or juniors with financial need. Degree of self-sufficiency is considered.

*Josephine County Home Extension Scholarship*
$800 to a Josephine County student in home economics. Awarded on the basis of high scholarship, aptitude, and financial aid.

*Kappa Omicron Nu Scholarship*
$250 to a student member of Kappa Omicron Nu (a home economics honor society) with demonstrated leadership skills and commitment to home economics. Additional Kappa Omicron Nu application is required. Award is based on scholarship and financial need.

*Mary C. Kennison Scholarship*
$800 to benefit a student in home economics of an underrepresented minority group; preference to Native Americans.

*Kermis Scholarship (Oregon Association for Family and Community Education)*
$400 to a junior or senior with financial need in upper one-third of class with aptitude and interest in a career in Home Economics Extension in Oregon.

*Lathrop Scholarship (Oregon Association for Family and Community Education)*
$500 to a junior or senior in home economics with good scholarship, financial need, and an expressed interest in an Extension career in Oregon.

*Martha Dreyer MacGregor Scholarship*
Two $1000 awards to juniors or seniors in home economics who are Oregon high school graduates with financial need.

*Helen McDowall Memorial Scholarship*
Three scholarships of $900 to sophomores, juniors, or seniors in home economics from Clackamas County with demonstrated aptitude and interest in home economics.

*Ava Milam Clark Fellowship*
For graduate student in home economics.

*Dorothy Sherrill Miller Scholarship*
Two $3000 awards to students in home economics with financial need and high scholarship.

*Rita Norris Memorial Fellowship*
Ten scholarships of $1000 to graduate students who are Oregon residents pursuing a Master of Arts in Teaching.

*Ben and Ethel Pubols Scholarship*
Two $700 awards to students in home economics with academic achievement and financial need.

*Minnie Price Memorial Scholarship*
Five scholarships of $1100 to freshmen who are rural Oregon residents.

*June E. and Truxton Ringe Scholarship*
Two $600 awards to juniors or seniors in home economics who are residents of either Oregon or Washington with demonstrated scholastic achievement.

*Azalea and Charles Sager Scholarship*
$800 to a junior or senior in home economics; preference is given to a resident of Azalea House.

*Audrey Wiencken Smith Scholarship*
Two $800 awards to juniors or seniors based on high scholarship, financial need, and aptitude.

*Esther Taskerud Scholarship*
Three $650 awards to undergraduate students in home economics with commitment to the field; preference is given to students with a 4-H background.

*Trindle Scholarship (Oregon Association for Family and Community Education)*
$700 to an undergraduate student with aptitude and interest in a Home Economics Extension career in Oregon.

*Woods/Foster Fellowship*
Approximately $1000 to a graduate student.

**Apparel, Interiors, Housing, and Merchandising**
*Ruth Beckwith Memorial Scholarship*
Three $900 awards to undergraduate students, with preference to students specializing in Housing Studies.

*Gladys Whipple Goode Memorial Scholarship*
Three scholarships of $500 to sophomores or juniors who have demonstrated interest and talent in apparel, interiors, and merchandising. Preference for Oregon residents talented in the field of clothing, textiles, and related arts.

*Granite-Meyer Housing Award*
$1000 to a graduate student to provide financial assistance with research for studying housing. Award based on relevance and originality of the proposed research, financial need, and scholastic standing.

*Dorothy Schilling Memorial Award*
$100 to a junior, senior, or graduate student who has completed at least three credits in courses related to design of fashion apparel, functional clothing, or theatrical costuming. Must have strong demonstrated interest in aesthetic aspects of clothing. Application process includes two letters of recommendation and portfolio of student work. Special application form in 224 Milam.

**Human Development & Family Sciences**
*Laurinda Kemper Dickinson Memorial Home Economics Scholarship*
$300 to a home economics student in Human Development and Family Sciences with demonstrated academic promise.

*May Dubois Memorial Thesis or Dissertation Grant*
$500-$875 to a graduate student with a minimum GPA of 3.50 pursuing a master's degree in home economics education. Must have completed two-thirds of the required hours in the program, including the course on research methods.

*Margaret Frances McGinnis Scholarship*
Established in 1993 in memory of the first Margaret McGinnis. She drove a covered wagon across the plains to Eastern Oregon. Her ultimate destination was Corvallis so that her children could attend OAC. Four generations have since graduated from OSU.

*The Lyle-Meyer Graduate Fellowship*
For graduate student planning a career in family studies.

*Philip O'Neill Graduate Fellowship*
$200 for a graduate student in Human Development and Family Sciences for teaching potential.

*Buena Maris Mockmore Steinmetz Memorial Scholarship*
$450 to a junior, senior, or graduate student with scholastic competence, financial need, and evidence of intent to continue in the field of child development or family relationships.

**Nutrition & Food Management**
*Helen Charley Graduate Fellowship*
For graduate student in foods & nutrition.

*Arthur E. Gravatt Fellowship*
For graduate student in family resource management or nutrition and food sciences, with minor in an area of social science.

*Maren-Gribskov Scholarship*
Two scholarships of $1800 for undergraduate students majoring in Nutrition and Food Management with an option in dietetics or food systems management.

*Annie McDonald Lindsay Memorial Scholarship*
$1000 to an undergraduate student and $2500 to a graduate student studying Dietetics or Nutrition Science. Must have at least one year of studies left. Criteria includes evidence of academic achievement through grades in science.

*Jewell Fields Rohlfing Fellowship*
$1000 to a graduate student in Dept. of Nutrition & Food Management.

*Ruth Kennedy Tartar Memorial Graduate Research Grant*
Two $1500 awards to graduate students to cover expenses incurred in research.

*Mary J. Woodburn Graduate Fellowship*
For an entering or returning full-time graduate student in the Dept. of Nutrition and Food Management.

## COLLEGE OF OCEANIC AND ATMOSPHERIC SCIENCES

For additional information and application form, contact G. Brent Dalrymple, Dean, College of Oceanic and Atmospheric Sciences, Oceanography Administration Office.

*Chipman-Downs Memorial Fellowship*
To assist graduate students in the College of Oceanic and Atmospheric Sciences who require emergency funding.

*Curtis and Isabella Holt Memorial Education Fund in Marine Science*
For students studying Oceanography.

*Richard Mathews Memorial Scholarship*
For a deserving graduate student nearing completion of thesis.

*Carl Schumacher Student Awards in Marine Sciences*
To encourage highly qualified applicants to enroll in marine science graduate programs at Oregon State University.

**Marine Resource Management**
*Geoffrey Dimmick Memorial Fellowship*
Two scholarships to marine resource management graduate students with financial need.

## COLLEGE OF PHARMACY

For additional information on Pharmacy scholarships and application form, contact Richard A. Ohvall, dean, College of Pharmacy, Pharmacy Building, Room 205A. Application period: February 26-March 25. Awards made at the Pharmacy banquet in the spring. Students must be enrolled in the professional program to be eligible. No scholarships are available for pre-pharmacy students at this time.

*American Drug Stores Scholarship*
A $1000 award to a student with experience in corporate community practice.

*Steve Bartlett Memorial Scholarship*
Two scholarships selected by sponsor; preference given to students from Josephine or Jackson counties. Amount varies.

*A.K. Berman Scholarship*
Given to students with Benton County backgrounds.

*Brauti Family Endowed Scholarship*
One $1000 award to a senior with strong community pharmacy interest and outstanding communication skills. Preference to students from Clatsop and Tillamook Counties, OR.

*Cardinal Distribution Scholarship*
$1,000 given to student pursuing community professional position.

*Claud W. Campbell Scholarship*
A $1000 scholarship to a junior or senior with outstanding administrative/organization skills.

*O'Deane Faris Scholarship*
Need, professional activity in junior year, and scholarship: Amount varies.

*Morris and Ann Beth Fischer Memorial Award*
Father and daughter both Pharmacy alums. Endowed scholarship to worthy student. Amount varies.

*Frank and Esther Golden Scholarship*
Scholarships for outstanding achievement in scholastic performance and professional activities. Amounts vary.

*High School Pharmacies Scholarship*
Five scholarship(s) awarded to deserving student(s) who are community practice oriented in a small chain setting. Amount varies.

*Curtis and Isabella Holt Memorial Pharmacy Scholarship*
Scholarships of $500 to first-year students.

*McKesson Foundation Scholarship*
$1,000 available to children or grandchildren of McKesson Pharmacy Customers and pharmacy students working at McKesson Pharmacy Customer pharmacies.

*McKesson-Vendors Endowed Scholarship*
$1,000. Criteria include grades and well-rounded citizenship. Amount varies with endowment earnings.

*Dorman Hyde Memorial Scholarship*
$1500 to a senior I who is active in extra-curricular activities and demonstrates leadership in professional activities.

*Lane County Pharmacy Association Scholarship*
Need, resident of Lane County. Amount varies.

*Linn/Benton Pharmaceutical Association Scholarship*
Must be resident(s) of Linn or Benton County. Amount varies.

*Oregon Pharmacy Foundation Scholarships*
$500 scholarships to students who have demonstrated good academics and involvement in community health care.

*OSCP Ralph Robertson Memorial Scholarship*
$500 awarded on the basis of financial need, grades and orientation toward consulting pratice.

*J.M. Long Scholarship*
Scholarship for one year to incoming junior(s), with strong interest in community pharmacy. Selected by donor.

*Marion-Polk-Yamhill Pharmaceutical Association Scholarship*
Awarded to a junior or senior from Marion-Polk-Yamhill counties, strong academics & need. Amount varies.

*Fred Meek Memorial Scholarship*
To a senior I student. Selected on the basis of scholastic ability and financial need. Amount varies.

*Fred Meyer Scholarship*
Leadership, need, for chain store interested. Amount varies.

*NACDS Education Foundation*
Only second or third year student with a demonstrated interest in Community Pharmacy. Amount varies.

*OSPA Scholarship (Oregon State Pharmaceutical Association)*
Selected by the OSPA Committee. Amount varies.

*Oregon Society of Health-Care Pharmacists Scholarship (Pharm-D students)*
Selected by OSHP. Amount varies.

*Oregon Veterans in Pharmacy Scholarship*
Given to Oregon student interested in community practice. Amount varies.

*Professional Compounding Centers of America Scholarship*
To a student pursuing the science and practice of compounding. Amount varies on matching gifts..

*Professional Society of Pharmacists Scholarships*
Selected by PSOP. Amount varies.

*Wal-Mart Scholarship*
A $1000 award based on need, leadership, and community practice.

*Walgreen Scholarship*
A $1000 award based on need, leadership and community practice.

*Glaxo Wellcome "Pride in Pharmacy" Scholarship*
$1,000 awarded to a senior I with demonstrated leadership skills and professional involvement.

*Women in Pharmacy Endowed Scholarship*
Annual award from earnings in support of women as heads of households in the College of Pharmacy.

## COLLEGE OF VETERINARY MEDICINE

The scholarships listed below are for veterinary medicine students only. For additional information on scholarships in the College of Veterinary Medicine and application form, contact the Dean's Office, College of Veterinary Medicine, 200 Magruder Hall.

*American Animal Hospital Association Scholarship*
$250 to a fourth-year student in recognition of outstanding clinical proficiency in small animal medicine and surgery.

*Auxiliary to the Oregon Veterinary Medical Association Scholarship*
$500 to a first-year student who has advanced the prestige of the College of Veterinary Medicine on the University campus.

*Auxiliary to the American Veterinary Medical Association Scholarship*
$200 to a fourth-year student who has advanced the prestige of the College of Veterinary Medicine on the University campus.

*Don and Betty Bailey Scholarship*
$500 to a fourth-year student interested in small ruminants.

*Cascade Obedience Club Scholarship*
As funds permit, $1,000 awards are given to Oregon resident students from Washington, Clackamas, or Multnomah counties who have an interest in small animals or small animal practice.

*Roby D. Eaton Memorial Scholarship*
$100 given to a third-year student interested in equine medicine and surgery.

*Chintimini Kennel Club Scholarship*
Two scholarships of $1000 to third-year students based on financial need and interest in canine medicine and surgery. For Oregon residents.

*Frank & Amy Finch Memorial Scholarship*
Two scholarships of $500 to fourth-year students exhibiting proficiency in equine medicine or surgery.

*Jack Hardesty Memorial Scholarship*
Four scholarships of $250 to first-year or third-year students with first priority to individuals with children.

*Hill's Pet Products, Inc. Scholarship*
$1,000 given to a fourth-year student who has demonstrated skill in the application of clinical nutrition in small animals.

*Bruce Hultgren Memorial Scholarship*
$100 to a first-year student who exhibits an interest in and an aptitude for veterinary pathology.

*Dallen Jones Memorial Scholarship*
$200 to a first-year student, with preference for persons from the Douglas County area. Selection based on character, attitude, maturity, and professional conduct.

*L.M. Koger Memorial Scholarship*
$150 to a first-year student based on character, attitude, maturity, and professional conduct.

*Creston & Dorothea Lamont Memorial Veterinary Medicine Scholarship*
$275 for a student interested in poultry as a career. Scholarship may be awarded to the same student throughout the four-year program. Priority to first-year students.

*Richard & Elsie Lawton Memorial Scholarship*
$1000. Awards committee to make recommendation.

*Dick Magruder Memorial Scholarship*
$500. Awards committee to make recommendation.

*Oregon Veterinary Medical Association Scholarship*
$1000 to first-year students based on character; attitude; moral and professional conduct; and contribution, interest, and dedication to the welfare of his/her classmates. For Oregon residents.

*Pfizer, Inc. Scholarship*
$1,000 to assist a fourth-year student.

*Purina Mills, Inc., Scholarship*
$200 to a fourth-year student who exhibits the greatest effort, interest, aptitude and proficiency in swine medicine.

*Rogue Valley Kennel Club Scholarship*
As funds permit. Scholarship based on financial need and a sincere interest in small animal practice.

*Rogue Valley Veterinary Medicine Medical Association Scholarships*
$250. Funds to provide assistance to a first-year and a third-year student with moving costs to and from OSU to WSU.

*J.E. Salsbury Memorial Veterinary Medicine Scholarship*
One scholarship at $2000, others at $1500 or $1000. For third-year students demonstrating superior scholarship, initiative, perseverance, potential for leadership, and financial need.

*Carolina Cabaret Memorial Scholarship*
$1,000 scholarship to a third or fourth-year student with an interest in equine medicine and surgery, demonstrating a good work ethic and a compassion for animals and their owners.

## 4-H

For more information on 4-H scholarships, contact Duane P. Johnson, State 4-H Youth Development Office, 105 Ballard Extension.

*Babe Coe Memorial Scholarship*
Approximately $1500 to a freshman who was a 4-H member enrolled during their senior year in high school. Must have completed a minimum of three years of 4-H including the current year. For Oregon residents. Also based on high school academic performance.

*4-H Foundation W. Durrant Scholarship*
For worthy 4-H members from Columbia County. Contact Columbia County Extension Service, St. Helens, Oregon (503) 397-3462.

*Harney County 4-H Memorial Scholarship*
For 4-H members from Harney County, Oregon. Contact Harney County Extension Service, Burns, Oregon, (503)573-2506.

*O.M. Plummer Memorial Agricultural Honors Scholarship*
For entering students, with preference for students studying animal science. Must be a 4-H member with a record of leadership, and participation in a 4-H Animal Science Project. Also based on academic performance.

*Spitzbart Scholarship*
$5500 scholarship for students enrolling in any program at Oregon State University. Must have been a 4-H member and must have participated in the 4-H Division of the Oregon State Fair. Also based on academic performance.

*Washington County Extension Scholarship*
Approximately $50 with first preference for women from Washington County.

*Blanche Grover Wellock Memorial Scholarship*
For 4-H member from Curry County. Contact Curry County Extension Service, Gold Beach, Oregon (503) 247-6672.

*Robert W. Wilcox Memorial Scholarship*
$250-500 to graduate students with financial need. Specifically for Extension agents or others who wish to obtain an advanced degree and return to or go into the Extension program to do 4-H youth development education work.

## All-Campus Scholarships

These need-based scholarships are awarded to eligible undergraduates during the financial aid process. The FAFSA is required to be submitted by February 1 for award consideration.

*Clarence W. Agsten Memorial Scholarship*
One or two awards of $500-$1000.

*Frank and Mabel Albright Memorial Scholarship*
Tuition and books, for a freshmen who is a graduate of a Benton County high school. Citizenship and community activity also considered. Renewable for four years if 2.50 GPA maintained at OSU.

*Naomi Catherine Andrews Memorial Scholarship*
One or two awards of $600 for residents or non-residents.

*Mary C. Barbare Memorial Scholarship*
For undergraduate students.

*Jack Bennett Memorial Scholarship*
$300 to a graduate of a Josephine County high school. Preference given to students from Grants Pass.

*Professor John Fulton*
Awarded to long term female residents of Benton County, OR.

*Marie Harbeck Berger Scholarship*
$300-$600 for residents or non-residents with demonstrated leadership and service qualities. Entering freshmen must have a minimum GPA of 3.50, returning students a minimum GPA of 3.00.

*Charles H. Bowen Jr. Memorial*
$200-$600. To provide financial aid to deserving students.

*Pearl Chinn Alumni Scholarship*
One $500 award to an incoming freshman who is an Oregon resident.

*James Harrison Collins Memorial Scholarship*
$500-$1000 for graduates of a Columbia County high school. Must be an Oregon resident with a record of service to school and community and be in top 15 percent of high school graduating class.

*Inez Darling Davis Memorial Scholarship*
$200-$700 for sophomore.

*U.G. Dubach Memorial Scholarship*
Tuition scholarship for residents or non-residents.

*Minette Phillips Espy Memorial Scholarship*
Need-based scholarship with first preference for female.

*Farmers Insurance Group of Companies Scholarship*
Tuition scholarship awarded annually to students majoring in business or mathematics. Must have sophomore standing or above with cumulative GPA of 2.30 or above.

*Fisher Mark Scholarship*
Assistance to married, undergraduates with a 3.00 GPA, sophomore or above.

*Eldon Frink Memorial Scholarship*
$500-$1200 to juniors or seniors, with preference given to students from the southwestern rural area of Polk County. Awarded to students in Agricultural Sciences, Forestry, and Home Economics & Education on a rotating basis.

*Harry E. Goheen Memorial Book Scholarship*
Approximately $300 to a junior or senior majoring in math or computer sciences. First priority to under-represented minority students.

*William F. Herrin Memorial Scholarship*
$1000-$2000 to juniors or seniors who are Oregon residents with all schooling done at OSU. Renewable for one year. Minimum GPA of 3.00.

*Harry & David Holmes Scholarship*
One or two awards of $500-$1000 to graduates of a Jackson County high school.

*Duane E. Marshall Memorial Scholarship*
$500 to freshmen, with priority for graduates of Newberg High School.

*Paul McGrath Memorial Scholarship*
$3000 with first preference to students from McMinnville High School (then other Yamhill County schools).

*Irene McKinley Memorial Scholarship*
Amount varies.

*Herman & Lois Miller Memorial Scholarship*
Three to five awards of $600-$2000 to students preparing to teach. Preference given to older students returning to school. Minimum GPA of 2.50.

*Moss Scholarship*
Undergrad female, single parent, preference to Hort. 2.5. Renewable.

*Grayce E. Oliver Memorial Scholarship*
A number of awards of approximately $1600 to entering freshmen who are Milwaukie High School graduates. GPA of 3.00 or above in high school. Recipient must possess acceptable character and citizenship with strong potential and direction towards professional goals. Renewable for four years.

*Ruth Wight Rasmussen*
Awarded to entering freshman graduates of Lebonon H.S.

*George & Shirley Ray Scholarship*
$500-$1000 to sophomore or junior transfer students from Central Oregon Community College. Priority for those who have attended COCC for two years. Preference for Oregon residents.

*Elizabeth Ritchie Memorial Scholarship*
$500-$1000 for Oregon high school graduates of outstanding ability, including but not limited to athletic ability.

*Robert W. Shaw Memorial Scholarship*
$500-$1000 for native-born citizens of the U.S. with excellent academic record.

*Derald D. Swift Memorial Scholarship*
Approximately $1600 for students from Malheur County, Harney County, or other Eastern Oregon County. Also considered are students form Payette County, Idaho. In order of preference, scholarship based on integrity, character, citizenship, financial need, and athletic potential.

*Forrest Tower Memorial Scholarship*
Awarded to students with high financial need.

*Mary VanKirk Memorial Scholarship*
Awarded to student with high financial need.

*Rueben G. & Myron M. Winslow Memorial Scholarship*
Awarded to freshman and returning students. Awards of approximately $1000.

*Earl and Dora Wininger/Gaylord Scholarship*
Awarded to entering freshman from North Marion High School.

## AMERICAN INDIAN/ALASKAN NATIVE

For more information, contact Coordinator, Indian Education Office, Office of Multicultural Affairs, 328 Snell Hall, 737-4383.

*OSU Native American Scholarship*
Funds provided by David W. Schacht and William Harrison Gill. Awards average $800-1200 per year. Must be a full-time student. Must submit a Federal Financial Aid application. Renewal possible if recipient reapplied each year.

*Harold Gilman Smith Scholarship*
Awards of $3,000 per year. Must be tribally enrolled. Minimum 3.0 GPA for application and renewal.

*Leona Weatherford Scholarship*
Award of $1250 per year to a female Indian student pursuing a graduate degree in any field.

*Native American Emergency Loan Fund*
Funds donated by Myron Cropsey and David W. Schacht. Small short-term loans available to help Indian students with temporary financial crises.

## ATHLETICS

For more information on Beaver Club scholarships for intercollegiate athletes, contact Michael L. Beachley, compliance officer, Intercollegiate Athletics, 221 Gill.

## FRATERNITIES & SORORITIES

*Alpha Lambda Scholarship*
Numerous scholarships totaling approximately $1000. For active members in good standing with the Alpha Lambda Chapter of Lambda Chi Fraternity. Selections made based on equal weighting of financial need, scholastic performance, service to the fraternity, and service to OSU. Contact Bill Deeks, Alpha Lambda Association, P.O. Box 1419, Beaverton, OR. 97075.

*Dorothy & Dave Blasen Scholarship*
$300 to a member of Kappa Sigma Fraternity who is active in Army ROTC. Contact Kappa Sigma Fraternity, OSU Chapter.

*Vane & Fern Gibson Memorial Chi Omega Scholarship*
Over $100 to a Chi Omega member of junior standing living in Eta Alpha Chapter House. Must have contributed to the betterment of Chi Omega Sorority and OSU. Contact Nancy Kniesel, Chi Omega Chapter Advisor.

*Vane & Fern Gibson Memorial Phi Delta Theta Scholarship*
Over $100 to a Phi Delta Theta Fraternity member of junior standing who has contributed to the betterment of the fraternity. Based on qualities of character, scholarship, leadership, and service. Must live in Chapter House in junior year. Contact Erin Haynes, Phi Delta Theta Chapter Advisor, OSU Fund, 517 Snell Hall.

*Hilda Jones Kappa Delta Scholarship*
$500 to a member of Alpha Kappa Chapter of Kappa Delta Sorority. Based on service to Kappa Delta through leadership, fostering and promoting sisterhood, service to campus and community, scholastic achievement, and financial need. Contact Kappa Delta Scholarship Chairperson.

*Elizabeth Flanagan Kuni Sigma Phi Epsilon Scholarship*
$250 award to an active Sigma Epi Epsilon member who has completed three years of study at OSU with the high cumulative grades. Contact Sigma Phi Epsilon Scholarship Chair, OSU Chapter.

*Lambda Chi Alpha Trust Scholarship*
$300-$450 to an active member in good standing with the Alpha Lambda Chapter of Lambda Chi Alpha Fraternity. Selection based on equal weighting of financial need, scholastic performance, service to the fraternity, and service to OSU. Contact Bill Deeks, Alpha Lambda Association, P.O. Box 1419, Beaverton, OR. 97075.

*Thomas W. Morrish Memorial Scholarship*
Approximately $500 to members of Kappa Sigma Fraternity who display outstanding commitment and participation with emphasis on athletics and scholastic achievement. For juniors or seniors with a GPA of 3.00 or above. Contact Kappa Sigma Fraternity, OSU Chapter.

*Gayle Schumacher Memorial Scholarship*
Priority to "Greek" women of junior standing at OSU who show above average scholarship and leadership. Contact the Office of Greek Life, 164 Memorial Union East.

*Clayton Strain Memorial Scholarship*
Numerous awards totaling approximately $15000 per year. For active members in good standing with the Alpha Lambda Chapter of Lambda Chi Alpha. Selection based on equal weighting of financial need, scholastic performance, service to the fraternity, and service to OSU. Contact Bill Deeks, Alpha Lambda Association, P.O. Box 1419, Beaverton, OR. 97075.

*William L. Thomas Scholarship*
For undergraduate student who is a member of Oregon Alpha. Recipient must live in the chapter house all three terms while receiving award and be a member in good standing. Contact Oregon Alpha Chapter of Sigma Alpha Epsilon.

*Don Welp Memorial Scholarship*
$1400 with priority consideration given to sons and daughters of members of OSU's Alpha Theta Chapter of Phi Kappa Theta Fraternity, who graduated from OSU prior to 1975. For undergraduate or graduate students enrolled in the College of Agricultural Sciences or the College of Science majoring in Food Science & Technology or Plant Pathology. Contact Dan Farkas, key advisor, Food Science & Technology, 108 Wiegand Hall.

*M. Christopher Wimpee Kappa Sigma Scholarship*
A $500 award to an active member with financial need, strong career goals, and an accumulative GPA of 3.50. Contact Kappa Sigma Scholarship Chair, OSU Chapter.

*Terry Yaguchi Memorial Scholarship*
To a currently enrolled active member of Delta Lambda Chapter of Delta Tau Delta Fraternity. Academic performance and financial need considered. Contact Delta Tau Delta Fraternity, Oregon State University.

*Gary Young Delta Tau Delta Scholarship*
An award to memorialize Gary Young is available to active members of Delta Tau Delta. Contact Delta Tau Delta Scholarship Chair, OSU chapter.

*Rosenkrans Delta Chi Scholarship*
Annually, more than $20,000 in scholarship is given to associate members and members in good standing of the OSU chapter of Delta Chi fraternity. Selection is based on GPA, awards, chpater involvement, campus involvement, and community service. Contact the Delta Chi President.

*Greek Man of the Year*
A $500 award is given to the man who best represents the ideals of Greek Life on the basis of scholarship; chapter, campus and community involvement; and public service. Recipient must be an OSU student and a member in good standing of a NIC fraternity. Contact the Office of Greek Life, 164 Memorial Union East.

*Greek Woman of the Year*
A $500 award is given to the woman who best represents the ideals of Greek Life on the basis of scholarship; chapter, campus and community involvement; and public service. Recipient must be an OSU student and a member in good stand of a NPC Sorority. Contact the Office of Greek Life, 164 Memorial Union East.

## MISCELLANEOUS SCHOLARSHIPS

*DeLoach Work Scholarship*
$500 for undergraduate students. Application is to be initiated by faculty members. The work assignment must relate to the area of the students' academic training and must provide a significant learning experience. Contact Office of Academic Affairs, 624 Kerr Administration Building.

*R. Sue and Fred M. Shideler Journalism Scholarship*
For a student working on the *Barometer* staff, serving as a publications intern, or as a political or journalism intern. Contact Frank Ragulsky, Student Media, 118 Memorial Union East.

*Tuthill Work Scholarship*
Pays wages for workers in the Soils Department Lab and the Engineering Labs. Contact Department of Crop & Soil Science or College of Engineering.

*Tim Wirth Memorial Scholarship*
For Crescent Valley High School graduates who show good citizenship in school and community and are involved in high school athletics. Minimum high school GPA of 3.25. Contact Crescent Valley High School Career Center.

*Grace Wu Memorial Scholarship*
$250 for a sophomore, junior, or senior. The recipient must show totally unbiased leadership. Staff and faculty members submit names of possible candidates. Contact Erin Haynes, Director, OSU Development Office, 526 Snell Hall.

*National Merit Scholarship*
OSU participates as a college sponsor with the National Merit Program. Students must apply through the National Merit Program and list OSU as their first choice university for consideration. The OSU Financial Aid Scholarship Committee awards up to three scholarships to applicants who are recommended as finalist by the National Merit deadline. The minimum annual stipend is $500, renewable for four years. Larger stipends, up to $2,000 annually, are awarded on the basis of individual need as determined by students completing the financial aid application each year.

## HATFIELD MARINE SCIENCE CENTER

For more information, contact Pam Rogers, HMSC, 2030 Marine Science Drive, Newport, OR 97365-5296.

*Fred & Joan Crebbin Memorial Fellowship*
For graduate students, with preference for deserving students who are involved in marine science public education program as interns, and to students whose major study emphasis is Marine Biology, particularly mammals.

*Curtis & Isabella Holt Memorial Education Fund in Marine Science*
For graduate or undergraduate students in marine sciences. Application by faculty advisor. Request must have definite educational output for a course, public education, or Extension, and be marine related.

*Walter Jones Memorial Fellowship*
To encourage graduate work in subjects which contribute to fisheries development. Candidate must have completed 12 or more hours of graduate work, and have demonstrated ability to conduct research which would contribute to fisheries development.

*Lylian B. Reynolds Memorial Scholarship*
For graduate students engaged in study of marine science and resident at HMSC.

*Carl Schumacher Award in Marine Sciences*
To encourage highly qualified applicants to enroll in marine science graduate programs at OSU. Evidence of past superior academic performance and potential for continuing superior performance at graduate level; evidence of potential for creative research; preference given to first-time graduate students.

*Bill Wick Fisheries Memorial Scholarship*
To support a graduate student project in marine fisheries and ocean research.

*Mamie Markham Research Awards*
To support research and researchers at Oregon State University's coastal centers. Graduate students, post-doctoral fellows, and faculty support will be considered for research in marine ecology, biology, physiology, biochemistry and basic research in aquaculture and the wise use of marine resources.

*Anja M. Robinson Fellowship*
For graduate students in shellfish aquaculture research at the Hatfield Marine Science Center.

## INTERNATIONAL

Financial need a factor for all international student scholarships. Unless otherwise specified, any major considered. For more information, contact the Office of International Education, 444 Snell.

*Sherman & Carrie Cook Scholarship*
For international students likely to return to their country to work for betterment and progress in their country.

*Joel R. Friend International Student Scholarship*
For international students from Thailand, Taiwan, and the Republic of China.

*Fulbright Grants*
Grants, lasting appoximately 9-12 months, for U.S. citizens who are graduating seniors, Masters level, or Ph.D. candidates to research and/or study in one of over 120 foreign countries. Selection of grantees is based on merit, feasibility and validity of the project, maturity, ability to adept to a new culture, association of the proprosed project to current and future academic and career goals.

*Global Graduates*
The Oregon International Internship Program offers students scholarships to help defray the costs associated with doing a professional internship overseas. Students applying for internships through the program are eligible for scholarships for airfare, room and board and living expenses. Shcolarships vary by intership site and a student's financial situation.

*Lucy Hsu Ho Scholarship*
$500 to undergraduate or graduate international student of ethnic Chinese descent. Based on leadership in student and/or community activities and organizations, and desire to serve others in candidate's future chosen field of work.

*International Degree (ID)*
The International Degree (ID) Program offers scholarship support to undergraduate students to study in certain countries. To find out more about scholarships, students are encouraged to discuss their Study Abroad goals with the ID Staff in the Office of International Education.

*National Security Education Program Scholarships*
Scholarships for undergraduate and graduate study of lesscommonly taught languages and cultures. Undergraduate students may use award to participate in study abroad programs anywhere outside Western Europe, Australia, New Zealand, or Canada. Graduate students may use award for overseas or domestic study. All recipients are required to enter into a service agreement. Restricted to U.S. citizens.

*Toivo Niemi Memorial Finnish Student Scholarship*
For international undergraduate or graduate students from Finland, with first preference for a discipline in natural resources.

*Simerville International Education Award*
Approximately $100 for undergraduate or graduate U.S. or international students. Recipient must have voluntarily contributed extensively to international understanding, either through personal relationships, research and scholarship, or involvement in campus or community organizations.

*Gertrude Strickland Memorial Fellowship*
For international graduate students. Special consideration given to those students who do not qualify for an international student scholarship.

*Hugh & Helen Wood Nepalese Scholarship*
For students from Nepal. Recipients must agree to become a "public servant" in Nepal engaged in an occupation designed to contribute to the welfare and development of Nepal. Must intend to return and serve Nepal for five years after graduation. Minimum GPA of 3.50.

*Others*
Two scholarships available in the Department of Foreign Languages and Literature, refer to the Scholarships and Awards section under the College of Liberal Arts.

## ROTC

### Air Force ROTC/Aerospace Studies

*Lt. James L. Badley Memorial Northwest Conclave/Arnold Air Society Award*
Approximately $500 based entirely on excellent character of students. Contact Air Force ROTC, Arnold Air Society Squadron, James L. Badley squadron, 308 McAlexander Fieldhouse.

*Capt Robert A. Brett, Jr. Student Assistance Fund*
A $500 award available to a sophomore, junior or senior AFROTC cadet based on leadership, academic performance and financial need. Students must have a cumulative GPA of 2.5 and a 3.0 in Air Force Studies classes. Contact the Air Force Studies Department at 541-737-3291.

*94th Bomb Group's Halm Scholarship*
Students eligible for this $750 scholarship must be an AFROTC cadet. It is awarded on the basis of the person's proven academic ability, professional commitment, extracurricular activities and moral criteria. Contact the Air Force Studies Department at 541 -737-3291 .

*American Legion Scholarship, Post 10*
This $200 scholarship is awarded by the American Legion Post 10 of Corvallis. It is awarded to any AFROTC student based on excellent character of the student. Contact the Air Force Studies Department at 541-737-3291.

*National Competition Scholarships*
Air Force ROTC offers 2-, 3-, and 4-year national competition merit scholarships. Scholarships pay tuition, fees, books, and $150 stipend each school month for the term of the scholarship. Three- and 4-year scholarships are awarded to high school seniors, 2-and 3-year scholarships are available for college freshmen and sophomores. High school students interested in applying should consult their school counselors or call the Air Force Studies Department by the end of their junior year or early in their senior year. All others should contact the Aerospace Studies Department at 541-737-3291.

*Professional Officer Course Scholarships*
All Air Force ROTC cadets not awarded merit scholarships may qualify for $2000 per year towards books and tuition in their junior and senior years. Contact the Air Force Studies Department at 541-737-3291 for more details.

### Army ROTC/Military Science

*Military Science Scholarship*
For MS III or MS IV cadets attending OSU or WOSC. Minimum 2.50 overall GPA, with at least a 3.00 GPA in Military Science. Financial need considered. Contact LTC (Ret) Mike Rainbolt, College of Business Academic Adviser, 737-3716.

*Any major Scholarship*

*The European-Pacific Theatre Memorial Award*
For a contract eligible cadet who has completed MS I of MS II. Minimum 2.5 overall GPA, with at least a 3.00 GPA in Military Science. Financial need considered by selection committee. Contact the Department of Military Science, (541) 737-3511.

*Dorothy & Dave Blasen Scholarship*
For an undergraduate or graduate student who is a member of Kappa Sigma Fraternity and active in Army ROTC. Contact Kappa Sigma Fraternity, OSU Chapter.

*National Competition Scholarship*
Army ROTC offers 2-, 3-, and 4-year national competition merit scholarships. Each pays up to $12,800 in tuition, laboratory, and incidental fees; book allowance of $150 per term; and $150 subsistence each school month for the term of the scholarship. The four-year scholarships are awarded to selected high school graduates. High School students interested in applying should consult their school counselors or call the Department of Military Science by the end of the junior year or early in the senior year.

*Open Scholarships*
Three, two, or guaranteed reserve forces duty on-campus scholarships are available to selected University freshmen and sophomores, whether or not they are enrolled in ROTC courses. These scholarships have the same benefits as listed above. Full information on Army scholarships may be obtained by contacting the Department of Military Science at (541) 737-3511.

### Naval ROTC/Naval Science

*Corvallis Reserve Officer Association/NROTC OSU Alumni Scholarship Award*
To benefit students enrolled in the NROTC program at OSU. Financial need is the primary consideration for selection, but outstanding academic and aptitude performance as well as future potential is also considered. Questions can be directed to the Naval Science Department/Naval ROTC at 737-6289.

*Darrel Tipples Memorial Scholarships*
For a junior or senior enrolled in the NROTC program (Marine Option), not military salaried, and committed to fulfillment of a military career. Questions can be directed to the Marine Officer Instructor (MOI) at 737-5608.

*LtGen Robert O. Bare Scholarship*
To benefit students enrolled in the NROTC program (Marine Option) at OSU. Questions can be directed to the Marine Officer Instructor (MOI) at 737-5608.

*NROTC College Program 2-3 year Scholarships*
This program is designed for individuals who did not receive or did not apply for the 4-year NROTC National scholarship, but desire to become an officer in the Navy or Marine Corps. The College Program provides an excellent opportunity to compete for a 3-year or 2-year scholarship and a commission in the Navy or Marine Corps. If you receive a scholarship, your tuition and fees would be paid as well as books and $150 a month stipend. Questions can be directed to the Naval Science Department /Naval ROTC at 737-6289.

*2 Year NROTC National Scholarship*
This program is a two year NROTC program leading to a commission in the U.S. Navy. Applicants must apply during their sophomore year of college. Selected applicants attend the Naval Science Institute (NSI) in the summer after completion of their sophomore year. During the final two years of college the Navy pays tuition, books and fees. Any questions can be directed to the Naval Science Department /Naval ROTC at 737-6289.

*Professor of Naval Science-Minority Scholarship (Tweeddale NROTC Scholarship)*
The Professor of Naval Science can award an immediate scholarship (one/year) to qualified minority students interested in the NROTC program and receiving a commission in the U.S. Navy. If accepted, your tuition and fees would be paid as well as books and $150 a month. Any questions can be directed to the Naval Science Department /Naval ROTC at 737-6289.

| ORGANIZATION | MEN/WOMEN | NATIONALLY | DATE ESTABLISHED AT OSU | DATE ESTABLISHED TYPE OR FIELD OF INTEREST | ADVISER |
|---|---|---|---|---|---|
| **General Honor Societies** | | | | | |
| Alpha Lambda Delta | Both | 1924 | 1933 | Freshmen scholarship | Roger Penn, 7-3657 |
| Blue Key | Both | 1924 | 1934 | Senior leadership | Yvonne Sebastian, 7-6370 |
| Cardinal Honors | Both | 1932 | 1979 | Junior leadership | Kerrie George, 7-2626 |
| Mortar Board | Both | 1918 | 1933 | Senior leadership | Kerrie George, 7-2626 |
| Phi Eta Sigma | Both | 1923 | 1949 | Freshman scholarship | Jonathan King, 7-4601 |
| Phi Kappa Phi | Both | 1897 | 1924 | Scholarship | Rebecca Warner, 7-2641 |
| Sigma Xi | Both | 1886 | 1937 | Science research | William Warnes, 7-7016 |
| Alpha Epsilon | Both | 1963 | 1975 | Agricultural Engineering | Inactive |
| Alpha Pi Mu | Both | 1949 | 1969 | Industrial Engineering | Logen Logendran, 7-5239 |
| Beta Alpha Psi | Both | 1919 | 1959 | Accounting | Mary Alice Seville, 7-6060 |
| Beta Gamma Sigma | Both | 1913 | 1963 | Business | Ron Miller, 7-3520 |
| Epsilon Pi Tau | Both | 1930 | 1931 | Vocational/Industrial Engineering | Inactive |
| Eta Kappa Nu | Both | 1904 | 1921 | Electrical Engineering | Steve Goodwick, 7-2970 |
| Kappa Delta Pi | Both | 1911 | 1928 | Education | Inactive |
| Kappa Tau Alpha | Both | 1910 | 1976 | Journalism | Inactive |
| Omicron Delta Upsilon | Both | 1915 | 1979 | Economics | Martha Farundorf, 7-1477 |
| Omicron Nu | Both | 1912 | 1919 | Home Economics | Geraldine Olson, 7-1070 |
| Phi Alpha Theta | Both | 1921 | 1980 | History | Lisa Sarasohn, 7-1271 |
| Phi Sigma Alpha | Both | 1920 | 1978 | Political Science | Jim Foster, 7-2811 |
| Pi Delta Phi | Both | 1906 | 1962 | French | Inactive |
| Pi Tau Sigma | Both | 1916 | 1941 | Mechanical Engineering | Gordan Reistad, 7-3441 |
| Rho Chi | Both | 1908 | 1922 | Pharmacy | Keith Parrott, 7-5794 |
| Sigma Delta Pi | Both | 1919 | 1970 | Spanish | Inactive |
| Sigma Pi Sigma | Both | 1921 | 1934 | Physics | Albert Stetz, 7-1698 |
| Sigma Tau Delta | Both | 1924 | 1981 | English | Brenna Weller, 7-1643 |
| Tau Beta Pi | Both | 1885 | 1924 | Engineering | Tom Miller, Karen Helt, Alan Huster, 7-3322 |
| Xi Sigma Pi | Both | 1908 | 1921 | Forestry | Bill Atkinson, 7-4952 |
| **Professional Fraternities** | | | | | |
| Alpha Zeta | Both | 1897 | 1918 | Agriculture | Jim Thompson, 7-1908 |
| Eta Sigma Gamma | Both | 1967 | 1979 | Health Science | Ana Harding, 7-3832 |
| Kappa Psi | Both | 1879 | 1911 | Pharmacy | Inactive |
| Lambda Kappa Sigma | Women | 1913 | 1930 | Pharmacy | Jane Aldrich, 7-5776 |
| Phi Chi Theta | Both | 1924 | 1924 | Business | Inactive |
| Phi Delta Chi | Both | 1893 | 1982 | Pharmacy | GH Constantive, 7-5783 |
| Women in Comm. | Both | 1909 | 1925 | Speech | Trischa Knapp, 7-5392 |
| Zeta Phi Eta | Women | 1893 | 1967 | Journalism | Inactive |
| **Recognition Societies** | | | | | |
| Angel Flight | Both | 1957 | 1961 | Air Force | Inactive |
| Arnold Air Society | Both | 1947 | 1951 | Air Force | Cpt. Chris Harris, 7-6285 |
| Beaver Believers | Both | ..... | 1959 | Athletic greeters | Carol Blazevich, 7-7363 |
| Iota Sigma Pi | Women | 1916 | 1960 | Chemistry | Inactive |
| Order of Omega | Both | 1967 | 1976 | Greeks | Bill Brennan, 7-3660 |
| Phi Lambda Upsilon | Both | 1899 | 1928 | Chemistry, Biochemistry, and Chemical Engineering | Christine Pastorek, 7-6732 |
| Phi Sigma | Both | 1915 | 1933 | Biology | Inactive |
| Scabbard and Blade | Men | 1904 | 1920 | Military | Cpt. Jeffrey Cunningham 7-6902 |
| **Other Societies** | | | | | |
| Society of Amer Mil Engrs | Both | 1924 | 1980 | Military | Richard Watson, 7-5611 |
| Swords of Honor | Both | ..... | 1980 | Military | Inactive |
| Talons | Women | ..... | 1933 | Service | Melanie Marshall, 7-4691 |
| Thanes | Men | 1918 | 1936 | Service | Natalie Dollar, 7-5386 |

# Housing and Residence Hall Programs

*The Department of University Housing and Dining Services 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.*

**PAULETTE RATCHFORD**
*Assistant Director*

**TOM SCHEUERMANN**
*Director*

**TERRI TOWER**
*Assistant Director*

**RICH TURNBULL**
*Assistant Director*

**GUS VILLARET**
*Assistant Director*

## INTRODUCTION

University Housing's main goals are to help students succeed academically, become active citizens of their communities, and 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 life staff, bring suggestions for improvements, and receive assistance on their concerns and interests. Emphasis is upon providing comfortable, safe, reasonably priced living accommodations and programs which satisfy residents' desires for both privacy and community.

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.

Students are not required to live in University housing, but they may find it easier to make friends and adjust to University life if they live on campus for a year or two.

## COOPERATIVE HOUSES

The eight cooperative houses at Oregon State University provide small-group living experiences for approximately 400 students. House capacities vary from 40 to 60. Student residents are responsible for developing their internal governmental organizations. Incoming students receive help from returning cooperative members in adjusting to the University and to the unique, dynamic atmosphere of the cooperative. Cooperative members reduce their board-and-room costs by performing work duties of three to five hours per week in the houses. All cooperatives are smoke-free.

Oregon State University owns and operates six cooperative houses: Azalea House, Oxford House, and Reed Lodge for women; and Avery Lodge and Heckart Lodge for men. Dixon Lodge is for upperclass men and women.

Beaver Lodge and Varsity House are independently owned and accommodate men. All cooperatives are members of the Intercooperative Association (ICA).

Information and application forms may be obtained from the Department of University Housing and Dining Services or from the individual private houses.

## RESIDENCE HALLS

Through its 10 residence halls and the College Inn, the University offers a variety of living environments including special program halls, designated quiet floors, coeducational facilities, and a graduate student program.

Bloss Hall and the College Inn are reserved for upperclass and transfer students and students who have been out of high school for at least one year. Cauthorn Hall and the renovated West International House offer cultural diversity programs for U.S. and international students. The refurbished McNary Hall is home to Honors College students. The Callahan Hall program focuses on the First Year Experience. Residents in Engineering program has been established in Wilson Hall and Finley features a Wellness program. The Graduate Student Program is situated in Poling Hall. Students interested in the College Inn, which is located at the north edge of campus, should write directly to College Inn, 155 N.W. Kings Blvd., Corvallis, OR 97330.

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 the renovated Marketplace West in West Dining Center and in the redesigned McNary Dining Center. Residential students have a choice of four flexible meal plans, which can be used in any food service location on campus.

For more detailed descriptions of residence halls and cooperative houses, please see the Residential Life Handbook and Planner, or check out the Housing Web site at http://orst.edu/Dept/Housing/.

## RESIDENCE HALL AND COOPERATIVE RESERVATIONS

Students submit a contract and application fee to make reservations for university-owned residence halls and cooperatives. Flexible academic year contracts are available to all students. Contracts 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 1998-99. When established, the new rates will be available through the Department of University Housing and Dining Services.*

| **Residence Halls Meal Plans 1-4** | **Double** | **Single** |
|---|---|---|
| Standard Hall | $5,200-$4,560 | $6,130-$5,490 |
| West Int'l Hall | $5,422-$4,784 | $6,388-$5,758 |
| Graduate Student Program with meal plan | | $6,388-$5,748 |
| Graduate Student Program without meal plan | | $3,584 |

Rates listed are for academic year; room and meal package rates will vary by type of meal plan chosen. West and Graduate Program rates include vacation break periods during the academic year.

**Cooperative Houses**

Room and Meals*-Academic Year $2,866

**Note: the cooperative house rates are an estimated total for room and meals. Meal costs are assessed at each cooperative and rates may vary. Students must enter into a meal plan agreement with the cooperative in which they reside. Meal plan costs average approximately $1,300 per academic year; housing costs approximately $1,566.*

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.

## Housing for Graduate Students

Housing for graduate students is available in Poling Hall. Graduate students may also choose the other residence halls or cooperative houses as a housing option. Students in Poling may choose the Graduate Student Program Charge Plan, which allows them to pay only for actual meals eaten.

## University Housing for Student Families (All Terms)

Oregon State University maintains 94 unfurnished apartments in Orchard Court for student families. Rentals start at approximately $350 a month with water, garbage, and TV cable service furnished. Students should apply to the Department of University Housing and Dining Services. The wait list for Student Family Housing is approximately 1-2 years.

## Housing in Summer Session

Summer Session housing is available in one or two residence halls. A summer meal plan is required for all students in the summer session hall(s).

Graduate Student Program residents may extend their contracts for summer session and remain in their rooms. No meal plan is required.

## Off-Campus Housing

Current bulletin board listings of a variety of rentals available in Corvallis and surrounding communities are located in the Memorial Union lower concourse. A copy of the "Renters' Guide" may be obtained upon request from Student Activities, MU East, Corvallis, OR 97331.

## Fraternities and Sororities

The 26 fraternities and 16 sororities at Oregon State University offer men and women the opportunity to choose a small living group experience within the total University-recognized housing program.

Fraternities and sororities for the most part are private, nonprofit organizations whose chapter houses are located within a mile radius of campus. Four sororities & two fraternities do not live in a chapter house. First year costs may include initial affiliation expenses, and, in some instances, building fund charges.

Membership in the Greek letter societies is by invitation and is based upon mutual choice. "Rush" (the process of member selection) for all groups is sponsored by Interfraternity (men's) and Panhellenic (women's) Councils immediately before the beginning of fall term classes and informally throughout the academic year.

Fraternity pledges can expect to live in the chapter houses provided they haven't made prior, binding contractual agreements to live elsewhere. Materials concerning fraternities and rush are sent to all undergraduate men admitted to Oregon State University. Specific questions concerning

rush registration should be directed to Interfraternity Council (IFC), 200 Kerr Administration Building (541) 737-5432.

Information about sororities and rush is automatically sent to admitted undergraduate women. If a woman who plans to attend OSU does not receive a rush booklet she may request one from Panhellenic Council, 200 Kerr Administration Building. (541) 737-5646.

## ACADEMIC LEARNING SERVICES

**LESLIE DAVIS BURNS**
Office of Academic Affairs
(541) 737-0729

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.

### Courses

#### Lower Division Courses

**ALS 101. COMPREHENSION SKILLS (3).** Provides conditioning and further experience with reading for academic purposes. Reading for meaning and developing strategies for success will be the course focus. Building a larger vocabulary and participation in group problem-solving will also be stressed.

**ALS 102. COMPREHENDING TEXTUAL MATERIALS (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 103. METHODS OF STUDY (3).** Designed to assist students in developing effective study habits, including; successful note-taking skills, examination expertise, use of the library and other campus resources, general orientation to the university and what is expected of students at the university.

**ALS 104. QUANTITATIVE ANALYSIS SKILLS (3).** Basic concepts and solution techniques in mathematical foundations with emphasis on skill development, applications, problems analysis, data processing and presentation. PREREQ: Appropriate placement scores. EOP students only.

**ALS 107. CAMP ORIENTATION (1-3).** Assists students of migrant worker background to develop successful skills adaptive to the culture of higher education. PREREQ: CAMP program students only. May be repeated for three consecutive terms. Graded P/N.

**ALS 110. STUDENT ATHLETE ORIENTATION (3).** Designed to assist incoming student athletes to explore the skills needed to succeed in college. Topics to include time management, resources for academic success, health and wellness and student athlete interaction with the public. PREREQ: Consent of instructor. Graded P/N.

**ALS 111. OSU ODYSSEY (1).** Students develop skills and knowledge that enable them to have a successful OSU experience. Topics include academic success skills, diversity and wellness issues, student rights and responsibilities, and history and structure of the University. Graded P/N.

**ALS 112. COMPUTER TECHNOLOGY SURVIVAL SKILLS (1).** Introduction to basic computer skills needed for success in courses, including Internet, WWW, online searching, e-mail, presentation software, and use of general access computer labs. Graded P/N.

**ALS 113. ACADEMIC ENGLISH FOR NON-NATIVE SPEAKERS (3).** Vocabulary building, reading, writing, speaking, and comprehension of spoken discourse for new writers of academic English.

**ALS 114. CAREER DECISION MAKING (2).** Students explore education and career possibilities and develop decision-making skills. Emphasis on self-exploration using career assessment, literature, and media and computer resources. Graded P/N.

**ALS 115. WRITTEN ACADEMIC ENGLISH (3).** Provides new writers of academic English with skills in developing cohesively unified paragraphs. Includes substantial discussion of grammar, punctuation, and usage conventions of standard written English.

**ALS 170. CONTRACT FOR LEARNING (1-3).** Assists students in academic difficulty to reassess their academic goals and develop more effective strategies for success. PREREQ: Departmental approval required.

**ALS 200. COMMUNITY TUTORING AND MENTORING (1-3).** Supervised tutoring and mentoring of public school students, especially in the area of bilingual participants. Practical experience with younger children. PREREQ: Consent of instructor. Graded P/N.

**ALS 211. CRITICAL ANALYSIS (3).** Development of a question-asking attitude for academic study. Enables students to explore the issues and make informed decisions. Graded P/N.

**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.

**ALS 265. PEER ADVISING TECHNIQUES (3).** Students are trained to become effective peer advisors. Training includes: active listening; effective communication; knowledge of available resources and contracts with professionals.

**ALS 266. PEER ADVISING PROCESSES (3).** Students are trained in group dynamics and effective needs assessment skills. Students are provided with the opportunity to serve as group leaders and peer advisors. PREREQ: ALS 265.

#### Upper Division Courses

**ALS 311. WORKFORCE PREPARATION (3).** Practical applications of job search skills and strategies including; resumes, cover letters, informational interviews, and interview techniques. Employer-employee relations are also discussed.

**ALS 406. PROJECTS (1-3).** PREREQ: Departmental approval required. Graded P/N.

**ALS 407. SEMINAR (1-3).**

**ALS 410. INTERNSHIP (1-12).** PREREQ: Departmental approval required.

**ALS 411. ATHLETES IN TRANSITION (2).** Designed for junior and senior student athletes who wish to explore the career search process, discover career and internship opportunities, produce dynamic resumes and learn and practice interview skills. PREREQ: Consent of instructor Graded P/N.

**ALS 425. TUTORING AND MENTORING SKILLS (1-3).** Students are provided with an opportunity to gain experience in working with diverse groups of students who need tutorial assistance with upper division classes.

## CAREER SERVICES

**TOM MUNNENLYN**
*Director*

**JAMES CHANG**
*Coordinator, Cooperative Education/Internships/Adviser*

**DEE SAFLEY**
*Coordinator, Student Employment Services*

**EDIE BLAKLEY**
*Coordinator, National Student Exchange*

Career Services provides career and employment services and resources for undergraduates, graduates, and alumni.

#### Employer Recruitment Services

Over 400 employers interview undergraduates, graduates and alumni each year in OSU Career Services. The annual Career Information Fair brings more than 100 companies to campus to meet with students. Career advisers are also available to discuss careers and job development. The Center maintains student and alumni career credentials and provides referrals to on-campus and part-time positions through the Student Employment Services office. Seminars in the Center include orientation to services, writing cover letters and resumes, interviewing techniques, job search strategies and co-op and internship opportunities. Up-to-date information on the job market is provided and more than 600 company information binders are available for student use. Career Services is accessible through the World Wide Web at: osu.orst.edu/dept/career-services/. Listings of on-campus employer recruitment schedules, job listings and links to employer home pages are available from the Career Services home page.

Registration with Career Services begins by attending an orientation/registration session. Once registered, students can access the TSS (Total Scheduling System) phone system to schedule on-campus interviews with employers.

#### Cooperative Education/Internships/Field Placements

(Sophomores, Juniors, Seniors and Graduate Students)

Cooperative Education internships enable students to enhance their knowledge, personal development, and professional preparation. Co-op/internships blend academic study with productive employment in business, industry, government or social service agencies both in the United States and abroad. Internships draw upon a variety of resources and return benefits to the student, employer, community and the University.

Field placements are directly related to the student's career and educational goals and are most often jointly supervised by a faculty coordinator and the placement site supervisor. Placements may be full or part time. Students may earn from 3-16 credits through courses numbered 410 or 510. Work periods can be parallel or alternate with classwork between the sophomore and seniors years or during graduate studies. Students should contact Career Services or the faculty adviser in their academic department for information regarding participation in these programs.

**Student Employment Services (SES)**
The SES office is available to assist students in securing part-time employment on campus or in the general Corvallis area. Position listings are available to suit all skill levels and needs. Additionally, SES will assist students in payroll registration. For further information, visit the SES home page at: http://osu.orst.edu/dept/ses/studemp.htm.

**National Student Exchange**
NSE expands the boundaries of the University to allow academically qualified students the opportunity to study for up to one calendar year at one of 148 colleges and universities across the United States and it's territories. NSE provides students the opportunity to live in another part of the country, experience a different learning environemtn, and broaden social and cultural awareness, while maintaining academic progress toward their degree requirements. Credits earned during the exchange become a part of each student's OSU transcript. OSU students who have gone on exchange describe the opportunity as a highlight of their college years and a very meaningful educational experience.

## CHILD CARE SERVICES

**NANCY VANDERPOOL**
*Acting Dean of Students*

The Child Care Center at OSU is located at 11th & Adams and is a full-day child care center for children of students, staff and faculty. There are 148 full-time spaces for infants through Kindergarten. Child care may be purchased in segments of half-time and flex-time in addition to full-time. A day camp and full day care is also available in the summer. The OSU owned center is operated by KinderCare, Inc. Some subsidy for students is available. Further information may be obtained by calling the center (737-4641) or Student Development Services (737-3667).

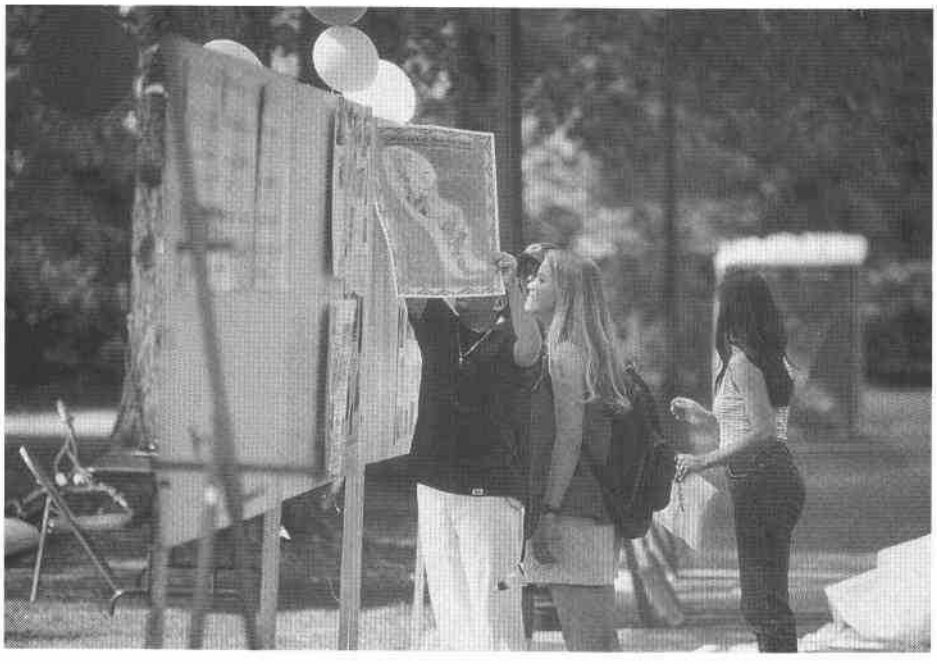
Also, two pre-school classes are available at the OSU Child Development Center. Information regarding other child care services in the area, family contact/emergency, etc., is available in the Student Development Office. Parent cooperative child care information may be obtained from ASOSU (737-2101).

## COMPUTER FACILITIES

Students at Oregon State have access to a wide variety of computer resources, from microcomputers to supercomputers, throughout the University. Information Services operates the UCS mainframe system for academic use. 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 PC; 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 per 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.



## UNIVERSITY COUNSELING AND PSYCHOLOGICAL SERVICES

**REBECCA A. SANDERSON**
*Director*

**LESLIE G. DUNNINGTON**
*Assistant Director*

**SANDY TSUNEYOSHI**
*Assistant Director for Clinical Service*

The University Counseling and Psychological Services supports the academic mission of Oregon State University by enhancing students' educational, career, and psychosocial development. Our philosophy is to value the personal worth of each individual, to respect and embrace human diversity, and to provide services that foster the development of healthy behaviors which are needed for success in a complex global environment.

The Services are designed to promote the educational, emotional, and social well-being of students through high quality time-effective counseling, referral, consultation, outreach, teaching and research. Counselors assist stuents with concerns such as:

- Becoming more proficient in life skills such as decision making, effective interpersonal communication, stress management, and conflict resolution;
- Planning and making choices about future careers;
- Coping with crises;
- Dealing effectively with academic stressors;
- Fostering personal growth and enhancing individual potential;
- Overcoming problems resulting from trauma, personal history, or situational crisis through time-effective counseling or referral for more intensive, lengthy, or specialized care.

All regularly enrolled Oregon State University students are eligible for services. The Counseling and Psychological Service provides brief interventions that assist students in problem resolution, skill building, and mental health support in order to maintain academic progress. Client concerns that involve more intensive care, certain specialization, or hospitalization may be referred to other mental health providers in the community.

The Counseling and Psychological Service is staffed by professional counselors and psychologists who are especially trained to

work with university students. Counseling is a confidential service. Anything said to a counselor, the fact that a student used the service, or any test results are not disclosed to other persons or agencies within the limitations of professional ethical and legal standards.

Students may receive up to five individual sessions without charge each year. A nominal fee is charged for individual counseling sessions beyond the fifth. Additional fees are charged for specialized services such as testing.

The Counseling and Psychological Service also houses two other programs. The University Exploratory Studies Program and the National Testing Program, which administers such national tests as the ACT, SAT, GRE, MCAT, TOEFL and PRAXIS.

## Student Development Services

**Nancy M. Vanderpool**

*Assistant to the Vice Provost for Student Affairs*

The focus of Student Development Services is on student advocacy, problem solving, crisis intervention and support. This work is done with the vision of making a contribution to a student's persistence to graduation, and his or her development of personal skills, professional competency and civic responsibility.

Specific program development and services are provided for commuters, returning adult learners, student parents and Golden Key Society. In addition, facilitation and assistance is given to emerging or ongoing campus environment concerns.

## Educational Opportunities Program

**Lawrence Griggs**

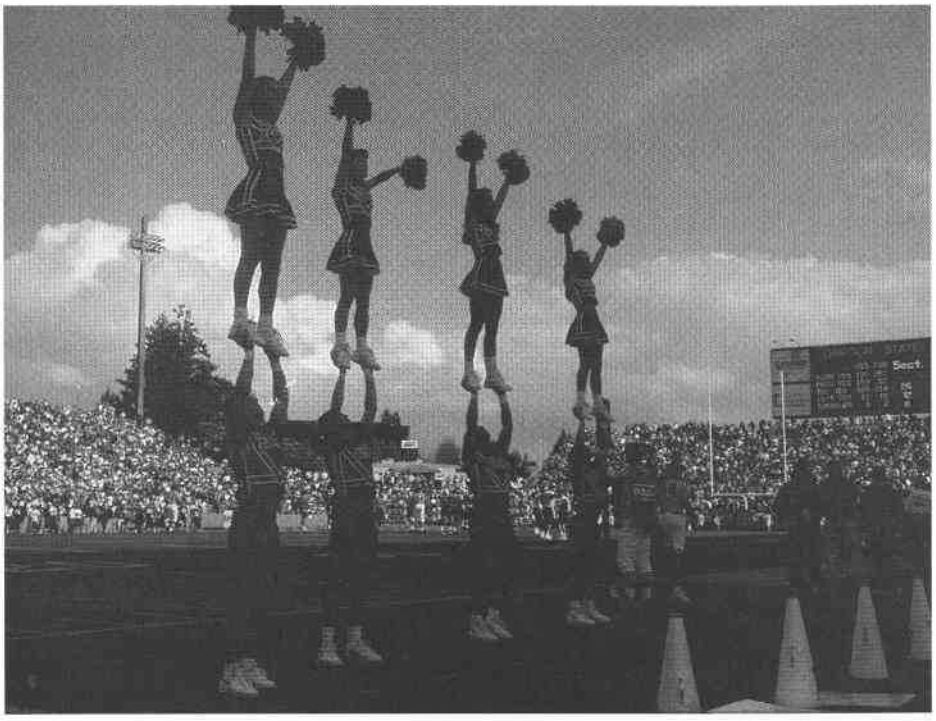
*Director*

Oregon State University's Educational Opportunities Program (EOP) is designed to recruit to the University and assist in the retention of minority, disadvantaged, and disabled students who have traditionally been denied equal access to higher education. EOP serves those who may or may not meet the current University admission requirements but are recognized as having the potential to successfully complete a college degree program.

EOP recruits within Oregon communities with concentrations of ethnic minority and non-traditional students. Recruited and referred students are assisted in gaining admission to the University.

After arrival on campus, the particular needs of the individual student are identified from placement tests, academic records, and information obtained from the student. An academic plan of tutoring, counseling, and advising is developed which determines the nature of the student's participation in EOP. The plan is subject to continual reexamination and may be revised at any time by the student and staff together.

United States citizens or permanent residents interested in participating in the program may write to the Educational Opportunities Program, OSU, 337 Waldo Hall, Corvallis, OR 97331-6405.



## English Language Institute

**Eve Chambers**

*Director*

### General information

The English Language Institute helps international students to attain the broad range of language, academic, and cultural skills necessary for competent study at an American college or university. The institute offers intensive ESL instruction in a variety of multilevel courses: reading/writing, listening/speaking, integrated skills, pronunciation, grammar and TOEFL preparation. The ELI is supported wholly by student tuition. Most students provide their own funding; however, some are sponsored by international organizations or foreign governments.

The academic experience is supplemented by social, cultural, and recreational activities. The American conversant program furnishes an opportunity for at least one hour a week of conversation with native speakers, both University students and members of the community. Students at the English Language Institute have the same privileges as regularly enrolled American students in the use of campus recreational facilities, library, bookstore, and student health and counseling services.

### Admission to OSU

International students who are academically admissible may be granted conditional admission to OSU if they have a TOEFL score from 450 to 549. (See Admission of International Students.) Conditionally admitted students are tested by the ELI upon their arrival on campus and a recommendation is made as to their course of study. In most cases these students can study part time at OSU and part time at the ELI. Students who have already been admitted to OSU with a 550 TOEFL but who need more English preparation are eligible to take an ELI course with no extra tuition charges.

### Diagnostic and Pronunciation Services

The ELI conducts regular on-campus testing of English language proficiency for international students and scholars in the OSU community. Based on this language assessment, the ELI recommends English language course work appropriate to the individual. The ELI also administers the SPEAK test, a test of oral skills, to international teaching assistants. The ELI offers special courses in English pronunciation/accent reduction and also maintains a self-study lab (Communication Station) where students and visitors can work on improving their spoken English.

### Special programs

The Division of International Special Programs offers customized programs for sponsored groups of international students and professionals. The ELI works closely with group sponsors to provide specialized English language instrution and cultural training which fits the needs of the sponsor.

Students can apply directly from the web page. For more information about any of the above services, contact the ELI in 301 Snell Hall, phone 737-2464 or see the ELI home page at: http://www.orst.edu/dept/eli/. Students can apply directly from the Web page.

## Learning and Resource Centers

Scattered across campus are learning centers to help students develop general study skills, increase their knowledge of a particular field, or prepare for specific course assignments. Most offer specialized library resources and self-paced learning materials; some offer tutoring, workshops, and access to equipment.

The Center for Writing and Learning (CWL) provides a variety of instructional services for students, including a Writing Center, a Study Skills Program, and a Conversant Program. The Writing Center is open to every undergraduate or graduate writer on campus, from any discipline, who wants to get a peer response from another writer. Writers from faculty, staff or Corvallis are welcome also. Writing Center Assistants often help writers with such matters as brainstorming, organizing, and revising, and they can help writers find answers to questions of grammar and usage as well. For half-hour or hour-long appointment call 737-5640. Short questions about writing may also be sent by E-mail to the Writing Center Hotline at WritingQ@mail.orst.edu. The Study Skills Program offers a non-credit class, How to Succeed in College, as well as free individual conferences. First year students and graduates, students with families, and students who are older than average benefit from effective strategies in time management, test taking, concentration, note taking, etc. The Conversant Program provides international students with English-speaking partners to share language, culture, and friendship. For information on the Study Skills or Conversant Programs, call 737-2930.

The Mathematics Learning Center provides assistance in all lower-division mathematics courses. Help is available on a drop-in basis weekdays from 9 am to 4:00 pm. Study materials, reference texts, old exams, and calculators are available. A computer lab is available for use by advanced math students in connection with some math courses. Independent study sections of some courses are also available.

Valley Library has numerous carrels with VCRs for independent study for a growing number of video taped programs in many disciplines.

Computer labs are available for students use in Valley Library, Milne Computer Center, Hovland Hall, and Bexell Hall. These labs provide students with computers, commonly needed software, and printers. There are staff at the labs available to provide support to students who are new to the facilities. In addition to computing, word processing, and printing, students may use the lab for electronic mail, Internet access, and World Wide Web. E-mail accounts are provided for all registered students attending OSU. Accounts can be activated in any of the student labs. Assistance is available from lab staff..

Other colleges, departments, or programs offering learning and resource centers include animal science, business, chemistry, University Counseling and Psychological Services, botany and plant pathology, education, the Educational Opportunities Program, forestry, geography, health, home economics, foreign languages, music, political science, and philosophy.

## Multicultural Affairs

**Phyllis S. Lee**
*Director*

The Office of Multicultural Affairs assists the University in promoting cultural diversity and awareness throughout the campus community. Its programs, services, and activities promote ethnic and cultural identity within a multicultural environment, and encourage and support cooperative relationships among ethnic groups and between those groups and the mainstream University population.

The staff provides consulting and resource services to all academic and support units, student organizations, and University administration as well as communities represented in the student body on issues and concerns related to cultural diversity.

In addition to programming and services which focus on recruitment, retention, and achievements of African American, Asian American, Hispanic American and Native American students and faculty, OMA's collaborative and cooperative efforts and activities involve all members of the campus community. Students are invited to visit the office, located in 330 Snell, for more details about activities, services and programs.

## National Student Exchange Program

**Edie Blakley**
*Coordinator*

Through the National Student Exchange (NSE) academically qualified students are given the opportunity to spend up to one academic year at another school while paying in-state tuition rates. Grades and credits earned during the exchange become a part of each student's OSU transcript.

Over 145 colleges and universities across the country currently participate in the National Student Exchange program. While on exchange, students have the opportunity to experience a different learning environment, to broaden social and cultural awareness, and to live in another part of the United States. OSU students who have gone on exchange often describe the opportunity as the highlight of their college career and one of the most meaningful times of their lives.

To qualify, a student must be a) an Oregon resident; b) a full-time student in good standing with a 2.50 cumulative grade-point average at the time of application and during the quarter prior to exchange; and c) an undergraduate who has earned at least 45 hours of credit at the time the exchange begins. Each year applications are available beginning November 1 and are due February 1 in the Office of the Dean of Students.

## Services for Students with Disabilities (SSD)

**Tracy L. Bentley-Townlin**
*Director*

**Diane M. Belair**
*Coordinator, Support Services*

The University offers services for students with disabilities.

Services available at OSU include notetakers, sign language interpreters, textbooks on tape, and alternative testing. Assistance with registration, housing arrangements, and other special needs is also available.

These and other services are described in the Services for Students with Disabilities brochure. The brochure includes information about people to contact for assistance and a brief description of available services.

For more information about any of these services, contact SSD, Room A200, Kerr Administration Building (737-4098 or T.D.D. 737-3666).

## Student Health Services

Student Health Services (SHS) provides comprehensive primary health care, disease prevention and treatment services, as well as health education for all registered OSU students. A quarterly health fee makes students eligible for most practitioner visits without a charge. Fees are charged for some services such as laboratory, x-ray, physical therapy and pharmacy. General medical and urgent care services are available year round. Hours and services may vary during term breaks and on holidays.

The mission of SHS is to provide quality, accessible, cost sensitive medical care and health education to the OSU community. SHS is accredited by the Accreditation Association for Ambulatory Health Care, Inc. and is a member of the American College Health Association.

Prevention and wellness programming are integrated with clinical medical care. Outpatient clinic services include: general medicine, gynecology and sexual health, allergy, sports medicine, physical therapy, and travel medicine. A self-care clinic is offered for evaluation of colds and respiratory symptoms. SHS also provides pharmacy, x-ray, massage therapy, acupuncture and laboratory services. User fees for support services may be billed to the

student's OSU account. Students are encouraged to have health insurance for reimbursement of medical expenses. (see ASOSU Health Insurance)

Health promotion and education includes a Speaker's Bureau, a video loan library, an assortment of health brochures, individual counseling in stress reduction, smoking cessation and nutritional assessment. Campus wide programs such as health fairs, workshops special events, and other outreach opportunities are offered by professional staff as well as trained peer leaders (HOPE).

Confidential care is provided by physicians, nurse practitioners, nurses and other health care professionals. Students are encouraged to become established with a primary care provider early in their university career. Fulfillment of students' academic and social potential is dependent upon their experiencing optimum health. SHS plays a vital role in assuring this success.

#### 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 of their immunization requirements before arriving at OSU. Proof of immunity is currently required for Measles, Mumps and Rubella. In consideration of public health, students may wish to have immunizations against Hepatitis B and Chicken Pox. For personal health, students should consider Hepatitis A, diphtheria/Tetanus booster and other possible travel immunization precaution. Annual Flu Clinics, providing influenza immunization, are held in fall term at SHS.

Most international students are required to have a tuberculin test upon arrival at OSU. For information call the Immunization HelpLine at 737-7573.

#### ASOSU Health Insurance

Students are urged to ensure their financial security with health insurance. The Associated Students of OSU (ASOSU) sponsors a group plan for students and their families. The plan is coordinated with Student Health Services. Most services are covered at 100%; physical therapy, osteopathic manipulation and durable medical equipment are paid at 80%. There is no preexisting condition limitation, and no deductible at Student Health Services. Inpatient expenses at Good Samaritan Hospital/Corvallis are covered at 80%. Students must pay the Health Fee to buy ASOSU Health Insurance. International students must provide proof of health insurance coverage or purchase ASOSU Health Insurance.

Eligibility information and enrollment forms can be obtained at ~e Insurance Office in Student Health (Plageman Building), or call 7377568.

## University Exploratory Studies Program

**Stephanie Hamington**
*Coordinator*

322 Kerr Administration Building,
(541) 737-2131

The University Exploratory Studies Program (UESP) is an academic advising program for students who are exploring majors at Oregon State University. UESP advisors are also availably to all undergraduate students for general academic information.

Students who are undecided about a major can elect to enroll in UESP instead of enrolling in a academic college major. Students are encouraged to declare a major as soon as they have decided. Transferring from UESP to an academic department can occur at any time during the exploratory period.

Regular academic advising is particularly important for the long-term academic success of students currently exploring multiple options. Therefore, all UESP students are required to obtain academic advising prior to registration for each term in the program. The "PIN"necessary for registration of UESP students is provided at the conclusion of the advising session.

Students in UESP receive specialized academic advising and are encouraged to participate in one or more career exploration experiences sponsored by the UESP and University Counseling and Psychological Services staff. These services include individual career counseling, career workshops, DISCOVER and the ALS 114 - Career Decision Making course.

DISCOVER is a computer-based career planning program which can help you learn more about yourself and occupations that may be right for you. DISCOVER is available free of charge to OSU students at various campus computer lab locations.

UESP has an internet home page that is linked to information about the world. Students can link to hundreds of career and academic major information sources. Some of the sources are for OSU departments, while others are world-wide. The Web address for UESP is: http :llwww. orst. edu/ dept/counseVuesp/ The ALS 114 Career Decision Making course also has a home page. That address is: http://www. orst.edu/ instruct/als1 l 4/als114.htm

## Veterans' Services and Veterans' Referral Center

The Veterans' Referral Center is an organization of student veterans serving other student veterans. The center provides referral information relating to the specific needs of the veteran community. Special attention is paid to VA benefits, personal finances, food stamps, part-time employment, readjustment to civilian and academic life, academic policies affecting veterans, and community relations. Presenting veterans' needs and problems to such institutions as the Associated Students and the Veterans Administration is also an integral function of the Veterans' Referral Center.

#### Veterans' Clerk

The veterans' clerk serves veterans by certifying their attendance at Oregon State University. All veterans, whether new, returning, or transfer students, who expect to receive benefits from the Veterans Administration must notify the veterans' clerk in the Registrar's Office. The amount of benefits varies with the number of credits taken. Details are available from the veterans' clerk.

The veterans' clerk also administers the progress standards for students who are receiving VA benefits. See Progress Standards for Veteran Students for more information on these standards.

#### State Educational 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 which the veteran is currently receiving the federal GI Bill. Information about this aid program may be obtained from the Department of Veterans' Affairs, Education Section, General Services Building, Salem, OR 97310, (541) 378-6840.

## WICHE Student Exchange Program

#### Western Undergraduate Exchange Program (WUE)

The Western Undergraduate Exchange (WUE) program offers the opportunity for students in 12 participating states to enroll in designated two-year and four-year academic majors in selected institutions at reduced tuition levels.

States participating in the Western Undergraduate Exchange are: Alaska, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah and Wyoming. California and Washington joined the WUE program in 1997-98; however, at this time Oregon does not accept students in the WUE program from California or Washington.

Programs open to WUE eligible students new to OSU, on a space available basis, include:

#### College of Agriculture

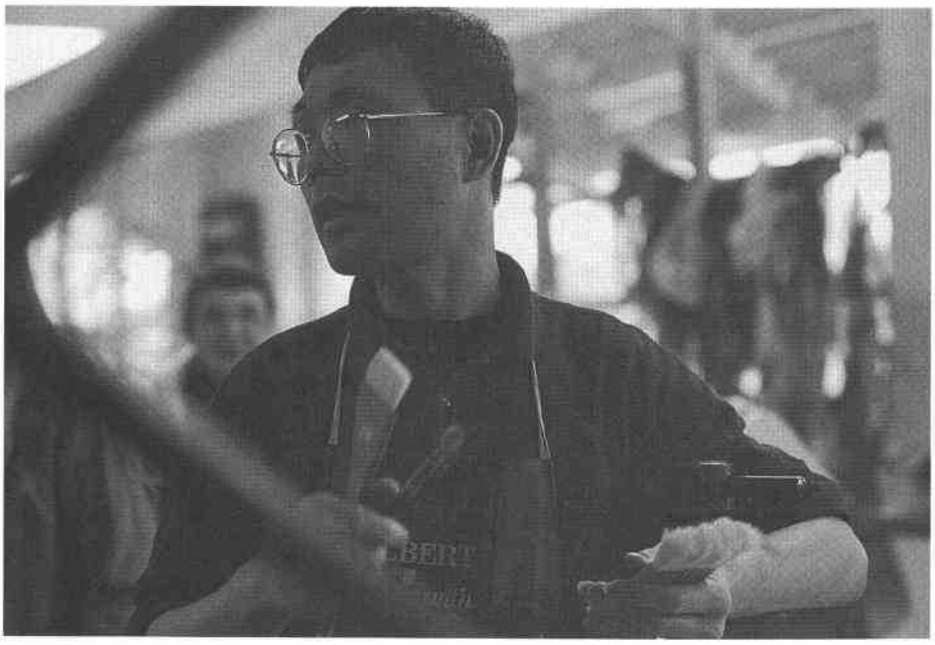
B.S. in Animal Science (Poultry Option)
B.S. in Bioresource Research
B.S. in Food Science and Technology
B.S. in Rangeland Resources

#### College of Engineering

B.S. in Nuclear Engineering
Pre-Nuclear Engineering
B.S. in Radiation Health Physics

#### College of Forestry

B.S. in Forest Engineering
B.S. in Forest Management
B.S. in Forest Products
B.S. in Forest Recreation Resources
B.S. in Natural Resources



**College of Health and Human Performance**
B.S. in Environmental Health and Safety
B.S. in Exercise and Sport Science
B.S. in Health Care Administration
B.S. in Health Promotion and Education

**College of Home Economics and Education**
B.S. in Apparel Design
B.S. in Human Development and Family Sciences (Family Finance Option) (Home Economics Communication Option)
B.S. in Nutrition and Food Management (Options in: Dietetics, Food Systems Management, Foods in Business, and Nutrition Science)

**College of Science**
B.S. in Environmental Sciences
Additional information is available from the Office of Admissions.

**Western Regional Graduate Program (WRGP)**
Residents of Alaska, Arizona, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, and Wyoming are eligible to enroll at resident rates of tuition in distinctive graduate programs. There is no requirement that students meet financial aid criteria.

Graduate programs are distinctive in the sense that they are uncommon and, through a regional review process are found to be of high quality. Programs are nominated by their institutions, reviewed by other graduate institutions in the participating states, and selected by the WRGP Advisory Council, a policy body that represents all participating states.

Programs open to WRGP eligible students new to OSU include:
Apparel, Interiors, Housing, and Merchandising (M.S., M.A., Ph.D)
Family Resource Management (Ph.D.)
Human Development and Family Studies (Ph.D.)
Marine Resource Management (M.A., M.S.)
Nutrition and Food Management (Ph.D.)
Oceanography-Biological (M.A., M.S., Ph.D.)
Oceanography-Chemical, Geological, and Physical (M.A., M.S., Ph.D.)
Toxicology (M.S., Ph.D.)

Interested students should apply for admission and for WRGP tuition status directly to the program director. Applicants must identify themselves as "WICHE WRGP" applicants. Additional information about this program and a list of contact persons for the graduate programs listed above are available from the Graduate School Office.

**Professional Student Exchange Program (PSEP)**
The Professional Student Exchange Program enables students in 13 western states (Alaska, Arizona, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, Utah, Washington, and Wyoming) to enroll in professional programs not available in their home state. The fields of study in this program are architecture, dentistry, graduate library studies, graduate nursing education, law, maritime technology, medicine, occupational therapy, optometry, osteopathic medicine, pharmacy, physical therapy, physician assistant, podiatry, public health, and veterinary medicine.

The Oregon State System of Higher Education participation in WICHE enables qualified Oregon resident students to apply for training at designated institutions (most in other states) in the following fields: graduate library studies, occupational therapy, optometry, osteopathic medicine, physical therapy, and podiatry. OSU provides opportunities for students from participating states to major in pharmacy and veterinary medicine.

In most programs, WICHE students receive preference in admission and pay resident tuition at state-supported institutions (or reduced tuition at private institutions). Students apply to the certifying office in their home state for certification in fields in which the state supports its residents through the Professional Student Exchange Program. The student then applies for admission to the participating university of their choice. Students from Oregon must make application as Oregon residents prior to October 15 of the year preceding the academic year of anticipated enrollment.

WICHE certification does not guarantee admission. The WICHE Professional Student Exchange Program applies only to the professional years of schooling; pre-professional study is not included. This is not a scholarship program, but an extension of the educational opportunities that each state offers its residents.

Additional information and forms for application and certification for Oregon resident students may be obtained by writing to: Certifying Officer for Oregon, WICHE Student Exchange Program, P.O. Box 3175, Eugene, OR 97403-0175. Interested nonresident student applicants should contact the Certifying Officer in their home state.

## WOMEN'S CENTER

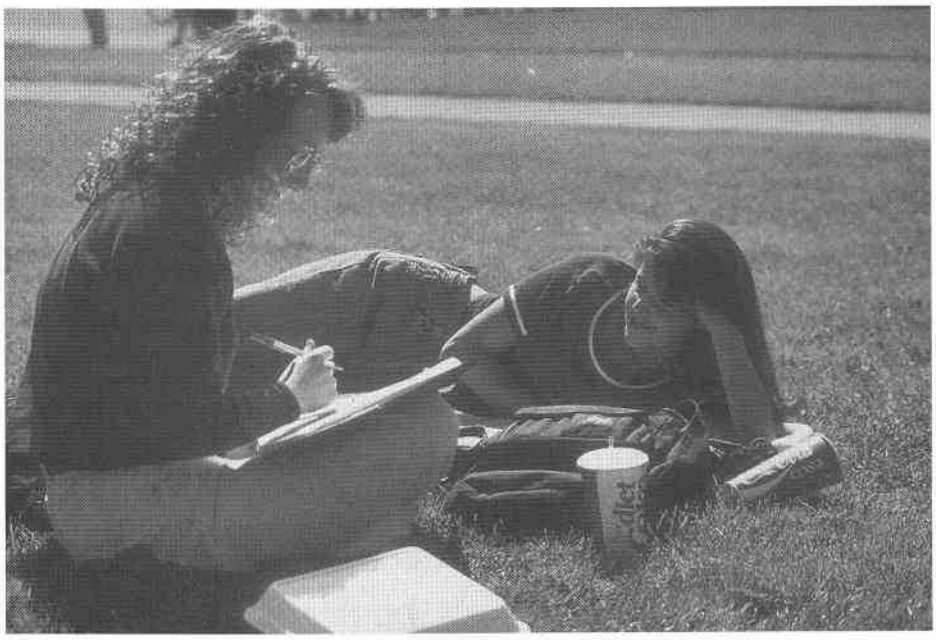
The Women's Center advocates for and empowers women students, faculty, and staff and offers information about women for everyone. A wide range of program offerings encourage exploration of current issues of importance to women and men in the academic community and in the larger society.

The center, located in Benton Annex between Benton Hall and the Pharmacy Building, provides a study space, meeting areas, a kitchen, , and an extensive library on women's issues.

Ongoing programs include a women's health month series, a celebration of Women's Herstory Month, a Women and Graduate school program, open forums dealing with important current issues, and other programs as defined by interest or need. The Women's Center is a division of the Memorial Union and Educational Activities.

## INFORMATION SERVICES

Information Services provides library, media, network and computing services and support to the OSU community, on-campus and beyond, through four departments: Oregon State University Libraries, the Communication Media Center, Central Computing and Network Services.



### OREGON STATE UNIVERSITY LIBRARIES

**Karyle Butcher**
*Interim, The Delpha and Donald Campbell University Librarian*

The University's instructional and research programs are supported by libraries which offer the most modern electronic services, and many unique collections which enhance and support the learning process.

The Valley Library contains more than 1,750,000 volumes, 340,000 government publications, and 1,500,000 microform pieces. Most materials are on open shelves, directly available to students and faculty. Located on the first floor of the six-story building are a student computer lab, newspapers, microforms and microform readers, government publications, and the Map Room.

Librarians are available at the reference and information desks on the second floor to assist library users in identifying and accessing information on all subjects. For help with extensive research projects, students, faculty and staff are encouraged to make appointments ahead of time through the reference and information desk. Members of the library faculty are available to work with other faculty in preparing course related instructional programs; for guidance and help in searching databases; to arrange interlibrary loans; to provide services for regional businesses and county Extension and Experiment Stations across the state.

The Valley Library also houses software, supercomputing and statistical consultants, and a computer help desk.

**Automation.** The OSU libraries are fully automated. The library on-line catalog, known as OASIS, is available through public terminals on each floor of the library, and to students and faculty in their offices and laboratories through the campus electronic network. Others can use modem dial-up access through the campus LAN. Non-print holdings are being added to OASIS. On-line databases are also available for searching in the library and through the campus LAN. The library mediates searches of off-campus databases as part of Reference Services. The library also maintains a section of the University gopher which structures access to other libraries' catalogs and to information files. Inquiries about automated access to the library should be addressed to the reference/information desk.

**Collections.** All library collections are under the direction of subject specialists who closely coordinate their efforts with teaching and research needs of the University. Subjects in which special strength has been developed are textiles, nutrition, mathematics, horticulture, oceanography, agriculture, forestry, entomology, and marine biology. Collections of some distinction are being developed in food technology, chemistry, plant pathology and mycology. Almost 18,000 serials are currently received, of which 7,000 are periodicals. Bound serials are a major portion of library's holdings. The library has one of the more comprehensive map collections in the Northwest, with over 170,000 maps.

Special Collections contains the papers of Linus Pauling, internationally acclaimed scientist, and the only person to have won two unshared Nobel prizes. The collection, which is in the process of being digitized, includes all of Pauling's personal and scientific papers, notebooks, and correspondence from 1916 to 1995. These papers, which number 300,000, reflect the variety and breadth of Linus Pauling's scholarly interest and his profound influence on the development of 20th-century chemistry and peace. There are also books, medals, research models, memorabilia and more than 100 films.

Also in Special Collections is the Atomic Energy Collection, one of the more important research collections on the subject in the United States. The collection consists of nearly 3,000 items, including the first published account of the discovery of radioactivity in 1896, by Henri Becquerel, the hearings of Robert Oppenheimer, and formerly secret reports, as well as cultural aspects of the atomic age.

The Valley Library is a U.S. Government depository library, as well as a depository for official publications of the state of Oregon. Publications from industrial, business, and international organizations and institutions are also received.

The Mark O. Hatfield Marine Science Center houses the Marilyn Potts Guin Library. Material in that library is included in OASIS, and is available to library users. The collection covers many aspects of marine science with particular strengths in marine mammals, marine fish, and agriculture.

Borrowing privileges are extended to the university community and to others by permission. Through a reciprocal agreement, state system libraries honor each other's student and faculty identification cards for circulating materials. Over 5,000,000 volumes in state higher education institution libraries are available to students, faculty and staff members through interlibrary loan. In addition, books are borrowed from and lent to other libraries in the Pacific Northwest, throughout the nation and the world. Membership in the Center for Research Libraries provides access to expensive and rare research materials.

### COMMUNICATION MEDIA CENTER

Primary focus of the Communication Media Center (CMC), is to offer faculty a broad range of instructional media resources to strengthen instructional processes, and thereby enhance student achievement through the use of current instructional technology methods and materials in the classroom.

The CMC supports development of instructional lessons using multimedia, television, and other types of media; the production of electronic, print and projection media including graphic, photographic, transparent, World Wide Web, and CD-ROM instructional materials; classroom support through development of multime-

dia-capable enhanced classrooms and the distribution and operation of AV and TV equipment; photographic services including, computer graphics artists service is available for outputting high quality computer generated color slides and overhead transparencies, the repair of electronic media equipment; the scheduling of video and film programs; and the distribution of video-taped programs via the Corvallis community cable system and a campus closed-circuit system. A faculty development lab is operated by CMC to facilitate faculty development of multimedia materials.

Through telecommunications systems, the CMC provides distance delivery of live classes to remote locations in the state and elsewhere in the country. Four classrooms have been designed specifically for this purpose. The CMC also has satellite downlink receiving equipment for teleconferencing and receiving instructional programs. CMC produces satellite teleconferences for OSU departments and for state and national distribution. Technical support and course development assistance for the use of the Oregon Ed-Net telecommunication system and the World Wide Web.

The CMC also operates computer labs which are available for student use in Valley Library Hovland Hall, Bexell Hall, and Sackett Hall, and Milne Computing Center. These labs provide students with computers, commonly needed software and printers. There are staff at the labs available to provide support to students who are new to the facilities. In addition to computing, word processing and printing, students may use the labs for electronic mail, Internet access and World Wide Web. E-mail accounts are provided for all registered students attending OSU. Accounts can be activated in any of the student labs. Assistance is available from lab staff.

In addition to the above services, methods and techniques concerning the different types of communication media are available. This service includes presentations about preparation of instructional materials, purchase of media equipment, methods of presentation, design of classrooms, design of instructional research proposals as they relate to media use and production, use of Oregon Ed-Net and distance learning, development of CD-ROM and WWW course materials, and other media-related topics.

Some of theses services are also available for research, administration, public relations and other noninstructional activities. There is a charge for noninstructional service.

**CENTRAL COMPUTING**
**Phil Isensee**
*Director*

Central Computing provides every student with a central computer account enabling access to the Internet and electronic mail, as well as the ability to run sophisticated programs on the central Unix computer system. These services are also available to faculty.

Central Computing manages administrative computing services, such as electronic kiosks which provide students with online access to grades, transcripts, schedules, etc., the telephone registration system, and the Banner student information system and data warehouse.

The central computers at this IS department are two Digital Corp. 7000/620 AXP Open/VMS machines which support administrative computing, and a Digital 2100 AXP OSF/1 host for academic use. A fiber-based campus network provides digital communication among various departmental and college computing facilities.

**NETWORK SERVICES**

Network Services offers resident students access to private phone service with free local calls and special rates for long-distance calls, with special rates for voice mail, call waiting and 3-way calling; free cable television hookup; direct access to the campus Ethernet computer network.

Other services provided to the OSU campus community includes telephone and voice mail services to all departments on campus, pagers, cellular phones, FAX and Telex services. Information is provided through the campus operators as well as the Staff Directory.

All telephone work is handled by the Network Services staff working with Departmental Telephone Coordinators in each campus department. Repair service calls are handled through the OSU Help Desk and the OSSHE Help Desk, both of which provide 24-hour-a-day emergency service.

The OSU switch is the hub of the Oregon State System of Higher Education telecommunications network, linking together all eight of the OSSHE institutions and the Hatfield Marine Science Center.

Network Services is involved in many campus-wide projects, including wiring the data network for OSU dorms and co-ops, supporting the transport mechanism of the NERO Project for the College of Engineering and the Computer Science Department; access to the NIIT superhighway for the College of Oceanic and Atmospheric Sciences; T-1 service for NorthwestNet Internet access, and Frame Relay services for OSSHENET administration, the Financial Information System (FIS), the Student Information System (SIS), and OSU Extension Service and Agricultural Experiment Stations.

*Faculty of the academic colleges design courses, curricula, and degree programs and deliver them to learners throughout Oregon*

Oregon State University serves the state of Oregon, the nation, and the world through teaching, research, and outreach. The OSU Statewide initiative includes many elements and programs of Oregon State University, some located at partnering institutions. The programs are diverse and range from OSU's statewide informal educational research programs (Agricultural Experiment Station, Forest Research Laboratory) to OSU's statewide outreach program (the OSU Extension Service and pre-college programs) to the for-credit instructional programs provided through the High School Outreach Program, the Alumni College, and our new statewide degree programs.

## Distance and Continuing Education

An important facet of OSU Statewide is the distance and continuing education function. This important program element delivers education to Oregonians at many locations, helping make the State of Oregon the campus of Oregon State University.

Distance and continuing education is the responsibility of Oregon State University's academic colleges, supported by an OSU Distance and Continuing Education Unit. The faculty of the academic colleges design courses, curricula, and degree programs and deliver them to learners throughout Oregon. Distance and Continuing Education provides program support and facilitation to assist the colleges and their faculties in program development, delivery marketing, and education.

In their support and facilitation role, the staff of Distance and Continuing Education provide technology support, training for faculty in distance education techniques, services for students enrolling in distance and continuing education programs, faculty support, facility coordination, and liaison with community colleges, OUS institutions, business, and other partners.

OSU Statewide Distance and Continuing Education Unit programs include:

a) Courses and degree programs offered in Corvallis and delivered to 15 cities throughout the state.

b) Courses offered via the internet, interactive television (Ed-Net) and through video workbooks.

c) Individualized Directed Learning (IDL) courses--independent study courses which allow students to earn credit from any location.

d) Non-credit and special programs, including the Professional Management Institute, a non-credit, year-long certificate program for business professionals.

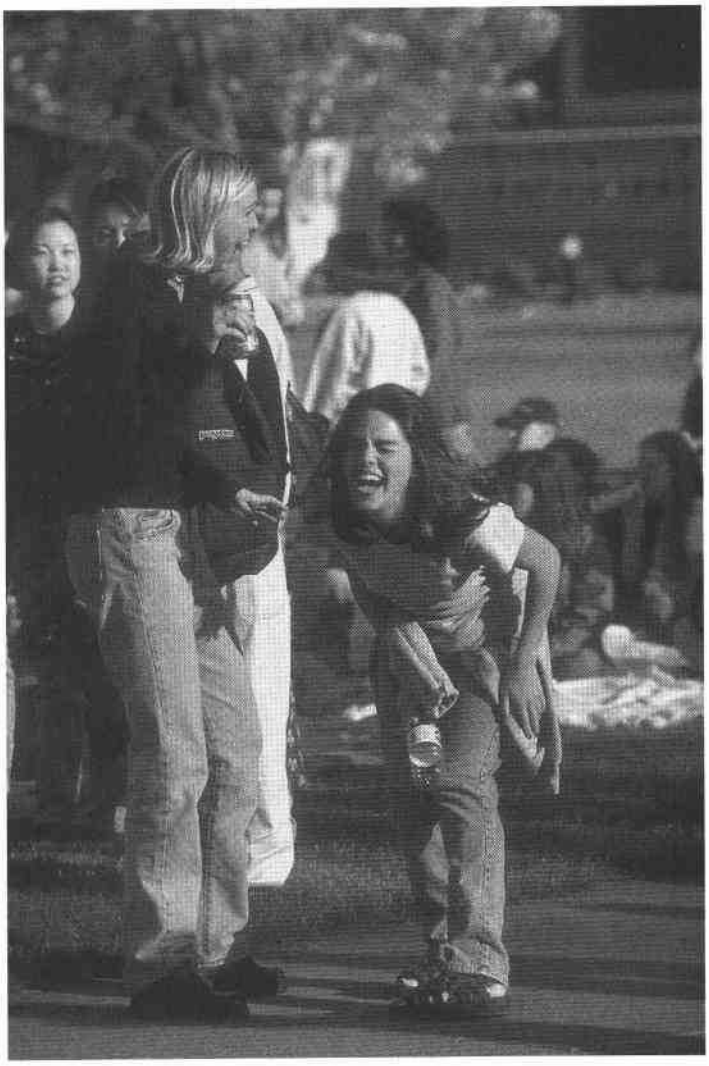
Distance Education, with ;the support of the Communication Media Center, provides instructional development support of lessons for delivery using multimedia, internet, and interactive television. Distance delivery of the classes is provided to remote locations in the state and elsewhere in the country through telecommunications networks. Additionally, four classrooms have been designed specifically for delivery. The CMC also has satellite downlink receiving equipment for teleconferencing and receiving instructional programs. Technical support and course development assistance for using the interactive television and the World Wide Web as course delivery methods is available through the Distance Eduction office. Periodic workshops are conducted for faculty to use.

## Alumni College

The Almuni College offers many benefits to OSU graduates. Automatic admission into postbaccalaureate programs; a "living transcript," which shows classes taken after graduation, including additional minors and certificates; and a lifetime e-mail address, are a few of the advantages for alumni.

**Lyla Houglum**
*Dean, Extension Service*

**Gretchen Schuette**
*Dean, Distance and Continuing Education*



## EXTENSION SERVICE

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, energy, and marine resources. It carries out its mission by extending the research knowledge base of the university to people who need the information, and provides leadership in applying this knowledge to the problems people have identified.

Anyone may take part in Extension Service offerings and the Extension staff is actively involving Oregonians who may not previously have used Extension Service programs. Thousands of Oregon citizens volunteer to assist in Extension programs by leading and teaching groups.

Extension educational programs are developed in response to the needs of people in Oregon. Needs are identified by Extension's staff of county agents (OSU faculty), who are located throughout the state in all of Oregon's 36 counties. Off campus faculty, who work with people to assess their needs, partner with members of Extension's on-campus specialist staff prepare useful educational programs for delivery. More than half of Extension's faculty are located off-campus in field offices. Financial support is from county, state, federal, and other sources.

For efficiency and for program quality, the Extension Service conducts its work on the basis of planned programs approved by the University and the U.S. Department of Agriculture. There are six major Extension education programs:

**Agriculture**
Extension's agricultural program provides education, training, and technical assistance to people with agriculturally related needs and interests. Major program emphasis is on food and fiber production, farm business management, marketing and processing of agricultural products, and resource use and conservation.

**Home Economics**
Extension's home economics program offers educational opportunities to help individuals and families manage their resources to meet needs for food, health, parenting, and human relationships.

**Forestry**
Extension's forestry program improves Oregonians' knowledge of forest resources and their options for expanding benefits from these resources. This educational program assists forest owners, managers, processors, and users in understanding small woodland production and management and use of all forest lands. Priority subjects are reforestation, growth, management, harvesting, processing and use of wood, protection of soil and water, and other multiple uses and values.

**Extension/Sea Grant Program**
Extension's Sea Grant Program provides education, training, and technical assistance to people with ocean-related needs and interests. Major efforts are concentrated in the areas of fisheries and wildlife, marine engineering, food science and technology, economics, business, resource management, education, and recreation. The program is primarily supported by the OSU Sea Grant College.

**4-H Youth Development**
Extension is the parent organization for all 4-H youth activities in Oregon. Its 4-H program assists young people, their families, and adult volunteers to become productive and self-directing by developing their practical skills and knowledge. Professionals and volunteers together provide educational projects and activities in animal science, plant science, home economics, communications, cultural and performing arts, natural science, and mechanical science. 4-H youth development offers programming to young people through 4-H clubs, school enrichment, after school and special interest groups.

**Energy**
Extension's energy program—supported in part by grants from Bonneville Power Administration and the U.S. and Oregon Departments of Energy—offers education, training, and technical assistance on conservation and renewable resources to help Oregonians solve energy-related problems.

## HIGH SCHOOL OUTREACH

The High School Outreach program offers college credit opportunities to students who are academically prepared to begin college-level course work while still attending high school.

## SUMMER SESSION

**SHIRLEY LUCAS**
*Coordinator of Summer Session*

OSU's Summer Session is a great way to begin, continue, or advance your education through more than 400 courses in 70 departments from agriculture to zoology. Courses range in length from two days to 11 weeks, with most courses running the eight weeks. Many departments also offer independent study projects, e.g. research, reading and conference, thesis, internship, etc.

The typical full-time summer course load for undergraduates is 12 credits; for graduates, 9 credits. Additional credits may be taken with the dean's approval.

Anyone can register for Summer Session classes because there are no admission requirements–you don't even have to apply. Students who have been academically suspended from the University are ineligible to attend Summer Session. Students who wish to be admitted to begin their degree course work during Summer Session must apply according to Admission's deadlines. For details contact Admissions at (541) 737-4411.

Non-resident students enjoy considerable tuition savings because there are no out-of-state fees during summer. Residents and non-residents pay the same tuition.

The Summer Session Bulletin, published each spring, contains current information on summer courses and schedule, registration procedures, tuition, housing, services and facilities, etc. For a free copy of the Summer Session Bulletin, contact the Summer Session Office (541) 737-1470 or stop by the Administration Building room A110.

## Memorial Union and Memorial Union East

The Memorial Union, located in the heart of the 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; and meeting rooms of all types.

The Memorial Union East contains an activity center for the use of all student organizations. It provides a communication center for student broadcast and publications media, meeting rooms, and a craft center.

The president of the Memorial Union is a student; other students share actively in its management and in organizing the social, recreational, and cultural programs.

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.

## MU Craft Center

The Memorial Union Craft Center, located on the ground floor of the MU East is one of only two such centers in Oregon. It is a dynamic, user-supported arts and crafts studio welcoming all adults and encouraging beginners as well as experienced craftspersons. The Craft Center is open 7 days a week during the regular academic year. The Center offers open studio workspace, classes, workshops, and button service.

The facility includes a fully-equipped ceramics studio, black and white and color photography darkrooms, woodshop, jewelry lab, glass studio, computer graphics station, fibers studio, mounting and matting area, and lots of room to work. Power and hand tools are available for use in all the craft areas. Other equipment available to members include a copy camera, sewing machine, opaque projector, and a craft books library. The Craft Center also operates a promotional button-making business.

Each term, more than 20 non-credit classes and workshops are offered. Beginner to advanced classes, taught by local artists, focus on non-competitive learning. Open studio memberships and limited-use day passes are also available for those with experience interested in just using the Center's tools, studio areas, and equipment for projects and exploration. Catalogs of offerings can be located each term around campus, at the Center or by calling 737-2937.

The Craft Center is a hands-on studio with a low key, friendly, and casual environment, and a great place to take a creative time out from the whirlwind of life.

## Student Government

The Associated Students of Oregon State University represents the student population at Oregon State University. ASOSU is composed of legislative, executive, and judicial branches of elected and appointed student government officials. ASOSU is committed to providing the students of Oregon State University with a valuable link to the campus, community, and state through the efforts of task forces and committees.

Students provide valuable insight on all of the activities taking place on campus. ASOSU helps to put the "student" back into student government. Opportunities for student involvement include task forces, student/faculty committees, or elected/appointed senate and executive positions.

Oregon State University students have the opportunity to play an active role in university government. Through serving on one of the many committees or boards available in ASOSU, students develop leadership abilities and become an active part of what is happening on a wide range of levels.

## Student Programming

The University experience includes many co-curricular activities. Located in the Memorial Union Program Office, the Memorial Union Program Council strives to provide many of these opportunities by presenting social, educational and recreational programs for students, faculty, staff, alumni, and guests of the University. The Program Council presents a broad range of programs intended to enhance the quality of life in the university community. This is achieved through many traditional events such as "Mom's Weekend," "Dad's Weekend," and the "Women's Leadership Conference." MUPC also programs a variety of events such as forums, musical events, and movies. In addition, the Program Council offers many programs relating to current events and programs designed to query individual beliefs in cultural backgrounds.

## Art and Music

Exhibits, lectures, concerts, and recitals sponsored by the departments of Art and Music, Encore, 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 Program Council, 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. Student and faculty art exhibits are shown in various galleries throughout the year (see "Library, Museums, Galleries, and Collections").

Membership in the student musical organizations is open to all students after consultation with the directors concerned. OSU groups are members of the American Symphony Orchestra League and the American Choral Foundation. Students in these activities earn regular credit. The Corvallis-OSU Symphony, University band organizations, the University Choir, Madrigal Singers, and the Choralaires present several concerts annually on the campus.

The Corvallis and OSU Music Association and the Friends of Chamber Music bring artists of international fame to the campus for concerts and recitals. Advanced music students and faculty also give public recitals during the year. Several dance recitals are given each year under the auspices of the College Health and Human Performance and other organizations.

## Forensics and Theatre

OSU's nationally recognized forensics program invites all undergraduates to participate in speech activities. Continuing a 60 year tradition at Oregon State, the forensics team involves members from all majors and schools on campus. Each year, students compete in state, regional and national intercollegiate tournaments. Events include parliamentary (limited preparation) debate, 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.

University Theatre, continuing a tradition of over a hundred years of public performances in Corvallis, offers all students involvement in the theatre creative process. Each season four main stage and numerous studio and classroom productions give student actors, designers and technicians ample opportunity to develop as theatre artists and craftspeople. In addition to class and production activities, students and faculty actively participate in regional and national festivals and conventions including Northwest Drama/American College Theatre Festival, Irene Ryan Scholarship Competitions, and United States Institute of Theatre Technology.

## Student Media

### 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).

### Beaver Yearbook

The yearbook reviews the people and events which make the academic year memorable. It is under the direction of student editors who determine its policy and content.

The yearbook may be ordered for $25.00 when paying fees during registration and is available for pickup at the Student Activities Center in the fall. They must be picked up

within 90 days from the time distribution begins. Yearbook fees are refundable in full during the first two weeks of the term in which payment is made. Thereafter, no refunds will be made on cancelled orders. Students who will not be on campus when the yearbooks are distributed may pay a mailing and handling fee at the Student Activities Center.

#### KVBR 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.

#### KBVR TV

A fully equipped television studio, editing facility and remote gear afford 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. KVBR TV can be seen on cable channel 99 in Corvallis, Albany and Philomath 4 nights a week from 7 p.m. to 12 p.m. Offices are located on the second floor of MU East (Snell Hall) (541) 737-6323.

#### Prism

The *Prism* literary magazine is published twice per year by volunteer students at Oregon State University. *Prism* welcomes contributions from the OSU community in the form of photography, art, poetry, short stories and music. Magazines are distributed during Winter term and Spring term and will be announced in *The Daily Barometer*. Contact the Student Media Office for more information.

### 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 Committee on Convocations and Lectures, Y-Round Table, Associated Students, Memorial Union Program Council, Sigma Xi, and others.

### The Experimental College

Established in 1970, the Experimental College offers a wide range of courses to anyone in the community interested in an alternative learning experience—students, faculty, staff, and Corvallis and area residents. Volunteers teach the courses, after submitting course proposals by the middle of the term prior to teaching. Each term, more than 30 courses are listed in the catalog, and more than 1,000 people enroll.

Class content, which is limited only by the imaginations and interests of the participants, includes aerobics, beer making, cooking, crafts, massage and yoga, and recreation courses. Classes are noncredit and nongraded. A $2 student and $4 for faculty, staff and general public registration fee helps pay registration costs and material fees cover direct materials used (teachers are not paid).

Participants are also encouraged to attend films, guest lectures, and special programs sponsored by the Experimental College. Northwest Excursions, patterned after the Trips and Tours programs, is run through the Experimental College and offers low-cost educational trips to participants. For more information about this student-administered program, contact the director of the Experimental College at 737-4683.

The Experimental College offers job opportunities to students interested in public relations, accounting, scheduling, and management. Volunteers move up into paid positions.

### Ethnic Cultural Centers

Oregon State University operates four ethnic cultural centers: the Asian Cultural Center, the Black Cultural Center, the Cesár Chávez Cultural Center, and the Native American Longhouse. The centers offer various academic, cultural, recreational, and social events. Each center is located in a separate facility; and all are open to the public.

The cultural centers provide support services to students of color as well as provide opportunities for all faculty & student to learn about different cultures in a risk free environment. The programs each center offers promote a greater awareness and understanding of lifestyles, problems, history, and cultural contributions of ethnic groups.

OSU's cultural centers are part of the Memorial Union Student Involvement Office. The cultural center staffs are supervised by the Diversity Development Coordinator. Each cultural center is advised by advisory board comprised of student leaders, faculty & administrators..

### Athletics

Oregon State University conducts athletic programs under the auspices of the NCAA for both men and women. Men's programs compete as a member of the Pacific-10 Conference in football, baseball, basketball, wrestling, crew, and golf. Men's soccer competes in the Mountain Pacific Sports Federation. The women's programs also compete in the Pacific-10 Conference and include volleyball, basketball, gymnastics, swimming and diving, softball, crew, soccer, and golf.

### Recreational Sports

Student-fee-funded recreational sports programs and facilities at Oregon State University are coordinated and administered by the Board of Recreational Sports.

The Department of Recreational Sports and the College of Health and Human Performance administer the following facilities available for recreational sports activities:

*Recreational Sports facilities:* Dixon Recreation Center, Stevens Natatorium, Outdoor Recreation Center, McAlexander Fieldhouse, Indoor Climbing Center, Peavy Sports Fields, and Tennis Pavilion and Courts.

*College of Health and Human Performance facilities:* Langton Hall, Women's Gym, intramural track, intramural playing fields, and golf practice areas.

Recreational Sports program opportunities at Oregon State University include:

*Informal recreation:* Dixon Recreation Center offers self-directed, as well as organized activities for all students, faculty, staff, and affiliates in aerobic fitness, conditioning, wallyball, basketball, racquetball, volleyball, squash, weight training, tennis, handball, table tennis, general exercise, and badminton.

Stevens Natatorium includes an 8-lane, 25-yard fitness pool, a deep water pool; and a spa with adjoining sun deck. Full-service locker rooms, equipment issue area, and a first aid station are also available. This facility accommodates recreational and fitness swimming, aqua conditioning, aquatic fitness classes, springboard diving, and the weekend Family Swim Program.

*Sport clubs:* Intercollegiate competition for students in bowling, cross country/track cycling, equestrian events, fencing, lacrosse, rifle, pistol, roller hockey, rugby, sailing, skiing, squash, tennis, triathlon, ultimate disc, volleyball, and water polo.

*Outdoor recreation:* An outdoor resource library; map file; equipment rental service; noncredit instruction in such activities as mountain and rock climbing, cross country skiing, bicycle maintenance, white water rafting, kayaking, and backpacking; and trip-planning assistance for backpacking, camping, rock climbing, canoeing, rafting, kayaking, and skiing.

The Indoor Climbing Center provides 4,000 square feet of climbing surface for climbers of all abilities. State-of-the-art features include a stemming corner and a chimney climb, overhangs, pockets, a lead arch, a crack wall, and a climbing route which leads across the ceiling. Other features are hangboards, a low-angling wall for beginners, rappeling stations, an "international bouldering wall", and facility rental opportunities.

*Fitness Programs:* Noncredit instructional fitness and sport skills classes in activities such as aerobic dance, step aerobics, conditioning, weight training, HYDRO-FIT© aqua conditioning, and martial arts.

Individual fitness incentive programs such as "A Point To Be Fit," one-on-one fitness assessments, and special events round out the fitness program offerings.

*Intramural Sports:* offers over 30 individual, dual, and team sports including flag football, volleyball, swimming, water polo, basketball, softball, soccer, track, golf, triathlon, 5K runs, bike races, bowling, skeet, billiards, tennis, racquetball, badminton, wrestling, free throw contest, three point shoot-out, and others.

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 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:

*The Natural History Collection* (Mason, Curator) 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 1000 preserved specimens of amphibians and reptiles from the Pacific Northwest constitute a considerable part of the teaching collection. Location: Cordley Hall II.

*The University Archives* (Lawrence A. Landis, Acting Archivist) is the official repository for University records. The University Archives was established in 1961 to collect, describe, preserve, make accessible to the public, and display historical records created or recived in connection with the transaction of University affairs. Approximately 200,000 photographic images 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.

The Archives is open to students, faculty, staff, and the public for research from 8 a.m. to 5 p.m., Monday through Friday. More information about archives and records management services and archives holding is available through the Internet on the OSU World Wide Web site. The Archives collections can provide information on OSU academic agriculture, forestry, and oceanography in Oregon; and local history. Location: Kerr Administration Building.

*The Public Wing of the OSU Marine Science Center* at Newport has been completely renovated. Interactive exhibitry, computer simulations, videos and aquariums will focus on marine research conducted at OSU. The theme, "Searching for Patterns in a Complex World," connects research topics from global perspectives down through the microscopic level. Educational opportunities such as Sea School programs for students are offered year-round.

*The Department of Apparel, Interiors, Housing and Merchandising* (E. Pedersen, Collection Manager) houses a collection of more than 1,000 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.

*The Archaeological Collection* (D. R. Brauner, B. Roth, Curators) consists of material specimens, artifacts, field notes, drawings, sketches, and photographs accumulated in archaeological investigations. Several thousand items of primary archaeological documentation comprise this collection. Location: Waldo Hall.

*The Neumann Collection* (R. L. Hall, Curator), a gift from Holm W. Neumann, Ph.D., M.D., includes several hundred human bones and fossil casts. Location: Waldo Hall.

*The Systematic Entomology Laboratory* contains approximately 2,700,000 insects and mites, chiefly from the Pacific Northwest. The collection is especially strong in Hymenoptera, Coleoptera, Lepidoptera, Homoptera, Diptera, and Hemiptera. Of special interest are the collections of beetles of the Pacific Northwest, sphecoid wasps of the world, bees, butterflies and skippers, mites associated with scarabs, marine mites, leaf hoppers, plant bugs, litter arthropods, forest insects, and aquatic insects. Location: Cordley Hall.

*The Fisheries and Wildlife Bird and Mammal Collections* (B. E. Coblentz, Curator of Mammals) include more than 9,000 specimens of birds and 7,500 specimens of mammals, as well as the Braly Ornithological Collection; Overton Dowell, Jr., Bird Collection; Alex Walker Ornithological Collection; Oregon Game Commission Collection. Location: Nash Hall.

*The Forest Products Collection* (B.L. Gartner, Curator) contains approximately 2,500 species of wood, primarily from North and South America, Southeast Asia, and Africa.

*The Department of Art Slide Collection* (C. Monders, Curator) contains 70,000 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.

*The Fine Arts Collection* (D. Russell, Curator), consists of medieval illuminated manuscript pages, European and Japanese prints, 20th-century paintings, prints, mosaics, sculpture, and crafts. Selections from the collection are exhibited occasionally in the Fairbanks and Giustina Galleries.

*The Geological Collections* (S. H. Bloomer, Director) include minerals, rocks, and fossils. The W. D. Wilkinson and Walter Lidstrom Memorial Mineral collections (E. M. Taylor, Curator) contain several hundred 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 (E.J. Moore, Curator). The Silurian Devonian Brachiopod Collection (A. J. Boucot, Curator), consisting of about one million specimens, is the most comprehensive of this type in the world with representation in some depth from every region in the world. This collection is the property of the U.S. Museum of Natural History, Washington, D.C. Location: Wilkinson Hall.

*The Herbarium* (A. I. Liston, Director) contains over 360,000 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 50,000 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.

*The Ichthyological and Herpetological Collection* (D. Markle and R. M. Storm, Curators) contains more than 12,000 cataloged lots of fish representing 180,000 specimens and 45 nominal type specimens. In addition, there are about 260,000 uncataloged specimens available for study. The collection emphasizes fishes of the Pacific Northwest, but specimens from many parts of the world are held. A small frozen tissue collection has been started. The herpetological section contains more than 10,000 specimens, mostly from western North America. Use of the collection is restricted to qualified students and investigators. Location: Nash Hall.

*The McDonald Collection* (Clifford S. Mead, Head of Special Collections) consists of rare books. Fine examples of typography, works of famous illustrators, numerous fine bindings, and several first editions are represented in the collection. Location: Valley Library.

*The Memorial Union Gallery* (Kent Sumner, Gallery Manager) includes collections of landscapes and marine paintings by the late William Henry Price and Leo Fairbanks. A permanent collection displays American Indian portraits by Carrie M. Gilbert and prints by Gordon Gilkey. Throughout the year numerous temporary exhibits of cultural and social interest are displayed in the main concourse of the Union.

*Fairbanks Art Gallery* (D. Russell, Director) exhibits monthly shows of contemporary art exhibits by outstanding regional and national artists, with a show by senior art majors featured each spring. The gallery's exhibits are also drawn from the Department of Art's collection. Location: Fairbanks Hall.

*The History of Atomic Energy Collection* (C. Mead, Head of Special Collections) consists of nearly 3,000 items, including the first published account of the discovery of radioactivity in 1896, writings on the Manhattan project, the hearings of Robert Oppenheimer, and formerly secret report of the effects of the atom bomb. It also features cultural aspects of the atomic age. Location: Valley Library.

*Giustina Gallery* (D. Russell, Director) features art by outstanding regional and national artists. Exhibits are rotated approximately every month with a show by senior art majors featured every spring. Location: LaSells Stewart Center. Hours: M-Friday, 8:00 am-5:00 pm and during evenings and weekends of special events.

## Alumni Association

**Donald Wirth**
*Director of Alumni Relations*

The purpose of the alumni association is to promote the interests and ideals of Oregon State University. Annual and life memberships are available to all graduates, former students and friends of Oregon State. The association publishes the *Oregon Stater* newspaper for all alumni, organizes alumni gatherings and class reunions, and maintains current address records and biographical data on all alumni.

The alumni association is governed by a board of directors of 62 members representing various geographical districts, all degree-granting colleges, the Golden Jubilee Association, and the student body.

## Oregon State University Foundation and University Development Office

**Gene Kersey**
*Director of Development, OSU*
**John Irving**
*Executive Director, OSU Foundation*

The Oregon State University Foundation and the OSU Office of Development work together to aid and promote Oregon State's teaching, research, and service activities.

The OSU Foundation, incorporated as a nonprofit corporation on October 15, 1947, fills the need for a legally sound, inclusive, charitable agency apart from but working in close coordination with the University. The Foundation receives gifts of cash, securities, and real and personal property, as well as deferred gifts such as bequests, life insurance, and life income agreements, to support the University's many programs.

In its first 50 years, the Foundation receipted $497 million to benefit the University.

Through its programs in annual giving, major gifts, and charitable estate planning, the Office of Development builds relationships with individuals, corporations, and foundations, to encourage them to support the University with contributions of both time and financial resources. The Office of Development also assists the University in identifying fund-raising priorities and coordinates campus-wide capital campaigns..

## Department of News and Communication Services

**Mark Floyd**
*Director*

All University news moves to off-campus media through the Department of News and Communication Services, which maintains close ties with the newspapers, wire services, radio and television stations, and professional publications of the state, region, and nation. The department also produces *OSU This Week,* the faculty and staff newsletter, published weekly during the school year.

## University Publications

**Jeffrey B. Grass**
*Director*

The Office of University Publications writes, edits, and designs the official publications of Oregon State University, including catalogs, books, posters, brochures, and programs. University departments that need publications are invited to contact the office for free editing, graphic design, and production coordination service.

## Oregon State University Press

**Jeffrey B. Grass**
*Director*

The Oregon State University Press—the only university press in Oregon—is a publisher of scholarly and regional books. The Press, founded in 1961, publishes mainly scholarly books and books of particular importance to the Pacific Northwest, especially those dealing with the history, natural history, cultures, and literature of the region, or natural resource issues.

## Community and Government Relations

**Kevin McCann**
*Director*

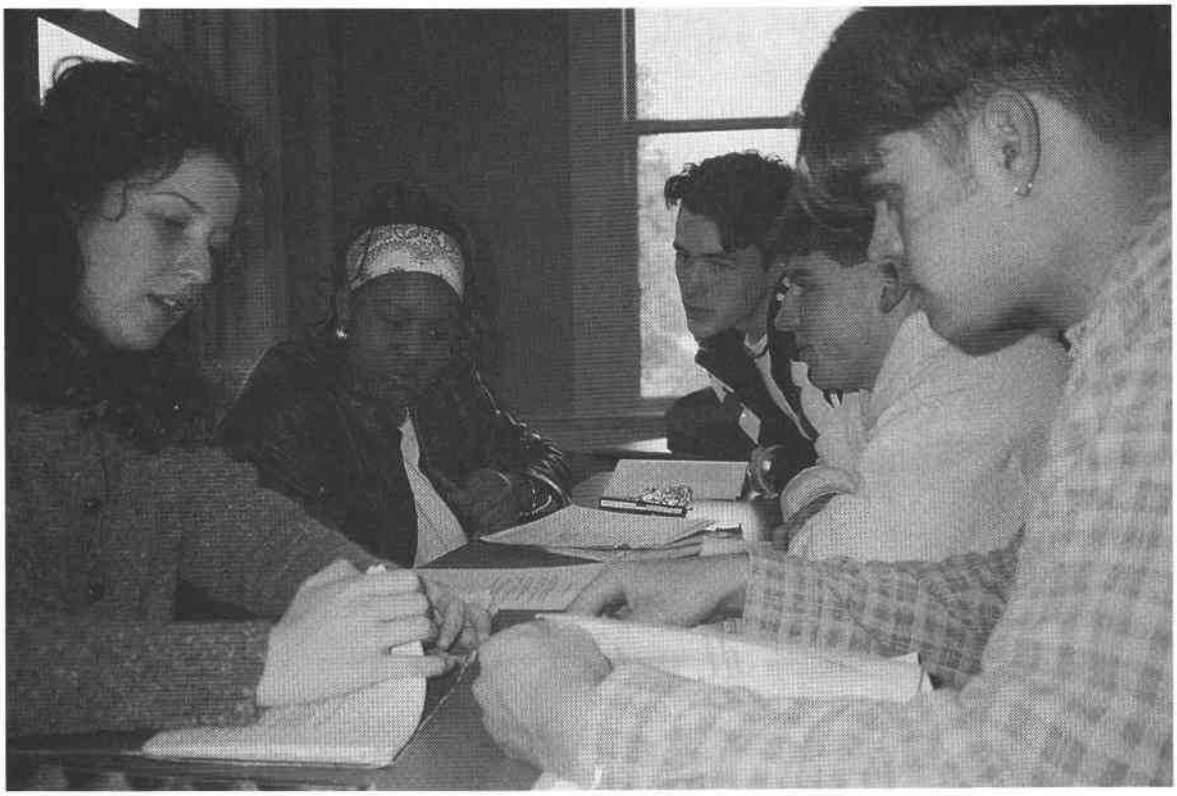
Statewide and local community information and assistance, as well as local and state government relationships are coordinated through this office in University Advancement. Legislative information and service are provided to the University, including assistance in making presentations to legislators and legislative committees.Community and government relations work is done cooperatively with the public affairs office of the Oregon State System of Higher Education and with other Oregon colleges and universities.

## Conference Facilities and Services

**Sylvia L. Moore**
*Director*

The Office of Office of Conference Facilities and Services administers the LaSells Stewart Center for Conferences and Performing Arts. It coordinates meetings and conferences both on and off campus for OSU faculty and staff as well as for non-profit and private sector groups. It also is responsible for scheduling of University facilities for non-academic use and the maintenance of the University master calendar.

# Honors College



*Students who complete the requirements of the Honors College receive OSU's most prestigious academic recognition: an Honors Baccalaureate Degree (B.A., B.F.A., or B.S.) in their major, jointly awarded by the Honors College and the college in which their major is located.*

The University Honors College provides challenging curricula, personal attention, and enhanced learning experiences both in general education and in the area of 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 mentorships, 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 available for transfer students or for students already enrolled at OSU. Such students should contact the Honors College office for information.

### ADMISSION

Admission is competitive and selective–only about 3% of all entering students join the University Honors College. 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 essay questions that reveal the student's background, interests, and academic motivations as well as abilities that may not be obvious from other measures.

Application of entering freshmen for admission to the University Honors College in Fall term should be submitted to UHC by February 1. Applicants must also have completed an application for admission to OSU by that time. Admission decisions are made by March 31. A smaller number of second-round admission decisions may be made after that date, but to assure priority consideration, admission applications should be submitted as early as possible.

November 15 is the deadline for Winter Term admission.

### 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 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.

### DEGREE REQUIREMENTS

Because the Honors degree is a single, jointly awarded degree, there are no additional credit-hour requirements beyond the total required by the college of the student's major. In addition to completing the requirements of their undergraduate major and the requirements of the Baccalaureate Core, students in the Honors College must satisfy the following requirements:

**First and Second Years (15)**
- Honors writing course (HC 199) (3)
- Honors Baccalaureate Core courses (12)

**Third and Fourth Years (15)**
(at least 12 must be upper division)
- Honors colloquia (4)
- Honors electives (6-9)
- Introduction to thesis or project (1)
- Thesis or project (4-6)

A student who completes the full 30 credits of Honors College courses will graduate as an Honors Scholar. A student who completes only the 15 credits of third- and fourth-year courses will be designated as an Honors Associate.

Honors writing and Baccalaureate Core courses may be used to satisfy the requirements of both the Honors College and the Baccalaureate Core. For students in majors that require a senior thesis or project, the Honors College thesis or project will often satisfy that requirement as well.

**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. Students whose cumulative GPA remains below the standard will be removed from UHC status.

## HONORS COURSES

See the *Schedule of Classes* each term under University Honors College and under departmental listings.

### HONORS COLLEGE 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. PREREQ: WR 121 and Honors College approval required. (Bacc Core Course).

**HC 299 SELECTED TOPICS (1-3).** Selected topics for University Honors College students. PREREQ: Honors College approval required.

**HC 401 RESEARCH (1-16).** PREREQ: Honors College approval required.

**HC 402 INDEPENDENT STUDY (1-16).** PREREQ: Honors College approval required.

**HC 403 THESIS (1-16).** PREREQ: Honors College approval required.

**HC 404 WRITING AND CONFERENCE (1-16).** PREREQ: Honors College approval required.

**HC 405 READING AND CONFERENCE (1-16).** PREREQ: Honors College approval required.

**HC 406 PROJECTS (1-16).** PREREQ: Honors College approval required.

**HC 407 SEMINAR (1-16).** PREREQ: Honors College approval required.

**HC 408 WORKSHOP (1-16).** PREREQ: Honors College approval required.

**HC 409 PRACTICUM (1-16).ANTH 210H. *COMPARATIVE CULTURES (3).** (Bacc Core Course) PREREQ: Honors College approval required.

University Honors College
Oregon State University
229 Strand Hall
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honors@ccmail.orst.edu

**JON HENDRICKS**
*Director*

**JANE SIEBLER**
*Head Advisor*

*The International Programs Offices (IP) provide the leadership for Oregon State University's involvement in a wide range of international activities: the exchange of students and faculty, cooperative research and learning experiences around the world, international curriculum development, and the development of global perspectives and understanding among nations and peoples. The IP offers logistical and administrative support for the University's international activities.*

**JOHN VAN DE WATER**
*Dean*

## INTERNATIONAL STUDENT AND SCHOLAR PROGRAMS

The Office of International Education (OIE) provides a wide range of programs and services for the international students and scholars on the OSU campus. At present there are some 1200 students and 300 scholars from more than 90 countries at Oregon State University. OIE also sponsors educational and cultural programs for the University and Corvallis community.

The Office of International Education provides special assistance to international students. The staff offers an orientation program for new students; provides liaison with University, community, and international sponsoring offices; advises on immigration and other governmental regulations, medical insurance coverage, and cultural and personal matters; helps with financial certifications for the transfer of funds from other countries; and advises on the University's policy of conditional admission related to language proficiency. The office conducts workshops of interest to international students on such issues as practical training, re-entry, as well as workshops for the community on cross-cultural awareness and concerns.

The OIE also provides leadership for a wide variety of cross-cultural activities to enrich the experience of international students on campus and in the community. Among the cooperating organizations are Crossroads International (a community organization), West International Hall (an OSU residence hall for international and American students), and the International Students of Oregon State University (ISOSU—a student organization). Crossroads International, provides home visits for new international students, Friendship Home contacts, conversation, partners for students and their spouses, and the Crossroads Conversation School. In addition, International Cultural Service Program (ICSP) provides tuition remission scholarships to a select number of international students who provide cultural and educational service in the mid-Willamette Valley area. These "cultural ambassadors" visit classes, clubs, service organizations, churches, nursing homes, & businesses to share information about their countries and cultures.

## OVERSEAS STUDY AND EXCHANGE PROGRAMS

OSU students may broaden their education by taking part in study abroad programs. All of the programs listed below 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 apply their financial aid to help cover the costs.

More information about each of the following programs can be obtained in the Office of International Education, Snell Hall, Fourth Floor (737-3006).

**Australia, Charles Sturt University.** Students of all majors may study for a year at Charles Sturt University and choose between 3 sites.

**Australia, Sydney.** Undergraduate business majors can spend a semester or a year at the University of Technology in Sydney.

**Austria, Vienna.** Students of all majors can study in Vienna for fall term or spring semester (winter/spring terms). Courses in literature, history, politics, economics, art history, music, psychology and German language are offered.

**Canada, Vancouver.** Students of all majors can spend a semester or a year at the University of British Columbia.

**China, Beijing.** The program at Central University for Nationalities combines intensive language study with courses on Chinese minority cultures. A two-week study tour to several minority regions is included. Students can choose a fall term, spring semester (winter/spring terms) or year-long option. Internships may be available during spring semester.

**Denmark, Aarhus.** College of Business students may satisfy the requirements of the International Business Concentration by studying fall term in Aarhus, Denmark. Each year, approximately 20 students are exchanged.

**Denmark, Copenhagen.** M.B.A. students may spend fall semester at the Copenhagen Business School.

**Denmark, Lyngby.** Upper level engineering students can study for a semester at the Danish Technical University.

**Ecuador, Quito.** Students may study at the Universidad San Francisco de Quito, or the Catholic University of Ecuador Quito, for the fall term, spring semester (winter/spring terms), or for the full academic year. Students live with a host family while studying language and culture. Regular university courses may be taken, depending on Spanish language ability. A minimum of two years of college-level Spanish is required.

**Ecuador, Quito.** (Summer) Students interested in improving their Spanish and learning more about the history and culture of Ecuador may participate in a five-week intensive study/travel seminar in Quito during the summer.

**England, Lancaster.** College of Science students may study for a year at the University of Lancaster in England.

**England, London.** Students of all majors may study fall, winter, or spring in historic London. This term-long program emphasizes the humanities and social sciences.

Field trips are integrated into the academic work to provide a balanced educational experience. Students live with British families.

**England, Nottingham.** Engineering students can spend a year at the University of Nottingham and take courses equivalent to OSU engineering degree requirements while experiencing the British culture and educational system.

**England, Sussex.** Students from the Colleges of Science, Engineering, and Liberal Arts can spend a year at the University of Sussex near Brighton, England.

**Finland, Jyvaskyla.** Students may spend a term or a year at the University of Jyvaskyla which has an internationally respected program in Exercise and Sport Sciences. Classes are taught in English.

**France, Angers.** Students of all majors can study in Angers for fall term or spring semester (winter/spring terms). Summer study for one, two, or three months is also possible. Courses in language, humanities, and social sciences are offered.

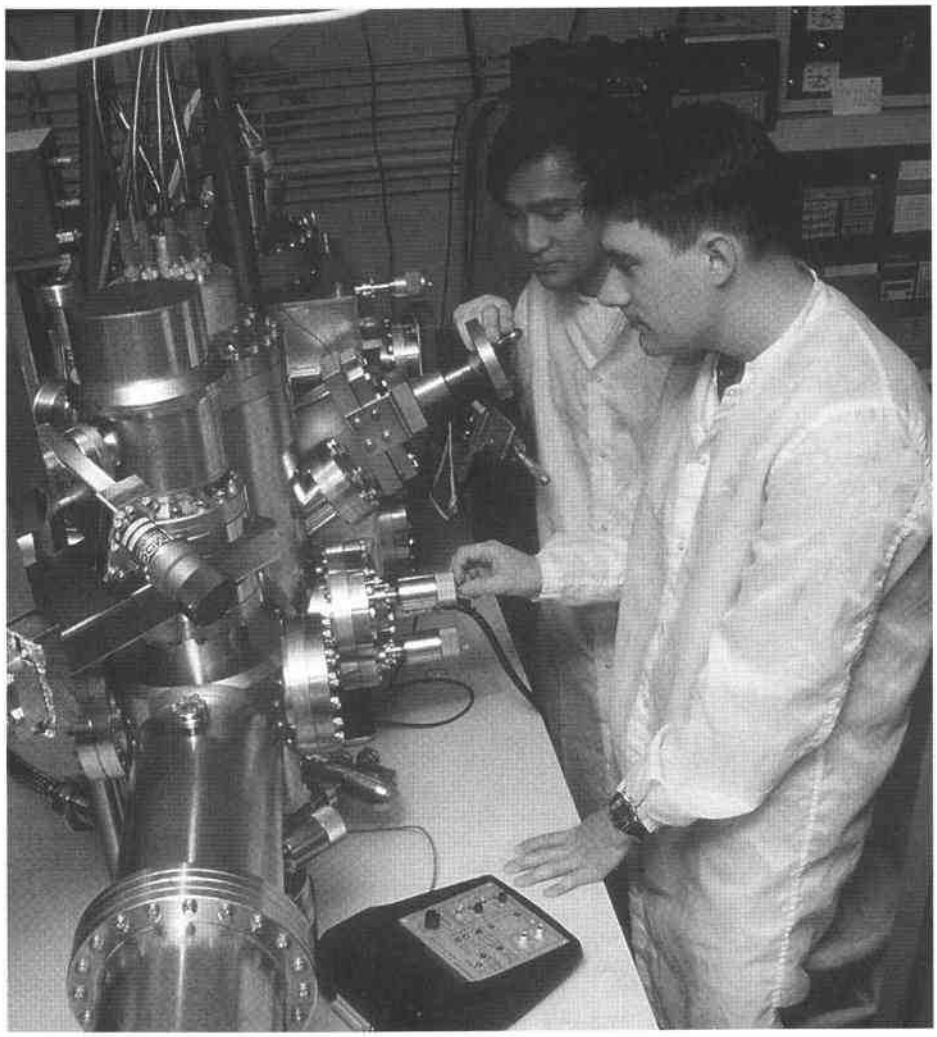
**France, Lyon.** Students of all majors may study for a year in Lyon. Depending on their language ability, students have the opportunity either to study French language and culture or take courses in virtually every academic area offered at OSU. A minimum of two years of college-level French is required.

**France, Poitiers.** This one-year academic program is for students (of all majors) who have studied at least two years of college-level French. Most students are enrolled in the Institute for Foreigners at the University of Poitiers, where they study French language and literature. Students with sufficient academic preparation may enroll in regular University of Poitiers classes.

**Germany, Baden-Württemberg.** Students in this year-long program may study at any one of the universities in the state of Baden-Württemberg, including Freiburg, Heidelberg, Hohenheim, Karlsruhe, Konstanz, Mannheim, Stuttgart, Tübingen, or Ulm. Applicants must have had at least two years of college-level German before beginning their studies in Germany.

**Germany, Tübingen.** A sixteen-week intensive German language program is available to qualified students who have completed two terms of first-year, college-level German. Students who complete the language intensive program can earn up to 21 credits in German language and culture.

**Italy, Siena.** Students of all majors can spend fall, winter, or spring term in Italy taking courses in Italian language, humanities, and social sciences. Excursions to cities such as Florence, Pisa, and Rome are included.



**Japan, Tokyo.** At Waseda University in Tokyo, students have an opportunity to study the history, culture, language, and economic conditions of Japan while living with a Japanese family. Instruction is in English. One year of college-level Japanese is required.

**Japan, Tokyo.** Aoyama Gakuin University's School of International Politics, Economics, and Business is the center of this program that integrates American and Japanese students. Instruction is in English. At least one year of college-level Japanese is required.

**Korea, Seoul.** The programs in Korea take advantage of the international divisions of the two universities, Yonsei and Ewha, where students enroll in language courses and study Asian history, economics, and culture in English. There is no language prerequisite.

**Mexico, Puebla.** This program at the University of the Americas or the Universidad Iberoamericana offers students the opportunity to take courses in Spanish with Mexican students. Participants reside in dormitories with Mexican roommates or with host families. A minimum of two years of college-level Spanish is required.

**New Zealand, Auckland.** Students in Biology and/or Environmental Science can study for a year at the University of Auckland.

**New Zealand, Canterbury.** Through the New Zealand exchange program, juniors and seniors in agriculture or forest recreation may study at Lincoln University (February-December).

**Norway, Kristiansand.** Business students may satisfy the requirements of the International Business Concentration by studying fall term in Norway. Classes are taught in English.

**Russia.** OSU students may study for a term or a year at selected Russian Universities in Yaroslavl, Voronezh or Moscow. Academic program includes intensive Russian language instruction plus courses in Russian history, politics, literature and economics. Two years of college Russian is a prerequisite.

**Thailand, Chiang Mai.** OSU students can study in Chiang Mai for a full semester at Payap University. Participants take courses in English in a variety of subject areas while studying Thai language. This program will begin in Fall 1998.

**Vietnam, Hue.** Students can spend winter term studying at Hue Teacher's University in central Vietnam. Courses are offered in Vietnamese language and culture. Students can also choose to stay in Vietnam spring term on a Global Graduates internship.

**Wales, Bangor.** Biology students can spend a year studying at the University of Wales in northern Wales.

#### INTERNATIONAL INTERNSHIPS

Global Graduates: The Oregon International Internship Program enables OSU students from all fields of study to integrate an international internship experience into their degree program. Internships can vary in length, from one term to three terms, and in format, to include a domestic internship or a study abroad program. Internships placements are in a wide range of countries and scholarships are available to help cover program costs. Language requirements vary depending upon the specific job description of the internship. A list of current openings is available on the Global Graduates website at: http://www.orst.edu/dept/int_ed/global_grads.

## OVERSEAS STUDY COURSES

The Office of International Education is responsible for overseas study and exchange programs. Each designation below is unique to the programs offered in a particular country. The X88 numbers signify overseas study courses. As in other OSU courses, course level is indicated by the first digit in the course number:
1 = freshman; 2 = sophomore; 3 = junior; 4 =senior; 5 = graduate
Participating students register in courses with the subject codes, numbers, and credit ranges shown below. After OSU course equivalents are determined or the course has been completed overseas, the generic overseas-study information is replaced either with direct equivalencies from the departmental course listings or with the appropriate course-level designations, titles, and credits for the courses below. For example, a junior level 4-credit course in the history of 19th-century Australia that was taken during participation in the Australian overseas program at Charles Sturt University might appear on the student's permanent OSU academic record as OCSU 388 HST: Australia in the 19th Century (3 credits).

For more details about the following programs — including prerequisites, language requirements, application procedure, etc. — please contact the Office of International Education or your academic adviser.

#### OVERSEAS STUDY COURSES

All the following courses can be taken for repeat credit when the topic varies. (NCSA is the Northwest Council on Study Abroad. OSSHE is the Oregon State System of Higher Education. ACC is the American College Consortium.)

**Oregon Study Centers in Australia**
OCSU 188, 288, 388, 488/588 (1-12).
Overseas studies at Charles Sturt University, Bathurst or Wagga Wagga.
OUTS 188, 288, 388, 488/588 (1-12).
Overseas studies at the University of Technology, Sydney.

**Oregon Study Centers in Austria**
OVLE 188, 288, 388, 488/588 (1-12).
Overseas studies, NCSA program Vienna.

**Oregon Study Centers in Canada**
OUBC 188, 288, 388, 488/588 (1-12).
Overseas studies at the University of British Columbia, Vancouver.

**Oregon Study Centers in China (People's Republic)**
OCUN 188, 288, 388, 488/588 (1-12).
Overseas studies at the Central University for Nationalities, Beijing (OSSHE).

**Oregon Study Centers in Denmark**
OAAR 188, 288, 388, 488/588 (1-12).
Overseas studies at the University of Aarhus, Aarhus.
OCBS 188, 288, 388, 488/588 (1-12).
Overseas studies at the Copenhagen Business School, Copenhagen.

**Oregon Study Centers in Ecuador**
OQUI 188, 288, 388 488/588 (1-12).
Overseas studies at the Pontificia Universidad Catolica del Ecuador, Quito (OSSHE).
OECU 188, 288, 388, 488/588 (1-12).
Summer Study in Ecuador, Quito.
OUSF 188, 288, 388, 488/588 (1-12).
Overseas studies at the Universidad San Francisco de Quito, Quito, Ecuador.

**Oregon Study Centers in England**
OLAN 188, 288, 388, 488/588 (1-12).
Overseas studies at the University of Lancaster, Lancaster.
OLON 188, 288, 388, 488/588 (1-12).
Overseas studies, NCSA Program, London
ONOT 188, 288, 388, 488/588 (1-12).
Overseas studies at the University of Nottingham, Nottingham.
OSUS 188, 288, 388, 488/588 (1-12).
Overseas studies at the University of Sussex, Sussex.

**Oregon Study Centers in Finland**
OJYV 188, 288, 388, 488/588 (1-12).
Overseas studies at the University of Jyvaskyla, Jyvaskyla.

**Oregon Study Centers in Former Soviet Union**
OFSU 188, 288, 388, 488/588 (1-12).
Overseas studies in the Former Soviet Union: variety of study sites.

**Oregon Study Centers in France**
OANG 188, 288, 388, 488/588 (1-12).
Overseas studies, NCSA Program, Angers.
OLYO 188, 288, 388, 488/588 (1-12).
Overseas studies at the Universities in Lyon (I, II, III and Université Catholique) (OSSHE).
OPOI 188, 288, 388, 488/588 (1-12).
Overseas studies at the Université de Poitiers, Poitiers (OSSHE).

**Oregon Study Centers in Germany**
OBWU 188, 288, 388, 488/588 (1-12).
Overseas studies at the Universities in Baden-Württemberg (Freiburg, Tübingen, Heidelberg, Stuttgart, Konstanz, Hohenheim, Mannheim, Karlsruhe, Ulm) (OSSHE).
OSIP 188, 288, 388, 488/588 (1-12).
Overseas studies, Spring Intensive Program, Tübingen (OSSHE).

**Oregon Study Centers in Italy**
OSIE 188, 288, 388, 488/588 (1-12).
Overseas studies, NCSA Program, Siena.

**Oregon Study Centers in Japan**
OAGU 188, 288, 388, 488/588 (1-1 2).
Overseas studies at Aoyama Gakuin University, Tokyo (OSSHE).
OTOY 188, 288, 388, 488/588 (1-12).
Overseas studies at Toyo University, Tokyo.
OWAS 188, 288, 388, 488/588 (1-12).
Overseas studies at Waseda University, Tokyo (OSSHE).

**Oregon Study Centers in Korea**
OEWH 188, 288, 388, 488/588 (1-12).
Overseas studies at Ewha University, Seoul (OSSHE).
OYON 188, 288, 388, 488/588 (1-12).
Overseas studies at Yonsei University, Seoul (OSSHE).

**Oregon Study Centers in Thailand**
OPAY 188, 288, 388, 488/588 (1-12).
Overseas studies at Payap University, Chiang Mai, Thailand (OSSHE).

**Oregon Study Centers in Mexico**
OETC 488/588 (1-12)
Intensive language program for teachers, Puebla.
OUNA 188, 288, 388, 488/588 (1-12)
Overseas study at the Universidad Nacional Autonoma de Mexico City, Mexico City.
OUDL 188, 288, 388, 488/588 (1-12).
Overseas studies at the Universidad de las Americas, Puebla (Cholula) (OSSHE).
OUIA 188, 288, 388, 488/588 (1-12).
Overseas studies at the Universidad Iberoamericana, Mexico City, Mexico.

**Oregon Study Centers in New Zealand**
OLIN 188, 288, 388, 488/588 (1-12).
Overseas studies at Lincoln University, Christchurch.
OAUC 188, 288, 388, 488/588 (1-12).
Overseas studies at the University of Auckland, Auckland.

**Oregon Study Centers in Norway**
OAGD 188, 288, 388, 488/588 (1-12).
Overseas studies at Agder College, Kristiansand

**Oregon Study Centers in Vietnam**
OHTU 188, 288, 388, 488/588 (1-12).
Overseas studies at the Hue Teacher's University in Hue, Vietnam. (OSSHE).

**Oregon Study Centers in Wales**
OBAN 188, 288, 388, 488/588 (1-12).
Overseas studies at the University of Wales, Bangor.

## INTERNATIONAL DEGREE

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**Undergraduate Major**

**International Studies (B.A.)**

Oregon State University offers the unique undergraduate International Degree, designed to prepare students in all disciplines for our increasingly integrated world. Unlike traditional international studies departments, the International Degree enables students to study a specific field and then add an international component. The course of study includes general international courses and international content courses in the student's major, foreign language study, and an experience overseas.

This baccalaureate degree is obtainable only in conjunction with another undergraduate degree offered by the University. For example, a student could earn both a B.S. in Environmental Sciences (primary degree) and a concurrent or subsequent B.A. in International Studies in Environmental Sciences. Undergraduate students in any major are eligible for the program.

Students should meet the following requirements for admission:

- A minimum 2.75 cumulative GPA after completing 32 credits of college-level courses.
- Proficiency in a foreign language equivalent to that attained by the end of a second-year language sequence at OSU.
- Any additional requirements established by the major department.

Once admitted, students are eligible for scholarships to assist in the cost of study abroad requirement.

### LANGUAGE ENTRANCE REQUIREMENTS

To be admitted, students must provide evidence of proficiency in a foreign language by completing one of the following:

- Four or more years of consecutive study of the same foreign language at the high school level preceding admission to Oregon State University.
- AP College Board test in a foreign language with a score of 4 or 5.
- Completion of the third term of a second-year foreign language sequence at OSU or at another accredited university with a GPA of 3.00 or better. This course must constitute a minimum of 4 quarter or 3 semester credits.
- One term of a third-year foreign language course (any course designated 311, 312 or 313) at OSU or another accredited university with a GPA of 3.00 or better. This course must constitute a minimum of 3 quarter or 2 semester credits.
- 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.

Students who change majors after admission to the International Degree Program must reapply for admission to the International Degree Program in the new department. Those pursuing two degrees in addition to the International Degree need apply to only one department.

### GENERAL INTERNATIONAL DEGREE REQUIREMENTS

International degree students are required to complete a primary degree. International Degree students must also complete an additional 32 credits of course work, which involves four classes from the Baccalaureate Core Curriculum, an overseas learning experience, a senior project and senior-level equivalency in a second language.

### ADDITIONAL BACCALAUREATE CORE COURSES

Students must include in the 32 extra credits a minimum of four courses selected from the Baccalaureate Core Curriculum. *These courses are in addition to the University's Baccalaureate Core requirements. (See the current* Schedule of Classes *for the most up-to-date list.)*

**Western Culture (2-4)**
*Select one course from the following:*

AIHM 379, 380. The Built Environment of Western Cultures (3,3)
ANTH 312. Peoples of the World (3)
ART 204, 205, 206. Intro to Art History–Western (4, 4, 4)
EC 319. Economic History & Development of the U.S. (3)
ENG 110. Introduction to Film Studies (3)
ENG 125. Film comedy (3)
ENG 201, 202, 203. Shakespeare (3, 3, 3)
ENG 204, 205, 205H, 206. Survey of English Literature (3, 3, 3, 3)
ENG 207, 207H, 208, 209. Literature of Western Civilization (3, 3, 3, 3)
ENG 215. Mythology (3)
ENG 253, 254, 255. Survey of American Literature (3, 3, 3)
ENG 317, 318, 319, 319H. The American Novel (3, 3, 3, 3)
FR 331, 332, 333. French Culture and Society Since the Revolution (3, 3, 3,)
GEO 106. Geog of the Western World (3)
GEO 326. Geography of Europe (3)
GEO 329. Geog of the U.S. and Canada (3)
GER 331, 332. German Culture (3,3)
HST 101, 102, 103. History of Western Civilization (3, 3, 3)
HST 201, 202, 203. History of the United States (3, 3, 3)
HST 201H, 202H, 203H. History of United States (3, 3, 3)
MUS 105. Sound and Silence (3)
PHL 150. Great Ideas of Philosophy (3)
PHL 201. Introduction to Philosophy (4)
PHL 205. Ethics (4)
PHL 205H. Ethics (4)
PHL 207. Political Philosophy (4)
PHL 220. World Views and Values in the Bible (4)

PHL 230. Christianity & Western Culture (4)
PHL 301, 302, 303. History of Western Philosophy (4, 4)
PHL 360. Philosophy and the Arts (4)
PHL 365. Law in Philosophical Persp (4)
PS 206. Introduction to Political Thought (4)
RUS 231, 232, 233. Russian Culture (3, 3, 3)
SPAN 331, 332. The Culture of Spain and Portugal (3, 3)
SPAN 336, 337. Latin American Culture (3, 3)
TCS 200. Twentieth Century American Realities (3)
TCS 201. Twentieth Century American Dreams (3)

**Cultural Diversity (6-8)**
*Select two courses from the following:*

ANTH 210. Comparative Cultures (3)
ANTH 210H. Comparative Cultures (3)
ANTH 311, 313, 314, 315, 316, 317, 318, 319. Peoples of the World (3 each)
ART 207. Indigenous Art of the Americas (3)
CHN 331, 332, 333. Chinese Culture (3, 3, 3)
ENG 210, 211, 212, 213. Literature of Non-European Civilization (3, 3, 3, 3)
ENG 360. Native American Literature (3)
ES 101. Introduction to Ethnic Studies (3)
ES 211. Survey of Chicano/Latino American Studies (3)
ES 231. Asian American Studies I: First and Second Generations (3)
GEO 105. 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)
HST 320. Ancient Near East (4)
HST 350,351. Modern Latin America (4,4)
HST 381,382. History of Africa (4,4)
HST 387, 388. History of the Middle East (3, 3)
HST 391,392. East Asia (4,4)
HST 485. Politics and Region in the Modern Middle East (3)
JPN 331, 332, 333. Japanese Culture (3, 3, 3)
MUS 108. Musical Cultures of the World (3)
NFM 216. Food in Non-Western Culture (3)
PHL 160. Quests for Meaning: World Religions (4)
PHL 311, 312, 313. History of Non-Western Religious Ideas (3-4 each)
PHL 315. Precolumbian Philosophy (4)
PHL 371. Philosophies of China (4)
RUS 231, 232, 233. Russian Culture (3)

**Additional Course (3-4)**
*Select one course from:*

The Western Culture, Cultural Diversity, and/or Contemporary Global Issues categories that does not focus on the same culture(s) used in meeting the requirement in the Western Culture or Cultural Diversity group above

**Contemporary Global Issues**

ANTH 380. Cultures in Conflict (3)
ANTH 462. Minority Cultures in China (3)
ANTH 482. World Food & the Cultural Implication of International Agricultural Development (3)
ANTH 483. Medical Anthropology (3)
ANTH 484. Wealth & Poverty (3)
ANTH 487. Language in Global Context (3)
ANTH 488. Business & Asian Culture (3)
AREC 351. Natural Resource Management (4)
AREC 433. International Agricultural Development (3)
AREC 461. Ag and Food Policy Issues (4)
BI 301. Human Impacts on Ecosystems (3)
BI 306. Environmental Ecology (3)
BI 306H. Environmental Ecology (3)
COMM 446. Communication in International Conflicts and Disputes (3)
ENG 414. Criticism, Culture, and World Community (3)
ENG 416. Power and Representation (3)
ENG 497. International Women's Voices (3)
FOR 365. Issues in Natural Resources Conserv (3)
FOR 365. Issues in Natural Resources Conservation (3)
FW 325. Global Crises in Resource Ecology (3)
GEO 300. Environmental Conservation (3)
GEO 308. Global Change and Earth Sciences (3)
GEO 350. Population Geography (3)
H 312. Aids & Sexually Transmitted Diseases in Modern Society (3)
HDFS 450. Families & Quality of Life in the Developing World (3)
HDFS 471. The World Consumer (3)
HST 317. Why War? A Historical Perspective (4)
HST 342. Christianity in Russia (3)
HST 385. Regional Conflict in Global Context (3)
HST 465. American Diplomatic History (3)
HST 485. Politics and Religion in the Modern Middle East (3)
MB 390. The World According to Microbes (3)
NFM 415. Global Food Resources and Nutr (3)
PHL 443. Values and Human Ecology (3)
PS 345. The Politics of Developing Nations (4)
PS 455. The United States as Viewed from Abroad (4)
RNG 468. International Rangeland Resource Management (3)
SOC 480. Environmental Sociology (3)
TCS 300. World Community in the Twentieth Century: Development (3)
TCS 301. World Community in the Twentieth Century: Underdevelopment (3)
WS 480. International Women (3)

## 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.
- 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.
- Demonstration of end of fourth-year level proficiency in a foreign language by successful completion of an achievement test administered by the Department of Foreign Languages and Literatures at OSU.
- Demonstration of oral proficiency in a foreign language as evidenced by an oral proficiency test administered by a certified foreign language proficiency tester, with the following Georgetown Language Roundtable Rating (used by the Defense Language Institute and the Foreign Service Institute): Romance Languages, Superior; Germanic and Slavic Languages, Advanced Plus; Other Languages, Advanced.
- For languages not offered at OSU, the requirement may also be completed by a minimum of nine-months' residency (study, research, work), after fulfilling the foreign language entrance requirement, in a country in which the language is spoken.

## Ten Weeks Abroad

Students must spend a minimum of 10 weeks in another country 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 Coordinators of the International Degree. Currently OSU has University-sponsored programs in 20 countries.
- An international internship or work program which receives academic credit.
- A pre-approved research project abroad.
- Previous international experience such as the Peace Corps approved by the primary academic department.

## Senior Project

The final requirement for the degree is to prepare a rigorous and integrative senior project, such as a thesis or research project, that demonstrates a fundamental and comprehensive understanding of global issues and of the international dimensions of the primary degree.

## Scholarships

In support of the overseas learning experience, the International Degree Program has funds available to assist students traveling to most areas of the world. These are awarded on a competitive basis. Scholarship applications are due approximately three months prior to the students's intended departure.

*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 significant 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

Although OSU has offered interdisciplinary programs for many years, new and innovative interdisciplinary baccalaureate degree programs are continually being approved.

At the undergraduate level, students have a variety of opportunities to pursue interdisciplinary interests.

- **Combine a major with one or more minor or option in other disciplines.** Undergraduate minors and options are listed throughout the catalog; and a table of majors, minors, and options is located in the front section of this catalog; consult the appropriate departmental catalog section for requirements.
- **Complete a certificate program.** These programs may be completed in conjunction with any baccalaureate degree program. Certificates in Applied Ethics, Human Services, Latin American Affairs, Peace Studies, Russian Studies, Twentieth Century Studies, and Women Studies are available through the College of Liberal Arts; the College of Home Economics and Education offers a certificate in Gerontology. Consult the appropriate college section of this catalog for further information on particular certificate programs.
- **Three Multimedia minors (Multimedia, Telemedia, and Print Media)** incorporate work from computer science, art, English, and speech communication to prepare students for the fast-paced world of electronic communication.

The boundaries between traditional media and new media are often blurred and many media professionals must be able to work with several media and reformat information originally gathered for one medium to suit a second or third medium. These minors provide students the needed tools for media communications in the 21st Century.

- **Earn a baccalaureate degree.** Baccalaureate degrees in American Studies and Liberal Studies are offered through the college of Liberal Arts. These programs allow students considerable flexibility in tailoring course work to particular interdisciplinary interests in the liberal arts and the sciences.
- The **Bioresource Research** degree provides students with broad academic training, focused course work in a specific bioresource option, and a research/mentorship opportunity unmatched in any other OSU undergraduate degree program.
- The **Earth Information Science and Technology** undergraduate minors and undergraduate options provide strong background in geosciences, forestry, environmental science, natural resources, bioscience engineering, and civil engineering.
- The **Environmental Sciences** major combines strong interdisciplinary preparation in the physical, biological, and social sciences with a core of environmental courses and a specialization in one science discipline relevant to the environment.
- The **Natural Resources** baccalaureate degree, drawing upon a broad curriculum based in the Colleges of Agricultural Sciences, Forestry, Liberal Arts, and Science, provides understanding of the social and scientific dimensions of a broad range of natural resource management challenges.
- The **International Degree**, earned concurrently with any other baccalaureate degree, allows students—through experience abroad, advanced course work in language and culture, and an individualized project—to bring an international dimension to any major. (See the International Education section of this catalog.)

## AMERICAN STUDIES

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**Undergraduate Major**

**American Studies (B.A., B.S.)**
Options
Ethnic Studies
Women Studies

See the College of Liberal Arts section of this catalog.

Footnotes for this section on page 89.

## APPLIED ETHICS

c/o Philosophy Department
208 Hovland Hall
Oregon State University
Corvallis, OR 97331-3902
(541) 737-2955

### Certificate Program

*Applied Ethics Certificate*

See the College of Liberal Arts section of this catalog.

## BIORESOURCE RESEARCH

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Agricultural and Life Sciences Building
Oregon State University
Corvallis, OR 97331-2911
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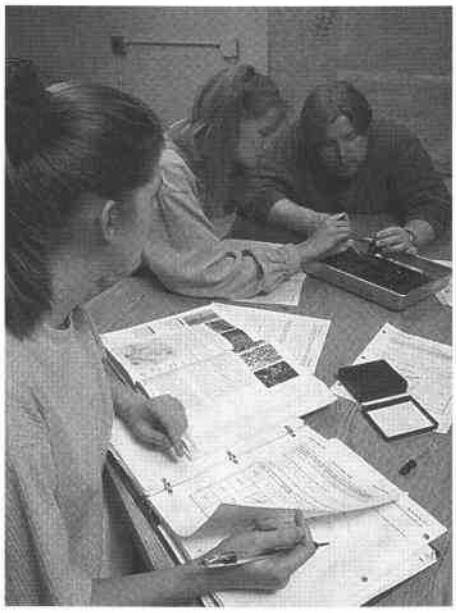
**Faculty:**
There are over one hundred Bioresource Research faculty mentors, from fifteen departments in the Colleges of Agricultural Science, Forestry, and Science: Agricultural Chemistry, Animal Science, Bioresource Engineering, Botany and Plant Pathology, Chemistry, Crop and Soil Science, Entomology, Fisheries and Wildlife, Food Science and Technology, Forest Resources, Forest Science, Horticulture, Microbiology, Rangeland Resources, and Zoology. The faculty are organized into ten interdepartmental option groups according to their research interests.

### Undergraduate Major

**Bioresource Research (B.S.)**
*Options*
Animal Reproduction and Development
Applied Genetics
Biosystems Modeling
Biotechnology
Environmental Chemistry
Food Quality
Pest Biology and Management
Plant Growth and Development
Sustainable Ecosystems
Toxicology

Bioresource Research students acquire research experience and broadly-based knowledge in interdisciplinary fields of agricultural, environmental, food, and forest sciences. Students determine their fields of study by choosing among ten different option areas. After two years of research in the program of a faculty mentor, each students writes a senior thesis. In addition to research expertise, students graduate with strong basic science backgrounds and problem-solving and communication skills. Many will become industrial or academic research professionals in areas



of science where there will be a shortage of qualified individuals for the foreseeable future. Others will enter graduate and professional schools in the life sciences or become highly effective secondary school science teachers.

### CURRICULA

**BACCALAUREATE CORE REQUIREMENTS (48)**

Bioresource Research Core (23)
BRR 100. Great Experiments in Bioresource Sciences (1-twice)
BRR 401. Research (14)
BRR 403. ^Thesis (4) (Writing Intensive Course)
BRR 406. Projects-Data Presentation (1)
BRR 407. Seminar (1-twice)

**Physical Sciences and Mathematics (60)**
CH 221-223. General Chemistry with Lab (15)
CH 331, CH 332. Organic Chemistry (8)
CH 337. Organic Chemistry Lab (3)
BB 450, BB 451. General Biochemistry (7)
PH 201-203. Physics (15)
MTH 251, MTH 252. Calculus (8)
ST 351. Statistics (4)

**Biological Sciences (16)**
BI 211-213. Biology (12)
BI 311. Genetics (4)

**Communication (6)**
WR 327. Technical Writing (3)
COMM 111. Public Speaking (3)

**Western Culture (4)**
PHL 205. Ethics (4)

**Unrestricted Electives (20)**

**Specialization and Breadth Electives (29)**
These electives must include 18 upper-division credits in Specialization Courses related to the area of the student's research, as specified in the option descriptions below, and at least 11 credits (4 credits upper-division) in Breadth Courses, in the agricultural, environmental, food, and forest sciences. Required or Specialization Courses listed below in the option sections may be used to satisfy either the 18-credit upper-division or the 11-credit breadth requirement, but not both.

### OPTIONS

**ANIMAL REPRODUCTION AND DEVELOPMENT**

Research in this option entails the study of life processes in cells, organs, and whole animals to enhance efficient production of high quality animal food products. Students use antibody-based assays, molecular genetics, protein chemistry, embryo and tissue culture, electron chemistry, or other modern laboratory techniques to study various aspects of reproduction, development, and growth.

**Required Courses**
AC 460. Biotechnology: Perspectives and Case Studies (3)
ANS 121. Introductory Animal Science (4)
ANS 316. Reproduction in Domestic Animals (4)
ANS 317. Reproduction in Domestic Animals Lab (1)
ANS 314. Animal Physiology (4)
CSS 300. Intro. to Crop Production (4)
*Select one of the following courses:*
AC 450. Environmental Toxicology (3)
BOT 331. Plant Physiology (5)
CSS 305. Principles of Soil Science (5)
ENT 311. Introduction to Insect Pest Management (5)
MB 302. General Microbiology (3)
RNG 341. Rangeland Resources (3)

**Specialization and Breadth Courses**
Four to six credits approved by option faculty and research mentor.

**APPLIED GENETICS OPTION**

Applied Genetics is a field of science directed at changing the genome of a variety of organisms, in order to increase their utility to humankind. This is accomplished through a variety of techniques derived from cytogenetics, molecular biology, and Mendelian and quantitative genetics. Typically, applied geneticists have expertise in one or more related fields of study. These include agronomy, biochemistry, botany, entomology, food processing, forestry, microbiology, pathology, physiology, and statistics. The goals of applied geneticists include: 1) improving the quality of food and fiber products, 2) improving the cost efficiency of any given product, and 3) minimizing adverse environmental effects of food or fiber production.

**Required Courses**
AC 460. Biotechnology: Perspectives and Case Studies (3)
ST 411. Methods of Data Analysis (4)
CSS 430 and CSS 450. Plant Genetics, Plant Breeding (3,4) or ANS 378. Animal Genetics (4) or FS 444. Forest Genetics (4) or FW 455. Fishery Genetics (4)

**Specialization and Breadth Courses**
15 to 18 credits approved by option faculty and research mentor.

### BIOSYSTEMS MODELING OPTION

Biosystems Modeling involves the application of general systems theory to the analysis of agricultural and environmental systems. Systems theory provides a method of analyzing overall system behavior by examining relations among—and the behavior of—individual components, and synthesizing these relationships into a mathematical framework that can describe 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. Systems modeling is a powerful tool in the development of comprehensive solutions to problems. Examples are the responses of salmon in natural and hatchery environments to such factors as water flow, oxygen levels, and temperature; interactions between crops, such as sweet corn, filberts, and apples, with pests, such as corn earworm, filbert moth, and codling moth, with respect to use of pesticides and crop yields.

**Required Courses**

BRE 471. Biosystems Modeling Techniques (3) or ST 435, Quantitative Ecol (3) or ST 443, Appl Stochastic Models (3)
CS 131. Introduction to Fortran Programming (4) or CS 161. Introduction to Programming Methodology (4)
ST 411, ST 412. Introduction to Mathematical and Statistics (4,4) or ST 421, ST 422, Intro to Math Stat (4,4)

**Specialization and Breadth Courses**

Fourteen credits approved by option faculty and research mentor.

### BIOTECHNOLOGY OPTION

Biotechnology involves genetic engineering of organisms to make or modify products, to improve plants or animals, or to develop useful microorganisms. Examples include: gene transfer to increase plant yield and 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 for development of vaccines; production of antibodies for detection of animal and plant diseases. Students will gain laboratory and/or field experience in modern techniques of 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)
MB 302. Gen Microbiology (3)
MB 303. Gen Microbiology Lab (2) or HORT 441. Plant Tissue Culture (4)
MB/GEN 454. Microbial Genetics (4) or GEN 455. Eukarotics Molecular Gen (4)
MTH 254. Vector Calculus I (4)

**Specialization and Breadth Courses**

12-14 credits approved by option faculty and research mentor.

### 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**

PH 211-213. General Physics with Calculus (4,4,4) for PH 201-203

**Required Courses**

AC 430. Chemical Behavior in the Environment (3) or CSS 446. Geochem Soil Ecosystem Properties (3)
CH 421, CH 422. Analytical Chemistry (3,3) or CH 425. Analytical Chemistry (4) or CH 440. Physical Chemistry (3)
CH 428. Instrumental Analysis (4) or AC 428. Chemical Analysis of Environmental Residues (3) or CH 435. Structure Determination by Spectroscopic Methods (3)
CSS 305. Principles of Soil Science (5)
MTH 254. Vector Calculus I (4)

**Specialization and Breadth Courses**

7 to 11 credits approved by option faculty and research mentor.

### FOOD QUALITY OPTION

Food Quality research includes a broad range of studies involving food and beverages in four categories: sensory appeal, convenience, safety, and nutrition. 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 microorganisms 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 411-413. Food Chemistry (4,4,4)
MB 302. General Microbiology (3)

**Specialization and Breadth Courses**

14 credits approved by option faculty and research mentor.

### PEST BIOLOGY AND MANAGEMENT OPTION

Pest Biology and Management involves the study of living organisms, such as insects, pathogens, vertebrates, and weeds, that limit agricultural productivity. Research approaches range from basic laboratory studies to field experiments. Students will develop research skills in pest biology, in development of management strategies, and in assessment of pest impact on plants or livestock.

**Required Courses**

BOT 350. Introductory Plant Pathology (4)
CSS 440. Weed Control (5)
ENT 311. Introduction to Insect Pest Management (5)

**Specialization and Breadth Courses**

Fifteen credits approved by option faculty and research mentor.

### PLANT GROWTH AND DEVELOPMENT OPTION

Research in this option is concerned with the control and coordination of processes in cells, organs, and/or whole plants. Students will develop research skills and knowledge in studies of 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.

**Required Courses**

BOT 331. Plant Physiology (5)
BOT 413. Plant Anatomy (4)
*Select two of the following:*
BI 488. Environ Phys of Plants (3)
BOT 421. Adv Plant Systematics (4)
BOT 433. Hormonal Regulation of Plant Growth and Development (3)
CSS 305. Principles of Soil Science (5)
HORT 416. Plant Nutrition (4)

**Specialization and Breadth Courses**

Eleven to fourteen credits approved by option faculty and research mentor.

### SUSTAINABLE ECOSYSTEMS OPTION

Sustainable Ecosystems research addresses the sustainability of crop, forest, rangeland, wildlife, fishery, and native ecosystems. The programs aim to define and develop natural and managed ecosystems in which environmental soundness is a result of the conscientious interaction of human beings 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. Thus the research is multi-disciplinary; 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.

**Required Courses**
BI 370. General Ecology (3) or BOT 341. Plant Ecology (4) or FOR 341. Forest Ecology (4)
BI 371. Ecological Methods (3) or RNG 441. Rangeland Analysis (4)
Additional courses required in three categories: Ethics, Social/Political, and Management. Contact Adviser, 737-2999.

**Specialization Courses**
Nine to fourteen credits approved by option faculty and research mentor.

**TOXICOLOGY OPTION**

Toxicology concerns itself with potentially hazardous chemicals in our food and feed supply, and in our environment. Toxic chemicals include not only pesticides and herbicides, but compounds that exist naturally as basic components of edible 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 disorder. Toxicological research focuses on understanding mechanisms by which such compounds exert toxicities, on attempting to more clearly understand the human and environmental risks from given levels of exposure, and on identifying acceptable means for reducing risks. Students will acquire laboratory skills in applied biochemistry and molecular, cellular, and organismic biology.

**Substituted courses**
CH 334-CH 336. Organic Chem (3,3,3) for CH 331-333.

**Required Courses**
AC 430. Chemical Behavior in the Environment (3) or CH 390. Environmental Chemistry (3)
AC 450. Environmental Toxicology (3)

**Specialization and Breadth Courses**
Twenty-three credits approved by option faculty and research mentor.

## COURSES

**Lower Division Courses**

**BRR 100. GREAT EXPERIMENTS IN BIORESOURCE SCIENCES (1).** Course for students interested in BRR to help them start the process of defining their research interests and thinking about project areas. Students meet with other BRR students and faculty. Participating BRR faculty mentors describe research projects and experimental approaches, and pose interesting political and ethical questions related to scientific research. Students write about and discuss topics with fellow BRR freshmen and sophomores interested in the various research options, and some junior and senior students already involved in their research projects.

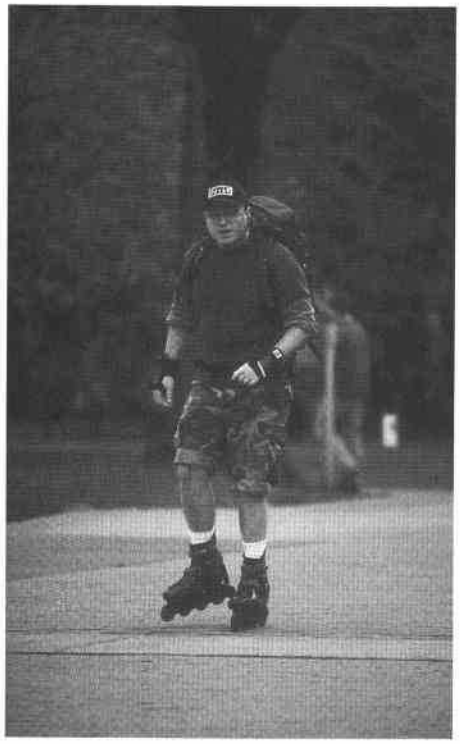
**Upper Division Courses**

**BRR 401. RESEARCH (1-14).** Students select from over 100 research faculty and programs, across college and departmental boundaries, with which they will work to complete a total of 14 credits of research. Students and faculty follow established guidelines for preparing their project proposals, follow-up reports, and completing their research thesis. They learn research methodologies applicable to their chosen field. Valuable professional contacts are gained and students acquire new confidence in themselves after having completed a project. Students are evaluated on their ability to develop and complete a research project proposal (due before 3 research credits are completed), learn and develop research methodologies, and learn trouble shooting procedures applicable to their chosen field of research.

**BRR 403. ^THESIS (4).** Students Independently develop and summarize their own research project in writing. This is a writing intensive course (WIC) that meets the University Baccalaureate requirement, and because the writing process for each project is iterative, students have several opportunities to learn and improve their writing abilities. Students are encouraged to write their 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 project proposal, project update, and final thesis. Timeliness of reports are factored in student assessments. The student's faculty mentor and the BRR co-directors provide comments on reports and a consensus grade when the thesis is completed. (Writing Intensive Course)

**BRR 405. READING AND CONFERENCE (1-16).**

**BRR 406. PROJECTS/DATA PRESENTATION (1).** Designed to evaluate and develop poster and slide presentations containing scientific data. Students are exposed to a variety of scientific disciplines as they prepare and critique not only their own, but other students' posters and oral presentations. Students improve both written and oral communication skills as they learn aspects of good presentation and discussion skills and discover the appropriate information to display on slides and posters. Students receive a letter-grade based on participation, Improvement, and the quality of a final poster project and oral presentation.



**BRR 407. SEMINAR (1).** Encourages excellence in public speaking. Students attend public seminars and provide both written and oral evaluations of these presentations to the class. Not only does this format expose students to a variety of current seminar topics, it provides them with the opportunity to evaluate components of good public seminars. As seniors, students in this course receive a grade only after completing a public seminar on their own research. Juniors receive a letter grade based on their oral and written summaries of seminars attended. Seniors receive a letter grade based on their public seminar.

# EARTH INFORMATION SCIENCE AND TECHNOLOGY (EIST)

A. Jon Kimerling
(Geosciences)
257 Wilkinson
Oregon State University
Corvallis, OR 97331
(541) 737-1225

William J. Ripple
(Forest Resources)
011 Peavy
Oregon State University
Corvallis, OR 97331
(541) 737-3056

Robert J. Schultz
(Civil Engineering)
215 ECE
Oregon State University
Corvallis, OR 97331
(541) 737-4579

**Undergraduate Minor**

**Earth Information Science and Technology**
*Option*
Earth Information Science and Technology

**Graduate Minor**

**Earth Information Science and Technology**

## UNDERGRADUATE MINOR

The undergraduate Earth Information Science and Technology minor is designed to give students a basic understanding of four component fields—geographic information systems (GIS), remote sensing, cartography, and surveying—while allowing advanced study in a particular field. The EIST minor may be attractive to students interested in geoscience, forestry, environmental science, natural resources, bioresource engineering, civil engineering, and other students needing a strong background in these fields. Civil Engineering students completing the surveying track minor will be prepared to take the Fundamentals of Land Surveying (FLS) examination.

The EIST minor is offered by three participating departments—civil engineering, forest resources, and geosciences—for their own majors and students from other departments. Courses have been coordinated so that students completing the required core courses will be able to take any of the advanced courses, provided the mathematics and/or physics requirements of each have been met. Interested students should contact the appropriate participating department, where an adviser will be assigned.

Contact A. Jon Kimerling, Department of Geosciences, 257 Wilkinson Hall, (541) 737-1225 for information.

#### Required Core Courses

GEO 360. Cartography (4)
CEM 263, FE 210 or CE 361. Surveying (3)
FOR 220, GEO 418, or CE 466. Photo Interpretation (3,3,3)
GEO 444. Remote Sensing (3)
GEO 465. Geographic Information Systems (3)
Minimum mathematics: MTH 112 or equivalent high school course, ST 201, ST 202, or ST 351, ST 352.

#### Advanced Courses

Four upper division courses selected from the following:
CE 365. Highway Location and Design (3)
CE 461. Photogrammery (3)
CE 463. Control Surveying (4)
CE 465. Oregon Land Survey Law (3)
CE 469. Property Surveys (3)
FOR 420. Advanced Air Photos and Remote Sensing (3)
FOR 421. Advanced GIS Applications in Forestry (3)
GEO 460. Map Design and Production (4)
GEO 462. ^Geosciences Field Methods (4) (Writing Intensive Course)
GEO 445. Computer-Assisted Cartography (3)
GEO 466. Digital Image Processing (3)

The four advanced courses may be in one of several tracks, with the exact courses to be taken determined in consultation with the student's faculty adviser. Typical tracks are listed below, but many other combinations are possible.

*Cartography*
CE 461, GEO 460, GEO 445, GEO 466, or GEO 462
*Remote Sensing*
CE 461, F 420, F 421, GEO 466
*Geographic Information Systems*
CE 469, F 420 or GEO 466, F 421, GEO 445
*Surveying*
CE 461, CE 463, CE 465, CE 469

## Undergraduate Option

(21 credits, including 15 upper division)

Students electing the undergraduate option must take the required core courses listed for the undergraduate minor, plus two advanced courses from the above list. The two advanced courses are selected in consultation with a faculty adviser to best meet the student's professional interests.

## Graduate Minor

#### Required Core Courses

CE 566/GEO 518. Photo Interpretation (3)
GEO 544. Remote Sensing (3)
GEO 565. Geographic Information Systems (3)

#### Advanced Courses

Two advanced courses from the following, as determined in consultation with the student's graduate adviser. These courses, plus the minor core, must form a coherent minor program.
CE 561. Photogrammetry (3)
CE 563. Control Surveying (4)
CE 565. Oregon Land Survey Law (3)
CE 569. Property Surveys (3)
FOR 520. Adv Air Photos and Remote Sensing (3)
FOR 521. Adv GIS Applications in Forestry (3)
FS 691. Use of Remote Sens in Land Ecol (2)
GEO 560. Map Design & Production (4)
GEO 562. ^Geosciences Field Methods (4) (Writing Intensive Course)
GEO 545. Computer-Assisted Cartography (3)
GEO 566. Digital Image Processing (3)
GEO 580. Advanced GIS Applications in Geosciences (3)
OC 678. Satellite Oceanography (3)

# ENVIRONMENTAL SCIENCES

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**Undergraduate Major**
**Environmental Sciences (B.S.)**
**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 a B.S. degree in Environmental Science 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 Science 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 B.S. degree in Environmental Science provides excellent training for careers with agencies responsible for environmental protection and natural resource use, consulting firms, and those seeking opportunities for graduate studies.

## Major Curriculum

The Environmental Sciences degree requires credits in five categories: 48 credits of baccalaureate core; 70 credits of basic science, humanities and skills core; 25-26 credits of environmental sciences and humanities; 27-31 credits of specialization; and 32-37 credits of elective courses.

#### 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.

#### Sample Curriculum

Courses listed below are required and may be taken in an order other than that listed below

#### Freshman Year

CH 121, CH 122, CH 123 or CH 221, CH 222, CH 223. Gen chemistry (15)
MTH 251, MTH 252. Calculus (8)
WR 121. English Composition (3)
CS 101. Computers: Applications and Implications (or higher CS course) (4)
HHP 231. Lifetime Fitness for Health (3)
PHL 205. Ethics (4)
Required courses and/or electives (8)

#### Sophomore Year

BI 211, BI 212, BI 213. General Biology (12)
EC 201, EC 202. Intro. to Microeconomics, Intro. to Macroeconomics (8)
ST 201, ST 202. Principles of Statistics (6) or ST 351, ST 352. Introduction to Statistical Methods (8)
Writing II, III (6)
Required courses and/or electives (11-13)

#### Junior and Senior Years

PH 201, PH 202, PH 203 or PH 211, PH 212, PH 213. General Physics (15)
ATS 210. Intro to Atmospheric Sciences (3)
BI 370. *Ecology (3)(Bacc Core Course)
OC 331. Intro. to Oceanography (3)
GEO 201. Earth System Science (4) or GEO 221. Environmental Geology (3) or CSS 305. Principles of Soil Science (5)
One course in conservation and management (AREC 351, FOR 365, GEO 300, GEO 350, GEO 422, PH 313 or RNG 468) (3)
One course in environmental ethics and politics (ANTH 481, AREC 352, PHL 440, PHL 443, PS 474, PS 475, or PS 476) (3-4)
One course in history of science and society (HSTS 416, HSTS 421, HSTS 425, HST 467, HST 468, HST 481, or SOC 456) (3-4)
One course in the human environment (BI 301, BI 306H, BI 333, BI/BOT 489, CE 356, CH 374, FW 325, H 344, or Z 348) (3)
Observation experience (3)
Courses required for specialization area (27-31)
Required courses and/or electives (13-20).

**SPECIALIZATION AREA (27-31)**
This requirement can be met by completing an approved minor from a participating program in the environmental or closely related sciences, choosing an approved option, or working with advisers to develop an innovative course cluster to analyze environmental systems.

Approved minors are: agricultural economics, botany, earth information science and technology, entomology, environmental geosciences, environmental health, fisheries and wildlife, forest recreation resources, horticulture, insect pest management, oceanography, political science, rangeland resources, resource economics, sociology, soil science, and zoology. Approved options in environmental sciences include: aquatic biology, aquatic chemistry, aquatic physics, atmospheric processes, environmental chemistry, environmental communications, environmental engineering, environmental policy, forest ecology, ocean-atmosphere-land systems, and terrestrial ecosystems.

**ELECTIVE COURSES (32-37)**
These courses are unrestricted.

**OBSERVATIONAL EXPERIENCE REQUIREMENT (3)**
The program must contain at least one course, internship or research experience which provides opportunities for hands-on experience in design and collection of observations in the physical , biological or social environment. Students are urged with work with advisers at an early stage in their study to identify courses or experiences which are appropriate.

## MINORS

The minor in Environmental Sciences is available to students from all departments and programs at Oregon State University. A year of physical sciences, general biology, and one course each in calculus and statistics are prerequisites. The 28-29 credits required for the minor are in addition to the credits required for the student's major. Course substitutions must be selected in consultation with an environmental sciences adviser; substitutions must cover material in the same course category (natural environmental systems or humans and the environment) at a similar or higher level.

**Natural Environmental Systems (13-14)**
BI 370. Biosphere (3)
GEO 201, GEO 221 or CSS 305. Lithosphere (4-5)
OC 331. Hydrosphere (3)
ATS 210. Atmosphere (3)

**Humans and the Environment (15)**
HSTS 416, HSTS 421 HSTS 425, HST 467, HST 468, HST 481 or SOC 456. History of Science and Society (3)
ANTH 481, AREC 352, PHL 440, PHL 443, PS 474, PS 475, PS 476, or PHL 490. (When the topic is "Ethical Issues in the Resource Sciences"). Environmental Ethics and Politics (3)
AREC 351, FOR 365, GEO 300, GEO 350, GEO 422, PH 313 or RNG 468. Conservation and Management (3)
BI 301, BI 306H, CE 356, CH 374, FW 325, H 344 or Z 348. The Human Environment (3)
BI 333 or BI 489/BOT 489. Problem Analysis (3)

## COURSES

**ENSC 401. RESEARCH (1-16).** PREREQ: Consent of instructor and department approval required.

**ENSC 405. READING AND CONFERENCE (1-12).** PREREQ: Consent of instructor and department approval required.

**ENSC 410. INTERNSHIP (1-12).** Supervised practical experience working with professionals at selected cooperating institutions, agencies, laboratories, or companies. PREREQ: Consent of instructor and department approval required. Graded P/N.

## MULTIMEDIA MINORS

### Minors

**Multimedia**
**Telemedia**
**Print Media**

We are entering a new age: the Information Age, a time of significant changes in the media of communication which will affect all facets of our lives.

Digital technologies have transformed the print and broadcast media. New media are simultaneously competing with and extending traditional media. Community newspapers and national magazines have added frequently ambitious web sites in order to capture an emerging market as it grows. CD-ROMs have become a staple of publishing. Books often contain CD-ROMs. CD-ROMs often replace books. The boundaries between traditional media and new media are often blurred and many media professionals must be able to work with several media and reformat information originally gathered for one medium to suit a second or third medium. The proposed minors provide students the needed tools for media communications in the 21st Century.

In addition, because the program consists of a series of minors, it allows students to mix work in media communications with more extensive work in their major. Students are thus able to merge a familiarity with communication tools with expertise in a content field. The minors themselves are constructed in such a way that they recognize the overlap in a variety of different media and a single core program provides an efficient way to cover the overlapping material.

### CURRICULUM

The following minors will consist of 39–42 credits, at least 17 of them upper-division. The minors integrate work from computer science, art, English, and speech communication. It is possible for students to complete a 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 art, computer science, English, or speech communication, it is possible that there will be overlap between the requirements of the major and the minor. It is thus explicitly stated that the minor must include 27 credits not used as part of the student's major program, and that 12 of those 27 credits must be upper division.

All students take a 19–20 credit media communications core and select one of three minors.

**Media Communications Core (19–20)**
ART 120. Computers in Graphic Design (3)
ART 300. Visual Communication (3)
COMM 280. Media Communication in the Information Age (3)
CS 295. Authoring for the World Wide Web (4)
WR 201. Writing for the Media (3)
*One of the following:*
Senior Project (406) in the student's major field (3), or Internship (410) in the student's major field (3), or CS 495, Interactive Multimedia Projects, (4)[for Multimedia minor]

**Multimedia Minor (39–41)**
Media Communications Core (19–20)
COMM 382. Telemedia Design and Production (4)
COMM 486. Media Aesthetics (3)
CS 391. Social and Ethical Issues in Computer Science (3)
CS 395. Interactive Multimedia (4)
*Two of the following:*
ART 222. Graphic Design I (3)
COMM 322. Small Group Problem Solving (3)
COMM 385. Communication & Culture in Cyberspace (3)
COMM 484. Media Criticism (3)
CS 151. Introduction to 'C' Programming (4)
MUS 105. Sound and Silence (3)

**Telemedia Minor (41–42)**
Media Communications Core (19–20)
COMM 382. Telemedia Design and Production (4)
COMM 480. History of Media Communication (3)
COMM 482. The Media in Culture and Society (3)
COMM 484. Media Criticism (3)
COMM 486. Media Aesthetics (3)
*One of the following:*
COMM 368. Propaganda and Social Control (3)
COMM 385. Communication & Culture in Cyberspace (3)
One additional course in advanced media techniques (3)

**Print Media Minor (39–40)**
Media Communications Core (19–20)
COMM 482. The Media in Culture and Society (3)
COMM 484. Media Criticism (3)
WR 301. Copyediting (4)
WR 305. Reporting (4)
*Two of the following:*
ART 263. Digital Photography (3)
WR 327. Technical Writing (3)
WR 414. Advertising and Public Relations Writing (3)
WR 448. Magazine Article Writing (3)
WR 449. Critical Reviewing (3)
WR 462. Science Writing (3)
The minor must include 27 total credits not used as part of the student's major program. Twelve of those credits must be upper division.

## LATIN AMERICAN AFFAIRS

Robert Kiekel, Director
224 Kidder Hall
Oregon State University
Corvallis, OR 97331-4603
(541) 737-3940

### Certificate Program

Latin American Affairs

See the College of Liberal Arts section of this catalog.

## LIBERAL STUDIES

Gary Tiedeman, Director
213F Social Science Hall
Oregon State University
Corvallis, OR 97331-6202
(541) 737-0628

### Undergraduate Major

**Liberal Studies (B.A., B.S.)**
*Options*
Pre-M.A.T. for Elementary Education

See the College of Liberal Arts section of this catalog.

## NATURAL RESOURCES

Bo Shelby, Director
113 Peavy Hall
Oregon State University
Corvallis, OR 97331-5703
(541) 737-4951

### Undergraduate Major

**Natural Resources (B.S.)**
*Options*
Agroforestry
Aridland Ecology
Forest Ecosystems
Geosciences and Natural Resources
Native American Use of Natural Resources
Natural Resource Education
Resource Economics & Policy
Resource Reuse & Waste Management
Water Quality

### Minor

Natural Resources

Graduates in Natural Resources will have an understanding of a range of natural resource problems. The program is a broad-based curriculum involving studies from the Colleges of Agricultural Sciences, Forestry, Liberal Arts, and Science, organized around a natural resources theme. This degree will give students the ability to work with issues and experts in a variety of resource fields, and the capability to deal with social and political components of resource management.

## MAJOR CURRICULUM

The Natural Resources degree requires all students to complete a minimum number of credits in three areas: 46 credits of core courses, 21 credits of breadth requirements, and 50 credits of option.

**CORE REQUIREMENTS (46)**

Students must satisfy the University Baccalaureate Core Requirements (48 + WIC), *plus* the Natural Resources Core listed below.

MTH 112, or MTH 241, or MTH 251. Mathematics (4)
BI 101, BI 102, BI 103. Biology (12)
ST 351. Statistics (4)
BI 370. General Ecology (3)
FE 430, RNG 355, OC 331, or OC 332. Water Science (3)
GEO 101, GEO 102 or GEO 201. Earth Science (4)
ATS 210, Atmospheric Science (3)
PS 474, RNG 490, or FOR 460. Forest Policy (4)
AREC 351, AREC 352, FOR 430, or FOR 432. Resource Economics (4)
NR 455. Natural Resource Decision Making (3)
Seminars in Natural Resources (2)

*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 REQUIREMENTS (21)**

Students must complete one upper division course from each of the following groups:

**Fisheries & Wildlife (3)**

FW 320. Intro. Population Dynamics (4)
FW 321. Fisheries and Wildlife Resource Ecology (3)
FW 451. Biology of Game Birds (5)
FW 454. Fishery Biology (5)
FW 458. Management of Big Game Animals (4)
FW 465. Marine Fisheries (4)
FW 473. Fish Ecology (4)
FW 481. Wildlife Ecology (3)
FW 485. Wildlife Behavior (4)
FS 453. Managed Forest and Wildlife Interactions (3)

**Range (3)**

RNG 347. Arid Land Biomes (3)
RNG 350. Grassland Ecosystems (3)
RNG 421. Rangeland Improvements & Restoration Ecology (4)
RNG 441. Rangeland Analysis (4)
RNG 442. Rangeland-Animal Relations (4)
RNG 450. Landscape Ecology & Analysis (3)

**Forestry (3)**

FOR 341. Forest Ecology (4)
FOR 365. Issues In Natural Resources Conservation (3)
FOR 390. Forestry For Teachers (3)
FOR 460. Forest Policy (4)
FOR 441. Silviculture Principles (4)
FS 450. Integrated Forest Protection (4)
FOR 457. Techniques For Forest Resource Analysis (4)

**Resource Values/Philosophy (3)**

PHL 440. Environmental Ethics (3)
PHL 443. World Views and Environmental Values (3)
ANTH 481. Natural Resources and Community Values (3)
ANTH 482. World Food and Cultural Implications of Intn'l Ag Dev (3)
GEO 420. Geography of Resource Use (3)

**Social and Political (3)**

PS 474. Bureaucratic Politics (4)
PS 475. Environmental Politics and Policy (4)
PS 476. Science and Politics (4)
PS 472, 473. Public Administration (4, 4)
PS 452. Alternative International Futures (4)
HST 481. Environmental History of the U.S. (3)
HSTS 421. Technology and Change (3)
BA 432. Environmental Law (4)
SOC 456. Science and Technology in Social Context (3)
SOC 475. Rural-Urban Sociology (3)
AREC 477. Economics, Politics, & Government (3)

**Land and Water (3)**

CSS 425. Sustaining Soil Productivity (3)
CSS 475. Agricultural Management of Oregon Soil Resources (2)
CSS 485. Environmental Applications of Soil Science (4)
RNG 355. Desert Watershed Management (3)
RNG 455. Riparian Ecology & Management (3)
GEO 306. Earth Resources & Hazards (3)
GEO 423. Land Use (3)
GEO 424. Water Resources Geography (3)
GEO 425. Water Resources Management in U.S. (3)
GEO 429. Topics in Resource Geography (3)

**Amenity Uses of Natural Resources (3)**

FOR 351. Recreation Behavior and Management (4)
FOR 352. Wilderness Management (3)
FOR 354. Amenity Resource Management (3)
FOR 459. Forest Resource Planning and Decision Making (4)
FOR 453. Nature Based Tourism (3)
FOR 444. Ecological Aspects of Park Management (3)
FOR 493. Environmental Interpretation (4)
FS 453. Managed Forest & Wildlife Interactions (3)
GEO 485. Tourism & Recreation Resources (3)

**OPTION REQUIREMENTS (50)**

The option is a preapproved set of courses organized around a natural resource theme from at least three departments with no more than 25 credits from one department. In cases where separate curricular programs are housed within a single department, the credit limit applies to the program's courses, not the department's.

Optionally, a student may propose a set of courses around a natural resource theme and seek approval of the Natural Resources Program Committee. This is intended to allow for degree paths not anticipated by preapproved option course lists. Student proposed option must meet the three department criterion.

**Minimum upper division credits: 60**
**Total number of credits required: 180**

**NATURAL RESOURCES MINOR (28)**

Students majoring in other programs at OSU can choose a minor in Natural Resources. The minor is intended to provide a broad exposure to the natural resources field. It offers course work in seven areas that integrate a number of natural resource disciplines.

**Required (14)**

FOR 111. Introduction to Forestry (4)
FW 251. Principles of Wildlife Conservation (3)
FOR 251. Recreation Resource Management (4)
RNG 341. Rangeland Resources (3)

One upper-division class from each of the following Breadth Requirements course list:
Resource Values/Philosophy (3)
Social and Political (3-4)
Land and Water (2-4)

Any additional classes from the Breadth Requirements course lists to total 28 credits.

Students who have taken one or more of these courses in their major may not also count those courses towards the Natural Resources Minor. They may substitute any other courses from the list of Natural Resources Breadth courses to reach the 28 credit requirement.

## COURSES

**NR 405. READING AND CONFERENCE (1-9).**

**NR 406. PROJECTS (1-9).**

**NR 407. SEMINAR (1-9).**

**NR 455. NATURAL RESOURCE DECISION MAKING (3).** Individuals, groups, and corporate or organizational decision making. Emphasis on analysis of decision making in natural resource contexts: decision factors, cognitions, and processes.

# PEACE STUDIES

C/O Speech Communication
104 Shepard Hall
Oregon State University
Corvallis, OR 97331-6199
(541) 737-2461

**Faculty**

*Associate Professor* Gregg Walker

**Certificate Program**

Peace Studies

See the College of Liberal Studies section of this catalog.

# RUSSIAN STUDIES

Vreneli Farber, Director
34 Kidder Hall
Oregon State University
Corvallis, OR 97331-4603
(541) 737-3957

**Certificate Program**

Russian Studies

See the College of Liberal Arts section of this catalog.

## TWENTIETH CENTURY STUDIES

Center for the Humanities
Autzen House
Oregon State University
811 S.W. Jefferson Ave.
Corvallis, OR 97333-4506
(541) 737-2450

**Certificate Program**

Twentieth Century Studies

See the College of Liberal Arts section of this catalog.

## WOMEN STUDIES

Janet Lee, Director
200 Social Science Building
Oregon State University
Corvallis, OR 97331-6208
(503) 737-2826

**Faculty**

*Associate Professor* Lee; *Instructor* Shaw
Program faculty in departments throughout the university.

**Certificate Program**

Women Studies

**Minor**

Women Studies

See the College of Liberal Arts section of this catalog.

## GRADUATE PROGRAMS

At the graduate level, Oregon State University offers a flexible Master of Arts in Interdisciplinary Studies degree program as well as interdisciplinary masters and doctoral programs in agriculture, college student services administration, economics, environmental sciences, forestry, genetics, manufacturing engineering, marine resource management, material science, molecular and cellular biology, plant physiology, public health, scientific and technical communication, and toxicology.

In addition, a graduate minors in earth information science and technology and gerontology are offered.

For more information about the interdisciplinary programs listed, see the listing in this section or see the appropriate college or departmental listing.

## AGRICULTURE

R. Lee Cole, Program Director
College of Agricultural Sciences
112 Strand Agriculture Hall
Oregon State University
Corvallis, OR 97331
(541) 737-1336

The Master of Agriculture degree requires a student to attain advanced knowledge and achievement integrated across three fields of study. Two of the three fields must be from the College of Agricultural Sciences or closely related areas. The third field of study can be from any approved graduate major or minor. With appropriate justification, each of these three fields of study 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 consist of a major concentration and two minor concentrations. The major 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 6 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 and requires the department head's signature. The student's committee will consist of a representative from the major and each minor concentration. 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.

## COLLEGE STUDENT SERVICES ADMINISTRATION

J. Roger Penn, Chair
200 Kerr Administrative Services
Oregon State University
Corvallis, OR 97331-2133
(541) 737-3655

**Graduate Major**

**College Student Services Administration, Ed.M., M.S.**

The College Student Services Administration program offers preparation in the organization, leaderships 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 M.S. and Ed.M. degrees are offered with a major in CSSA. Two academic years

on campus are required toward the completion of the minimum of 54 credits of academic work. One year of full time work experience is required for admission, and the application deadline is March 15 for admission the following fall.

Paid assistantships are an important part of the curriculum and the total learning experience. They are generally required for all master's students.

### COURSES

**Upper Division Courses**

**CSSA 405. READING AND CONFERENCE (1-16).**

**CSSA 406. PROJECTS (1-16).** CSSA 406D: Program, Facilities, and Student Development Skills for Residence Hall Student Staff; CSSA 406L: Interpersonal Skill Development and Peer Advising Techniques; CSSA 406P: Leadership Training, Interpersonal Skill Development, and Facilities Management in Living Groups.

**CSSA 407. SEMINAR (1-16).**

**CSSA 408. WORKSHOP (1-16).**

**CSSA 492/CSSA 592. LEADERSHIP: UNDERSTANDING AND UTILIZING DIVERSITY (3).** Examination of individual differences, power and discrimination is studied in the context of a leadership perspective based on building personal power and building allies. Students will apply theory to campus or community organizations. PREREQ: SOC 204. CROSSLISTED as SOC 492/592.

**Graduate Courses**

**CSSA 501. RESEARCH (1-16).**

**CSSA 502. INDEPENDENT STUDY (1-16).**

**CSSA 503. THESIS (1-16).**

**CSSA 505. READING AND CONFERENCE (1-3).** CSSA 506D: Leadership Training, Interpersonal Skill Development, and Facilities Management for Graduate Staff in Residence Halls.

**CSSA 506. PROJECTS (1-16).**

**CSSA 507. SEMINAR (1-5).**

**CSSA 508. WORKSHOP (1-3).**

**CSSA 548. AMERICAN HIGHER EDUCATION (3).** The origins and development of colleges and universities in the United States from the colonial colleges to the present.

**CSSA 550. INTRODUCTION TO PROFESSIONAL COMPETENCIES IN STUDENT SERVICE ADMINISTRATION (1).** College student services administration as a field of study, introduction to and review of basic competencies, identification of professional development goals.

**CSSA 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 post-secondary educational institutions; leadership development.

**CSSA 552. PRINCIPLES AND THEORIES OF STUDENT DEVELOPMENT (3).** Theoretical and philosophical foundations of student development; analysis of college student characteristics and the student culture; non-traditional student sub-groups; student attitudes, values, and beliefs; concepts and models which promote student learning; and assessment of student growth.

**CSSA 553. 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.

**CSSA 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.

**CSSA 555. PRACTICUM IN COLLEGE STUDENT SERVICES (3).** In-depth experience in student services administration and student advising in a variety of offices and departments on campus and at other colleges and universities.

**CSSA 556. CURRENT PRACTICES IN STUDENT SERVICES ADMINISTRATION (1).** Orientation to and review of current practices and specialized functions in college student services administration.

**CSSA 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.

**CSSA 601. RESEARCH (1-16).**

**CSSA 602. INDEPENDENT STUDY (1-16).**

**CSSA 603. DISSERTATION (1-16).**

**CSSA 605. READING AND CONFERENCE (1-5).**

**CSSA 606. PROJECTS (1-16).**

**CSSA 607. SEMINAR (1-5).**

**CSSA 608. WORKSHOP (1-3).**

**CSSA 680. STUDENT ACTIVITIES AND COLLEGE UNION ADMINISTRATION (3).** Advanced study of the historical and philosophical foundations of student activities and college union administration with a special emphasis on current principles and practices; co-curricular student involvement; student organization and leadership development; and student government, student media, student organization advising.

**CSSA 681. RECREATIONAL SPORTS ADMINISTRATION IN HIGHER EDUCATION (3).** Advanced study of the theory as well as historical growth and development of recreational sports administration on college and university campuses with an emphasis on program development, coordination, and administration.

**CSSA 682. STUDENT HOUSING AND RESIDENCE LIFE ADMINISTRATION (3).** Advanced study in various aspects of providing educational living environments for students with a special emphasis on varied philosophical approaches, organizational style and structure, fiscal planning and management, food service, residence programs, and daily operations.

**CSSA 683. STUDENT FINANCIAL AND ADMINISTRATION (3).** Advanced study of the history, philosophy, development, and growth of student financial aid in the United States with a special emphasis on the types of financial aid, student financial aid advising and counseling, and general administration in a financial aid office.

**CSSA 684. NEW STUDENT PROGRAMS AND ENROLLMENT MANAGEMENT (3).** Advanced study of current principles, practices, and trends in the management of student enrollment in colleges and universities with a special emphasis on prospective student relations, admissions, orientation, registration, and retention.

**CSSA 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.

**CSSA 686. ADVANCED STUDIES IN HIGHER EDUCATION ADMINISTRATION (1).** Current issues and trends in higher education with a special emphasis on the relationship between student affairs, academic affairs, administrative affairs, and institutional leadership.

## EARTH INFORMATION SCIENCE AND TECHNOLOGY

A. Jon Kimerling
(Geosciences)
257 Wilkinson Hall
Oregon State University
Corvallis, OR 97331
(541) 737-1225

**Graduate Major**

**Earth Information Science and Technology**

See the College of Science section of this catalog.

## ECONOMICS

Arthur O'Sullivan, Chair
University Graduate Faculty of Economics
319B Ballard Extension
Oregon State University
Corvallis, OR 97331-3612
(541) 737-2508

**Graduate Major**

**Economics, M.A., M.S., Ph.D.**

See the College of Liberal Arts section of this catalog.

## ENVIRONMENTAL SCIENCES GRADUATE PROGRAM

William E. Winner, Director
Environmental Sciences Graduate Program
2088 Cordley Hall
Oregon State University
Corvallis, OR 97331-2902
(541) 737-5263

**Graduate Major**

**Environmental Sciences, M.A., M.S., Ph.D.**

The Environmental Sciences Graduate Program provides curricula leading to M.A., M.S. and Ph.D. degrees in Environmental Sciences. The curricula integrates thinking across disciplines, especially life, physical, and social sciences. Environmental sciences 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 sciences. Strength in these disciplines allows the ES Graduate Program to provide a high-quality interdisciplinary education for environmental scientists and to provide continuing post-graduate educational opportunities to scientists who are already active in the field. The degrees

administered by the ES Graduate Program are the contribution from OSU to the Joint-Campus Graduate Program for Environmental Sciences, Studies, and Policy that links environmental graduate programs among the major research universities in Oregon.

The purpose of the ES Graduate Program is to develop 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, and Quantitative Analysis. Methods and Numerical Skill Courses, Electives, and Thesis make up the remainder of a student's program.

### DEGREE REQUIREMENTS

**M.A. and M.S. Degrees (45)**
Environmental Sciences Core Courses (9)
Methods and Numerical Skills Courses (6)
ES Area of Concentration (Track) (15)
Elective Courses (3-9)
Thesis (6-12)

**Ph. D. Degree (108)**
Environmental Sciences Core Courses (10)
Methods and Numerical Skill courses (9)
ES Area of Concentration (Track) (30)
Elective Courses (3-23)
Thesis (36-56)

Note: The M.A. degree requires proficiency in a foreign language.

## FORESTRY

George W. Brown, Dean
150D Peavy Hall
Oregon State University
Corvallis, OR 97331-5704
(541) 737-2221

**Graduate Major**

**Master of Forestry (M.F.)**

See the College of Forestry section of this catalog.

## GENETICS

L. Walter Ream, Co-director
ALS 1081C
Oregon State University
Corvallis, OR 97331-3002
(541) 737-1791

**Graduate Major**

**Genetics, M.A., M.S., Ph.D.**

See the College of Agricultural Sciences section of this catalog.

## GERONTOLOGY

Alexis Walker, Director
Oregon State University
Corvallis, OR 97331-5102
(541) 737-1083

**Certificate Program**

Gerontology

**Graduate Minor**

**Gerontology**

See the College of Home Economics and Education section of this catalog.

## INTERDISCIPLINARY STUDIES

Mary Prucha, Coordinator
Graduate School
300 Kerr Administration Building
Oregon State University
Corvallis, OR 97331-2121
(541) 737-4881

**Master of Arts**

**Interdisciplinary Studies (M.A.I.S.)**

Any graduate major or graduate minor may be used as one of three required fields for an M.A.I.S. program. Program participation varies from year to year. Programs currently participating in this degree are adult education[1]; agricultural and resource economics; agricultural chemistry[1]; agricultural education; animal science, anthropology; apparel, interiors, housing, and merchandising[1]; applied anthropology; art; biochemistry and biophysics; botany and plant pathology; business administration[1]; civil engineering[1]; community college education[1]; community health; computer science[1]; crop science[1]; economics; education[1]; English; entomology; environmental health management; family resource management[1]; fisheries science; food science and technology; foreign languages and literatures (French, German, or Spanish); forest products; forest resources; forest science; geography[1]; geology[1]; gerontology[1]; health and safety administration; health education[1]; history; history of science[1]; horticulture; human development and family studies[1]; human performance; industrial engineering; international agricultural development[1]; manufacturing engineering; marine resource management; mathematics; molecular and cellular biology; music; nutrition and food management; operations research; philosophy; physics; political science; poultry science; psychology; public health; rangeland resources; scientific and technical communication; sociology; soil science; speech communication; statistics; toxicology; water resources; wildlife science; and women studies.

### COURSES

**IST 501. RESEARCH (1-16).**

**IST 503. THESIS (1-16).**

**IST 505. READING AND CONFERENCE (1-16).**

**IST 506. PROJECTS (1-16).**

## MANUFACTURING ENGINEERING

Academic Program Director
118 Covell Hall
Oregon State University
Corvallis, OR 97331-2407
(541) 737-2365

**Graduate Major**

**Manufacturing Engineering, M.Eng.**

See the College of Engineering section of
Oregon State University
Corvallis, OR 97331-6001
(541) 737-7023

**Graduate Major**

**Material Science, M.S.**

See the College of Engineering section of this catalog.

## MOLECULAR AND CELLULAR BIOLOGY

Daniel Arp, Director
3021 Agricultural Life Science
Oregon State University
Corvallis, OR 97331-7303
(541) 737-3799

**Graduate Major**

**Molecular and Cellular Biology**

See the College of Science section of this catalog.

## PLANT PHYSIOLOGY

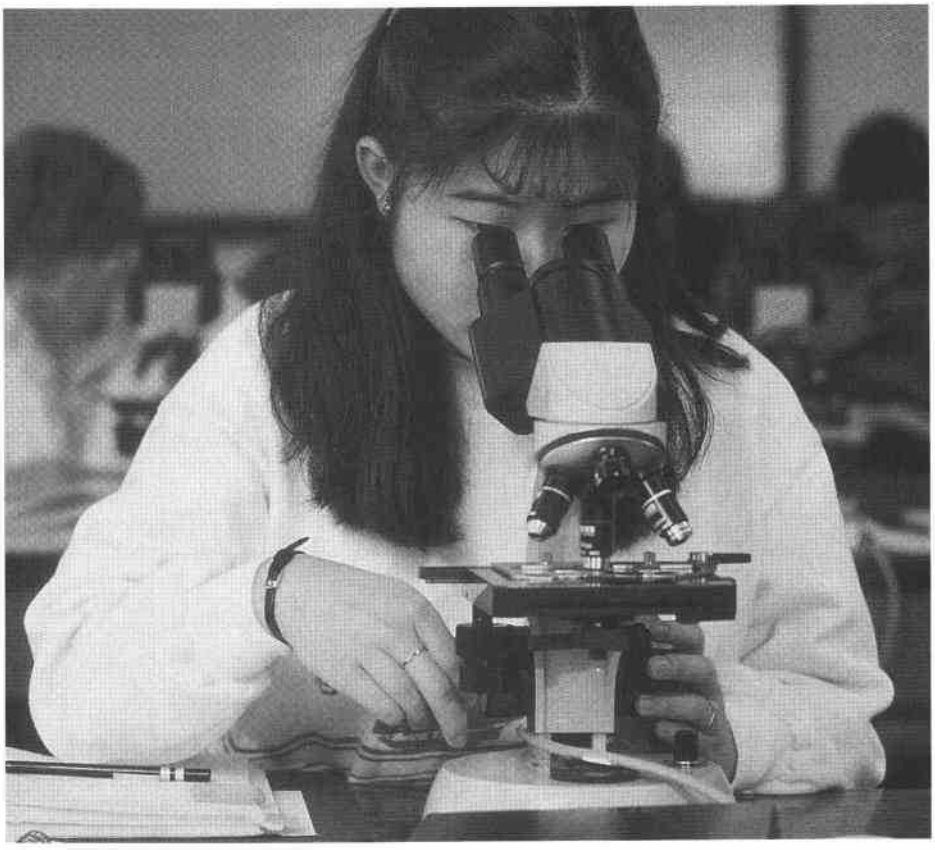
Patrick J. Breen, Chair
4017 Agricultural Life Science
Oregon State University
Corvallis, OR 97331-7304
(541) 737-5469

**Graduate Major**

**Plant Physiology (M.S., Ph.D.)**

Plant physiology is a complex interdisciplinary field which requires broad training in the plant sciences and in such varied disciplines as physics, chemistry, biochemistry, genetics, and statistics. Courses relevant to plant physiology, and active research programs in plant physiology are found in many departments and in several colleges of the University. The curriculum reflects the need for breadth of training and draws upon courses from a number of departments of the University.

The core curricula for programs leading to the Ph.D. and M.S. degrees in plant physiology are listed below.



**Ph.D. Program**

*Plant Physiology*

One course required in each of the following four areas (11-12)

*Plant Metabolism*
BB 653. Plant Biochemistry (3)

*Water, Nutrition, and Transport*
CSS 655. Plant Water Relations (3)
HORT 623. Phloem Transport (3)

*Plant Growth and Development*
BOT 533. Hormonal Regulation of Plant Growth & Development (3)
BOT 593. Selected Topics: Plant Cell and Molecular Biology (3)
HORT 541. Plant Tissue Culture (4)

*Environmental Physiology*
BOT 588. Environmental Physiology of Plants (4)
HORT 629. Plant Dormancy and Stress Physiology (3)
RNG 643. Arid Land Plant Physiology (4)

***Biochemistry***

BB 590, BB 591, BB 592. Biochemistry (9)

***Genetics/Cellular Biology***

A graduate-level course in genetics or molecular biology (3).

***Advanced Laboratory Methods***

BB 593. Biochemistry Laboratory (2)
Other laboratory course(s) consistent with the goals of the student (2).

***Seminars***

Two seminar presentations, including one on a different topic than the thesis.

Total Credits (Minimal Requirements)

**Required core courses (27-32)**
Seminars (2)
Research, thesis and supportive electives (68-75)
Total Program (108)

**M.S. Program**

*Plant Physiology*

**One course from at least two of the areas listed in the Ph.D. curriculum.**

***Biochemistry***

BB 550, BB 551. General Biochemistry (7)

***Advanced Laboratory Methods***

BB 593. Biochemistry Laboratory (2)

***Other***

At least two other courses from the Ph.D. core curriculum (5-6)

***Seminars***

Two seminar presentations, including one on the thesis research.

***Total Credits***

Core Courses (19-22)
Seminars (2)
Research, thesis, and supportive electives (21-24)
Total Program (45)

**Courses**

**PP 501. RESEARCH (1-16).**

**PP 503. THESIS (1-16).**

**PP 505. READING AND CONFERENCE (1-16).**

**PP 507. SEMINAR (1-16).**

**PP 601. RESEARCH (1-16).**

**PP 603. THESIS (1-16).**

**PP 605. READING AND CONFERENCE (1-16).**

**PP 607. SEMINAR (1-16).**

## PUBLIC HEALTH

Rebecca Donatelle, Chair
258 Waldo
Oregon State University
Corvallis, OR 97331-6406
(541) 737-2686

**Graduate Major**

**Master of Public Health (M.P.H.)**

See the College of Health and Human Performance section of this catalog.

## SCIENTIFIC AND TECHNICAL COMMUNICATION

William Keith, Director
107 Shepard Hall
Oregon State University
Corvallis, Oregon 97331-6199
(541) 737-5399

**Graduate Major**

**Scientific and Technical Communication (M.A., M.S.)**

**Minors**

Communication Studies
Technical Field
Writing Education

See the College of Liberal Arts section of this catalog.

## TOXICOLOGY

Ian J. Tinsley, Interim Chair
1007 Agricultural Life Science
Oregon State University
Corvallis, OR 97331-7301
(541) 737-1789

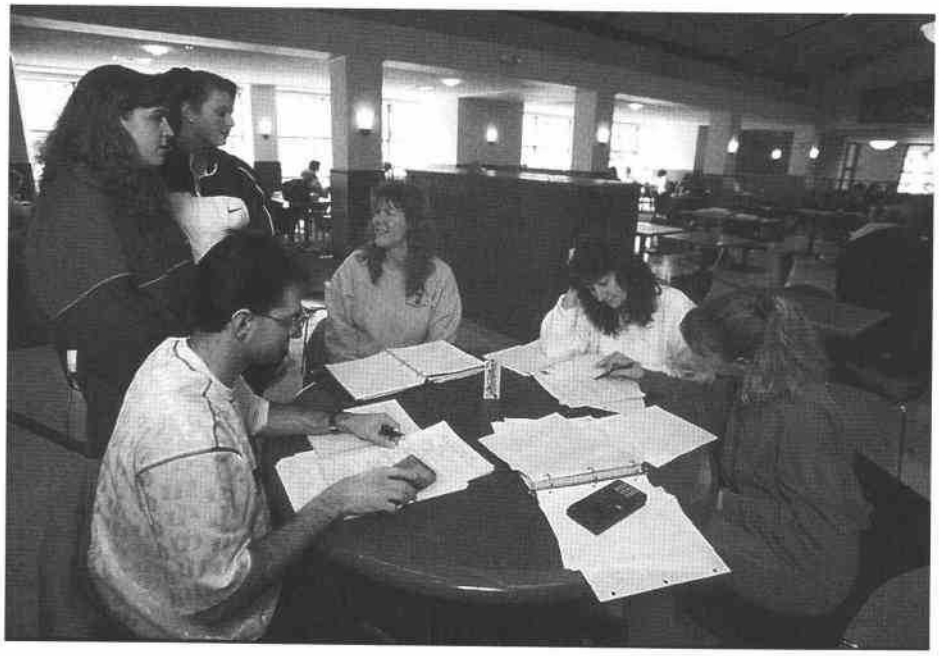
**Graduate Major**

**Toxicology (M.S., Ph.D.)**

Toxicology is an interdisciplinary graduate program administered by the Graduate School. The Toxicology Program offers courses leading to the M.S. or Ph.D. degree in Toxicology and prepares students for careers in toxicology in industry, government, and academic institutions. Biochemical, chemical, and pathological research approaches are emphasized, focusing on the following areas: analytical, aquatic, biochemical, comparative, environmental, food, immuno- and neurotoxicology. The close interactions between the faculty and the National Institute of Environmental Health Sciences (NIEHS) supported Environmental Health Sciences Center and Marine/Freshwater Biomedical Sciences Center at OSU contribute additional research and training opportunities for students. Three scientists from the Oregon Health Sciences University are also faculty members and provide students with new opportunities directly related to issues in human health. Most students in the program receive financial support through graduate research assistantships or from an NIEHS environmental health predoctoral training program.

The Toxicology Program has an interdisciplinary focus with faculty from the Colleges of Science, Agricultural Sciences, Pharmacy, Veterinary Medicine, Engineering, the staff of OSU's Hatfield Marine Sciences Center, and from the Center for Research on Occupational and Environmental Toxicology, and the Department of Pharmacology at the Oregon Health Sciences University in Portland.

Students who wish to enter the program should have a B.S. degree (or equivalent) in a science related field and are expected to develop a M.S. or Ph.D. curriculum related to their own area of specialization. Students will take a core set of courses and they will attend and participate in the Toxicology Seminar class. Courses in toxicology also may be taken by students in engineering or the basic sciences.



### COURSES

**Upper Division Courses**

**TOX 420/TOX 520. COMPARATIVE METABOLISM OF FOREIGN COMPOUNDS (3).** Metabolism of exogenous chemicals by plants and animals and relation to environmental problems; comparative aspects of metabolic processes; interacting effects of other chemicals, nutritional and environmental variables; metabolic aspects of selective toxicity. Offered alternate years. PREREQ: BB 450, BB 451 for TOX 520. CROSSLISTED as AC 420/AC 520.

**TOX 428/TOX 528. CHEMICAL ANALYSIS OF ENVIRONMENTAL RESIDUES (3).** Separation and analysis of chemical pollutants in the environment; considerations in sampling, separation techniques, methods of chemical analysis used for analysis and confirmation of trace levels of organic chemicals and heavy metals. PREREQ: CH 428. CROSSLISTED as AC 428/AC 528.

**TOX 430/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. PREREQ: CH 106, CH 331, senior standing. CROSSLISTED as AC 430/530.

**TOX 445/TOX 545. ON-LINE TOXICOLOGY DATA SYSTEMS (3).** Use of on-line systems (Toxline, CASOnline, etc.) to obtain bibliographic and other data relating to toxicology and application of PROPHET system for toxicological data analysis. PREREQ: BB 450 or BB 451 CROSSLISTED as AC 445/ /AC 545, TOX 445/TOX 545

**Graduate Courses**

**TOX 501. RESEARCH (1-16).**

**TOX 503. THESIS (1-16).**

**TOX 505. READING AND CONFERENCE (1-16).**

**TOX 507. SEMINAR (1-16).**

**TOX 601. RESEARCH (1-16).**

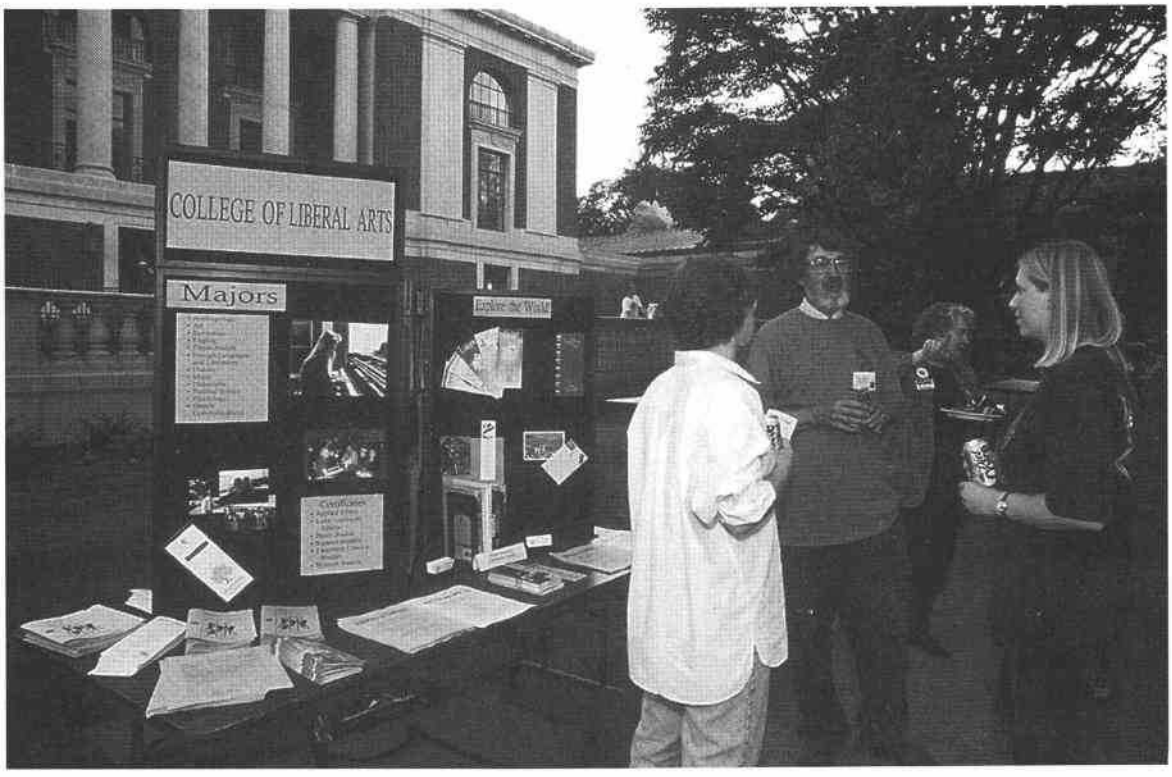
**TOX 603. THESIS (1-16).**

**TOX 605. READING AND CONFERENCE (1-16).**

**TOX 607. SEMINAR (1-16).**

**FOOTNOTES**

[1] Not as a primary area of concentration


COLLEGE OF LIBERAL ARTS
Majors

*The College of Liberal Arts offers major programs in the arts, humanities, and social sciences that are at the very core of human knowledge and whose existence make OSU a true University. Students can earn degrees in 13 departments and two interdisciplinary programs and certificates of specialized training in six other fields. The College is also home to two programs pre-law students often select —one in political science (emphasizing writing, analytical skills, and knowledge of government and politics), the other in philosophy (stressing logic, ethics, and the philosophy of law).*

Students work in an atmosphere that is conducive to achieving their personal goals. The College provides the opportunity for professionalism and success, whether one is painting a picture, writing a short story or conducting an individual research project. Students gain the skills and knowledge necessary to be successful in careers while at the same time becoming responsible citizens and creative problem solvers and being involved in activities that enrich the cultural life of OSU, Corvallis, and the entire mid-Willamette Valley.

Students get individual attention in student learning communities and the chance to know their professors, many of whom are also academic advisers. As a result, there is less of the impersonal feeling often found at large universities. In fact, the OSU College of Liberal Arts is very much like a small liberal arts college within a large university.

The list of accomplishments of the College and its faculty is endless. The bottom line is this: Students can get an excellent education by enrolling in one of the majors offered in the College of Liberal Arts—where great futures start.

## Majors

The College of Liberal Arts offers major programs leading to the Bachelor of Arts (B.A.) or Bachelor of Science (B.S.) degree in the following:

American Studies
Anthropology
Art
Economics
English (B.A. only)
Ethnic Studies
French (B.A. only)
German (B.A. only)
History
Liberal Studies
Music
Philosophy
Political Science
Psychology
Sociology
Spanish (B.A. only)
Speech Communication

The Bachelor of Fine Arts (B.F.A.) degree is offered in applied visual arts by the Department of Art. B.F.A. degree requirements differ from those in other College of Liberal Arts programs. Students in the B.F.A. degree program must complete the baccalaureate core and a minimum of 105 credits in art.

## International Degree

College of Liberal Arts majors can earn a second degree in international studies concurrently. See the Interdisciplinary Studies section of this catalog for more information.

## Graduate Study in Liberal Arts

### M.A. in Applied Anthropology

The M.A. in Applied Anthropology provides 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. This course of study integrates anthropological theory and practice within a specific concentration chosen by the student.

An area of concentration can be chosen from one of the following: business anthropology with an Asian focus, cultural resource management, historic archaeology, language and cross-cultural communication, health and culture, and natural resources and communities.

Electives will be drawn from University-wide graduate-level courses which complement core courses and courses chosen in one of the six concentrations.

All students will take a core program of 9 credits. Students must take 12 credits within their particular concentration including at least 3 credits of anthropological methods courses which relate to their particular concentration. From 9 to 15 elective credits form the third part of the program; they may be taken either in a single department or in more than one department if they have an integrated focus. At least 9 of these credits will be taken in a minor field. Candidates must also demonstrate proficiency in a foreign or field language. Following the course work, students will spend one quarter on an internship. Afterwards the student will begin researching and writing a thesis.

### M.A. and M.S. in Scientific and Technical Communication

A one-year program designed to train people in scientific and technical communication and to help communication majors in business, industry, government, and educational institutions. Courses in this interdisciplinary program come chiefly from the Departments of English and Speech Communication.

#### Requirements

- 45 graduate credits and thesis or program-oriented paper
- 30 of those graduate credits in the major, 15 graduate credits from either a technical area, a communication specialty area, or an education area
- An internship with an organization that communicates technical or scientific information.

### M.A., M.S., and Ph.D. in Economics

A graduate program in economics that is a unique blend of the talents and resources of three departments: Economics, Agricultural and Resource Economics, and Forest Management. This combination provides students with an excellent and diverse

207 Social Science Hall
Oregon State University
Corvallis, OR 97331-6202
(541) 737-4582

### Administration

**Kay F. Schaffer**
*Dean*

**William G. Robbins**
*Associate Dean*

**Carolyn Maresh**
*Director of Administration*

**Jeff Hale**
*Director of Development*

**Polly Gross**
*Head Adviser, Pre-Education Adviser*

**Jill Anderson Hieb**
*Academic Adviser*

program and trains them to analyze the economic problems of this increasingly complex society. The doctorate and master's degrees are offered by these departments and students are prepared for careers in both the public and private sectors.

**Master of Science Core Program**
Microeconomic Theory (9)
Macroeconomic Theory (4)
Econometrics (7)
Mathematics (3)
Electives or Departmental Requirements (13)
Thesis (9)
Minimum credits, thesis option (45)

**Doctor of Philosophy Core Program**
Microeconomic Theory (12)
Macroeconomic Theory (4)
Mathematical Statistics (3)
Econometrics (3)
Electives and Departmental Requirements: At least three years of full-time work beyond the bachelor's degree is required.
Thesis: Course and thesis requirements in addition to the core program requirements are determined by the student's committee.

### MASTER OF ARTS IN INTERDISCIPLINARY STUDIES (MAIS)

A program designed for students who want to attain broad and advanced knowledge from three fields of study. It is common for more than one field to be in the College of Liberal Arts. All three fields may be in liberal arts.

Subject areas participating in the MAIS degree are anthropology, art, economics, English, foreign languages & literatures, history, history of science, music, philosophy, political science, psychology, sociology, speech communication, and women studies.

**Requirements**

- a minimum of 9 credits in each of three fields of study, at least 12 credits in the College of Liberal Arts
- no more than 21 credits (excluding thesis or project credits) in any one field unless the total exceeds 45 credits
- a foreign language is required only if it is one of the three fields of study
- a thesis or program-oriented paper
- a final oral examination

## MINORS

Students throughout the University may elect minor programs in anthropology, art, Chinese, communication, economics, English, French, German, history, Japanese, music, philosophy, political science, psychology, Russian, sociology, Spanish, theater arts, 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 individual students in their personal development and enrichment through a deeper understanding of themselves and appreciation of human cultural development.

## ACADEMIC ADVISING

The College of Liberal Arts and Oregon State University want you and every student to succeed. This requires that students understand and meet the academic requirements set by the college and University. They are encouraged to "take charge" of their academic career and meet with an adviser. That individual will assist students in course selection, listen to academic concerns, explain program options, and outline academic progress. Wise students will consult with their departmental adviser every term. Advisers are valuable resources.

## COLLEGE OF LIBERAL ARTS REQUIREMENTS

The purpose of these requirements is to encourage exploration and broad study—to encourage students to take more rather than fewer courses in areas outside their major field. Students are required to satisfy three sets of requirements: University baccalaureate core requirements, CLA requirements, and major program requirements. No student may use a single course to satisfy requirements in more than one set. Departments may add further restrictions, such as prohibiting majors from using courses taken within their department and not counted towards their major to satisfy either University or CLA requirements.

Courses taken to satisfy the University baccalaureate core requirements or the College of Liberal Arts requirements may also be used to satisfy requirements for a minor or a second major.

The sciences, social sciences, and professional courses requirement for the B.S. degree is considered a CLA requirement, even though the courses are to be specified by the major department. Thus, courses taken to satisfy this requirement will not be counted in the major. College of Liberal Arts students must fulfill the following requirements:

**B.A. candidate[1]**
One course in each of these areas:[2]
Humanities (3)
Fine arts (3)
Social sciences (3)
Non-Western culture (3)[3]
One additional course in one of the preceding four areas (3)
Foreign language through second year (24)
TOTAL (39)

**B.S. candidate**
One course in each of these areas:[2]
Humanities (3)
Fine arts (3)
Social Sciences (3)
Non-Western Culture (3)
One additional course in one of the preceding four areas (3)
Computer science and quantitative studies (12)
TOTAL (27)

**Definition of Academic Divisions for Area Studies Requirement:**
1) Humanities (H)—critical examination of influential traditions and ideas as defined by major scholarly works: English; film; foreign language, literature, and culture; history; philosophy; and women studies.

2) Fine Arts (FA)—participation in or appreciation of creative expression in different forms: art; creative writing (including poetry, fiction, drama); the dance; music; theatre (including performance, studio, history, appreciation, theory).

3) Social Science (SS)—scientific investigation and theory pertaining to human individuals, social groups, institutions, and ideologies: anthropology, economics, political science, psychology, sociology and approved geography courses.

4) Non-Western Culture (NC)—study in any of the areas below focusing outside of western culture: cultures of Africa, Asia, Russia, South America, Central America-Caribbean, Middle East, the Pacific, Native North Americans.

**Meeting Requirements**
To help students meet specific requirements of the University Baccalaureate Core (BC) and the distribution requirements of the College of Liberal Arts, the college suggests the following curriculum for the first two years. Students are advised to seek help in course selection from their assigned departmental adviser or the College of Liberal Arts Advising Office in Social Science Hall.

**Freshman Year**
Writing I (3)
Mathematics (3)
Humanities (3)
Fine arts (3)
Social science (3)
First year foreign language (B.A. candidates) (12)
Physical science (lab) (4)
Biological science (lab) (4)
Fitness (3)
Electives or major (8)

**Sophomore Year**
Writing II (3)
Western culture (3)
Non-western culture (3)
Second year foreign language (B.A. candidates) (12)
One additional course in two of the following: humanities, fine arts, social science or non-western culture (6)
Additional required or major course work
Electives or major (7)

**Upper Class Years**
It is expected that upper class students will focus on their major program of studies. They must complete an additional writing intensive course (WIC) in their major area and enough electives to complete the minimal requirements of 180 credits. Sixty (60) credits must be upper division.

### TEACHER TRAINING

The College of Liberal Arts offers excellent undergraduate preparation for students interested in becoming English, music or social studies teachers. The Liberal Studies pre-education program with its combination of courses in two or more departments is ideal for elementary school teachers.

Students wishing to become high school social studies teachers may complete their undergraduate preparation at OSU, gaining the knowledge from outstanding social scientists. The teacher credentials specialist will assist with their preparation for the National Teachers Examination and application to graduate programs.

### CERTIFICATE PROGRAMS

Certificate programs in Latin American Affairs, Peace Studies, Russian Studies, Twentieth Century Studies, and Women Studies are offered to all students and may be taken concurrently with any major degree program.

### PRELAW PREPARATION

OSU provides opportunities for a complete and rigorous prelaw education, sending accomplished graduates on to some of the finest law schools in the nation.

Law is one of the few professional schools that does not require a particular set of courses as a prerequisite for admission. Thus, prelaw students may major in any subject. They are advised to supplement their major courses with a diverse selection of courses that offer depth, rigor, and skill in three areas: conciseness and clarity of expression in writing and speaking; a keen sense of logic, and the ability to reason with abstract, ambiguous facts; and insight into the institutions and values of society.

Accordingly, the College of Liberal Arts offers many effective and engaging ways to prepare for law school, rather than a single prelaw program.

Students interested in law school should contact James Foster in Political Science (737-2811) as soon in their academic career as possible. Such students also should obtain the two College of Liberal Arts prelaw advising brochures from Foster. As sophomores, students interested in prelaw should enroll in LS 300.

### PROGRAM ON GERONTOLOGY

Administered through the College of Home Economics, the Program on Gerontology involves seven colleges and 14 departments throughout the University, including the College of Liberal Arts. Through course work in these departments, the program offers a multi-disciplinary perspective on aging and prepares students for careers in programs on aging, or for work with the elderly as a specialty within another professional area. Undergraduate students may earn a certificate in gerontology; graduate students an integrated minor. For more information, contact the director of the Department of Human Development and Family Studies, College of Home Economics.

## AMERICAN STUDIES

David Robinson, Director
224 Moreland Hall
Oregon State University
Corvallis, OR 97331-5302
(541) 737-1641

### Undergraduate Major

**American Studies (B.A., B.S.)**
*Options*
Ethnic Studies
Women Studies

*American Studies is an interdisciplinary* program which offers students the opportunity to earn the B.A. or B.S. degree through the interdisciplinary study of American culture, society, values, and institutions. Rather than having courses for the major restricted to a single department or field, the student in consultation with the American Studies director, selects relevant courses from three or more fields in the College of Liberal Arts that have the United States as their principal subject matter. The program is particularly appropriate for students who wish to combine the approaches of several disciplines to the study of the United States. An option in Ethnic Studies or Women Studies may also be included in the major, upon completion of the University's prescribed requirements for options within a major. The American Studies degree can also be combined with study in certificate programs such as Peace Studies, Twentieth-Century Studies, and Women Studies.

B.S. candidates must fulfill CLA requirements for the B.S. degree.

### MAJOR CURRICULUM (45)

**Required Courses**

ENG 253, ENG 254, ENG 255. Srvy of Am Lit (9)
HST 201, HST 202, HST 203. Hist of the U.S. (9)
AMS 311 or AMS 407. Am Studies Seminar (3)
Upper division credits from at least three departments in courses pertinent to a study of American culture, society, values, and institutions (24)

### COURSES

**Upper Division Courses**

**AMS 311. TOPICS IN AMERICAN STUDIES (3).** Selected topics, changed annually, which 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.

**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.

**AMS 406. PROJECTS (1).** Studies of American culture and society centered around topical events or cultural programs of current interest in American Studies.

**AMS 407. ^SEMINAR (3).** Close examination of selected topics in American culture and society. Fulfills the requirement for an integrated course in the major. For seniors or advanced students. May be repeated for credit as topics vary. (Writing Intensive Course) CROSSLISTED as ENG 407/ENG 507.

**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.

**Graduate Courses**

**AMS 507. SEMINAR (3).** (See AMS 407 for description.) CROSSLISTED as ENG 407/ENG 507.

## ANTHROPOLOGY

John A. Young, Chair
238 Waldo Hall
Oregon State University
Corvallis, OR 97331-6403
(541) 737-4515

**Faculty**

*Professors* Bonnichsen, Hall, Smith, Young; *Associate Professor* Brauner, Gross, Rosenberger; *Assistant Professors* Khanna, Roth

### Undergraduate Major

**Anthropology (B.A., B.S.)**
*Options*
Archaeology/Physical Anthropology
Cultural Anthropology
General Anthropology

### Minor

Anthropology

### Graduate Major

**Applied Anthropology (M.A.)**

The Department of 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. The department also participates in the M.A.I.S. degree program.

### CURRICULUM

**Major Requirements**

Majors develop a broad anthropological background. The program features three options: archaeology/physical anthropology, cultural anthropology, and general anthropology.

A departmental adviser works with students to determine the option and courses needed to meet the interest of the student and complete the program. 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 below.

## MAJOR PROGRAMS WITH OPTION REQUIREMENTS

### ARCHAEOLOGY/PHYSICAL OPTION

**Background (12)**

ANTH 100. Intro to Arch & Phys Anthro (3,4) or *ANTH 330. Evolution of People, Technology, and Society (3)
ANTH 110. Intro to Cultural Anthropology (3) or ANTH 210. Comparative Cultures (3) or ANTH 226. Cultures of OSU (3)
ANTH 230. Time Travelers (3)
ANTH 240. From Ape to Angel (3)
ANTH 283. Ethnography of Health (3)

**Core (12)**

ANTH 350. Language, Culture and Society (3)
ANTH 370. Family, Gender & Generation (3)
ANTH 431. Archaeology Meth and Theory (3)
ANTH 441. Primate and Human Paleontology (3)

**Advanced (28)**

*Select 7 credits from the following:*
ANTH 380. Cultures in Conflict (3)
ANTH 411-420. World Cultures (4)
Any course in the 460s, 470s or 480s
*Select 9 credits from the following:*
ANTH 430. Topics in Archaeology (1-3)
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 Res: Policy & Proced (3)
ANTH 436. Northwest Prehistory (3)
ANTH 437. First American Studies and Ice-Age Environments (3)
ANTH 439. Faunal Analysis (3)
*Select 6 credits from the following:*
ANTH 340. Natural History of the Primates (3)
ANTH 345. Biological and Cultural Construction of Race (3)
ANTH 440. Topics in Physical Anthropology (1-3)
ANTH 442. Human Biology (3)
*Select 6-10 credits from the following:*
ANTH 438. Archaeology Field School (10)
ANTH 443. Human Osteology Lab (2)
ANTH 445. Human Biology Lab (2)
ANTH 493. Statistical Applications in Anthropology (1-3)
ANTH 497. Archaeological Field Methods (1-3)

**Total Required Credits (52)**

### CULTURAL ANTHROPOLOGY OPTION

**Background (6)**

ANTH 100. Intro to Arch & Phys Anthro (3-4) or *ANTH 330. Evolution of People, Technology, and Society (3)
ANTH 110. Intro to Cultural Anthropology (3) or ANTH 210. Comparative Cultures (3) or ANTH 226. Cultures of OSU (3)

**Core (12)**

ANTH 230. Time Travelers (3)
ANTH 240. From Ape to Angel (3)
ANTH 350. Language, Culture, and Society (3)
^ANTH 370. Family, Gender & Generation (3)

**Advanced (31)**

*Select 8 credits from the following:*
ANTH 411-420. World Cultures (4)
*Select 17 credits from the following:*
ANTH 283. Ethnography of Health (3)
ANTH 380. Cultures in Conflict (3)
Any course in the 460s, 470s, 480s, or 490-496, 498
*Select 6 credits from the following:*
ANTH 450. Topics in Linguistics (3)
ANTH 451. Sociolinguistics (3)
ANTH 452. Popular Narr and Verbal Art (3)
ANTH 487. *Language in Global Context (3)
ANTH 498. Oral Traditions (3)

**Total Required Credits (49)**

### GENERAL ANTHROPOLOGY OPTION

**Background (6)**

ANTH 100. Intro to Arch & Phys Anthro (3-4) or *ANTH 330. Evolution of People, Technology, and Society (3)
ANTH 110. Intro to Cultural Anthropology (3) or ANTH 210. Comparative Cultures (3) or ANTH 226. Cultures of OSU (3)

**Core (12)**

ANTH 230. Time Travelers (3)
ANTH 240. From Ape to Angel (3)
ANTH 350. Language, Culture, and Society (3)
ANTH 370. Family, Gender & Generation (3)

**Advanced (32)**

*Select 4 credits from the following:*
ANTH 411-420. World Cultures (4)
*Select 11 credits from the following:*
ANTH 380. Cultures in Conflict (3)
Any course in the 460s, 470s, 480s, or 490-496, 498
*Select 6 credits from the following:*
ANTH 430. Topics in Archeology (1-3)
ANTH 431. Archaeology Method and Theory (3)
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 437. First American studies and Ice Age Environments (3)
ANTH 439. Faunal Analysis (3)
*Select 8 credits from the following:*
ANTH 340. Natural History of the Primates (3)
ANTH 345. Biological and Cultural Construction of Race (3)
ANTH 440. Topics in Physical Anth (1-3)
ANTH 441. Primate and Human Paleontology (3)
ANTH 442. Human Biology (3)
*Select 3 credits from the following:*
ANTH 450. Topics in Linguistics (3)
ANTH 451. Sociolinguistics (3)
ANTH 452. Popular Narr and Verbal Art (3)
ANTH 487. Language in Global Context (3)
ANTH 498. Oral Traditions (3)

## MINOR

A grade of C- or better is required for all courses used to complete minor requirements. Such courses cannot be taken S/U.

**Background (6)**

*Select 6 credits from the following:*
ANTH 100. Intro to Arch & Phys Anthro (3,4) or *ANTH 330. Evolution of People, Technology, and Society (3)
ANTH 110. Intro to Cultural Anth (3)
ANTH 210. Comparative Cultures (3)
ANTH 230. Time Travelers (3)
ANTH 240. From Ape to Angel (3)

**Core (at least 6)**

*Select 6 to 12 credits from the following:*
ANTH 340. Natural History of the Primates (3)
ANTH 350. Language, Culture, and Society (3)
^ANTH 370. Family, Gender & Generation (3)
ANTH 431. Archeology Meth and Theory (3)

**Advanced (9-15)**

ANTH 311-320. Peoples of the World (3)
ANTH 411-420. World Cultures (4)
ANTH 380. Cultures in Conflict (3)
Any 3-credit course from 430s through 480s
ANTH 435. Cultural Res: Policy & Procedures (3)
ANTH 443. Human Osteology Lab (2)

**Total Required Credits (27)**

## GRADUATE PROGRAM

**Master of Arts in Applied Anthropology**

The Master of Arts in Applied Anthropology is designed for students who want to combine practical skills with a broad understanding of cross-cultural and social factors. The program will prepare students for positions at the local, national and international levels. Seven concentrations are available to the students: Business Anthropology with an Asian Focus, Health and Culture, Language and Cross-Cultural Communication, Natural Resources and Communities, Cultural Resource Management, First American Studies, Historic Archeology. Each area of concentration combines class work, internship, and thesis into a unique program which enables students to apply knowledge and skills to problem solving outside academia.

All students take a core program of 9 credits in anthropology. Students must take 12 credits within their concentration; 3 credits of anthropological methods courses which relate to their particular concentration; 9-15 electives in a single department or in more than one department, if they have an integrated focus; at least 9 of those credits will be taken in a minor field related to the concentration in anthropology. Following the course work, students will spend one quarter on an internship off campus earning 6-12 credits. Following the internship, their thesis work will be implemented. Candidates must also have documented proficiency in a foreign language at the second-year level.

### M.A.I.S. Degree

The department also participates in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) degree program. In other advanced degree programs, anthropology may be used as a minor. See Graduate School for details.

## COURSES

### Lower Division Courses

**ANTH 100. AN INTRODUCTION TO ARCHAEOLOGY AND PHYSICAL ANTHROPOLOGY (3/4).** An introduction to human biological and cultural development including anthropological approaches to primate studies and human biological and cultural development, including anthropological approaches to primate studies and human prehistory, from the first archaeological traces through the advent of agriculture and urbanization. Four credits includes recitation. (SS)

**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).**

**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 226. CULTURES OF OREGON STATE UNIVERSITY (3).** Overview of concepts related to culture and intercultural communication. Topics that will be explored include: culture identity, cultural adaptation and adjustment, language codes, values, stereotyping, intercultural relationship development, and communication competence.

**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. FROM APE TO ANGEL (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)

### Upper Division Courses

**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. Cannot be taken if student is taking or has completed the 400-level course in the same geographical area. PREREQ: Completion of ANTH 110 or ANTH 210 or completion of social processes and institutions requirement. (Bacc Core Course)

**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. Cannot be taken if student is taking or has completed the 400-level course in the same geographical area. PREREQ: Completion of ANTH 110 or ANTH 210 or completion of social processes and institutions requirement. (Bacc Core Course)

**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. Cannot be taken if student is taking or has completed the 400-level course in the same geographical area. PREREQ: Completion of ANTH 110 or ANTH 210 or completion of social processes and institutions requirement. (Bacc Core Course)

**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. Cannot be taken if student is taking or has completed the 400-level course in the same geographical area. PREREQ: Completion of ANTH 110 or ANTH 210 or completion of social processes and institutions requirement. (Bacc Core Course)

**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. Cannot be taken if student is taking or has completed the 400-level course in the same geographical area. PREREQ: Completion of ANTH 110 or ANTH 210 or completion of social processes and institutions requirement. (Bacc Core Course)

**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. Cannot be taken if student is taking or has completed the 400-level course in the same geographical area. PREREQ: Completion of ANTH 110 or ANTH 210 or completion of social processes and institutions requirement. (Bacc Core Course)

**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. Cannot be taken if student is taking or has completed the 400-level course in the same geographical area. PREREQ: Completion of ANTH 110 or ANTH 210 or completion of social processes and institutions requirement. (Bacc Core Course)

**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. Cannot be taken if student is taking or has completed the 400-level course in the same geographical area. PREREQ: Completion of ANTH 110 or ANTH 210 or completion of social processes and institutions requirement. (Bacc Core Course)

**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. Cannot be taken if student is taking or has completed the 400-level course in the same geographical area. PREREQ: Completion of ANTH 110 or ANTH 210 or completion of social processes and institutions requirement. (Bacc Core Course)

**ANTH 320. PEOPLES OF THE WORLD—TOPICS (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. Cannot be taken if student is taking or has completed the 400-level course in the same geographical area. PREREQ: Completion of 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. PREREQ: Sophomore standing. (STS) (Bacc Core Course)

**ANTH 340. NATURAL HISTORY OF THE PRIMATES (3).** An introduction to primate studies in the context of evolutionary theory as it affects the study of Homo sapiens; emphasis upon primate behavior, sociobiological theory, conservation, ecology, fieldwork, and application of research with primates to Homo sapiens. PREREQ: Completion of biological science requirement or ANTH 100 or ANTH 240. (SS)

**ANTH 345. *BIOLOGICAL AND CULTURAL CONSTRUCTIONS OF RACE (3).** The social, cultural, and historical context of human biological diversity in the United States. This course will acquaint students 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. PREREQ: Sophomore standing, completion of one anthropology course. (Bacc Core Course)

**ANTH 350. LANGUAGE, CULTURE AND SOCIETY (3).** 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. PREREQ: 3 credits of social science. (SS)

**ANTH 370. ^FAMILY, GENDER, AND GENERATION (3).** A cross-cultural approach to understanding social roles as determined by stages in the life-cycle, gender, and kinship relations. Examines the cultural meaning of ceremonies and rituals marking transitions in the life-cycle that transform social identity. Reviews theory and explanations given for different social structures. Offers broad perspectives on issues such as birthing, child abuse, delinquency, generation gap, gender inequality, marriage and divorce, aging, treatment of the aged, and coping with death. PREREQ: ANTH 110 or completion of social processes and institutions requirement. (SS) (Writing Intensive Course)

**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. PREREQ: ANTH 110 or completion of non-Western cultures requirement. (SS) (Bacc Core Course)

**ANTH 401/ANTH 501. RESEARCH (1-6).**

**ANTH 402/ANTH 502. INDEPENDENT STUDY (1-6).**

**ANTH 403/ANTH 503. THESIS (3-6).**

**ANTH 405/ANTH 505. READING AND CONFERENCE (1-6).**

**ANTH 406/ANTH 506. PROJECTS (1-6).**

**ANTH 407/ANTH 507. SEMINAR (1-3).**

**ANTH 408/ANTH 508. WORKSHOP (1-6).**

**ANTH 410/ANTH 510. 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. PREREQ: 6 credits of anthropology.

**ANTH 411/ANTH 511. WORLD CULTURES—NORTH AMERICA (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. PREREQ: 9 credits of social science including 3 credits of anthropology, or graduate standing.

**ANTH 412/ANTH 512. WORLD CULTURES - EUROPE (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. PREREQ: 9 credits of social science including 3 credits of anthropology, or graduate standing.

**ANTH 413/ANTH 513. WORLD CULTURES—LATIN AMERICA (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. PREREQ: 9 credits of social science including 3 credits of anthropology, or graduate standing.

**ANTH 414/ANTH 514. WORLD CULTURES—MIDDLE EAST (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. PREREQ: 9 credits of social science including 3 credits of anthropology, or graduate standing.

**ANTH 415/ANTH 515. WORLD CULTURES—AFRICA (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. PREREQ: 9 credits of social science including 3 credits of anthropology, or graduate standing.

**ANTH 416/ANTH 516. WORLD CULTURES—SOUTH AND SOUTHEAST ASIA (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. PREREQ: 9 credits of social science including 3 credits of anthropology, or graduate standing.

**ANTH 417/ANTH 517. WORLD CULTURES—PACIFIC (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. PREREQ: 9 credits of social science including 3 credits of anthropology, or graduate standing.

**ANTH 418/ANTH 518. WORLD CULTURES—CHINA (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. PREREQ: 9 credits of social science including 3 credits of anthropology, or graduate standing.

**ANTH 419/ANTH 519. WORLD CULTURES—JAPAN AND KOREA (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. PREREQ: 9 credits of social science including 3 credits of anthropology, or graduate standing.

**ANTH 420/ANTH 520. 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. PREREQ: 9 credits of social science including 3 credits of anthropology, or graduate standing. Graded P/N.

**ANTH 430/ANTH 530. TOPICS IN ARCHAEOLOGY (1-3).** Recent advances in archaeology and their application to special fields of study. Topics vary from term to term but include archaeological theory, historic sites archaeology, zooarchaeology, issues in cultural resource management. PREREQ: ANTH 100, or ANTH 330, ANTH 230 or equivalent.

**ANTH 431/ANTH 531. ARCHEOLOGICAL THEORY (3).** Historical development of archaeological field techniques and theoretical concepts with an emphasis on modern method and theory in North American archaeology. PREREQ: ANTH 230 or equivalent.

**ANTH 432/ANTH 532. 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. PREREQ: 6 credits of anthropology.

**ANTH 433/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 8000 years ago. PREREQ: 6 credits of anthropology.

**ANTH 434/ANTH 534. NORTH AMERICAN AFTER THE ICE AGE (3).** The development of regional hunting and gathering adaptive strategies in North America from 8000 B.P. to the historic period are examined against a backdrop of changing climate, natural disasters, population growth, and human invention. PREREQ: ANTH 433 or 6 credits of anthropology.

**ANTH 435/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. PREREQ: Anth 230, ANTH 431, or consent of instructor.

**ANTH 436/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 ecological zones with 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. PREREQ: 6 credits of anthropology.

**ANTH 437/ANTH 537. FIRST AMERICAN STUDIES AND ICE-AGE ENVIRONMENTS (3).** Dynamics of environmental change and cultural development during late Ice-Age times; paleoclimatology, glaciology, oceanography, geology, paleontology, palynology, physical anthropology, the archaeology; overview of modeling the dynamics and linkages between the earth's subsystems and the development and spread of modern humans. PREREQ: 6 credits of anthropology or consent of instructor.

**ANTH 438/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. PREREQ: 6 credits of anthropology.

**ANTH 439/ANTH 539. FAUNAL ANALYSIS (3).** Interpretation of animal bone in archaeological sites; procedures of identification, reconstruction of paleo ecology and taphonomy.

**ANTH 440/ANTH 540. TOPICS IN PHYSICAL ANTHROPOLOGY (1-3).** Recent advances in physical anthropology and their applications to special fields of study. Topics vary from term to term but include human adaptability, skeletal biology, dental anthropology, theory of evolution. PREREQ: ANTH 240 or ANTH 340, or general biology or equivalent.

**ANTH 441/ANTH 541. PRIMATE AND HUMAN PALEONTOLOGY (3).** 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. PREREQ: ANTH 240 or ANTH 340 or general biology or equivalent.

**ANTH 442/ANTH 542. HUMAN BIOLOGY (3).** Description and evaluation of the biological heterogeneity of human populations. Traits of known and unknown inheritance, evolutionary theory, anthropological genetics. Racial, populational, and clinal methods as applied to contemporary peoples. PREREQ: ANTH 240 or ANTH 340 or general biology or equivalent.

**ANTH 443/ANTH 543. HUMAN OSTEOLOGY LAB (3).** Identification and analysis of human skeletal materials in an archaeological context. PREREQ: ANTH 100 or ANTH 240.

**ANTH 445/ANTH 545. HUMAN BIOLOGY LAB (2).** Laboratory exercises in human biology and serology. PREREQ: ANTH 100.

**ANTH 450/ANTH 550. TOPICS IN LINGUISTIC ANTHROPOLOGY (1-3).** Recent advances in the study of culture and communication and their application to special fields of knowledge. Topics vary from term to term but include ethnography of communication, language socialization, quantitative approaches to the study of language, semiotics, cross-cultural semantics and artificial intelligence. PREREQ: 3 credits of linguistic anthropology.

**ANTH 451/ANTH 551. SOCIOLINGUISTICS (3).** 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. PREREQ: ANTH 350 or graduate standing.

**ANTH 452/ANTH 552. POPULAR NARRATIVE AND VERBAL ART (3).** 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. PREREQ: ANTH 350 or graduate standing. (FA)

**ANTH 460/ANTH 560. TOPICS IN COMPARATIVE CULTURES (1-3).** Recent advances in the study of comparative cultures and their application to special fields of study. Topics vary from term to term but include cultural futures, urban industrial cultures, early state systems, pastoralists, horticulturalists, and foragers. PREREQ: 3 credits of social science.

**ANTH 462/ANTH 562. MINORITY CULTURES OF CHINA (3).** Compares non-Han minority cultures in China in terms of subsistence patterns, population, language, social organization, religion, change and modernization. Includes Tibetans, Mongolians, Manchu and lesser known groups having Buddhist, Islamic and Animistic traditions. Subsistence types range from hunter-gatherers to horticulturalists, pastoralists, agriculturalists and merchants. PREREQ: 3 credits of social science.

**ANTH 470/ANTH 570. TOPICS IN CULTURAL ANTHROPOLOGY (1-3).** Covers recent advances in cultural anthropology and their applications to the field. Topics vary from term to term but include human ecology, ethnobotany, ethnomusicology, autoethnography, the anthropology of law, the anthropology of international business, economic anthropology, religion and folklore, and women in cross-cultural perspective. PREREQ: 3 credits of social science.

**ANTH 471/ANTH 571. ECONOMIC ORGANIZATION AND CULTURE (3).** Consideration of theories and case studies concerning the interaction of economic pursuits with social relations and cultural meanings in industrial and developing societies. PREREQ: 3 credits of social science.

**ANTH 472/ANTH 572. CONTEMPORARY INDIAN ISSUES (3).** 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. PREREQ: 3 credits of social science.

**ANTH 473/ANTH 573. GENDER, ETHNICITY, CULTURE (3).** Study of the practices and ideologies of gender as they intersect with those of ethnicity, culture. PREREQ: 3 credits of Social Science.

**ANTH 474/ANTH 574. CROSS-CULTURAL HEALTH AND HEALING (3).** Focus on the current status of health across the world and the linkages between gender roles and cultural ideology. Emphasis on the importance of a gendered and culturally informed perspective on global health issues.

**ANTH 480/ANTH 580. TOPICS IN APPLIED ANTHROPOLOGY (1-3).** Recent advances in applied anthropology and their application to special fields of study. Topics vary from term to term but include social impact assessment, risk analysis, rural development, cross-cultural communication, anthropology of education, nutritional anthropology and health. PREREQ: 3 credits of social science.

**ANTH 481/ANTH 581. NATURAL RESOURCES AND COMMUNITY VALUES (3).** Investigates relations between resource-based communities and centers of political power where ideology and policy about resource use are molded. Issues are considered from a temporal and comparative perspective. Integrates concepts from social science, economics, and ecology. PREREQ: 3 credits of social science.

**ANTH 482/ANTH 582. WORLD FOOD & CULTURAL IMPLICATIONS OF INTN'L AG DEV. (3).** 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. PREREQ: Senior standing.

**ANTH 483/ANTH 583. MEDICAL ANTHROPOLOGY (3).** 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. PREREQ: upper division standing.

**ANTH 484/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. PREREQ: 3 credits of social science.

**ANTH 485/ANTH 585. USES OF ANTHROPOLOGY (3).** 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. PREREQ: 3 credits of social science.

**ANTH 486/ANTH 586. CROSS-CULTURAL ALCOHOL USE AND ALCOHOLISM (3).** Students will examine and contrast the way in which alcohol is used in various cultural and ethnic groups within the United States and worldwide. Medical concepts of alcohol abuse and alcoholism will be studied and interpreted within contemporary society. Ethnographic observations of alcohol use will be completed and the ethnographic approach to the study of alcohol problems in different cultural settings will be discussed. PREREQ: 3 credits of social science.

**ANTH 487/ANTH 587. *LANGUAGE IN GLOBAL CONTEXT (3).** 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. PREREQ: ANTH 350 or some knowledge of linguistic structure or graduate standing. (Bacc Core Course)

**ANTH 488/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. PREREQ: 3 credits of social science. (Bacc Core Course)

**ANTH 490/ANTH 590. TOPICS IN METHODOLOGY (1-3).** Recent advances in methodology and their application to special fields of study. Topics vary from term to term but include computer modeling, faunal analyses, genealogical method, survey research. PREREQ: 6 credits anthropology or graduate standing.

**ANTH 491/ANTH 591. ETHNOGRAPHIC METHODS (1-3).** Cultural descriptions are produced through systematic observation, elicitation, and analysis to achieve proximity to the insiders point of view. Covers techniques of interviewing, validating, and interpreting cultural data. Allows students to practice what they have learned. PREREQ: 6 credits of anthropology or graduate standing.

**ANTH 493/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. Evaluates the adequacy of data for parametric and nonparametric statistical tests. PREREQ: 6 credits of anthropology or graduate standing.

**ANTH 494/ANTH 594. LINGUISTIC TRANSCRIPTION (1-3).** A training and practicum in the elicitation, transcriptions and analysis of language. PREREQ: ANTH 350 or graduate standing.

**ANTH 496/ANTH 596. VISUAL ANTHROPOLOGY (1-3).** Examines the use of photography and film for ethnographic description and analysis of culture. Students are encouraged to pursue individual projects. PREREQ: 6 credits of anthropology or graduate standing.

**ANTH 497/ANTH 597. ARCHAEOLOGICAL FIELD METHODS (1-3).** Archaeological field strategies emphasizing reconnaissance and survey. Application of field equipment and project management. PREREQ: ANTH 431.

**ANTH 498/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. PREREQ: ANTH 350 and ANTH 452 (can be taken concurrently) or graduate standing.

**ANTH 499. SPECIAL TOPICS IN ANTHROPOLOGY (1-16).**

**Graduate Courses**

**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. PREREQ: 9 credits of upper division social science, including at least one 400-level anthropology course.

**ANTH 595. ANTHROPOLOGICAL RESEARCH DESIGN (3).** Critical examination of research design and methodology in anthropology; analysis of methods and procedures of research in the subfields of anthropology. PREREQ: 9 credits of upper division social science, including at least one 400-level anthropology course.

## ART

Jim Folts, Chair
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(541) 737-4745

**Faculty**

*Professors* Branch, Brown, Chappell, Hardesty, Morandi, Sayre, Wiprud; *Associate Professors* Folts, Jordon, Loeb, Pilliod; *Assistant Professors* Bowers, Hiratsuka, Marks, Maul; *Senior Research Assistant* Russell; *Slide Librarian* Monders; *Assistant to the Chair* Melton; *Student Services Coordinator* Hones

### Undergraduate Majors

**Art (B.A., B.S.)**
Art History, B.A.
Fine Arts, B.A., B.S.
Graphic Design, B.A., B.S.
Photography, B.A., B.S.

**Applied Visual Arts (B.F.A.)**
Fine Arts, B.F.A.
Graphic Design, B.F.A.
Photography, B.F.A.

### Minors

Art History
Multimedia
Telemedia
Print Media
Photography
Visual Arts

The Department of Art offers extensive course work in fine art, graphic design, photography, and art history. Study in these areas leads to the Bachelor of Fine Arts (B.F.A.) degree, the Bachelor of Arts (B.A.) degree, or the Bachelor of Science (B.S.) degree.

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 major programs prepare the student for a range of professional opportunities or later graduate study in graphic design, advertising, communications, photography, fine art, and art history. As an enrichment for our students, the department sponsors exhibitions, lectures, workshops, and other events related to the visual arts.

Candidates for the B.S. or B.F.A. degrees may have an emphasis in fine art, graphic design or photography. Candidates for the B.A. degree may have an emphasis in those studio areas or art history.

The B.F.A. is a preprofessional degree requiring a minimum of 103 credits in the visual arts. College of Liberal Arts requirements for the B.F.A. differ from other degree programs. (See B.F.A. in Applied Visual Arts.)

Admission into upper-division graphic design courses is selective and competitive. Students must have completed all freshman-level core courses as well as all 200-level graphic design courses prior to continuing on to upper-division course work. To continue in upper-division graphic design courses, students must be approved by the graphic design faculty following achievement of a satisfactory academic record in graphic design courses and a review of a limited portfolio and a written statement. This review will ordinarily occur during the spring term prior to the junior year. Students transferring to OSU as juniors may submit portfolios and statements for review in early summer. Contact the department for specific details.

The visual arts minor is a studio concentration in either fine art or graphic design. The photography minor offers an opportunity to focus on the mastery of the fundamentals of photography. The art history minor combines an introduction to art history with an opportunity to explore advanced topics. The department also participates in the media communications minors (multimedia, telemedia, and print media) listed in the Interdisciplinary Studies section of this catalog.

The Department of Art is a participant in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) degree program.

### DEPARTMENTAL REQUIREMENTS

#### ART CORE CURRICULUM—24 CREDITS

ART 115. Design I (4)
ART 117. Design II (4)
ART 131. Drawing I (4)
ART 204, ART 205, ART 206. Art History (9)
ART 234. Drawing II/Figure (3)

**NOTE:** The core curriculum studio courses must be completed before taking upper division art courses for a major program. In addition, it is strongly suggested that students take HST 101, HST 102, and HST 103, History of Western Civilization, prior to taking ART 204, ART 205, and ART 206. Art majors may not elect to take required art courses on an S-U graded basis.

#### FINE ARTS (B.A., B.S.) (63)

Candidates for the B.A. or B.S. degree in Fine Arts must build a studio concentration in either Printmaking, Painting, or Sculpture. A studio concentration is a minimum of 24 credits (lower and upper division) in one studio area.

**Lower Division (33)**
Art core curriculum (24)
ART 253. Ceramic Sculpture I (3) or ART 291. Sculpture I (3)
*Select 6 credits from the following:* ART 261, ART 281, ART 222, ART 223.

**Upper Division (30)**
Art history (300/400-level) (at least one course must be at the 400-level) (12)
Fine Arts electives (300-level) (9)
Fine Arts electives (400-level) (9)

#### GRAPHIC DESIGN (B.A., B.S.) (63)

**Lower Division (30)**
Art core curriculum (24)
ART 222. Graphic Design I (3)
ART 223. Graphic Design/Typography I (3)

**Upper Division (33)**
ART 320, ART 321. Graphic Design II (6)
ART 322, ART 323. Graphic Design/Typography II (6)
ART 367. History of Design (3)
Art History (300/400-level) (6)
ART 420, ART 421, ART 422. Graphic Design III (12)

#### PHOTOGRAPHY (B.A., B.S.) (63)

**Lower Division (30)**
Art core curriculum (24)
ART 261. Photography I (3)
ART 262. Photography II (3)
ART 263. Digital Photography (3)

**Upper Division (33)**
ART 341. Photographic Techniques (3)
ART 342. Photographic Aesthetics (3)
ART 343. The View Camera (3)
ART 346. Photo Illustration (3)
ART 368. History of Photography (3)
ART 441. Portfolio (3)
ART 446. Documentary Photography (3)
Art history (300/400-level) (9)

#### ART HISTORY (B.A.) (50)

**Lower Division (23)**
ART 115. Design I (4)
ART 131. Drawing I (4)
ART 204, ART 205, ART 206. Art History (9)
ART 207. Indigenous Art of the Americas (3)
Art studio electives (3)

**Upper Division (27)**
ART 469. Meth and Theories of Art History (3)
Art History (300-level) (15)
Art History (400-level) (9)

NOTE: Art History majors must successfully complete at least one term of a third-year foreign language.

#### B.F.A. DEGREE

A minimum 3.00 grade point average must be maintained in all art courses used to meet B.F.A. requirements.

#### FINE ARTS (B.F.A.) (103)

**Lower Division (33)**
Art core curriculum (24)
ART 253. Ceramic Sculpture (3) or ART 291. Sculpture I (3)
ART 261. Photography I (3)

ART 291. Sculpture I (3)
ART 261. Photography I (3) or ART 253. Ceramic Sculpture (3)
ART 281. Painting I (3)
ART 291. Sculpture I (3)

**Upper Division (70)**
ART 306. Art Advisor Review (1)
ART 331. Drawing III/Concepts (3)
ART 334. Drawing III/Figure (3)
ART 375, ART 376, ART 377. Printmaking (9)
ART 381, ART 382, ART 383. Painting II (3)
300-level painting (6)
ART 391. Sculpture II (3)
300-level sculpture (6)
Art History (300/400-level) (3 hours may be ART 207) (12)
400-level studio block (24)

NOTE: the 400-level studio block may be any combination of painting, printmaking, sculpture, or drawing for five credits each, including B.F.A. critique groups.

**GRAPHIC DESIGN (B.F.A.) (103)**
**Lower Division (39)**
Art core curriculum (24)
ART 222. Graphic Design I (3)
ART 223. Graphic Design/Typography (3)
Art studio electives (200-level) (9)

**Upper Division (64)**
ART 306. Art Advisor Review (1)
ART 320, ART 321. Graphic Design II (6)
ART 322, ART 323. Graphic Design/Typography II (6)
ART 367. History of Design (3)
ART 420, ART 421, ART 422. Graphic Design III (15)
ART 427. Graphic Design/Senior Portfolio (3-5)
Art History (300/400-level) (3 hours may be ART 207) (9)
Art studio electives (300/400-level) (19-21)

**PHOTOGRAPHY (B.F.A.) (103)**
**Lower Division (39)**
Art core curriculum (24)
ART 261. Photography I (3)
ART 262. Photography II (3)
ART 263. Digital Photography (3)
Art studio electives (200-level) (6)

**Upper Division (64)**
ART 306. Art Advisor Review (1)
ART 341. Photographic Techniques (3)
ART 342. Photographic Aesthetics (3)
ART 343. The View Camera (3)
ART 346. Photo Illustration (3)
ART 368. History of Photography (3)
ART 441. Portfolio (15)
ART 446. Documentary Photography (6)
Art History (300/400-level) (3 hours may be ART 207) (9)
Art studio electives (300/400-level) (18)

## MINORS

Art minors may not elect to take required art courses on an S-U graded basis.

**VISUAL ARTS MINOR (30)**
ART 115. Design I (4)
ART 117. Design II (4)
ART 131. Drawing I (4)
ART 234. Drawing II/Figure (3)
Studio courses in an approved program which includes at least 12 credits of upper-division courses (15)

**PHOTOGRAPHY MINOR (27)**
ART 261. Photography I (3)
ART 262. Photography II (3)
ART 263. Digital Photography (3)
ART 341. Photographic Techniques (3)
ART 342. Photographic Aesthetics (3)
ART 343. The View Camera (3)
ART 346. Photo Illustration (3)
ART 368. History of Photography (3)
ART 441. Photography III (3) or ART 446. Documentary Photography (3)

**ART HISTORY MINOR (27)**
ART 204, 205, 206. Introduction to Art History—Western (9)
ART 207. Indigenous Art of the Americas (3)
ART 469. Methods and Theory of Art History (3)
Upper-division art history courses including at least 3 credits at the 400-level (12)

## COURSES

### LOWER DIVISION COURSES

**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. DESIGN I (4).** Introductory 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 color and two-dimensional design. (FA)

**ART 117. DESIGN II (4).** Studio course following ART 115 that examines three-dimensional design elements and their organization and color theories. Emphasizes innovative problem solving and the use of varied media. Gives students a sound conceptual foundation to apply to more advanced media-oriented courses. PREREQ: ART 115.

**ART 120. COMPUTERS IN GRAPHIC DESIGN (3).** A technical course covering basic software and hardware used in the graphic design field. Required for graphic design students.

**ART 131. DRAWING (4).** Introductory studio course in drawing techniques with emphasis on developing skills in perception and visual organization. (FA)

**ART 199. SPECIAL STUDIES (1-16).** Departmental consent required.

**ART 204. *INTRODUCTION TO ART HISTORY - WESTERN (3).** An 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).** An 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).** An 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).** An 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 215. DESIGN III/COLOR (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. PREREQ: ART 115, ART 117.

**ART 222. GRAPHIC DESIGN I (3).** Introductory studio course in principles and processes of graphic design communication. PREREQ: ART 115, ART 120, ART 131. Departmental approval required.

**ART 223. GRAPHIC DESIGN/TYPOGRAPHY I (3).** Introductory studio course in the development and use of the letterform as applied to typography. Emphasis on rendering techniques and on the exploration of type as graphic element. PREREQ: ART 115, ART 120, ART 131. Departmental approval required.

**ART 234. DRAWING II/FIGURE (3).** Drawing from the life model with emphasis on skill building and conceptual awareness as well as anatomical consideration. PREREQ: ART 131.

**ART 253. CERAMIC SCULPTURE I (3).** Studio course in basic materials and techniques of sculpture with emphasis on design concepts; a foundation for further three-dimensional work in the visual arts.

**ART 260. *DEVELOPMENTS IN PHOTOGRAPHY (3).** The historical development of photography. Includes studio work experimenting with early photographic techniques and major genres. (Bacc Core Course)

**ART 261. PHOTOGRAPHY I (3).** 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. (FA)

**ART 262. PHOTOGRAPHY II (3).** Introduction to 35mm color photography. Color balance, color negative and positive processes. Elements of lighting. Introduction to the photo essay. Students must supply suitable 35mm camera. PREREQ: ART 261.

**ART 263. DIGITAL PHOTOGRAPHY (3).** Capturing, processing, and printing digital images. Image control and manipulation. Elements of photographic montage. PREREQ: ART 115.

**ART 281. PAINTING I (3).** Introductory studio course with emphasis on basic materials and techniques in painting. PREREQ: ART 131. Course offered 3 credit per term, 2 terms. (FA)

**ART 291. SCULPTURE I (3).** Studio course in basic materials and approaches used in sculpture; a foundation for further three-dimensional work. Course offered 3 credits per term, 2 terms. (FA)

### Upper Division Courses

**ART 301. ^WRITING IN ART AND DESIGN (3).** Seminar examining the context of art, design, or art history through readings and critical writing within an area of specialization. PREREQ: Junior Standing. (Writing Intensive Course)

**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. For BFA students only. To be taken third term Junior year. PREREQ: Departmental approval. Graded P/N.

**ART 320. GRAPHIC DESIGN II (3).** Intermediate course in graphic design. Emphasis on understanding principles of visual organization and on exploring the development of concepts for solving visual communication problems. Required for graphic design majors. PREREQ: Core curriculum; ART 222, ART 223. Departmental approval required.

**ART 321. GRAPHIC DESIGN II (3).** Intermediate course in graphic design. Emphasis on understanding principles of visual organization and on exploring the development of concepts for solving visual communication problems. Required for graphic design majors. PREREQ: ART 320. Departmental approval required.

**ART 322. GRAPHIC DESIGN/TYPOGRAPHY II (3).** Intermediate studio course exploring the principles of typographic design. Course work stresses the use of type as a tool of communication through both experimental and applied problems. Required for graphic design majors. PREREQ: ART 222, ART 223. Departmental approval required.

**ART 323. GRAPHIC DESIGN/TYPOGRAPHY II (3).** Intermediate studio course exploring the principles of typographic design. Course work stresses the use of type as a tool of communication through both experimental and applied problems. Required for graphic design majors. PREREQ: ART 322. Departmental approval required.

**ART 331. DRAWING III (3).** Creative development and expression of visual concepts through the use of drawing media; emphasis on defining and directing creative development. PREREQ: Core curriculum; ART 234. Course offered 3 credits per term, 3 terms.

**ART 334. DRAWING III/FIGURE (3).** Studio course in drawing from the life model; emphasis on developing skills and understanding of the human form. PREREQ: Core curriculum; ART 234. Course offered 3 credits per term, 3 terms.

**ART 341. PHOTOGRAPHIC TECHNIQUES (3).** Demonstration of the zone system, photographic chemistry, and archival processes. PREREQ: Core curriculum; ART 262.

**ART 342. PHOTOGRAPHIC AESTHETICS (3).** Critique sessions on technical and aesthetic aspects of the medium. PREREQ: ART 341.

**ART 343. THE VIEW CAMERA (3).** Operation of the techniques of using the view camera. PREREQ: Core curriculum; ART 262.

**ART 346. PHOTO ILLUSTRATION I (3).** Studio lighting. The 4x5 view camera. Sheet film. Black and white and color illustration. PREREQ: Core curriculum; ART 262.

**ART 353. CERAMIC SCULPTURE II (3).** Intermediate studio course with a continued emphasis on individual problem solving as related to sculpture. PREREQ: Core curriculum; ART 253. Course offered 3 credits per term, 3 terms.

**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. PREREQ: ART 204, ART 205, 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. PREREQ: ART 204, ART 205, ART 206.

**ART 362. HISTORY OF ART (3).** Lecture course on the principal stylistic manifestations of European architecture, painting, and sculpture from the late Middle Ages to 1750. Northern Renaissance art. PREREQ: ART 204, ART 205, ART 206. Need not be taken in order. Courses offered every other year.

**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. PREREQ: ART 204, ART 205, 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. PREREQ: ART 204, ART 205, 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 since 1750. PREREQ: ART 204, ART 205, 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 since 1750. PREREQ: ART 204, ART 205, 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 371. CREATIVE ART PROJECTS (3).** Advanced studio work on approved projects in drawing, painting, sculpture, graphic arts, and ceramics. Upper division standing, one year lower division work in the selected medium, and approval of instructor required. Course offered 3 credits per term, 3 terms. Departmental consent required.

**ART 375. PRINTING/RELIEF (3).** Studio course in relief printmaking with emphasis on woodcut; may include other relief processes. PREREQ: Core curriculum.

**ART 376. PRINTMAKING/INTAGLIO (3).** Studio course in intaglio printmaking. Emphasis on etching, aquatint, and soft ground; may include other intaglio printmaking. PREREQ: Core curriculum.

**ART 377. PRINTMAKING/LITHOGRAPHY (3).** Studio course in most aspects of stone and metal plate lithography. PREREQ: Core curriculum.

**ART 378. PRINTMAKING/MONOTYPE (3).** Studio course in monotype printmaking drawing upon techniques from drawing, painting, and printmaking.

**ART 381. PAINTING II/FIGURE (3).** Painting with emphasis on studies of the figure that deal primarily with formal elements of color and form: compositional groupings, the figure as a symbol and the figure as a vehicle of expression. PREREQ: Core curriculum, ART 281.

**ART 382. PAINTING II/CONCEPTS (3).** Painting with emphasis on the four major concepts or influences of the 20th century: abstraction, surrealism, cubism, and expression in developing a painting style. PREREQ: Core Curriculum, ART 281.

**ART 383. PAINTING II/ABSTRACT AND MULTIMEDIA (3).** Painting with emphasis on painting as a means of image conjuring, derived as a solution to an aesthetic and/or communication problem using mixed media, collage and assemblage. PREREQ: Core curriculum, ART 281.

**ART 391. SCULPTURE II (3).** Intermediate studio course with emphasis on developing greater skills and technical knowledge in moldmaking, welding, carving, plaster or metal casting. PREREQ: Core curriculum; ART 291. Course offered 3 credits per term, 3 terms.

**ART 401/ART 501. RESEARCH (1-16).** PREREQ: Department approval required.

**ART 402/ART 502. INDEPENDENT STUDY (1-16).** PREREQ: Department approval required.

**ART 403/ART 503. THESIS (1-16).** PREREQ: Department approval required.

**ART 405/ART 505. READING AND CONFERENCE (1-16).** PREREQ: Department approval required.

**ART 406/ART 506. PROJECTS (1-16).** PREREQ: Department approval required.

**ART 407/ART 507. SEMINAR (1-16).** PREREQ: Department approval required.

**ART 408/ART 508. WORKSHOP (1-16).** Departmental approval required.

**ART 410/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. May be repeated for a maximum of 15 credits. PREREQ: Department 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. PREREQ: Core curriculum plus twelve hours of upper-division studio credits. (Writing Intensive Course)

**ART 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)

**ART 420/ART 520. GRAPHIC DESIGN III (3-5).** Advanced problems in exploration and development of concepts of solving visual communication problems. PREREQ: ART 321, ART 323.

**ART 421/ART 521. GRAPHIC DESIGN III (3-5).** Advanced problems in exploration and development of concepts for solving visual communication problems. PREREQ: ART 420.

**ART 422/ART 522. GRAPHIC DESIGN III (3-5).** Advanced problems in exploration and development of concepts for solving visual communication problems. PREREQ: ART 420, ART 421.

**ART 423/ART 523. GRAPHIC DESIGN/INFORMATION DESIGN (3-5).** Advanced problems in the design of systems used for the visual communication of complex information such as instructional materials, maps, charts, and diagrams. PREREQ: ART 320, ART 323. Not offered every year.

**ART 427/ART 527. GRAPHIC DESIGN/SENIOR PORTFOLIO (3-5).** Portfolio development, resume writing, matting of artwork for presentation purposes, letters of reference. PREREQ: 4 hours 400-level graphic design.

**ART 429/ART 529. GRAPHIC DESIGN STUDIO (3).** Provides experience working with clients on actual projects in a professional environment. PREREQ: ART 222, ART 223. May be repeated to a maximum of 18 credits. PREREQ: Department approval required.

**ART 431/ART 531. 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. PREREQ: 9 credits of ART 331. Course offered 3-5 credits per term; maximum 15 credits.

**ART 434/ART 534. DRAWING IV/FIGURE (3-5).** Development of an individual approach to the varied aspects of figure drawing; emphasis on exploration of traditional and contemporary techniques and styles. PREREQ: 9 credits of ART 334. Course offered 3-5 credits per term; maximum 15 credits. Departmental consent required for 5 credits.

**ART 441/ART 541. PHOTOGRAPHY III (3-5).** 2 Using the camera as a tool to sharpen aesthetic and visual perception. PREREQ: ART 341, ART 341, ART 343.

**ART 445/ART 545. PHOTO ILLUSTRATION II (3).** Advanced projects in studio illustration. PREREQ: ART 346.

**ART 446/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. PREREQ: 12 credits of photography. May be repeated for a maximum of 9 credits.

**ART 453/ART 553. CERAMIC SCULPTURE III (3-5).** Advanced studio course for the development of individual approaches to the varied aspects of sculpture. PREREQ: 9 Credits ART 353. Course offered 3-5 credits per term; maximum 15 credits.

**ART 460/ART 560. 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. PREREQ: 9 credits of art history, American literature, or American history. Not offered every year.

**ART 461/ART 561. 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. PREREQ: 9 credits of art history, American literature, or American history. Not offered every year.

**ART 462/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. PREREQ: 9 credits of art history, or permission of instructor. Not offered every year.

**ART 463/ART 563. 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 Medicis Florence. Subject matter may vary year to year. PREREQ: 9 credits of art history, or permission of instructor. Not offered every year.

**ART 464/ART 564. 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 Medicis Florence. Subject matter may vary year to year. PREREQ: 9 credits of art history, or permission of instructor. Not offered every year.

**ART 465/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 467/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 469/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. PREREQ: 9 credits of art history, or permission of instructor.

**ART 475/ART 575. PRINTMAKING STUDIO (3-5).** Studio workshop in relief, intaglio, lithographic, and silkscreen media on an individual project basis. PREREQ: 9 credits of 300-level printmaking. Course offered 3-5 credits per term; maximum 15 credits.

**ART 481/ART 581. PAINTING III (3-5).** Development of individual interests and directions in painting. PREREQ: 9 credits of 300-level painting. Course offered 3-5 credits per term; maximum 15 credits.

**ART 491/ART 591. SCULPTURE III (3-5).** Development of individual interests and directions in sculpture. PREREQ: 9 credits of 300-level sculpture. Course offered 3-5 credits per term; maximum 15 credits.

**ART 495/ART 595. EXHIBITION DESIGN (2).** Participatory experience in art gallery exhibition design. Working in Fairbanks Gallery specialized study of visual organization and technical methods of placement in the gallery environment. Includes visual design, lighting, and technical installation. Course offered 2 credits per term, maximum 6 credits.

## ECONOMICS

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**Faculty**

*Professors* Farrell, McMullen, O'Sullivan, V. Tremblay; *Associate Professors* Chao, Fraundorf, Kerkvliet, Martins; *Assistant Professors* Baek, Connolly, C. Tremblay

### Undergraduate Major

**Economics (B.A.,B.S.)**

### Minor

Economics

### Graduate Major

**Economics (M.A., M.S., Ph.D.)**
***Graduate Areas of Concentration***

Economics of Growth and Change
Industry Studies (Agriculture, Forestry, Marine)
National Resources and Environmental Economics

Economics is a social science that studies how individuals and societies choose to allocate scarce resources among competing ends. There are two major subdivisions of economics: microeconomics and macroeconomics. Microeconomics studies the economic behavior of consumers, producers, and industries and is the basis of many applied fields in economics such as industrial organization, transportation economics, labor economics, resource economics, urban-regional economics, public finance, and international trade. Macroeconomics examines the aggregate economic behavior of such variables as inflation, unemployment, and growth. It applies to such fields as monetary economics, fiscal policy, business cycles, and international finance.

### UNDERGRADUATE PROGRAM

The Department of Economics offers an undergraduate program leading to the B.A. or B.S. degree and provides minor programs to complement majors in other disciplines. Economics is an excellent choice for students who seek:

- to enter law school or graduate programs in economics, business, public administration or other social sciences.
- to prepare for careers in business or public management.
- to become wiser consumers and more valuable 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. A major in economics 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.

The department invites undergraduate students to combine a serious study of economics with the study of another discipline, through the CLA Liberal Studies Program, earning concurrent degrees, or enrolling in a minor program to complement studies in their major discipline. The minor requirements are listed below.

Below lists a recommended program of study for an undergraduate degree in economics. Students are strongly encouraged to take calculus and statistics by the

end of their sophomore year and intermediate microeconomic theory, intermediate macroeconomic theory, statistics, and econometrics by the end of their junior year.

**Freshman Year and Sophomore Year**
Calculus (MTH 111 and MTH 241 or MTH 251)
Principles of Economics (ECON 201-202)
Economics Electives

**Sophomore or Junior Year**
Microeconomic Theory (ECON 311-312)
Macroeconomic Theory (ECON 315)
Economics Electives
Statistics (ST 351 or 451)

**Junior or Senior Year**
Economic Research, WIC Course (ECON 328)
Econometrics (ECON 325)
Economics Electives

Students interested in graduate study in economics should take three or more courses in calculus and additional courses in matrix algebra and statistics. Early counsel with an adviser is also recommended.

## MAJOR PROGRAM (52)

ECON 201, ECON 202. Principles of Economics (8)
MTH 241 or 251. Calculus (4)
ECON 311, ECON 312. Microeconomic Theory (8)
ECON 315. Macroeconomic Theory (4)
ST 351. Introduction to Statistical Methods (4)
ECON 325. Introduction to Econometric Methods (4)
ECON 328. Introduction to Economic Research, WIC Course (4)
Additional approved economics courses at the 200-level or above. (16). Students must take at least one 4 credit hour course at the senior level. These include ECON 407 and others numbered above ECON 410.
Notes: All students must receive a grade of C (2.0) or better in all upper division required courses and must maintain an overall grade point average (GPA) of 2.0 or above in all economics courses. MTH 241 is a prerequisite for ECON 311; ECON 311 and ST 351 are prerequisites for ECON 325.
NOTE: AREC 452, Marine and Fishery Economics, may count as an economics elective toward major and minor programs in economics.

## MINOR PROGRAM (28)

Students minoring in economics must complete a minimum of 28 credit hours at the 200 level or above with a GPA of at least 2.00 in the program of study. Students wanting a transcript-visible minor must:
(1) Meet with the Department of Economics minor adviser.
(2) Declare the minor on the appropriate form in their major college.

The minor consists of (1) Principles of Economics - ECON 201, ECON 202 (8 credit hours), (2) courses that fulfill one of the areas listed below (12 credit hours) and (3) two additional upper division economics classes or both ECON 325 and ST 351 (8 credit hours).
MICROECONOMIC THEORY: ECON 311 and two of the following: ECON 312, ECON 460, ECON 465, ECON 480, ECON 490.
MACROECONOMIC THEORY: ECON 315 and two of the following: ECON 316, ECON 330, ECON 441.
INTERNATIONAL ECONOMICS: Any three from the following: ECON 340, ECON 420, ECON 422, ECON 440, ECON 441, ECON 455.
PRE-LAW: ECON 311 and any two of the following: ECON 312, ECON 383, ECON 435, ECON 439, ECON 460, ECON 481.
U.S. ECONOMIC INSTITUTIONS: Any three from the following: ECON 319, ECON 330, ECON 435, ECON 477, ECON 481.
RESOURCE AND ENVIRONMENTAL ECONOMICS: ECON 311, ECON 352, and AREC 452
GENERAL: Any other 12 hour program as approved by the minor adviser.

## GRADUATE PROGRAM

The Department of Economics offers the M.A., M.S., and Ph.D. degrees, as well as courses applicable toward graduate degrees in forest resources and agricultural and resource economics. The department also participates in the graduate program in Interdisciplinary Studies (M.A.I.S.). The graduate program in economics emphasizes a strong foundation in economic theory and econometrics. An additional area of specialization is the economics of growth and change, an area of study that gives students the opportunity to study international economics, industrial organization and technological change, human capital, urban-regional economics, and resource economics.

**Admission Requirements**
For admission, an applicant must have at least a "B" average in the last two years of undergraduate study. Graduate Record Examination (verbal, quantitative, and analytical) results must be submitted. The undergraduate major need not be economics, but an appropriate background in economic theory, calculus, linear algebra, and statistics is recommended. Provisional admission is granted in special circumstances, for example, to applicants with a limited economics or mathematics background.

**Master's Degree**
The master's degree requirement includes courses in economic theory (ECON 512, ECON 513, ECON 515) and econometrics (ECON 525, ECON 526), a specialty field of study in economics, and additional elective courses in order to meet the 45 graduate credit requirement. Students must maintain a minimum grade point (GPA) average of 3.00 in all graduate work and in all graduate credits in economics. Well-prepared students should be able to complete the master's program within two years.

**Doctor of Philosophy Degree**
The Ph.D. degree in economics has four main requirements.

1. Satisfactorily complete the graduate core courses in economic theory (ECON 512, ECON 513, ECON 611, ECON 612, ECON 613, ECON 515, ECON 615) and in econometrics (ECON 525, ECON 526, ECON 625, ECON 627) and pass comprehensive examinations on this core material.

2. Satisfactorily complete at least one major field of study in economics and pass a comprehensive field examination.

3. Submit and orally defend an acceptable dissertation proposal.

4. Complete 112 (approved) graduate credits and an acceptable dissertation.

Students must maintain a minimum GPA of 3.00 in all graduate work and in all graduate credits in economics. Once all core and field examinations have been passed, the student is guided by his or her dissertation committee. A student with the recommended background can complete the doctoral program in four years, but many students take five years.

A more detailed description of the economics graduate degree requirements is in the department's pamphlet, "Graduate Study in Economics," which may be obtained from the department office.

**Financial Assistance and Application Information**
A number of graduate teaching assistantships are awarded each year to incoming and continuing graduate students. Applications for assistantships should be completed by March 1.

For additional information, please contact:

The Director of Graduate Studies
Department of Economics
303 Ballard Extension Hall
Oregon State University
Corvallis, OR 97331-3612
Phone 541-737-2321
Fax: 541-737-5917
E-Mail: econgrad@orst.edu

Web Address: http://osu.orst.edu/dept/econ/

## COURSES

**Lower Division Courses**

**ECON 199. SPECIAL TOPICS (1-16).**

**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. PREREQ: MATH 111 or equivalent is recommended. (Bacc Core Course) (SS)

**ECON 202. *INTRODUCTION TO MACROECONOMICS (4).** An introduction to macroeconomic principles including the 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. PREREQ: MTH 111 or equivalent is recommended. (Bacc Core Course) (SS)

**ECON 203. APPLICATIONS TO ECONOMIC ISSUES (4).** Applications of economic principles to selected U.S. and Applications of economic principles to selected United world economic problems such as growth, instability, States and world economic problems such as growth, poverty, pollution, trade imbalance. instability, poverty, pollution, and trade imbalance. PREREQ: ECON 201, ECON 202. (SS)

### Upper Division Courses

**ECON 311. INTERMEDIATE MICROECONOMIC THEORY I (4).** An examination of the theories of consumer behavior and demand, production, cost, the firm, supply, and competitive and monopoly market structures. PREREQ: ECON 201, ECON 202, and MTH 241 or MTH 251. CROSSLISTED AS AREC 311.

**ECON 312. INTERMEDIATE MICROECONOMIC THEORY II (4).** An examination of the theories of imperfect competition, input markets, general equilibrium, and welfare economics. PREREQ: ECON 311. CROSSLISTED AS AREC 312.

**ECON 315. INTERMEDIATE MACROECONOMIC THEORY I (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 New Classical. PREREQ: ECON 201, ECON 202.

**ECON 316. INTERMEDIATE MACROECONOMIC THEORY II (4).** INTERMEDIATE MACROECONOMIC THEORY II An examination of individual sectors of the macro economy, An examination of individual sectors of the macro economy, including theories of consumption, investment, money including theories of consumption, investment, money demand and money supply; introduction to economic demand and money supply; An introduction to economic growth, open economy macroeconomics, and monetary and fiscal growth, open economy macroeconomics, and monetary and fiscal policy issues. PREREQ: ECON 315.

**ECON 319. *ECONOMIC HISTORY AND DEVELOPMENT OF THE UNITED STATES (4).** Traces United States economic development from European origins to present with particular emphasis on relationships between economic, technological and institutional factors and on developing understanding of contemporary economic issues. (Bacc Core Course) (SS)

**ECON 325. INTRODUCTION TO ECONOMETRIC METHODS (4).** Introduction to the application of statistics to economics. Elementary sampling theory, statistical inference, and simple and multiple regression analysis. Economic applications and data analysis are emphasized. PREREQ: ECON 311, ST 351.

**ECON 328. ^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. PREREQ: ECON 201, ECON 202. Intermediate economic theory is strongly recommended. (Writing Intensive Course)

**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. PREREQ: ECON 201, 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. PREREQ: ECON 201, ECON 202. (SS)

**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. PREREQ: ECON 201, ECON 202. (SS)

**ECON 352. *ENVIRONMENTAL ECONOMICS AND POLICY (3).** Analysis of the interrelationships among economic activity, government policies, and the environment; benefits and costs of economic growth; economics of environmental quality and the social costs of pollution. Three to five case studies, selected by the instructor, introduce students to the way economists analyze environmental policies. PREREQ: ECON 201. CROSSLISTED AS AREC 352. (Bacc Core Course)

**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. PREREQ: ECON 201. (Bacc Core Course) (SS)

**ECON 401. RESEARCH (1-16).** PREREQ: Departmental approval required.

**ECON 402. INDEPENDENT STUDY (1-16).** PREREQ: Departmental approval required.

**ECON 403. THESIS (1-16).** PREREQ: Departmental approval required.

**ECON 405. READING AND CONFERENCE (1-16).** PREREQ: Departmental approval required.

**ECON 406. PROJECTS (1-16).** PREREQ: Departmental approval required.

**ECON 407. SEMINAR (1-16).** PREREQ: Departmental approval required.

**ECON 408. WORKSHOP (1-16).** PREREQ: Departmental approval required.

**ECON 410. INTERNSHIP (1-16).** PREREQ: Departmental approval required.

**ECON 418/ECON 518. HISTORY OF ECONOMIC THOUGHT (4).** Major schools of economic theory and thought in historical context; classical and neoclassical contributions, precursors, and critics. PREREQ: ECON 311, ECON 315.

**ECON 420/ECON 520. COMPARATIVE ECONOMICS SYSTEMS: IDEOLOGY, THEORY, AND POLICY (4).** Ideologies, economic models of capitalism and comparative economic performance of capitalism and socialism. PREREQ: ECON 201, ECON 202. (SS)

**ECON 422/ECON 522. SOVIET AND POST SOVIET ECONOMICS (4).** Soviet economic history and structure, economic calculation and performance, money and finance, trends and prospects. PREREQ: ECON 201, ECON 202. (SS)

**ECON 435/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. PREREQ: ECON 311.

**ECON 439/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. PREREQ: ECON 311, ECON 435, or equivalent.

**ECON 440. INTERNATIONAL TRADE AND POLICY (4).** Classical and new trade theories; commercial policies including tariffs, quotas, and other trade barriers. PREREQ: ECON 201.

**ECON 441/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. PREREQ: ECON 315.

**ECON 455/ECON 555. ECONOMIC DEVELOPMENT (4).** History, theories and policies for economic development in the Third World of underdeveloped countries. PREREQ: ECON 201, ECON 202. (SS)

**ECON 460/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. PREREQ: ECON 311.

**ECON 465/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. PREREQ: ECON 311.

**ECON 477. ECONOMICS, POLITICS, AND GOVERNMENT (3).** Why and how governments tax, spend, subsidize, regulate, and deregulate; applications of economic and public choice theory. PREREQ: ECON 201, ECON 202. CROSSLISTED as AREC 477, PS 477.

**ECON 480/ECON 580. 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. PREREQ: ECON 311.

**ECON 481/ECON 581. ECONOMICS OF LABOR UNIONS (4).** Economic analysis of the formation, growth, and operation of unions in the United States; theory and practice of collective bargaining; effects of unions on the United States economy. PREREQ: ECON 201, ECON 202. (SS)

**ECON 490/ECON 590. REGIONAL ECONOMICS (4).** Analysis of regional and urban economies: survey of regional economic development policy, local public economics, location theory, size and spatial distribution of urban places, externalities and public goods, and contemporary regional and urban issues. PREREQ: ECON 311.

**ECON 495/ECON 595. HEALTH ECONOMICS (4).** Economic foundations of health and medical care providers; efficiency in health delivery systems; health as a personal human capital investment; determinants of healthy behavior; the impact of public policy on public health. PREREQ: ECON 201, ECON 202. (SS)

### Graduate Courses

**ECON 501. RESEARCH (1-16).** PREREQ: Departmental approval required.

**ECON 502. INDEPENDENT STUDY (1-16).** PREREQ: Departmental approval required.

**ECON 503. THESIS (1-16).** PREREQ: Departmental approval required.

**ECON 505. READING AND CONFERENCE (1-16).** PREREQ: Departmental approval required.

**ECON 506. PROJECTS (1-16).** PREREQ: Departmental approval required.

**ECON 507. SEMINAR (1-16).** PREREQ: Departmental approval required.

**ECON 511. OPTIMIZATION IN ECONOMICS (3).** Matrix algebra; application of derivatives, differentials, and the implicit function theorem to comparative statics; unconstrained optimization of functions with single and multiple variables; constrained optimization. PREREQ: ECON 312, MTH 251. CROSSLISTED as AREC 511.

**ECON 512. MICROECONOMIC THEORY I (4).** Economic theories of consumer behavior and demand, production, cost, the firm, supply, and competitive and monopoly market structures. PREREQ: ECON 312. CROSSLISTED as AREC 512.

**ECON 513. MICROECONOMIC THEORY II (4).** Economic theories of imperfect competition, input markets, general equilibrium and welfare economics. PREREQ: ECON 512. CROSSLISTED as AREC 513.

**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, and the open economy macroeconomics. PREREQ: ECON 315 or equivalent.

**ECON 525. ECONOMETRIC METHODS (3).** 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. PREREQ: ECON 325 and ECON 512 or consent of instructor. CROSSLISTED as AREC 525.

**ECON 526. APPLIED ECONOMETRICS (3).** 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. PREREQ: ECON 525, CROSSLISTED as AREC 526.

**ECON 540. INTERNATIONAL TRADE AND POLICY (4).** Classical and new trade theories; analysis of tariffs, quotas, and other trade barriers. PREREQ: ECON 311.

**ECON 550. THE ECONOMICS OF GROWTH AND CHANGE (3).** Seminar on the causes and consequences of economic growth and change. Emphasis on the impact that international trade, economic systems, and investments in human capital and new technologies have on regional, national, and world economic growth and change, using evolutionary, institutional, and neo-classical approaches. PREREQ: ECON 312 and ECON 315 or equivalent.

**ECON 601. RESEARCH (1-16).** PREREQ: Departmental approval required.

**ECON 602. INDEPENDENT STUDY (1-16).** PREREQ: Departmental approval required.

**ECON 603. THESIS (1-16).** PREREQ: Departmental approval required.

**ECON 605. READING AND CONFERENCE (1-16).** PREREQ: Departmental approval required.

**ECON 606. PROJECTS (1-16).** PREREQ: Departmental approval required.

**ECON 607. SEMINAR (1-16).** PREREQ: Departmental approval required.

**ECON 611. ADVANCED MICROECONOMIC THEORY: PRODUCTION AND CONSUMPTION (3).** A rigorous development of the theory of production and consumption behavior, with emphasis on duality. PREREQ: ECON 513, MTH 254. CROSSLISTED as AREC 611.

**ECON 612. ADVANCED MICROECONOMIC THEORY: OUTPUT AND INPUT MARKETS (3).** Competitive, monopoly, and imperfectly competitive input and output market structures; game theory. PREREQ: ECON 611. CROSSLISTED as AREC 612.

**ECON 613. ADVANCED MICROECONOMIC THEORY: GENERAL EQUILIBRIUM AND (3).** WELFARE A rigorous treatment of general equilibrium and welfare theory; risk, uncertainty, and imperfect information; social choice theory. PREREQ: ECON 612. CROSSLISTED as AREC 613.

**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. PREREQ: ECON 515.

**ECON 617. RESEARCH METHODOLOGY (3).** Examination of what constitutes reliable knowledge in economics; philosophy of science and economic research; fundamental economic concepts affecting economic research; quantitative techniques and empirical investigation. PREREQ: Completion of one academic year of graduate work in economics or a related field. CROSSLISTED as AREC 617.

**ECON 625. ADVANCED ECONOMETRICS I (3).** Statistical foundations of econometrics; the general linear statistical model with autocorrelation and heteroscedasticity; maximum likelihood estimation; hypothesis testing; multicollinearity; errors in variables; asymptotic distribution theory. PREREQ: AREC 526, ST 521. CROSSLISTED as AREC 625.

**ECON 626. ADVANCED ECONOMETRICS II (3).** Systems of equations; seemingly unrelated regression models; identification and estimation of simultaneous equation models; time series analysis; distributed lag models; forecasting and model evaluation. PREREQ: ECON 625. CROSSLISTED as AREC 626.

**ECON 627. APPLIED MICRO-ECONOMETRICS (4).** Seminar on the use of advanced econometric techniques and the application of econometrics to microeconomic models for purposes of testing theory and evaluating policy. PREREQ: ECON 613 and ECON 626 or consent of instructor.

**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 mutilateral trade negotiations, international factor movements, economic integration, and international debt. Analysis of endogenous innovation and growth on world trade. PREREQ: ECON 513, ECON 526, and ECON 540.

**ECON 641. INTERNATIONAL FINANCE AND ECONOMIC GROWTH (4).** Theoretical and empirical analysis of international financial markets with emphasis on relationships between government policies and exchange rates; theories, policies and evidences of exchange rate regimes, exchange rate determination, exchange rate volatility, and market efficiency; effects of fiscal and monetary policies on international transactions and economic growth. PREREQ: ECON 515, ECON 526, and ECON 541 or consent of instructor.

**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. PREREQ: ECON 513, ECON 526, AND ECON 560 or consent of instructor.

**ECON 680. HUMAN CAPITAL AND ECONOMIC GROWTH (4).** Examination of determinants and effects of individual and social investment in education, training, and health. The course then looks at human capital's influence on the rate of economic growth and its role in both hindering and facilitating economic change. PREREQ: ECON 513, ECON 526, AND ECON 580 or consent of instructor.

**ECON 690. URBAN-REGIONAL ECONOMIC GROWTH (4).** Seminar on the uses of economic analysis to explain why cities exist; where cities develop and how they develop in a region; how cities grow and how public policy affects urban growth; how various activities are arranged within cities; and why the traditional monocentric city was replaced by the modern multicentric city. PREREQ: ECON 513 and ECON 526 or consent of instructor.

# ENGLISH

Robert Schwartz, Chair
238 Moreland Hall
Oregon State University
Corvallis, OR 97331-5302
(541) 737-3244

**Faculty**

*Professors* Anderson, Ede, Frank, Lewis, Oriard, Robinson, Schwartz; *Associate Professors* Ahearn, Campbell, Copek, Daniels, Daugherty, Glenn, Havazelet, Johnson, Kesler, Rice, Wess; *Assistant Professors* Barbour, Collins, Cornell, Davison, Helle, Sandor; *Instructors* Lawler, Leeson, Weller

**Undergraduate Major**

**English (B.A.)**

**Minors**

English
Writing

**Graduate Major**

**English (M.A.)**
**Scientific and Technical Communication (M.A., M.S.)**
**Language Arts Education (M.A.T.)**

The Department of English offers instruction in literature and writing to students in all disciplines who seek the cultural and intellectual values of the humanities and the broadening influence of humanistic studies. In addition, the department provides a program of courses for those interested in the English major or a minor in literature or writing, especially those who plan to teach English in the elementary or secondary schools, who plan to pursue graduate work in English, or both.

## MAJOR PROGRAM

Undergraduate English majors must satisfy university language requirements for the B.A. degree; complete:

a) two (2) of the following sequences: Survey of English Literature (ENG 204, ENG 205, ENG 206), Survey of American Literature (ENG 253, ENG 254, ENG 255), and Literature of Western Civilization (ENG 207, ENG 208, ENG 209);

b) one course in Shakespeare (ENG 201, ENG 202, ENG 203);

c) two methods courses (ENG 200 and ENG 345);

d) a total of 27 credits in upper-division courses in the department, including at least 9 credits in literature before 1800 and at least 9 credits in literature after 1800.

## 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 requires 27 credits of course work, of which at least 12 credits must be upper division. Some may be applied toward the University's general education requirements.

The minor in Writing requires a total of 27 credits to be taken as 9 credits from WR 199, WR 214, WR 222, WR 224, WR 241, WR 323, WR 324, WR 327, or WR 341; 9 credits from WR 406, WR 407, WR 411, WR 416, WR 420, WR 424, WR 441, WR 493, WR 495; and 9 credits from upper division literature or writing electives.

## Graduate Program

The Department offers a Master of Arts degree in English literature, with emphasis in English and American literatures, composition and rhetoric, cultural studies, and creative writing. Detailed information on the graduate faculty and program is available from the English Department.

The department offers Master of Science and Master of Arts degrees in Scientific and Technical Communication. (See Scientific and Technical Communication in the College of Liberal Arts section of this catalog.) The department also participates in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) degree program; see Graduate School.

## Language Arts Education

The Department of English, in cooperation with the Professional Teacher Education Program, offers a Master of Arts in Teaching leading to Oregon certification in language arts (grades 5-12). The program combines course work in education, field experience, and subject area course work on cultural and critical literacy. For complete program information on course work to be completed, the student should contact the adviser, Professor Anita Helle.

## Courses

### ■ LANGUAGE ARTS EDUCATION

#### Graduate Courses

**ENED 507. SEMINAR (1-3).** STUDENT TEACHING

**ENED 509. PRACTICUM IN LANGUAGE ARTS (1-16).** A structured experience for the in-service teacher to develop materials, techniques, and strategies for action research in the secondary classroom. PREREQ: Admission to M.A.T. program; teaching experience.

**ENED 510. PROFESSIONAL INTERNSHIP: ENGLISH EDUCATION (1-15).** Full- and part-time field experience which enables the intern to integrate subject area and pedagogical knowledge, as well as demonstrate specific teaching competencies through presentation of work samples and assessment by OSU supervisors. PREREQ: Admission to M.A.T. Program.

### ■ LITERATURE

#### Lower Division Courses

**ENG 104,ENG 105,ENG 106. *INTRODUCTION TO LITERATURE (3,3,3).** Study of the major genres of literature for greater understanding and enjoyment. ENG 104: Fiction. ENG 105: Drama. ENG 106: Poetry. Need not be taken in order. (Bacc Core Course) (H)

**ENG 110. *INTRODUCTION TO FILM STUDIES (3).** Introduction to the methods, criticism, and theory of cinema art. Two lectures and separate screenings each week. Film fee will be required. (Bacc Core Course) (H)

**ENG 125. *FILM COMEDY (3).** Film as comic art form and social document. Two lectures and separate screenings each week. Film fee will be required. (Bacc Core Course) (H)

**ENG 199. SPECIAL STUDIES (1-16).** PREREQ: 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,ENG 202,ENG 203. *SHAKESPEARE (3,3,3).** The major plays chronologically. Need not be taken in order. (Bacc Core Course) (H)

**ENG 204,ENG 205,ENG 206. *SURVEY OF ENGLISH LITERATURE (3,3,3).** English literature presented in chronological sequences. ENG 204: Beowulf to Milton. ENG 205: Milton to Coleridge. ENG 206: Byron to the present. Need not be taken in order. (Bacc Core Course) (H)

**ENG 207,ENG 208,ENG 209. *LITERATURE OF WESTERN CIVILIZATION (3,3,3).** The great plays, poems and fiction of western civilization. ENG 207: The Classic World: Greek, Hebrew, Roman, and Christian to St. Augustine. ENG 208: The Renaissance to the Age of Reason: Dante to Voltaire. ENG 209: The Romantic Revolt: Goethe to the present. Need not be taken in order. (Bacc Core Course) (H)

**ENG 210,ENG 211,ENG 212,ENG 213. *LITERATURES OF THE WORLD (3,3,3,3).** Representative works of poetry, prose, and drama from non-Western cultural traditions. ENG 210: Literature of Asia. ENG 211: Literature of Africa. ENG 212: Literature of Meso- and South America and the Caribbean. ENG 213: Literature of the Middle East. Need not be taken in order. Complete sequence not offered every year. (Bacc Core Course) (H)

**ENG 215. *CLASSICAL MYTHOLOGY (3).** Greek and Roman mythology, its allusions, continuing influences. Not offered every year. (Bacc Core Course) (H)

**ENG 220. *TOPICS IN DIFFERENCE, POWER, AND DISCRIMINATION (3).** A comparative treatment of literary topics in the context of institutional and systematic discrimination. (Bacc Core Course)

**ENG 221. *AFRICAN-AMERICAN LITERATURE (3).** 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. May be repeated up to four times. (Bacc Core Course)

**ENG 245. *THE NEW AMERICAN CINEMA (3).** 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. (Bacc Core Course)

**ENG 253,ENG 254,ENG 255. *SURVEY OF AMERICAN LITERATURE (3,3,3).** Readings from American literature presented in chronological sequence, with emphasis on major writers. ENG 253: Colonial to Romantic: Beginning through Emerson, Thoreau, Hawthorne and Melville. ENG 254: Romantic to 1914: Whitman through Dreiser and Wharton. ENG 255: World War I to the present. Need not be taken in order. (Bacc Core Course) (H)

**ENG 260. *LITERATURE OF AMERICAN MINORITIES (3).** Study of the literature of American minorities: North American Indian, Black, Chicano/Chicana, Asian, Middle Eastern, Gay and Lesbian. PREREQ: Sophomore standing. Not offered every year. (Bacc Core Course) (H)

**ENG 263. GREAT BOOKS (3).** Selected great books of the world. Not offered every year. (H)

**ENG 265. *FILMS FOR THE FUTURE (3).** 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. (Bacc Core Course) (H)

**ENG 275. *THE BIBLE AS LITERATURE (3).** Biblical structure, literary types, ideas, influences. Not offered every year. (Bacc Core Course) (H)

**ENG 280. SELECTED TOPICS IN LITERATURE & SOCIETY (3).** The study of literature in its social context. Topics change each term. Not offered every year.

**ENG 285. SELECTED TOPICS IN FILM STUDIES (3).** Thematic approach to film study. Topics change each term. Lectures and separate screenings each week. Film fee will be required. Not offered every year.

#### Upper Division Courses

**ENG 317,ENG 318,ENG 319. *THE AMERICAN NOVEL (3,3,3).** Chronological survey of the novel in America from the late 18th century to the present. ENG 317: Beginnings to Chopin. ENG 318: Modernist Period: Dreiser to Faulkner. ENG 319: Post-World War II: Mailer to the present. Need not be taken in order. (Bacc Core Course)

**ENG 320. AMERICAN DRAMA (3).** Selected American plays, concentrating on the twentieth century. Not offered every year. (H)

**ENG 345. METHODS AND MATERIALS OF LITERARY CRITICISM (3).** Critical analysis and evaluation of literary texts, based on the principles of literary judgment. PREREQ: Junior standing. Required for English majors. (H)

**ENG 360. *NATIVE AMERICAN LITERATURE (3).** An introduction to the prose and poetry written by Native Americans of the North American continent. (Bacc Core Course)(H)(NC)

**ENG 362. *WOMEN'S VOICES IN AMERICAN LITERATURE (3).** Study of the relation between women's literature and American culture: home, family, regionalism, progress and reform, personal experience. (Bacc Core Course) (H)

**ENG 374. *MODERN SHORT STORY (3).** Survey of the short story from the nineteenth century to the present. (Bacc Core Course) (H)

**ENG 401/ENG 501. RESEARCH (1-16).** PREREQ: Department approval required.

**ENG 402/ENG 502. INDEPENDENT STUDY (1-16).** PREREQ: Department approval required.

**ENG 403/ENG 503. THESIS (1-16).** PREREQ: Department approval required.

**ENG 405/ENG 505. READING AND CONFERENCE (1-16).** PREREQ: Department approval required.

**ENG 406/ENG 506. PROJECTS (1-16).** PREREQ: Department approval required.

**ENG 407/ENG 507. ^SEMINAR (1-16).** May be repeated as topics vary. PREREQ: Departmental approval. CROSSLISTED as AMS 407. (Writing Intensive Course)

**ENG 410. INTERNSHIP IN ENGLISH (1-16).** Provides upper-division English majors with supervised, on-the-job work experience, accompanying academic readings. PREREQ: Junior standing in English; 12 credits of literature; 6 credits of writing beyond WR 121. Departmental approval required. Graded P/N.

**ENG 411/ENG 511,ENG 412/ENG 512,ENG 413/ENG 513. DEVELOPMENT OF THE DRAMA (3,3,3).** Reading and analyzing plays. ENG 411: Classical (Greek and Roman). ENG 412: Renaissance and Neoclassical. ENG 413: Romantic and Modern. PREREQ: Sophomore standing; 9 credits of literature. Need not be taken in order. (H)

**ENG 414/ENG 514. *CRITICISM, CULTURE, AND WORLD COMMUNITY (3).** Reading and analysis of international critical theory and methods, with emphasis on postmodern literary and popular culture and its effects on communities. (Bacc Core Course)

**ENG 415/ENG 515. *INDUSTRIALISM AND THE ENGLISH NOVEL (3).** Studies in the development of the English novel within a context of changes in society brought on by first the industrial revolution and later the technological revolution. (Bacc Core Course)

**ENG 416/ENG 516. *POWER AND REPRESENTATION (3).** Critical analysis of works by colonized peoples, women, and ethnic minorities, with a focus on the issue of representation. (Bacc Core Course)

**ENG 417/ENG 517,ENG 418/ENG 518,ENG 419/ENG 519. THE ENGLISH NOVEL (3,3,3).** Selected English novels from Defoe to present. ENG 417: Defoe through Scott. ENG 418: The Victorian novel. ENG 419: Twentieth Century. PREREQ: Sophomore standing; 6 credits in English at level 200 or above. Complete sequence not offered every year. Need not be taken in order. (H)

**ENG 420/ENG 520. *STUDIES IN DIFFERENCE, POWER, AND DISCRIMINATION (3).** Comparative studies in literature documenting or illuminating institutional and systematic discrimination. (Bacc Core Course)

**ENG 424/ENG 524. EARLY ROMANTIC LITERATURE (3).** Romantic-period writings, with emphasis on Blake, Coleridge, and Wordsworth. (H)

**ENG 425/ENG 525. MEDIEVAL ENGLISH LITERATURE (3).** Chiefly the study of late 14th century poetry in Middle English. Usually the focus is on the Gawain poet and on Chaucer's early works, but earlier or later medieval writers (such as Boethius, the Beowulf poet, or Malory) may be included.

**ENG 426/ENG 526. THE AGE OF CHAUCER (3).** Study of Chaucer's major works, especially of the Canterbury Tales, in their historical, cultural, and poetic context. (H)

**ENG 428/ENG 528. LITERATURE OF THE EARLY RENAISSANCE (3).** Literature of the 16th century from early writers of poetry, prose and drama such as Skelton, More, Wyatt, and Surrey. (H)

**ENG 429/ENG 529. LITERATURE OF THE ELIZABETHAN AGE (3).** Literature of the late 16th and early 17th centuries from writers such as Sidney, Marlowe, and Spenser (excluding Shakespeare). (H)

**ENG 430/ENG 530. METAPHYSICAL AND CAVALIER POETS (3).** Major poetry of Donne and Jonson, and such followers as Herbert, Marvell, Herrick, and Lovelace. (H)

**ENG 431/ENG 531. ^JOHN MILTON (3).** Major poetry of John Milton, with special attention to Paradise Lost. Not offered every year. (H) (Writing Intensive Course)

**ENG 432/ENG 532. RESTORATION AND AUGUSTAN LITERATURE (3).** Selected writings of Dryden, Pope, Swift, and their contemporaries. Not offered every year. (H)

**ENG 433/ENG 533. THE AGE OF JOHNSON (3).** Selected writings of Samuel Johnson and his contemporaries. Not offered every year. (H)

**ENG 434/ENG 534. LATER ROMANTIC LITERATURE (3).** Romantic-period writing, with emphasis on Keats, Byron, and Shelley. Not offered every year. (H)

**ENG 436/ENG 536. THE AGE OF DICKENS (3).** Fiction, poetry, and nonfiction prose of such writers as Dickens, Bronte, Carlyle, and Tennyson. Not offered every year. (H)

**ENG 437/ENG 537. THE AGE OF REALISM AND SYMBOLISM (3).** Writings of such authors as G. Eliot, Hardy, Swinburne, and Wilde. Not offered every year. (H)

**ENG 438/ENG 538. THE MODERNIST MOVEMENT IN LITERATURE (3).** English, Irish, and American literature from the turn of the century to World War I, including Conrad, James, Joyce, and Yeats. Not offered every year. (H)

**ENG 439/ENG 539. (3).** English and American writers from World War I to the present, including Waugh, Hemingway, T.S. Eliot, Lawrence, and Fitzgerald. Not offered every year. (H)

**ENG 440/ENG 540,ENG 442/ENG 542. LITERATURE OF THE IRISH RENAISSANCE (3,3).** ENG 440: James Joyce. ENG 442: Yeats and Irish drama. Need not be taken in order. Not offered every year. (H)

**ENG 454/ENG 554. MAJOR AUTHORS (3).** Advanced study of major English and/or American authors. Subjects change from term to term; see Schedule of Classes. May be repeated for a maximum of 9 credits. Not offered every year. (H)

**ENG 455/555. CONTINENTAL EUROPEAN LITERATURE (3).** Major continental European works in translation. ENG 455: 19th Century. ENG 456: 20th Century. Need not be taken in order. Not offered every year.

**ENG 456. CONTINENTAL EUROPEAN LITERATURE (3).** Major continental European works in translation. ENG 455: 19th Century. ENG 456: 20th Century. Need not be taken in order. Not offered every year.

**ENG 457/ENG 557,ENG 458/ENG 558. COMPARATIVE LITERATURE: COLONIALISM/POSTCOLONIALISM (3,3).** ENG 457/ENG 557: Major works from Europe and the non-Western world during the colonial era: 1800-1945. ENG 458/ENG 558: Major works from Europe and the Non-Western world in the postcolonial period: WWII to the present. Need not be taken in order. Not offered every year. (H)

**ENG 488/ENG 588. LITERATURE FOR TEACHERS (3).** A review of approaches to literature for students who plan to teach English. Critical reading and analysis of literature appropriate for secondary schools.

**ENG 490/ENG 590. DEVELOPMENT OF THE ENGLISH LANGUAGE (3).** A historical study of the English language from Anglo-Saxon times to the present. (H)

**ENG 491/ENG 591. THE STRUCTURE OF ENGLISH (3).** New analytic and descriptive methods applied to English grammar. PREREQ: Senior standing. (H)

**ENG 495/ENG 595. LANGUAGE, TECHNOLOGY, AND CULTURE (3).** Explores relationship between literacy, technology, and thought.

**ENG 497/ENG 597. *INTERNATIONAL WOMEN'S VOICES (3).** 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. (Bacc Core Course)

**ENG 498/ENG 598. WOMEN AND LITERATURE (3).** 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. (H)

### Graduate Courses

**ENG 556. CONTINENTAL EUROPEAN LITERATURE (3).** (See ENG 456 for description.)

### Upper Division Courses

**ENG 435/ENG 535. STUDIES IN SHAKESPEARE (3).** Shakespeare's works from a variety of critical and scholarly perspectives. May be repeated for a maximum of 9 credits. PREREQ: At least one quarter of Shakespeare. Not offered every term.

**ENG 445/ENG 545. ^STUDIES IN NONFICTION (3).** Particular essayists and journalists, movements, problems, conventions, and types of nonfiction writing in English. Topics change from term to term: see Schedule of Classes. May be repeated for a maximum of 9 credits. Not offered every year. (Writing Intensive Course)

**ENG 450/ENG 550. STUDIES IN SHORT FICTION (3).** Particular writers, movements, and types of short fiction. Topics change from term to term: see Schedule of Classes. May be repeated for a maximum of 9 credits. Not offered every year.

**ENG 452/ENG 552. ^STUDIES IN FILM (3).** 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. A film fee will be required. May be repeated for a maximum of 9 credits. Not offered every year. (Writing Intensive Course)

**ENG 460/ENG 560. STUDIES IN DRAMA (3).** Particular dramatists, movements, conventions, and types of world drama. Topics change from term to term; see Schedule of Classes. May be repeated for a maximum of 9 credits. Not offered every term.

**ENG 465/ENG 565. STUDIES IN THE NOVEL (3).** Particular novelists, movements, conventions, and types of the novel throughout its history. Topics change from term to term; see Schedule of Classes. May be repeated for a maximum of 9 credits. Not offered every term.

**ENG 470/ENG 570. ^STUDIES IN POETRY (3).** Particular poets, movements, problems, conventions, and types of poetry in English or English translation. Topics change from term to term; see Schedule of Classes. May be repeated for a maximum of 9 credits. Not offered every term. (Writing Intensive Course)

**ENG 475/ENG 575. STUDIES IN CRITICISM (3).** Particular critics, critical movements, issues, and histories of criticism. Topics change from term to term; see Schedule of Classes. May be repeated for a maximum of 9 credits. Not offered every year.

**ENG 480/ENG 580. ^STUDIES IN LITERATURE, CULTURE & SOCIETY (3,3).** Study of literature in its relationship to society and culture; study of literary culture. Topics change from term to term; see Schedule of Classes. May be repeated for a maximum of 9 credits. Not offered every term. (Writing Intensive Course)

**ENG 485/ENG 585. STUDIES IN AMERICAN LITERATURE (3).** Special topics in American literary history. Organized around movements, regions, themes, or major authors. Topics change from term to term; see Schedule of Classes. May be repeated for a maximum of 9 credits. Not offered every term.

**ENG 486/ENG 586. STUDIES IN BRITISH LITERATURE (3).** Particular British writers, movements, conventions, genres, and problems. Topics change from term to term; see Schedule of Classes. May be repeated for a maximum of 9 credits. Not offered every year.

## ■ WRITING

### Graduate Courses

**WR 527. ADVANCED TECHNICAL WRITING (3).** Advanced strategies of technical communication. PREREQ: Graduate standing. May be repeated to form a 9-credit sequence. CROSSLISTED as STC 527.

### Lower Division 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. May be repeated for credit 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. PREREQ: Students scoring below 36 on the Test of Standard Written English are strongly advised to take WR 115 before enrolling in WR 121. Consult English Department for further information. Required of all students. (Bacc Core Course)

**WR 199. SPECIAL STUDIES (1-16).** PREREQ: Departmental approval required.

**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. PREREQ: WR 121. (Bacc Core Course)

**WR 222. *ENGLISH COMPOSITION (3).** Continued practice in expository writing with an emphasis on argumentation and research. PREREQ: WR 121. (Bacc Core Course)

**WR 224. *INTRODUCTION TO FICTION WRITING (3).** Discussion workshop. Student work examined in context of contemporary published work. PREREQ: WR 121. (Bacc Core Course) (FA)

**WR 241. *INTRODUCTION TO POETRY WRITING (3).** Discussion workshop. Rudiments of mechanics and some background in development of modern poetry. PREREQ: WR 121. (Bacc Core Course) (FA)

**Upper Division Courses**

**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. PREREQ: WR 121. (Bacc Core Course)

**WR 324. *SHORT STORY WRITING (3).** Study and writing of the short story. PREREQ: WR 224 or consent. May be repeated to form a 9-credit sequence. (Bacc Core Course) (FA)

**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. PREREQ: WR 121. (Bacc Core Course)

**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. PREREQ: WR 121. (Bacc Core Course)

**WR 341. *POETRY WRITING (3).** Study and writing of verse. PREREQ: WR 241 or consent. (Bacc Core Course)

**WR 401/WR 501. RESEARCH (1-16).** PREREQ: Departmental approval required.

**WR 402/WR 502. INDEPENDENT STUDY (1-16).** PREREQ: Departmental approval required.

**WR 403/WR 503. THESIS (1-16).** PREREQ: Departmental approval required.

**WR 404/WR 504. WRITING AND CONFERENCE (1-16).** PREREQ: Departmental approval required.

**WR 405/WR 505. READING AND CONFERENCE (1-16).** PREREQ: Departmental approval required.

**WR 406/WR 506. PROJECTS (1-16).** PREREQ: Departmental approval required.

**WR 407/WR 507. SEMINAR (TBA) (1-16).** PREREQ: Departmental approval required.

**WR 408/WR 508. WORKSHOP (TBA) (1-16).** PREREQ: Departmental approval required.

**WR 411/WR 511. ^WRITING FOR TEACHERS (3).** Advanced composition in the context of current rhetoric and composition theory. For students expecting to teach English. PREREQ: Upper-division standing. (Writing Intensive Course)

**WR 414/WR 514. ADVERTISING AND PUBLIC RELATIONS WRITING (3).** Writing news releases, annual reports, brochures, newsletters, and other PR materials. Writing advertising copy. PREREQ: WR 214, upper division standing.

**WR 416/WR 516. ADVANCED COMPOSITION (3).** The development of style and voice in both the personal and the academic essay. PREREQ: upper-division standing. May be repeated to form a 9-credit sequence.

**WR 420/WR 520. STUDIES IN WRITING (3).** Selected topics in rhetoric and composition. PREREQ: upper-division standing. May be repeated to form a 9-credit sequence.

**WR 424/WR 524. ADVANCED FICTION WRITING (3).** Advanced fiction workshop with an emphasis on developing longer pieces. PREREQ: Six credits WR 324 or consent. May be repeated to form a 9-credit sequence.

**WR 441/WR 541. ADVANCED POETRY WRITING (3).** Advanced poetry workshop. PREREQ: WR 341 or consent. May be repeated to form a 9-credit sequence. (FA)

**WR 448/WR 548. MAGAZINE ARTICLE WRITING (3).** Writing the magazine article. Analyzing markets and writing query and cover letters, marketing manuscripts to magazines. Interviewing and researching. PREREQ: Upper- division standing.

**WR 449/WR 549. CRITICAL REVIEWING (3).** Writing critical reviews of books, television programs, movies, plays, and restaurants for newspapers and magazines. The role of criticism in popular culture. PREREQ: Upper- division standing.

**WR 462/WR 562. SCIENCE WRITING (3).** Reporting and writing about science and technology. Interviewing scientists and interpreting scientific information. PREREQ: Upper division standing. May be repeated to form a 9-credit sequence. CROSSLISTED as STC 562.

**WR 493/WR 593. ^THE RHETORICAL TRADITION AND THE TEACHING OF WRITING (3).** Major past and contemporary theories of written communication, their historical context, and their impact on writing and the teaching of writing. PREREQ: upper-division standing. (Writing Intensive Course)

**WR 495/WR 595. ^LITERATURE, COMPOSITION, AND LITERACY (3).** Historical, theoretical, and practical relationships between literature and composition; literacy as an idea, problem, issue. PREREQ: upper-division standing. (Writing Intensive Course)

**Graduate Courses**

**WR 512. CURRENT COMPOSITION THEORY (3).** Current rhetoric and composition theory and its applications for teachers and writers.

**WR 517. TEACHING PRACTICUM: ENGLISH COMPOSITION (1).** Required practicum for graduate students teaching English Composition.

**WR 518. TEACHING PRACTICUM: WRITING IN BUSINESS (1).** Required practicum for graduate students teaching Writing in Business.

**WR 519. TEACHING PRACTICUM: TECHNICAL WRITING (1).** Required practicum for graduate students teaching Technical Writing.

**WR 521. TEACHING PRACTICUM: FICTION WRITING (1).** Required practicum for graduate students teaching introduction to fiction writing.

## ETHNIC STUDIES

Erlinda Gonzales-Berry, Chair
230 Strand Agriculture Hall
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**Faculty**

*Professor* Gonzales-Berry
*Assistant Professors* Peters, Sakurai

### Undergraduate Major

**Ethnic Studies (B.A., B.S.)**

### Minor

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 underrepresented 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 understanding of ethnicity and cultural diversity.

Ethnic Studies majors and minors must satisfy all University Baccalaureate Core and College of Liberal Arts requirements for the BA or BS degree.

**MAJOR REQUIREMENTS**

In addition to an Ethnic Studies core of issue-based courses which examine the intersections of race, class and gender and their relation to the construction of ethnicity, two areas of emphasis on specific ethnic groups and a community internship are required.

Students work closely with a departmental advisor to determine a program of studies that best meets their needs.

A grade point average of 2.0 is required and majors must earn a grade of C- in all major courses.

Individualized research and study is limited to 3 credits.

**ETHNIC STUDIES CORE (21)**

ES 101. Introduction to Ethnic Studies (3)
ES 201. Inventing Ethnic America (3)
One 400-level Ethnic Studies Core WIC Seminar (3)
ES 410. Internship (12)

**EMPHASIS (30)**

Select two sequences from the following:
ES 211, 212, 213: Chicano-a/Latino-a Studies (3, 3, 3)
ES 221, 222, 223: African American Studies (3, 3, 3)
ES 231, 232, 233: Asian American Studies (3, 3, 3)
12 credits of upper division electives in an area of emphasis to be approved by the major advisor.

*(some courses may be taken from a list of non-departmental offerings, subject to departmental approval).*

**TOTAL REQUIRED CREDITS (51)**

### MINOR REQUIREMENTS

Students will work closely with a departmental advisor to determine a program of studies that best meets their needs.

A grade point average of 2.0 and a grade of C- in all minor course work are required.

Individualized research or study is limited to 3 credits.

ES 101. Introduction to Ethnic Studies (3)
ES 201. Inventing Ethnic America (3)

One sequence from the areas of emphasis (9 credits total):
ES 211, 212, 213: Chicano-a/Latino-a Studies (3, 3, 3)
ES 221, 222, 223: African American Studies (3, 3, 3)
ES 231, 232, 233: Asian American Studies (3, 3, 3)
ES 241, 242, 243: Native American/Alaskan Native Studies (3, 3, 3)

One 400-level Ethnic Studies Core Seminar (3)
ES 410. Internship (3)

6 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 non-departmental offerings, subject to departmental approval)

Total Required Credits (27)

**Lower Division 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.

**ES 199. SPECIAL TOPICS (1-16).**

**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 211. SURVEY OF CHICANO/LATINO AMERICAN STUDIES (3).** Term I: Precolumbian culture and society. A review of the cultures, art and intellectual achievements of societies in Mesoamerica prior to the arrival of the Spanish.

**ES 212. SURVEY OF CHICANO/A-LATINO/A STUDIES II (3).** An interdisciplinary survey of the Chicano/a experience, 1940-1980. Topics include urban culture; grassroots movements, middle-class reform; class, gender and labor issues; education; and cultural production as resistance.

**ES 213. CONTEMPORARY LATINO/A CULTURE AND ISSUES (3).** A compartive interdisciplinary treatment of contemporary Latino/a cultures and current issues affecting their status in the United States.

**ES 221. SURVEY OF AFRICAN AMERICAN STUDIES (3).** Term I: The transition from Africa to the A study of the history and economics of the slave trade, and the advent of African culture to the Americas.

**ES 231. *ASIAN AMERICAN STUDIES I: FIRST AND SECOND GENERATIONS (3).** Examination of the experiences of the first-and second-generation Asian Americans through personal narratives, historical texts, videos, and creative writings. Material will cover a wide historical period, from the mid-1800s to present.

**ES 232. THE ASIAN AMERICAN MOVEMENT 1968-1980 (3).** Examination of the Asian American movement of the late 1960s and 1970s.

**ES 233. ASIAN AMERICAN STUDIES (3).** Contemporary Cultures and Issues in Asian America. A study of the current situations faced by Asian Americans in the 1990's as well as contemporary creative works.

**ES 234. INTRODUCTION TO ASIAN AMERICAN LITERATURE (3).** A study of various Asian American literary texts with particular attention to themes involving place and displacement.

**ES 241. SURVEY OF AMERICAN INDIAN/ALASKAN NATIVE STUDIES (3).** Term I: An ethnohistorical analysis of America's original inhabitants and their culture diversity (Bacc Core Course).

**ES 242. SURVEY OF AMERICAN INDIAN/ALASKAN NATIVE STUDIES (3).** An ethnohistorical analysis of America's original inhabitants and their cultural diversity, from 1778 to 1871.

**ES 243. SURVEY OF AMERICAN INDIAN/ALASKAN NATIVES (3).** Comprehensive examination of Native American experience in the United States from 1871 to present.

**ES 299. SPECIAL TOPICS (1-16).**

**Upper Division Courses**

**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. CROSSLISTED: ENG 314.

**ES 331. JAPANESE AMERICANS AND WORLD WAR II (3).** A study of the literature and scholarship involving the internment and various experiences of Japanese Americans during and soon after World War II.

**ES 344. NATIVE AMERICANS IN THE MEDIA (3).** Analysis and understanding of the complex portrayals of Native Americans in the United States media, from early contact stereotypes to contemporary representatives.

**ES 345. NATIVE AMERICANS IN OREGON (3).** Analysis and understanding of the complex experiences of Native Americans in the present state of Oregon, from early contract with those of other ethnicities to contemporary demographic contexts.

**ES 399. SPECIAL TOPICS (1-16).**

**ES 401. RESEARCH (1-16).**

**ES 402. INDEPENDENT STUDY (1-16).**

**ES 405. READING AND CONFERENCE (1-16).**

**ES 406. PROJECTS (1-16).**

**ES 407. SEMINAR (1-16).**

**ES 409. PRACTICUM (1-16).**

**ES 410. WORK EXPERIENCE/INTERNSHIP (1-16).**

**ES 431/ES 531. TOPICS IN ASIAN AMERICAN STUDIES (3).** Race, Gender, and Sexuality in Asian American Studies. A study of various critical and theoretical approaches to issues of race, gender, and sexuality along with class and nationality in Asian American Studies.

**ES 444. NATIVE AMERICAN LAW: TRIBES, TREATIES, AND THE UNITED STATES (3).** Examination of the parameters of Native treaty relationships with the federal and state governments, and considers the future of these agreements.

**ES 455. ETHNIC RELATIONS IN THE UNITED STATES; CONTEMPORARY ISSUES (3).** Examples of issues critical to ethnic relations in the contemporary United States are researched, presented and analyzed. Diverse sunject areas are discussed and debated including, but not limited to, cultural stereotypes, immigration legislation, challenges of adapting in a new societal structure, and affirmative action movements.

**ES 499. SPECIAL TOPICS (1-16).**

## FOREIGN LANGUAGES AND LITERATURES

Joseph Krause, Chair
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Oregon State University
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(541) 737-2146

**Faculty**

*Professors* Carroll; *Associate Professors* Dilson, Farber, Garcia, Kiekel, King, Krause, Stehr, Wood, Yu; *Assistant Professor* Trujillo; *Senior Instructors* Hart, McCullough, Nakajima, Samuel

### Undergraduate Majors

**French (B.A.)**
**German (B.A.)**
**Spanish (B.A.)**

### Minors

Chinese
French
German
Japanese
Russian
Spanish

The Department of Foreign Languages & Literatures offers major programs leading to the B.A. degree in French, German, and Spanish and minor programs in Chinese, French, German, Japanese, Russian, and Spanish for undergraduate students with majors in other disciplines. The major and minor programs provide students with the opportunity to develop basic 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 banking, tourism, fashion, 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.

The department cooperates with other institutions of the State System of Higher Education 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-Wurttemberg and Cologne, West Germany; Szeged, Hungary; Tokyo, Japan; Seoul, Korea; and Puebla, Mexico. Students may also study at different institutions in Russia and in former Soviet Republics. See International Education and Foreign Study Programs.

## DEPARTMENTAL REQUIREMENTS

Lower division courses are prerequisite to the major and minor programs. Students with previous training or experience in the language are advised to take the departmental placement examination (Chinese, French, German, Japanese, Russian, or Spanish) and see an adviser in order to determine where to start their language study at the University.

To be admitted to a major or minor program in the department, a student must have attained appropriate proficiency (as defined by the language section faculty).

Foreign language majors may fulfill the CLA requirement for the B.A. degree by successfully completing a) a second-year sequence in a second foreign language; b) another 9 hours of upper division courses in their own major; c) one year of another language, plus 9 hours of approved upper division courses; d) take 18 hours of courses relating to a linguistic culture outside of their major.

Prior to graduation with a language major, students must participate or have participated in an approved study program or in an approved work experience in a country where the language is spoken, or must fulfill this requirement as the language section faculty prescribes.

## LIBERAL STUDIES

The B.A. in Liberal Studies offers area studies that allow students to use language and culture courses taaken in the Foreign Language Department 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, Hispanic Studies, Japanese Studies.

A minimum of 45 credits of course work in each concentration area is required to complete the Liberal Studies degree (see the Liberal Studies section of this catalog for details).

## CERTIFICATE PROGRAMS

The Foreign Language Department participates in the Latin American Affairs and Russian Studies Certificate programs. These interdisciplinary programs are designed for students who wish to combine their departmental major with a broad knowledge of Latin American or Russian affairs, past and present. Core courses are typically taken in language, in the humanities and social sciences (see the College of Liberal Arts section of this catalog for details).

## GRADUATE PROGRAMS

### Master of Arts in Teaching

(French, German, Spanish)

In conjunction with the Professional Teacher Education Program the Department of Foreign Languages and Literatures offers a Master of Arts in Teaching (MAT) degree which 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 coursework in the target language. To be admitted to the program students must demonstrate advanced proficiency in French, German or Spanish (as defined by the Department of Foreign Languages and Literatures). For complete program details students should contact the department's MAT Graduate Advisor or the School of Education.

(Bilingual Education/ESOL)

The Department of Foreign Languages and Literatures 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 coursework in education and achieve a proficiency level in a target foreign language as defined by the department. For complete program details students should contact the department's MAT Graduate Advisor or the School of Education.

### Master of Arts in Interdisciplinary Studies

French, German, and Spanish are recognized areas in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) Program. 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 M.A.I.S. students must meet the Graduate School's general entrance requirements and obtain the consent of a graduate faculty of the Foreign Language Department who agrees to serve as the field adviser.

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.

## B.A. DEGREE PROGRAMS

The minimum upper division course requirements in each major are as follows. Additional requirements are available from departmental advisers and the departmental office.

### French (45)

FR 311, FR 312, FR 313. Third-Year French (9)
FR 340. Intro to French Literary Studies (3)
FR 331, FR 332, FR 333. French Culture[7] (9)
FR 351. Pronunciation & Phonetics (3)
FR 411. Fourth-Year French[7] (3)
Upper division French electives, to be approved by the major adviser and to include a minimum of 6 credits at the 400 level (18)

### German (45)

GER 331, GER 332. German Culture (6)
GER 341, GER 342, GER 343. Survey of German Literature (9)
Upper division electives in German and related fields, to be approved by the major adviser and to include a minimum of 9 credits in German courses at the 400 level (30)

### Spanish (45)

SPAN 331, SPAN 332, SPAN 333. The Culture of Spain[8] (9) and/or
SPAN 336, SPAN 337, SPAN 338. Latin American Culture[8] (9)
SPAN 350. Phonetics and Pronunciation (3)
SPAN 351. Hispanic Linguistics[8] (3)
Upper division Spanish electives, to be approved by the major adviser and to include a minimum of 9 credits at the 400 level (30)

## MINOR PROGRAMS

### Chinese (30)

CHN 211, CHN 212, CHN 213. Second-Year Chinese (12)
CHN 311, CHN 312, CHN 313. Third-Year Chinese (9)
CHN 333. Modern Chinese Culture (3)
Upper division Chinese electives, to be approved by the minor adviser (6)

### French (30)

FR 211, FR 212, FR 213. Second-Year French (12)
FR 311, FR 312, FR 313. Third-Year French (9)
FR 333. French Culture (3)
Upper division French electives, to be approved by the minor adviser (6)

### German (30)

GER 211, GER 212, GER 213. Second-Year German (12)
Nine credits from GER 311, GER 312, GER 313, GER 317, GER 318 (9)
Nine credits from GER 331, GER 332, GER 341, GER 342, GER 343 (9)

### Japanese (30)

JPN 211, JPN 212, JPN 213. Second-Year Japanese (12)
JPN 311, JPN 312, JPN 313. Third-Year Japanese (9)
JPN 333. Modern Japanese Culture (3)
Upper division Japanese electives, to be approved by the minor adviser (6)

### Russian (30)

RUS 211, RUS 212, RUS 213. Second-Year Russian (12)
RUS 311, RUS 312, RUS 313. Third-Year Russian (9)
RUS 233. Modern Russian Culture (3)
Upper division Russian electives, to be approved by the minor adviser (6)

### Spanish (30)

SPAN 211, SPAN 212, SPAN 213. Second-Year Spanish (12)
SPAN 311. Third-Year Spanish (3)
SPAN 317. Directed Reading in Spanish (3)
SPAN 331, SPAN 332, SPAN 333. The Culture of Spain (6) and/or
SPAN 336, SPAN 337, SPAN 338. Latin American Culture (6)
Upper division Spanish electives, to be approved by the minor adviser (6)

## COURSES

### ■ CHINESE

#### Lower Division Courses

**CHN 111,CHN 112,CHN 113. FIRST-YEAR CHINESE (4,4,4).** 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. Must be taken in order. Lec/Rec.

**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.

**CHN 211,CHN 212,CHN 213. SECOND-YEAR CHINESE (4,4,4).** 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 B.A. requirement in foreign languages. PREREQ: CHN 113 or placement. Must be taken in order. Lec/Rec.

**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.

#### Upper Division Courses

**CHN 311,CHN 312,CHN 313. THIRD-YEAR CHINESE (3,3,3).** Study of more complicated grammatical patterns, writing of compositions, extensive practice in speaking, some reading of Chinese materials. PREREQ: CHN 213 or placement, and departmental authorization. Must be taken in order. May not be offered every year. Lec/Rec.

**CHN 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. (H)

**CHN 331,CHN 332,CHN 333. *CHINESE CULTURE (3,3,3).** Introduction to basic features of Chinese culture from ancient times to the present. CHN 331: The Classical and Medieval Periods—17th Century BC to 14th Century AD; CHN 332: The late Imperial Period—15th Century to early 20th Century; CHN 333: 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. PREREQ: Sophomore standing. Need not be taken in order. May not be offered every year. (Bacc Core Course)

**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. PREREQ: Completion of third-year Chinese with a minimum 3.0 GPA in that sequence and prior authorization from supervisor. Grade P/N.

**CHN 402/CHN 502. INDEPENDENT STUDY (1-16).** PREREQ: Departmental approval required.

**CHN 405/CHN 505. READING AND CONFERENCE (1-16).** PREREQ: Department approval required.

**CHN 410. INTERNSHIP (15).**

**CHN 411,CHN 412,CHN 413. FOURTH-YEAR CHINESE (NEWSPAPER CHINESE) (3,3,3).** 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. PREREQ: CHN 313, or placement and departmental approval required. Must be taken in order. Not offered every year.

### ■ FRENCH

#### Lower Division Courses

**FR 111,FR 112,FR 113. FIRST-YEAR FRENCH (4,4,4).** 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. Must be taken in order. Lec/Rec. COREQ: FR 199 strongly recommended.

**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.

**FR 211,FR 212,FR 213. SECOND-YEAR FRENCH (4,4,4).** Continued development of basic language skills, pronunciation, and vocabulary acquisition; introduction to extensive reading. Completion of FR 213 with grade of C- or better satisfies B.A. requirement in foreign languages. Native and/or bilingual speakers of French may not receive credit for FR 211, FR 212, FR 213. Must be taken in order. PREREQ: FR 113 or placement. COREQ: FR 299 strongly recommended. Lec/rec.

**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. See *Schedule of Classes* for current offerings and prerequisites.

#### Upper Division Courses

**FR 311,FR 312,FR 313. THIRD-YEAR FRENCH (3,3,3).** 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. PREREQ: FR 213 and departmental authorization. Must be taken in order.

**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. PREREQ: FR 213 or placement.

**FR 319. SELECTED TOPICS IN FRENCH LANGUAGE (3).** Skill-orientation variable. Conducted in French. Elective. Not offered every year. May be repeated for credit when topic varies. See *Schedule of Classes* for current topics and prerequisites.

**FR 329. TOPICS IN FRANCOPHONE LITERATURE AND/OR CULTURE IN ENGLISH (3).** Conducted in English. PREREQ: sophomore standing. Not offered every year. May be repeated for credit when topic varies. See *Schedule of Classes* for current topics and prerequisites.

**FR 331,FR 332,FR 333. *FRENCH CULTURE AND SOCIETY SINCE THE REVOLUTION (3,3,3).** Cultural life of the French people from Napoleon to the present. Conducted in French. PREREQ: Completion of 3 credits of 300-level French or placement for FR 331, FR 332; completion of 6 credits of 300-level French or placement for FR 333. Need not be taken in order. (Bacc Core Course) (H).

**FR 339. FRENCH: FRANCOPHONE STUDIES (3).** Elective; not offered every year. May be repeated for credit when topic varies.

**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. Must be completed prior to FR 341,FR 342,FR 343. PREREQ: FR 213 or placement. (H)

**FR 349. SELECTED TOPICS IN FRANCOPHONE LITERATURE (3).** Literary works, themes, movements, or authors from French-speaking areas of the world. Conducted in French. Not offered every year. May be repeated for credit when topic varies. See *Schedule of Classes* for current topics and prerequisites.

**FR 351. FRENCH PRONUNCIATION AND PHONETICS (3).** Intensive study of French pronunciation and diction. Close phonetic analysis of French sounds, intonation, and tone patterns. In-class drills. PREREQ: FR 213 or placement.

**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. PREREQ: 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. Graded P/N.

**FR 401/FR 501. RESEARCH (1-16).** PREREQ: Departmental approval required.

**FR 402/FR 502. INDEPENDENT STUDY (1-16).** PREREQ: Department approval required.

**FR 403/FR 503. THESIS (1-16).** PREREQ: Department approval required.

**FR 405/FR 505. READING AND CONFERENCE (1-16).** PREREQ: Department approval required.

**FR 407/FR 507. SEMINAR (1-16).** PREREQ: Department approval required.

**FR 410. INTERNSHIP (15).**

**FR 411/FR 511,FR 412/FR 512,FR 413/FR 513. FOURTH-YEAR FRENCH (3,3,3).** 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. PREREQ: FR 313 and departmental authorization.

**FR 419/FR 519. SELECTED TOPICS IN FRENCH LANGUAGE (3).** Skill-orientation variable. Conducted in French. Not offered every year. May be repeated for credit when topic varies. See *Schedule of Classes* for current topics and prerequisites.

**FR 439/FR 539. ^FRENCH: FRANCOPHONE STUDIES (3).** Variable topics in language, culture, or literature. May be repeated for credit when topic varies. Conducted in French. Not offered every year. See *Schedule of Classes* for current topics and prerequisites. (Writing Intensive Course)

**FR 449/FR 549. SELECTED TOPICS IN FRANCOPHONE LITERATURE (3).** Conducted in French. Not offered every year. May be repeated for credit when topic varies. See *Schedule of Classes* for current topics and prerequisites.

**FR 451/FR 551. FRENCH PRONUNCIATION AND PHONETICS (3).** Continued intensive study of French pronunciation and diction, including units on speech levels (poetry, song, and formal presentations) and accents of France and the francophone world. In-class drills. PREREQ: FR 351. May not be offered every year.

### ■ GERMAN

#### Lower Division Courses

**GER 111,GER 112,GER 113. FIRST-YEAR GERMAN (4,4,4).** 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. Must be taken in order.

**GER 117,GER 118,GER 119. FIRST-YEAR GERMAN CONVERSATION (2,2,2).** Pronunciation drills, practice in listening comprehension and speaking in small groups with tutors. Concurrent enrollment in GER 111,GER 112,GER 113 strongly recommended. May not be taken in place of GER 111,GER 112,GER 113 to fulfill language requirements. For first-year German students only.

**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.

**GER 211,GER 212,GER 213. SECOND-YEAR GERMAN (4,4,4).** 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 B.A. requirement in foreign languages. Native or bilingual speakers of German will not receive credit for GER 211,GER 212, or GER 213. PREREQ: GER 113 or placement. Must be taken in order.

**GER 217,GER 218,GER 219. SECOND-YEAR GERMAN CONVERSATION (2,2,2).** Pronunciation drills, practice in listening comprehension and speaking in small groups with tutors. Concurrent enrollment in GER 211,GER 212,GER 213 strongly recommended. May not be taken in place of GER 211,GER 212,GER 213 to fulfill language requirements. For students at second-year level only. PREREQ: One year of college German. Need not be taken in order.

**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.

### Upper Division Courses

**GER 311,GER 312,GER 313. THIRD-YEAR GERMAN (3,3,3).** Focus on development of German writing, speaking, and listening skills. Conducted in German. Both courses required of German majors and minors. PREREQ: GER 213 and departmental authorization. Must be taken in order.

**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. Not offered every year. Lec/rec.

**GER 329. SELECTED TOPICS IN LITERATURE AND/OR CULTURE (3).** Taught in English. May be repeated for credit when topic varies. See *Schedule of Classes* for current offerings. PREREQ: Sophomore standing. Not offered every year.

**GER 331/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. PREREQ: GER 213. (Bacc Core Course)

**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. PREREQ: Completion of 9 credits from GER 311,GER 312,GER 313. Not offered every year.

**GER 341,GER 342,GER 343. SURVEY OF GERMAN LITERATURE (3,3,3).** 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. PREREQ: GER 213 or placement. (H)

**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. PREREQ: GER 213 or placement. Not offered every year.

**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. PREREQ: GER 213 or placement. Not offered every year.

**GER 379. PROCTOR EXPERIENCE (1-2).** Supervised practicum for advanced students, with assignments as proctors or tutors in lower-division German language courses. May be repeated for credit. 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. PREREQ: Completion of 12 upper-division hours in German, including GER 311,GER 312,GER 313 with a minimum 3.00 GPA, and prior authorization of supervisor. Graded P/N.

**GER 401/GER 501. RESEARCH (1-16).** PREREQ: Department approval required.

**GER 402/GER 502. INDEPENDENT STUDY (1-16).** PREREQ: Department approval required.

**GER 403/GER 503. THESIS (1-16).** PREREQ: Department approval required.

**GER 405/GER 505. READING AND CONFERENCE (1-16).** PREREQ: Department approval required.

**GER 407/GER 507. SEMINAR (1-16).** PREREQ: Department approval required.

**GER 410. INTERNSHIP (15).**

**GER 411/GER 511,GER 412/GER 512,GER 413/GER 513. ^FOURTH-YEAR GERMAN (3,3,3).** Focus on development of German writing, speaking, and listening skills. Conducted in German. PREREQ: GER 313 and departmental authorization. (Writing Intensive Course)

**GER 419/GER 519. SELECTED TOPICS IN GERMAN LANGUAGE (3).** Conducted in German. May be repeated for credit when topic varies. See *Schedule of Classes* for current offerings. PREREQ: GER 313. Not offered every year.

**GER 439/GER 539. SELECTED TOPICS IN GERMAN CULTURE (3).** May be repeated for credit when topic varies. Conducted in German. PREREQ: 9 upper-division credits in German.

**GER 449/GER 549. SELECTED TOPICS IN GERMAN LITERATURE (3).** May be repeated for credit when topic varies. Conducted in German. PREREQ: 9 upper-division credits in German.

## ■ ITALIAN

### Lower Division Courses

**IT 199. SPECIAL STUDIES(1-16).** May be repeated for credit when topics caries. See Schedule of Classes for current offerings and prerequisites. Not offered every year.

**IT 299. SPECIAL STUDIES (1-16).** May be repeated for credit when topics caries. See Schedule of Classes for current offerings and prerequisites. Not offered every year.

### Upper Division Courses

**IT 405. READING AND CONFERENCE (1-16).** PREREQ: Departmental approval required.

**IT 410. INTERNSHIP (15).**

## ■ JAPANESE

### Lower Division Courses

**JPN 111,JPN 112,JPN 113. FIRST-YEAR JAPANESE (4,4,4).** Designed to help students develop an understanding of basic language structures and to acquire the ability to use languages 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. Must be taken in order. Lec/rec.

**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.

**JPN 211,JPN 212,JPN 213. SECOND-YEAR JAPANESE (4,4,4).** 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 B.A. requirement in foreign languages. PREREQ: JPN 113 or placement. Must be taken in order. Lec/rec.

**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.

### Upper Division Courses

**JPN 311,JPN 312,JPN 313. THIRD-YEAR JAPANESE (3,3,3).** Continued development of oral communication skills as required in a variety of social contexts. Further development of reading skills. PREREQ: JPN 213 or placement and departmental authorization. Lec/rec.

**JPN 329. SPECIAL TOPICS IN LANGUAGE, CULTURE, OR LITERATURE (1-16).** May be repeated when topic varies. See *Schedule of Classes* for current offerings and prerequisites. Not offered every year.

**JPN 331,JPN 332,JPN 333. *JAPANESE CULTURE (3,3,3).** JPN 331 and JPN 332: An introductory survey of Japanese history, arts, literature, society, and traditions from the ancient to the mid-19th century. JPN 333: 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. PREREQ: sophomore standing. Need not be taken in order. May not be offered every year. (Bacc Core Course).

**JPN 379. PROCTOR EXPERIENCE (1-2).** Supervised practicum for advanced students, with assignment as proctor or tutor in lower-division Japanese courses. May be repeated for credit. No credit may be used to satisfy requirements for a minor in Japanese. PREREQ: Completion of third-year Japanese with a minimum 3.00 GPA in that sequence and prior authorization from supervisor. Graded P/N.

**JPN 402/JPN 502. INDEPENDENT STUDY (1-16).** PREREQ: Department approval required.

**JPN 405/JPN 505. READING AND CONFERENCE (1-16).** PREREQ: Department approval required.

**JPN 410. INTERNSHIP (15).**

**JPN 411,JPN 412,JPN 413. FOURTH-YEAR JAPANESE (3,3,3).** Further development of conversational, reading, and writing skills. Readings include excerpts from contemporary essays, short stories, novels, plays, and newspaper articles. PREREQ: JPN 313 or placement, and departmental authorization. Must be taken in order. Not offered every year.

## ■ RUSSIAN

### Lower Division Courses

**RUS 111,RUS 112,RUS 113. FIRST-YEAR RUSSIAN (4,4,4).** 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. Must be taken in order.

**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.

**RUS 211,RUS 212,RUS 213. SECOND-YEAR RUSSIAN (4,4,4).** 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 B.A. requirement in foreign languages. PREREQ: RUS 113 or placement. Must be taken in order.

**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.

### Upper Division Courses

**RUS 311,RUS 312,RUS 313. THIRD-YEAR RUSSIAN (3,3,3).** Extensive practice in writing, reading, and speaking: refinement of grammar and pronunciation. PREREQ: RUS 213 and departmental authorization. Must be taken in order.

**RUS 329. SPECIAL TOPICS IN LANGUAGE, CULTURE, AND/OR LITERATURE (1-16).** May be repeated when topic varies. See *Schedule of Classes* for current offerings and prerequisites. Not offered every year.

**RUS 379. PROCTOR EXPERIENCE (1-2).** Supervised practicum for advanced students or native speakers, with assignment as proctor or tutor in lower-division Russian language courses. May be repeated for credit. No credits may be used to satisfy requirements for a minor in Russian or for a Russian Studies certificate. PREREQ: completion of Third-Year Russian with a minimum 3.00 GPA and prior authorization from supervisor. Graded P/N.

**RUS 402/RUS 502. INDEPENDENT STUDY (1-16).** PREREQ: Department approval required.

**RUS 405/RUS 505. READING AND CONFERENCE (1-16).** PREREQ: Department approval required.

**RUS 407/RUS 507. SEMINAR (1-16).** PREREQ: Departmental approval required.

**RUS 410. INTERNSHIP (15).**

**RUS 411,RUS 412,RUS 413. FOURTH-YEAR RUSSIAN (3,3,3).** 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. PREREQ: RUS 313 and departmental authorization.

## ■ SPANISH

### Lower Division Courses

**SPAN 111,SPAN 112,SPAN 113. FIRST-YEAR SPANISH (4,4,4).** Two class meetings and two recitations per week. Development of listening comprehension, speaking, reading, and writing skills. Must be taken in order. Native speakers and bilingual speakers may not receive credit for Span 111,SPAN 112,SPAN 113. Students with previous study of Spanish are admitted only by departmental authorization. Lec/rec.

**SPAN 199. SPECIAL STUDIES (1-3).**

**SPAN 211,SPAN 212,SPAN 213. SECOND-YEAR SPANISH (4,4,4).** Further development of listening comprehension, speaking, reading, and writing skills. Must be taken in order. Native speakers may not receive credit for SPAN 211,SPAN 212,SPAN 213. Completion of SPAN 213 with a grade of C- or better satisfies B.A. requirement for foreign languages. PREREQ: SPAN 113 or placement.

**SPAN 214,SPAN 215,SPAN 216. SECOND-YEAR SPANISH FOR THE NATIVE SPEAKER (4,4,4).** Designed for native speakers who learned Spanish in a home environment. Introduction to written Spanish. Must be taken in order. Completion of SPAN 216 with a grade C- or better satisfies B.A. requirement for foreign languages

**SPAN 299. SPECIAL STUDIES (1-3).**

### Upper Division Courses

**SPAN 301. SPANISH CONVERSATION (1).** Two recitations per week. Emphasis on retention and development of speaking and listening comprehension skills. May be repeated for up to 4 credits. No more than 2 credits may be used to satisfy requirements for the major or minor. Bilingual and native speakers may not receive credit for SPAN 301. PREREQ: SPAN 213 or placement.

**SPAN 311,SPAN 312,SPAN 313. THIRD-YEAR SPANISH (3,3,3).** Further development of listening comprehension, speaking, and writing skills. Must be taken in order. PREREQ: SPAN 213 or placement and departmental authorization.

**SPAN 314,SPAN 315,SPAN 316. THIRD-YEAR SPANISH FOR THE NATIVE SPEAKER (3,3,3).** Extensive practice in reading, writing and speaking; refinement of spelling, grammar and vocabulary within a dynamic cultural context. Must be taken in order. Native speakers should take SPAN 314, SPAN 315, SPAN 316 instead of SPAN 311, SPAN 312, SPAN 313; credit is not allowed for both. PREREQ: SPAN 216 or placement.

**SPAN 317,SPAN 318. DIRECTED READING IN SPANISH (3,3).** Further development of reading and writing skills through reading and study of selected modern literary works of Spain and Spanish America. Must be taken in order. PREREQ: SPAN 213 or placement.

**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. PREREQ: SPAN 312 or consent of instructor.

**SPAN 323. SELECTED TOPICS IN LUSO-HISPANIC LITERATURE IN ENGLISH TRANS (3).** May be repeated for credit when topic varies. May be used for Spanish major or minor only with departmental authorization. See Schedule of Classes for current term offering. PREREQ: Completion of 9 credits of any literature or junior or senior standing.

**SPAN 331,SPAN 332,SPAN 333. *THE CULTURES OF SPAIN AND PORTUGAL (3,3,3).** Historical development of the cultures and societies of the Iberian peninsula. Taught in Spanish. PREREQ: Completion of 9 hours from SPAN 311, SPAN 312, SPAN 313, SPAN 317, SPAN 318. (H) (Bacc Core Course)

**SPAN 336,SPAN 337,SPAN 338. *LATIN AMERICAN CULTURE (3,3,3).** Historical development of the cultures and societies of Latin America, with an emphasis on Spanish- and Portuguese-speaking peoples. Taught in Spanish. PREREQ: Completion of 9 credits from SPAN 311, SPAN 312, SPAN 313, SPAN 317, SPAN 318. (H) (Bacc Core Course)

**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. PREREQ: Completion of 9 credits from SPAN 311, SPAN 312, SPAN 313, SPAN 317, SPAN 318.

**SPAN 350. PHONETICS AND PRONUNCIATION (3).** PREREQ: SPAN 113.

**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. PREREQ: SPAN 350.

**SPAN 379. PROCTOR EXPERIENCE (1).** Supervised practicum for advanced students, with assignments as proctors or tutors in lower-division Spanish language courses. May be repeated for credit. 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. PREREQ: completion of 21 upper-division credits in Spanish with a minimum 3.00 GPA. Graded P/N.

**SPAN 401/SPAN 501. RESEARCH (1-16).** Department approval required.

**SPAN 402/SPAN 502. INDEPENDENT STUDY (1-16).** Department approval required.

**SPAN 403/SPAN 503. THESIS (1-16).** Department approval required.

**SPAN 405/SPAN 505. READING AND CONFERENCE (1-16).** Department approval required.

**SPAN 407/SPAN 507. SEMINAR (1-16).** Department approval required.

**SPAN 410. INTERNSHIP (15).**

**SPAN 411/SPAN 511,SPAN 412/SPAN 512,SPAN 413/SPAN 513. FOURTH-YEAR SPANISH (3,3,3).** Further development of listening comprehension, speaking, and writing skills. Must be taken in order. PREREQ: SPAN 313 or placement, and departmental authorization.

**SPAN 438/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. PREREQ: Completion of 6 credits from SPAN 331, SPAN 332, SPAN 333, SPAN 336, SPAN 337, SPAN 338. (Writing Intensive Course)

**SPAN 444/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. PREREQ: Completion of 21 upper-division hours in Spanish.

**SPAN 445/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. PREREQ: completion of 21 upper-division hours in Spanish.

**SPAN 461/SPAN 561,SPAN 462/SPAN 562,SPAN 463/SPAN 563. FIFTH-YEAR SPANISH (3,3,3).** 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. Must be taken in order. PREREQ: SPAN 413 or placement, and departmental authorization.

## ■ LINGUISTICS

### Lower Division Courses

**LING 199. SPECIAL STUDIES (1-16).** May be repeated when topic varies. See *Schedule of Classes* for current offerings and prerequisites. Not offered every year.

### Upper Division Courses

**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.

**LING 401/LING 501. RESEARCH (1-16).** PREREQ: Departmental approval required.

**LING 402/LING 502. INDEPENDENT STUDY (1-16).** PREREQ: Departmental approval required.

**LING 403/LING 503. THESIS (1-16).** PREREQ: Departmental approval required.

**LING 405/LING 505. READING AND CONFERENCE (1-16).** PREREQ: Departmental approval required.

**LING 407/LING 507. SEMINAR (1-16).** PREREQ: Departmental approval required.

**LING 410. INTERNSHIP (0-15).**

**LING 451/LING 551. GENERAL LINGUISTICS (3).** Language systems; comparative philology; historical, descriptive, and structural linguistics; semantics; phonetics and phonemics. PREREQ: 9 credits upper-division foreign language training or equivalent. Not offered every year.

## ■ INTERNSHIP

**FLL 410/FLL 510. FOREIGN LANGUAGE INTERNSHIP (1-12).** Opportunities for juniors and seniors to apply skills in foreign language and knowledge of foreign culture at selected government, industry, or business placement sites. Allows students to prepare for transition from academic world to work world. Interns are supervised and evaluated by employer and faculty coordinator. See also Oregon International Internships in the section on International Programs. PREREQ: 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 Department of Foreign Languages and Literatures.

### ■ OREGON STUDY CENTERS IN CHINA

#### Lower Division Courses

**CHN 188. CHINESE STUDIES, CHINESE STUDY CENTERS (1-12).** May be repeated when topic varies. CHN 188A: Topics, Chinese language; CHN 188B: Practical work (exercises).

**CHN 288. CHINESE STUDIES, CHINESE STUDY CENTERS (1-12).** May be repeated when topic varies. CHN 288A: Topics, Chinese language; CHN 288B: Practical work (exercises); CHN 288C: Topics, Chinese arts and letters; CHN 288D: Topics, China and Chinese society.

#### Upper Division Courses

**CHN 388. CHINESE STUDIES, CHINESE STUDY CENTERS (1-12).** May be repeated when topic varies. CHN 388A: Topics, Chinese language; CHN 388B: Practical work (exercises); CHN 388C: Topics, Chinese arts and letters; CHN 388D: Topics, China and Chinese society.

**CHN 488/CHN 588. CHINESE STUDIES, CHINESE STUDY CENTERS (1-12).** May be repeated when topic varies. CHN 488A/CHN 588A: Topics, Chinese language; CHN 488B/CHN 588B: Practical work (exercises); CHN 488C/CHN 588C: Topics, Chinese arts and letters; CHN 488D/CHN 588D: Topics, China and Chinese society.

### ■ OREGON STUDY CENTERS IN FRANCE

#### Lower Division Courses

**FR 188. FOREIGN STUDIES, FRENCH STUDIES CENTER (1-12).**

**FR 288. FRENCH STUDIES, FRENCH STUDY CENTERS (1-12).** May be repeated when topic varies. FR 288A: Topics, French language; FR 288B: Practical work (exercises); FR 288C: Topics, French arts and letters; FR 288D: Topics, France and French society.

#### Upper Division Courses

**FR 388. FRENCH STUDIES, FRENCH STUDY CENTERS (1-12).** May be repeated when topic varies. FR 388A: Topics, French language; FR 388B: Practical work (exercises); FR 388C: Topics, French arts and letters; FR 388D: Topics, France and French society.

**FR 488/FR 588. FRENCH STUDIES, FRENCH STUDY CENTERS (1-12).** May be repeated when topic varies. FR 488A/FR 588A: Topics, French language; FR 488B/FR 588B: Practical work (exercises); FR 488C/FR 588C: Topics, French arts and letters; FR 488D/FR 588D: Topics, France and French society.

### ■ OREGON STUDY CENTERS IN GERMANY

#### Lower Division Courses

**GER 188. GERMAN STUDIES, GERMAN STUDY CENTER (1-12).** May be repeated when topic varies. GER 188A: Topics, German language; GER 188B: Practical work (exercises).

**GER 288. GERMAN STUDIES, GERMAN STUDY CENTER (1-12).** May be repeated when topic varies. GER 288A: Topics, German language; GER 288B: Practical work (exercises); GER 288C: Topics, German arts and letters; GER 288D: Topics, Germany and German society.

#### Upper Division Courses

**GER 388. GERMAN STUDIES, GERMAN STUDY CENTER (1-12).** May be repeated when topic varies. GER 388A: Topics, German language; GER 388B: Practical work (exercises); GER 388C: Topics, German arts and letters; GER 388D: Topics, Germany and German society.

**GER 488. GERMAN STUDIES, GERMAN STUDY CENTER (1-12).** May be repeated when topic varies. GER 488A/GER 588A: Topics, German language; GER 488B/GER 588B: Practical work (exercises); GER 488C/GER 588C: Topics, German arts and letters; GER 488D/GER 588D: Topics, Germany and German society.

#### Graduate Courses

**GER 588. GERMAN STUDIES, GERMAN STUDY CENTER (1-12).** May be repeated when topic varies. GER 488A/GER 588A: Topics, German language; GER 488B/GER 588B: Practical work (exercises); GER 488C/GER 588C: Topics, German arts and letters; GER 488D/GER 588D: Topics, Germany and German society.

### ■ OREGON STUDY CENTERS IN HISPANIC COUNTRIES

#### Lower Division Courses

**SPAN 188. HISPANIC STUDIES, HISPANIC STUDY CENTERS (1-12).** May be repeated when topic varies. SPAN 188A: Topics, Hispanic language; SPAN 188B: Practical work (exercises); SPAN 188C: Topics, Hispanic arts and letters; SPAN 188D: Topics, Hungary and Hispanic society.

**SPAN 288. HISPANIC STUDIES, HISPANIC STUDY CENTERS (1-12).** May be repeated when topic varies. SPAN 288A: Topics, Hispanic language; SPAN 288B: Practical work (exercises); SPAN 288C: Topics, Hispanic arts and letters; SPAN 288D: Topics, Hungary and Hispanic society.

#### Upper Division Courses

**SPAN 388. HISPANIC STUDIES, HISPANIC STUDY CENTERS (1-12).** May be repeated when topic varies. SPAN 388A: Topics, Hispanic language; SPAN 388B: Practical work (exercises); SPAN 388C: Topics, Hispanic arts and letters; SPAN 388D: Topics, Hispanic society.

**SPAN 488/SPAN 588. HISPANIC STUDIES, HISPANIC STUDY CENTERS (1-12).** May be repeated when topic varies. SPAN 488A: Topics, Hispanic language; SPAN 488B: Practical work (exercises); SPAN 488C: Topics, Hispanic arts and letters; SPAN 488D: Topics, Hungary and Hispanic society.

### ■ OREGON STUDY CENTERS IN ITALY

#### Lower Division Courses

**IT 188. ITALIAN STUDIES, ITALIAN STUDY CENTER (1-12).** May be repeated when topic varies. IT 188A: Topics, Italian language; IT 188B: Practical work (exercises).

### ■ OREGON STUDY CENTERS IN JAPAN

#### Lower Division Courses

**JPN 188. JAPANESE STUDIES, JAPANESE STUDY CENTER (1-12).** May be repeated when topic varies. JPN 188A: Topics, Japanese language; JPN 188B: Practical work (exercises).

**JPN 288. JAPANESE STUDIES, JAPANESE STUDY CENTER (1-12).** May be repeated when topic varies. JPN 288A: Topics, Japanese language; JPN 288B: Practical work (exercises); JPN 288C: Topics, Japanese arts and letters; JPN 288D: Topics, Japan and Japanese society.

#### Upper Division Courses

**JPN 388. JAPANESE STUDIES, JAPANESE STUDY CENTER (1-12).** May be repeated when topic varies. JPN 388A: Topics, Japanese language; JPN 388B: Practical work (exercises); JPN 388C: Topics, Japanese arts and letters; JPN 388D: Topics, Japan and Japanese society.

**JPN 488. JAPANESE STUDIES, JAPANESE STUDY CENTER (1-12).** May be repeated when topic varies. JPN 488A/JPN 588A: Topics, Japanese language; JPN 488B/JPN 588B: Practical work (exercises); JPN 488C/JPN 588C: Topics, Japanese arts and letters; JPN 488D/JPN 588D: Topics, Japan and Japanese society.

### ■ OREGON STUDY CENTERS IN RUSSIA

#### Lower Division Courses

**RUS 188. RUSSIAN STUDIES (1-12).** RUS 188A: Topics, Russian language; RUS 188B: Practical work (exercises). May be repeated when topic varies.

**RUS 288. RUSSIAN STUDIES (1-12).** RUS 288A: Topics, Russian language; RUS 288B: Practical work (exercises); RUS 288C: Topics, Russian arts and letters; RUS 288D: Topics, Soviet Union and Soviet society. May be repeated when topic varies.

#### Upper Division Courses

**RUS 388. RUSSIAN STUDIES (1-12).** RUS 388A: Topics, Russian language; RUS 388B: Practical work (exercises); RUS 388C: Topics, Russian arts and letters; RUS 388D: Topics, Soviet Union and Soviet society. May be repeated when topics varies.

**RUS 488/RUS 588. RUSSIAN STUDIES IN USSR (1-12).** RUS 488A/RUS 588A: Topics, Russian language; RUS 488B/RUS 588B: Practical work (exercises); RUS 488C/RUS 588C: Topics, Russian arts and letters; RUS 488D/RUS 588D: Topics, Soviet Union and Soviet society. May be repeated when topics varies.

### ■ VARIOUS OVERSEAS STUDY CENTERS

**LING 388. LINGUISTIC STUDIES, VARIOUS STUDY CENTERS (1-12).** May be repeated when topic varies. LING 388A: Topics, General Linguistics; LING 388B: Topics, Synchronic (Descriptive) Linguistics: LING 388C: Topics, Diachronic (Historical) Linguistics: LING 388D: Applied Linguistics, e.g., Phonology, Morphology, Syntax, Practicum; LING 388E: TESOL (Teaching English to Speakers of Other Languages).

**LING 488/LING 588. LINGUISTIC STUDIES, VARIOUS STUDY CENTERS (1-12).** May be repeated when topic varies. LING 488A: Topics, General Linguistics; LING 488B: Topics, Synchronic (Descriptive) Linguistics; LING 488C: Topics, Diachronic (Historical) Linguistics; LING 488D: Applied Linguistics, e.g., Phonology, Morphology, Syntax, Practicum; LING 488E: TESOL (Teaching English to Speakers of Other Languages).

## HISTORY

Paul Farber, Chair
306 Milam Hall
Oregon State University
Corvallis, OR 97331-5104
(541) 737-3421

### FACULTY

*Professors* Farber, Ferngren, Kopperman, M. Nye, R. Nye, Robbins, Sarasohn; *Associate Professors* Beatty, Carson, Husband, Katz, LaFrance, Rupert; *Assistant Professors* Doel, Hackel, Ip, Rubert, Sklansky, Smith

**Undergraduate Major**

**History (B.A., B.S.)**

**Minor**

History

**Graduate Major**

History of Science (M.A., M.S., Ph.D.)

The Department of History offers major programs leading to the B.A. and B.S. degrees. 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. Students are urged to complete the B.A. degree requirements. Their programs will be worked out with their advisers.

B.A. candidates must have proficiency at the second-year level of a foreign language. B.S. candidates must complete an additional 12 credits of approved science, social science, or professional courses. See adviser for list of approved courses.

The department also offers a minor program for undergraduates with majors in other fields. Students electing a minor in history choose one of three areas, each requiring 27 credits: U.S. history; European history; or non-European, non-U.S. history.

## UNDERGRADUATE REQUIREMENTS

**Minimum total credits (49)**
**Minimum upper division credits (31)**

Courses that must be included in the 49-credits:
HST 101, HST 102, HST 103. History of Western Civilization (or equivalent courses approved by adviser) (9)
U.S. history (upper div courses may be used) (9)
Courses in a non-European, non-U.S. history area (6)
HST 407. Seminar (4)
HST 420. Historiography (3)
History electives (18)

## GRADUATE PROGRAM

The History of Science graduate program provides professional training in the interdisciplinary subject of history of science and technology. It bridges the humanities, social sciences, and the natural sciences by studying the social and cultural context within which science is practiced and has developed. Its successful pursuit requires an understanding of the development of the sciences and technology within particular historical settings, as well as the ability to synthesize knowledge from seemingly disparate fields of study. In addition to engaging in the teaching and research of a challenging academic discipline, historians of science may also work to help reform the teaching of science by placing science in a broader context and illustrating and explaining the processes of science.

History of science graduates are teachers at high schools, colleges and universities; they are archivists, museum curators, and editors; they are analysts of science and technology policy, and historians for governmental agencies, for research facilities, and for business corporations.

The Department of History offers the M.A., M.S., and Ph.D. degrees in History of Science. The Department also participates in the graduate program in Interdisciplinary Studies (M.A.I.S.). History and History of Science may be used as a major or minor in the MAIS degree program or as a minor in other graduate programs.

## 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) credit hours of graded undergraduate work of the first baccalaureate and all subsequent graded credit hours.

The applicant must submit photocopies of official transcripts of all previous academic work at the college or university level.

Applicants must also provide:
1. 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.
2. A photocopy of official record of Graduate Record Examination (GRE) scores. Normally, successful applicants will have achieved a minimum score of 550 on the verbal portion of the GRE and a minimum combined score (all 3 sections) of 1600.
3. Three letters of recommendation that specifically evaluate academic abilities and professional potential.

## GRADUATE DEGREE REQUIREMENTS

**Requirements for the Master's Degree.** Either the M.A. or M.S. may be earned. The M.A. 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 hours of graduate credit. 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 hours of course work in science, history, or a related (or integrated) field; a thesis is also required.

**Requirements for a Doctoral Degree.** The equivalent of three years of graduate work beyond the bachelor's degree is required including a 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 two foreign languages are required.

## COURSES

### ■ HISTORY

#### Lower Division Courses

**HST 100. FRESHMEN ORIENTATION (1).** Introduction to the study of history and basic methodology. Required for majors.

**HST 101,HST 102,HST 103. *HISTORY OF WESTERN CIVILIZATION (3,3,3).** 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. HST 101: The Ancient World to 1000 A.D. HST 102: 1000 A.D. to 1789. HST 103: 1789 to the present. Need not be taken in sequence(Bacc Core Course)(H)

**HST 199. SPECIAL STUDIES (1-16).**

**HST 201,HST 202,HST 203. *HISTORY OF THE UNITED STATES (3,3,3).** 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. HST 201: Pre-Columbian and colonial origins to 1820. HST 202: 1820-1920. HST 203: 1920 to present. Need not be taken in sequence. (Bacc Core Course)(H)

#### Upper Division Courses

**HST 309. COLLOQUIUM (3).**

**HST 315. THE EUROPEAN MILITARY, 1400-1815 (3).** 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.

**HST 316. THE AMERICAN MILITARY, 1607-1865 (3).** 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.

**HST 317. *WHY WAR: A HISTORICAL PERSPECTIVE (3).** 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. Not offered every year. (Bacc Core Course)

**HST 320. *ANCIENT NEAR EAST (3).** 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. Not offered every year. (Bacc Core Course)

**HST 321. GREECE (3).** 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.

**HST 322. ROMAN REPUBLIC (3).** 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.

**HST 323. ROMAN EMPIRE (3).** 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.

**HST 327,HST 328. HISTORY OF MEDIEVAL EUROPE (3,3).** Cultural, political, and economic history of the European Middle Ages from the fall of the Roman Empire in the West to the Renaissance.HST 327:284 A.D. to 1000. HST 328: 1000 to 1400. Need not be taken in sequence. Not offered every year.

**HST 329,HST 330,HST 331. HISTORY OF EARLY MODERN EUROPE (3,3,3).** Political, social, intellectual, and cultural history of Europe from 1400-1789. HST 329: The Renaissance; HST 330: The Reformation; HST 331: The scientific revolution, absolute monarchy, and the Enlightenment. Need not be taken in sequence. Not offered every year.

**HST 334,HST 335,HST 336. EUROPE SINCE THE FRENCH REVOLUTION (3,3,3).** Political, economic, social, and intellectual developments since the French Revolution. HST 334: 1789-1850. HST 335: 1850-1914. HST 336: 1914 to present. Need not be taken in sequence. Not offered every year.

**HST 342. *CHRISTIANITY IN RUSSIA (3).** An interdisciplinary investigation of the cultural ramifications of Christianity in Russia, with special emphasis on the contemporary dimensions of the subject. Topics include religion in daily life, church and state, Christianity and art, law and legal consciousness, and the impact of religion on gender and ethnicity. (Bacc Core Course)

**HST 343. WOMEN IN RUSSIA (3).** Interdisciplinary investigation of the social, political, and cultural roles of women in Russia. Topics include family relations, rituals of childbirth and child care, concepts of female honor, witchcraft, female religious communities, woman as healer, women and law, abortion, prostitution, and women in business and politics.

**HST 350,HST 351. *MODERN LATIN AMERICA (3,3).** History of the development of Latin America, emphasizing the issues of imperialism, economic dependency, social stratification, political instability, and nationalism within an international context. HST 350: 1492 to 1850. HST 351: 1850 to the present. Need not be taken in sequence. (Bacc Core Course.)(NC)

**HST 362,HST 363. WOMEN IN UNITED STATES HISTORY (3,3).** 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. HST 362: 1620-1890. HST 363: 1890 to the present.

**HST 364,HST 365. HISTORY OF BLACK AMERICANS (3,3).** The forces and personalities that have shaped the history of Black Americans in the United States. HST 364: African beginnings to the close of Reconstruction. HST 365: close of Reconstruction to the present. Need not be taken in sequence. Not offered every year.

**HST 366,HST 367. HISTORY OF THE AMERICAN INDIAN (3,3).** A study of the American Indian north of Mexico from before European contact to the present. HST 366: The indigenious population prior to European contact; initial alterations in and continued disruption of Indian society and culture; Indian-white conflict; emergence of U.S. govemment Indian policy to 1848. HST 367: Evolution of U.S.-Indian policy after 1848; consequences of forced assimilation; Indian Reorganization Act and Termination policies; growth of Pan-Indianism and the Red Power movement. Not offered every year.

**HST 368. *LESBIAN AND GAY MOVEMENTS IN MODERN AMERICA (3).** 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 (Bacc Core Course).

**HST 381,HST 382. *HISTORY OF AFRICA (3,3).** History of Africa from earliest times to present, including origins of human society, slave trade, European imperialism and African nationalism. HST 381: Africa before 1830. HST 382: Nineteenth and Twentieth Century Africa. (Bacc Core Course)(NC)

**HST 383. CONTEMPORARY REVOLUTIONS: CHINA AND SOUTH AFRICA (3).** Economic, social, and political roots of revolutions in the Twentieth Century China and South Africa.

**HST 384. ENVIRONMENTAL HISTORY OF AFRICA (3).** Using African history, this course examines how humans have been affected by their natural environment and how they have affected the environment.

**HST 385. *REGIONAL CONFLICT IN GLOBAL CONTEXT (3).** Examination of the roots of post-Cold War regional hostilities and the nature of international response. (Bacc Core Course)

**HST 387,HST 388. *ISLAMIC CIVILIZATION (3,3).** Political, social, and religious developments from 600 to the present. HST 387: Early history and the formation of Islamic society to the Mongol invasion. HST 388: The expansion of Islam, Turkic, and Asian dynasties, impact of Western imperialism and modern Islamic world. Need not be taken in sequence. (Bacc Core Course)

**HST 391,HST 392. *EAST ASIA (3,3).** History and culture of China, Japan, and Korea. HST 391: Prehistory to western encounters in the middle of the nineteenth century, with emphasis on the philosophical, artistic heritage, and social institutions of this region. HST 392: From the mid-nineteenth century to the present, with emphasis on modern political movements and cultural transformation. Need not be taken in sequence. (Bacc Core Course)(NC)

**HST 400. CAREERS IN HISTORY (1).** Planning the senior year. Advanced degree possibilities. Career options. Required of majors in junior year.

**HST 401/HST 501. RESEARCH (1-16).** Departmental approval required.

**HST 402. INDEPENDENT STUDY (1-16).** Departmental approval required.

**HST 403/HST 503. THESIS (1-16).** Departmental approval required.

**HST 405/HST 505. READING AND CONFERENCE (1-16).** Departmental approval required.

**HST 406/HST 506. PROJECTS (1-16).** Department approval required.

**HST 407/HST 507. ^SEMINAR (4).** (Writing Intensive Course)

**HST 410/HST 510. HISTORY INTERNSHIP (1-12).** Supervised work of a historical nature with historical societies, archives, museums, or other public or private organizations. May be repeated for a maximum of 12 credits, but no more than 6 credits may be used to satisfy the history major requirement of 45 credits.

**HST 415/HST 515. SELECTED TOPICS (3).** Selected topics of special or current interest not covered in other courses.

**HST 420/HST 520. HISTORIOGRAPHY (3).** How history has been, and is being, written. Topics include the major historians, philosophy of history, types and uses of historical evidence, and fields of historical investigation. Intended to provide a critical awareness of factors that influence the writing of history. PREREQ: 9 credits of history or upper division standing.

**HST 421/HST 521. HELLENISTIC GREECE (3).** 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. PREREQ: HST 101 or upper division standing. Not offered every year.

**HST 425/HST 525. THE HOLOCAUST IN ITS HISTORY (3).** An inquiry into the causes, course, and impact of the Holocaust. The general theme of Antisemitism in European history is explored for background. Topics discussed for comparative purposes include: Antisemitism in American History; other episodes of mass murder in the 20th century. Not offered every year.

**HST 428/HST 528,HST 429/HST 529,HST 430/HST 530,HST 431/HST 531. HISTORY OF WESTERN THOUGHT (3,3,3,3).** A synthesis of major developments in philosophy, science, social, and political theory and the arts between 1715 and the present.

**HST 432/HST 532. THE HISTORY OF SEXUALITY (3).** The history of human sexuality from 1700 to the present.

**HST 433/HST 533,HST 434/HST 534. ENGLISH HISTORY (3,3).** 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. HST 433/533: Medieval and Tudor-Stuart England. HST 434/534: England since 1688. Need not be taken in sequence. Not offered every year.

**HST 435/HST 535,HST 436/HST 536. HISTORY OF MODERN GERMANY (3,3).** Political, economic, social and intellectual developments from 1815 through the imperial, Weimar, and Nazi eras to the present. HST 435/535:1815-1914. HST 436/536:1914 to the present. Need not be taken in sequence. Not offered every year.

**HST 439/HST 539. READINGS IN EUROPEAN HISTORY (3-5).** Supervised readings designed to allow students to explore in-depth key issues in European history. Departmental approval required.

**HST 440/HST 540,HST 441/HST 541. HISTORY OF RUSSIA (3,3).** Political, economic, social, and cultural developments from the origins of the Russian state through the Gorbachev regime.HST 440/540: Russian history 862 to 1917. HST 441/541: 1917 to present. PREREQ: HST 101,HST 102,HST 103 or upper division standing. Need not be taken in sequence.

**HST 445/HST 545. SOCIETY IN MODERN RUSSIA (3).** Development of Russian/Soviet society since 1861, focusing on issues of gender, urbanization, literacy, the family, the evolution of legal consciousness, life at the workplace, education, and the general social ramifications of the end of serfdom and industrialization. PREREQ: One European history course. Not offered every year.

**HST 452/HST 552. MODERN MEXICO (3).** History of Mexico since 1810—economic, political, and social change and relations with the United States. PREREQ: HST 350 or HST 351 or upper division standing. Not offered every year.

**HST 456/HST 556. PROBLEMS IN LATIN AMERICAN HISTORY (3).** A focused examination of the origins and development of selective institutions and problems important to understanding the region, such as church, the military, labor, political instability, economic stagnation, and social stratification. PREREQ: HST 350 or HST 351 or upper division standing. Not offered every year.

**HST 459/HST 559. READINGS IN LATIN AMERICAN HISTORY (3-5).** Supervised readings designed to allow the student to explore in depth key issues in Latin American history.

**HST 460/HST 560,HST 461/HST 561,HST 462/HST 562. AMERICAN THOUGHT AND CULTURE (3,3,3).** An examination of the main currents of American thought and culture, emphasizing ideas and concepts which have influenced the development and growth of American institutions and values from the colonial period to the present. PREREQ: HST 201,HST 202,HST 203 or upper division standing. Need not be taken in sequence. Not offered every year.

**HST 463/HST 563. RELIGION IN AMERICAN PUBLIC LIFE (3).** Major aspects of the influence of religion in the unfolding of American public life, examining over time significant religious controversies, the church-state relationship, and the involvement of religious groups in political activities; also reviewing the impact of religion on such social issues as racism, feminism, and utopianism. PREREQ: HST 201,HST 202,HST 203 or upper division standing. Not offered every year.

**HST 464/HST 564,*HST 465/HST 565. AMERICAN DIPLOMATIC HISTORY (3,3).** HST 464/564:American diplomatic relations from the nation's founding to 1898. *HST 465/565: American diplomatic relations from 1898 to the present. PREREQ: HST 201,HST 202;HST 203 or upper division standing. Need not be taken in sequence. Not offered every year. (HST 465 is a Bacc Core Course.)

**HST 466. UNITED STATES-LATIN AMERICAN RELATIONS (3).** Analysis of United States-Latin American relations since 1776 treating issues of conflict and convergence: trade and investment, security, revolution, immigration, and nationalism. PREREQ: HST 350 or HST 351 or upper-division standing. Not offered every year.

**HST 467/HST 567,HST 468/HST 568. HISTORY OF THE AMERICAN WEST (3,3).** Important themes in the transformation of western America from the preindustrial 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. PREREQ: HST 201,HST 202,HST 203 or upper division standing. Need not be taken in sequence. Not offered every year.

**HST 469/HST 569. HISTORY OF THE PACIFIC NORTHWEST (3).** The demographic, ecological, and cultural transformation of Oregon, Washington, and Idaho from Indian times to the present. PREREQ: HST 201,HST 202,HST 203 or upper division standing.

**HST 471/HST 571,HST 472/HST 572. COLONIAL AMERICA (3,3).** Economic, political, social, religious, and intellectual development of colonial North America from the English background to 1763. HST 471/571: To 1689. HST 472/572: 1689-1763. PREREQ: HST 201 of upper division standing. Need not be taken in sequence. Not offered every year.

**HST 473/HST 573. THE ERA OF THE AMERICAN REVOLUTION (3).** The American Revolution, the drafting of the Constitution, and the launching of the new nation, 1763 to 1789. PREREQ: HST 201 or upper-division standing.

**HST 474/HST 574. JEFFERSONIAN AND JACKSONIAN DEMOCRACY (3).** 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. PREREQ: HST 201,HST 202 or upper-division standing. Not offered every year.

**HST 475/HST 575. CIVIL WAR AND RECONSTRUCTION (3).** 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. PREREQ: HST 202 or upper-division standing. Not offered every year.

**HST 477/HST 577. THE PROGRESSIVE AND NEW DEAL ERAS (3).** Twentieth-century U.S. history from 1900 to 1939, with emphasis on political and economic developments; attention given to diplomatic, cultural, and social change. PREREQ: HST 203. Not offered every year.

**HST 478/HST 578. THE UNITED STATES SINCE 1939 (3).** United Stated political, cultural, and diplomatic history from the Second World War through the 1970's, with special emphasis on the Cold War at home and abroad. PREREQ: HST 203 or upper-division standing. Not offered every year.

**HST 479/HST 579. READINGS IN UNITED STATES HISTORY (3-5).** Supervised readings designed to allow students to explore in depth, key issues in United States history. Departmental approval required.

**HST 480/HST 580. AMERICAN HISTORY THROUGH THE NOVEL (3).** Examination of 19th and 20th century novels as windows onto the landscape of the past, studying both novel and novelist.

**HST 481/HST 581. *ENVIRONMENTAL HISTORY OF THE UNITED STATES (3).** 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. REC: HST 201,HST 202,HST 203,HST 481. PREREQ: Upper-division standing. (Bacc Core Course)

**HST 485/HST 585. *POLITICS AND RELIGION IN THE MODERN MIDDLE EAST (3).** 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. PREREQ: Upper division standing or permission of instructor. (Bacc Core Course)

**HST 495/HST 595. CHINA IN THE TWENTIETH CENTURY (3).** 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. PREREQ: HST 391, HST 392 or upper-division standing. Not offered every year.

**HST 496/HST 596. GENDER, FAMILY, AND POLITICS IN CHINESE HISTORY (3).** A chronological approach to issues of gender, family, and politics in China from the earliest dynasties to the present.

**HST 497/HST 597. ASIA AND AMERICAN CULTURE (3).** An examination of mutual cultural images of Asians and Americans, and an examination of ethnic relations of Asians in American society.

**HST 499/HST 599. READINGS IN ASIAN HISTORY (3-5).** Supervised readings designed to allow students to explore in depth key issues in Asian history.

**Graduate Courses**

**HST 566. UNITED STATES-LATIN AMERICAN RELATIONS (3).** (See HST 466 for description.)

## ■ HISTORY OF SCIENCE

**Upper Division Courses**

**HSTS 401/HSTS 501. RESEARCH (1-16).** Department approval required.

**HSTS 403/HSTS 503. THESIS (1-16).** PREREQ: Graduate standing; department approval.

**HSTS 405/HSTS 505. RESEARCH (1-16).** Department approval required.

**HSTS 407/HSTS 507. SEMINAR (1-16).**

**HSTS 411/HSTS 511,HSTS 412/HSTS 512,HSTS 413/HSTS 513. *HISTORY OF SCIENCE (3,3,3).** This course stresses the interaction of scientific ideas with their social and cultural context. HSTS 411/HSTS 511: Scientific thought from ancient civilizations to post-Roman era. HSTS 412/HSTS 512:Origin of modern science in the 16th and 17th centuries. HSTS 413/HSTS 513: Development of modern science in the 18th and 19th centuries and to the present. PREREQ:Upper division standing; at least one science sequence. (Bacc Core Course)

**HSTS 415/HSTS 515. *^THEORY OF EVOLUTION AND FOUNDATION OF MODERN BIOLOGY (3).** Origin and development of Darwin's theory of evolution. Reception of theory and history of evolution to the present. PREREQ: Upper-division standing. (Bacc Core Course) (Writing Intensive Course)

**HSTS 417/HSTS 517. *^HISTORY OF MEDICINE (3).** 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. PREREQ: Upper division standing. (Bacc Core Course) (Writing Intensive Course)

**HSTS 418/HSTS 518. *^SCIENCE AND SOCIETY (3).** Science and Utopia. PREREQ: One year of college science. (Bacc Core Course)(Writing Intensive Course)

**HSTS 419/HSTS 519. *^STUDIES IN SCIENTIFIC CONTROVERSY: METHOD AND PRACTICE (3).** Course focuses on accounts of scientific discoveries which 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. (Bacc Core Course) (Writing Intensive Course)

**HSTS 421/HSTS 521. *TECHNOLOGY AND CHANGE (3).** 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. PREREQ: Upper-division standing. (Bacc Core Course)

**HSTS 425/HSTS 525. HISTORY OF THE LIFE SCIENCES (3).** History of ideas about life from Greeks to present day. Cultural background and development of major theories of the life sciences. PREREQ: Upper-division standing plus one year college sciences.

**HSTS 414/HSTS 514. *HISTORY OF TWENTIETH-CENTURY SCIENCE (3).** This course 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 1890's to the 1960's. (Bacc Core Course)

# LATIN AMERICAN AFFAIRS

Robert Kiekel, Director
224 Kidder Hall
Oregon State University
Corvallis, OR 97331-4603
(541) 737-3940

**Certificate Program**

Latin American Affairs

Students earning a certificate in Latin American affairs 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, 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, 14 credits of required core courses, and 16 credits of appropriate electives. In addition, the student must have proficiency in Spanish or Portuguese, equivalent to that attained by the end of the second-year sequence, or by placement scores.

### REQUIRED COURSES

HST 350, HST 351. Modern Lat Amer Hist (8)
SPAN 336, or SPAN 337, or SPAN 338. (3)
A seminar on Latin America through any of the participating departments (3)

### ELECTIVE COURSES

A minimum of 16 credits from a least two of the following eight areas:
ANTH 313. Peoples of the World—Lat Amer (3)
ANTH 413. World Cultures—Latin America (4)
AREC 431. International Ag Development (3)
GEOG 328. Geography of Latin America (3)
EC 451. Economic Survey of Latin America (3)
PS 344. Latin American Politics (4)
SOC 437. Minority Groups and Issues (4)
SPAN 438. Sel Topics in Luso-Hispanic Cult (3)
SPAN 445. Sel Topics in the Lit of Lat Amer (3)
Appropriate open-ended courses (402, 405, 407) through participating departments, as well as transfer credits, may also be used to satisfy requirements.

## LIBERAL STUDIES

Gary Tiedeman, Director
Polly Gross, Pre-Education Adviser
213F Social Science Hall
Oregon State University
Corvallis, OR 97331-6202
(541) 737-0628

### Undergraduate Major

**Liberal Studies (B.A., B.S.)**
*Options*
Pre-M.A.T. for Elementary Education

An interdisciplinary major in liberal studies leading to a B.A. or a B.S. degree is available for students whose academic and career interests suggest greater curricular breadth and flexibility than is available in other major programs.

Candidates for a Liberal Studies degree must complete the following:

- University Baccalaureate Core
- College of Liberal Arts core requirements
- A program of 45-60 credits that is thematic in nature, includes at least 27 upper division credits, and is developed from the course offerings of two or more departments within the College of Liberal Arts. The program must be approved in advance by the director.
- At least one Writing Intensive Course with a grade of C or better.

The typical program is designed to meet the particular needs and interests of the particular student and is unique in content. In some cases, a prestructured program may provide a suitable match. Current prestructured programs exist in: Asian Studies, Chinese Studies, European Studies, Environmental Policy, Japan Studies, Mass Communication, and Women Studies.

Finally, the Liberal Studies degree may be used as a Pre-M.A.T. (Master of Arts in Teaching) track with an Elementary Education focus. Specifications for the pre-M.A.T. option only are as follows:

**PRE-PROFESSIONAL ELEMENTARY EDUCATION CORE (94-105)**
(This fulfills the Baccalaureate Core)
Writing I, II, III/Speech (9)
MTH 211, 212, 213, 391 (12)
Computer Science (4)
Science (Bacc Core plus 2 additional from approved list) (18-20)
HST 203 plus 2 others from Western Culture (9)
Cultural Diversity (3)
HHP 231 (3)
PSY 201, PSY 202 (6)
GEO 105, GEO 106 (6)
Literature (9)
Difference, Power, & Discrimination (3)
Contemporary Global Issues (3)
Science, Technology and Society (3)
HDFS 311, HDFS 313, or PSY 350 (3-6)
Education (6)
Spanish: strongly recommended

**COLLEGE OF LIBERAL ARTS CORE (12)**

**ONE SPECIALIZATION (45)**

**Behavior Science Specialization**
PSY 27 upper division (including WIC)
SOC 204, 205, 206, 312, 340, 450

**Fine Arts Specialization**
Individually designed with either Art or Music emphasis. See Pre-M.A.T. adviser.

**Language Arts Specialization**
ENG 104, ENG 105, ENG 106 (9)
*One of:*
ENG 201, ENG 202, or ENG 203 (3)
WIC and Upper Division ENG (24)
WR 224, 324, (6)
TA 121

**Social Science Specialization**
ANTH 380
EC 201, 319
PS 201, 203 (8)
HST 201, 202, 203
Upper Division HST (18)
WIC (ANTH 370)

**Hispanic Studies Specializaton**
SPAN 311, 312, 313 (9)
SPAN 317, 318 (6)
SPAN 336, 337 (6)
SPAN 350, 351 (6)
ES 211, 212 (6)
GEOG 328 (3)
PS 344, PHL 315 or 316 (4)
HST 350, 351 OR Teaching Experience in Mexico (6-8)
WIC (SPAN 438) (3)

**American Minorities Studies Specialization**
ANTH 110, 311 (6)
ART 207 (3)
ENG 211, 212, 260, 360 (12)
ES lower division (3), upper division (6)
HST 362, 363, 364, 365 (12)
WIC (ANTH 370) (3)

### COURSES

**Lower Division Courses**

**LS 199. SPECIAL STUDIES (1-16).**

**Upper Division Courses**

**LS 300. LEGAL EDUCATION AND LEGAL CAREERS (2).** Team-taught preparation for undergraduates interested in attending law school. Course selection, practical advice, workshops, and field trips. Open to sophomores and juniors with a 3.0 GPA. or higher.

**LS 307. SEMINAR (1-16).**

**LS 402. INDEPENDENT STUDY (1-16).**

**LS 403. THESIS (1-16).**

**LS 405. READING AND CONFERENCE (1-3).**

**LS 406. PROJECTS (1-16).** May be repeated for a maximum of 12 credits.

**LS 407/LS 507. SEMINAR (1-16).**

**LS 408. WORKSHOP (1-16).**

**LS 409. PRACTICUM (1-3).**

**LS 410. INTERNSHIP (1-12).** Section 2: Restricted to students enrolled in off-campus programs in Astoria, Bend, Coos Bay, Hood River, and Newport. Not available to students in residence on the Corvallis campus. PREREQ: Senior standing, and 15 hours of residence work completed. Maximum of 12 credits. P/N grading.

## MUSIC

Marlan Carlson, Chair
101 Benton Hall
Oregon State University
Corvallis, OR 97331-2502
(541) 737-4061

**Faculty**
*Professors* M. Carlson, Coolen, Douglass, Eiseman; *Associate Professors* Jeffers, McCabe, Olson; *Assistant Professor* Scott; *Senior Instructors* A. Carlson, Krueger

### Undergraduate Major

**Music (B.A., B.S.)**
*Options*
Choral Conducting
Instrumental Conducting
Instrumental Performance
Music History and Composition
Piano Performance
Pre-Music Education
Vocal Performance

### Minor

Music (for nonmajors)

### Graduate Major

**Master of Arts in Teaching (M.A.T.)**
**Master of Arts in Interdisciplinary Studies (M.A.I.S.)**

### Teaching Certification

**Music Education (M.A.T.)**
Basic and Standard Certification through M.A.T.
Course work leading to Standard Certification for Music Educators who hold a valid Basic Teaching Certificate

The Department of Music offers programs leading to the B.A. or B.S. degree for music majors, a variety of Bacc 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 department in the College of Liberal Arts for a Liberal Studies major.

The Department of Music offers graduate courses in music education, literature and history, conducting, performance and special projects. Graduate students may pursue the Masters of Arts in Teaching (MAT) in music education or the Master of Arts in Interdisciplinary Studies (MAIS) in a broad range of fields. OSU's graduate programs in music have been approved by Oregon's Teacher Standards and Practices Commission for individuals who hold basic teaching licenses in music and who seek standard licensure in music. With careful planning it is possible to earn a master's degree enroute to standard licensure.

Performance instruction at the intermediate and advanced levels is available with instructor consent. Students should contact

the department office for application procedures and fee schedules.

Scholarships are available for music majors and for outstanding performers. Auditions and interviews take place in February, March, and April each year. Selection is based on musical and academic achievement.

The Music Learning Center in Benton Hall has a large collection of phonograph records, scores, and compact disks, as well as listening facilities, and electronic and computerized learning aids. Books on music and some printed music are also housed in Kerr Library.

Labs for the two-year literature and materials sequence are taught using computers in the Hovland Hall Multi-Media Lab.

Career possibilities in music include teaching in the schools or privately, performing in orchestras or ensembles, music librarianship, arts management, music business, and recording engineering.

## Major Program in Music

Departmental degree requirements are 66 credits, of which 24 must be upper division. Note: CLA 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.

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:**
MUS 121, MUS 122, MUS 123. Literature and Materials of Music (9)
MUS 124, MUS 125, MUS 126. L&M Lab (3)
MUS 134, MUS 135, MUS 136. Aural Skills (3)
MUS 221, MUS 222, MUS 223. Literature and Materials of Music II (9)
MUS 234, MUS 235, MUS 236. Aural Skills II (3)
MUS 324, MUS 325, MUS 326. Music History (9)
Lower Division Studio or Performance Ensemble or Accompanying (6)
TOTAL: 42

### CHORAL CONDUCTING OPTION

**Upper Division Requirements**
MUP 390-MUP 396. Studio Instruction (5)
MUS 340 or MUS 341. Performance Organizations (5)
MUS 315. Introduction to Conducting (2)
MUS 316, MUS 317. Choral Conducting I, II (4)
MUED 372, MUED 373. Singers Diction I and II (4)
MUED 477/MUED 577. Classroom Instrumental Techniques (2)
MUED 478/MUED 578. Techniques for the Vocal Instructor (2)
Junior/Senior Full Recital/Project (0)
TOTAL: 24

### INSTRUMENTAL EMPHASIS

MUED 277, 001-007. Instrumental Techniques (6)

**Upper Division Requirements**
MUS 315. Introduction to Conducting (2)
MUS 318, MUS 319. Instrumental Conducting I, II (4)
MUS 350, MUS 351 or MUS 360. Performance Organizations (5)
MUP 390-MUP 396. Studio Instruction (5)
MUED 478/MUED 578. Techniques for the Vocal Instructor (2)
Junior/Senior Full Recital/Project (0)
TOTAL (24)

### MUSIC HISTORY OR COMPOSITION OPTIONS

**Upper Division Requirements**
MUP 390-MUP 396. Studio Instruction (3)
MUS 340-MUS 369. Performance Org (3)
MUP 490-MUP 496. Studio Instruction (0)
MUS 423. Lit and Materials of Music III (3)
Upper division electives (from MUS 421, MUS 422, MUS 441-444) (12)
MUS 403. Senior Thesis/Composition (including public presentation) (3)
TOTAL (24)

### PRE-MUSIC EDUCATION OPTION

Refer to choral or instrumental emphasis. A general music option can also be arranged.

### INSTRUMENTAL PERFORMANCE OPTION

**Upper Division Requirements**
MUP 390-MUP 396. Studio Instruction (3)
MUP 490-MUP 496. Studio Instruction (3)
MUS 340-MUS 369. Performance Org (6)
Upper division electives from MUS 421-423, MUS 441-444 (12)
Junior Half Recital (0)
Senior Full Recital (0)
TOTAL (24)

### PIANO PERFORMANCE OPTION

**Upper Division Requirements**
MUP 390. Studio Inst (Upper Division) (3)
MUP 490. Studio Inst (Upper Division) (3)
MUS 363. Accompanying (6)
Upper division electives (from MUS 421-423, MUS 441-444) (12)
Junior Half Recital (0)
Senior Full Recital (0)
TOTAL (24)

### VOCAL PERFORMANCE OPTION

**Upper Division Requirements**
MUP 391 Studio Instruction (3)
MUS 340, 341. Performance Organizations (3)
MUP 491. Studio Instruction (3)
MUED 372. Singer's Diction I (2)
MUED 373. Singer's Diction II (2)
MUED 478/578. Techniques for the vocal Instructor (2)
Electives MUS 421-423. MUS 441-444 (9)
Junior Half Recital (0)
Senior Full Recital (0)
Total (24)

## Minor Program

Students majoring in other disciplines may elect a minor in music.

MUS 121, MUS 122, MUS 123. Literature and Materials of Music I (9)
Electives in Music (6)
*Upper division electives in Music from the following (12):*
MUP 390-596.
MUED 473, MUED 474, MUED 478, MUED 477
MUS 340, MUS 350, MUS 357, MUS 360, MUS 363 (6 credits maximum)
MUS 324, MUS 325, MUS 326
MUS 421-423, MUS 441-444
PH 331
CS 395
TOTAL (27)

## Graduate Study in Music (MAT or MAIS)

**Departmental procedure and criteria:**
The music advisor reviews transcripts, interviews the prospective student, and arranges an appropriate audition and interview. Students selecting conducting or history as an emphasis will demonstrate competence in those areas. Student should be accepted and notified in writing before enrolling in classes.

**Requirement to enter M.A.T. Program in Music Education:**
- Bachelor's degree and Graduate School acceptance
- Requirements for admission to OSU MAT program: (consult the School of Education for application form and deadlines)
- 3.0 GPA in last 90 graded quarter credits
- A 3.0 GPA in music courses
- Evidence of practicum experience equal to 90-120 clock hours in school music program (MUED 413 or equivalent)
- Demonstrate competence in piano proficiency and vocal proficiency through short audition
- Instrumental education students: demonstrate knowledge of teaching methods in brass, winds, strings, percussion (MUED 277 or equivalent)
- Choral education students: demonstrated competence in vocal pedagogy (MUED 478/MUED 578 or equivalent)
- Basic skills competence demonstrated by presenting passing scores on either the three sections of the California Basic Educational Skills Test (CBEST), or the PRAXIS-I PPST (Pre-Professional Skills Test).
- A minimum score of 610 on the Praxis II: Music Education Specialty Area Test (Test #0110) is required.
- Satisfactory answers to "good conduct" questions as required by Oregon Teacher Standards and Practices commission
- Resume, three letters of recommendation, essay of professional goals, and a successful interview.

**Prerequisite courses for all MAT:**
Ed 309 Field Practicum (3) or LS 403
MUED 413 Theory and Practicum (4)
MUED 473 Early Childhood Music Education (3)
Prerequisite courses for grade K-8 certification:
HDFS 311 and ED 411
Prerequisite courses for grades 5-12 certification:
HDFS 313 and ED 411, or:
ED 411 and ED 412

**OPTION ONE—FOR LICENSURE LEVELS ONE AND TWO—GRADES K–8 CERTIFICATION**

MUED 413 Senior Practicum (3)
MUED 473 Early Childhood Music Education (3)
MUED 574 Middle Level Music Education (3)
MUED 591 Curriculum Foundations in Music Education (3)
MUED 592 Curriculum Evaluation and Implementation (3)
MUED 406 Project (1)
MUED 507 Seminar (3)
MUED 510 Internship (15)
TOTAL (34)

ED 411 Educational Psychology (3)
HDFS 311 Infant and Child Development (3)
HDFS 420 Children with Special Needs (3)
ED 516 Foundational Perspectives in Education (2)
ED 518 Civil Rights in Education (2)
ED 519 Multicultural Issues in Education (2)
COUN 525 Fundamentals of Counseling (3)
TOTAL (18)

Return for final 15 credits, continuing license, and Masters:
ED 562 Intro to Research Methods in Education (3)
MUED 506 Project (3)
Electives (9)
TOTAL (15)

**OPTION TWO—FOR LICENSURE LEVELS THREE AND FOUR—GRADES 5–12 CERTIFICATION**

MUED 413 Senior Practicum (3)
MUED 580 Secondary Vocal Music Education (3)
MUED 581 Secondary Instrumental Music Education (3)
MUED 591 Curriculum Foundations in Music Education (3)

MUED 592 Curriculum Evaluation and Implementation (3)
MUED 406 Project (1)
MUED 507 Seminar (3)
MUED 510 Internship (15)
TOTAL (34)

ED 411 Educational Psychology (3)
ED 412 Adolescent Psychology (3)
ED 516 Foundational Perspectives in Education (2)
ED 518 Civil Rights in Education (2)
ED 519 Multicultural Issues in Education (2)
COUN 525 Fundamentals of Counseling (3)
TOTAL (15)

Return for final 15 credits:
ED 562 Intro to Research Methods in Education (3)
MUED 506 Project (3)
Electives (9)
TOTAL (15)

## MASTER OF ARTS IN INTERDISCIPLINARY STUDIES (MAIS)

See graduate catalog for description of MAIS degree. (Minimum 9 credits in each of three areas and maximum of 21, with 12 credits minimum in College of Liberal Arts.) For holders of Basic License in music who wish to pursue Standard licensure, a sample program might be:

Area One: MUED courses (573-579)
Area Two: ED courses
Area Three: Any graduate major or minor, including MUS courses.

A minimum score of 610 on the PRAXIS II: Music Education Specialty Area Test and a minimum score of 661 on the PRAXIS II: Professional Knowledge Test is required for licensure.

The MAIS requires a research project thesis and an oral exam.

## COURSES

### ■ MUSIC

**Lower Division 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. (Bacc Core Course) (FA)

**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). Course may be repeated for credit. See *Schedule of Classes* for topic being offered. For non-majors. Need not be taken in order. (Bacc Core Course) (FA)

**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. Course may be repeated for credit. (See *Schedule of Classes* for composers being offered.) For non-majors. Does not need to be taken in sequence. (Bacc Core Course) (FA)

**MUS 105. *SOUND AND SILENCE (3).** Survey of the uses of music in the human life cycle, examining the function of music in different cultures, periods, and styles. Interdisciplinary presentations, guest lecturers, videos and live performances. For nonmajors. (Bacc Core Course) (FA)

**MUS 107. *FOLK MUSIC OF NORTH AMERICA (3).** Examines the definitions, concepts, and social contexts of North American folk music traditions. Topics include the major non-Western traditions of Native Americans, Afro-Americans, and Hispanic Americans, as well as the Anglo-American folk tradition. For non-majors. (Bacc Core Course)(FA)

**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. (Bacc Core Course)

**MUS 111. FUNDAMENTALS OF MUSIC THEORY (3).** Basic course in the theoretical aspects of music. For non-majors.

**MUS 121,MUS 122,MUS 123. *LITERATURE AND MATERIALS OF MUSIC (3,3,3).** 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. PREREQ: Entrance exam. To be taken in sequence. (Bacc Core Course)

**MUS 124. KEYBOARD HARMONY LAB (1).** Scales, all major and harmonic form of minor, interval drill. Music majors must take course concurrently with MUS 121.

**MUS 125. SCORE READING LAB (1).** Transpose scores, harmonic idioms, harmonic progressions. Music majors must take concurrently with MUS 122.

**MUS 126. ORCHESTRAL LITERATURE AND HARMONI/LAB (1).** CD ROM harmonize melody with secondary functions, harmonic idioms. Music majors must take course concurrently with MUS 123.

**MUS 134,MUS 135,MUS 136. AURAL SKILLS I (1,1,1).** Aural comprehension of the basic melodic, rhythmic, and harmonic elements of music. To be taken in sequence. COREQ: MUS 121

**MUS 137. JAZZ IMPROVISATION (1-3).** Freshman level course. PREREQ: Department approval required.

**MUS 140. OSU CHAMBER CHOIR (1-2).** A select ensemble of approximately 40 mixed voices. Performances each term. Annual tours. PREREQ: Departmental approval required.(FA)

**MUS 141. UNIVERSITY SINGERS (1).** A mixed ensemble designed for the exploration and enjoyment of choral singing. Performance each term. No audition required.

**MUS 142. VOCAL JAZZ ENSEMBLE (1).** A small ensemble with special emphasis given to music in the jazz/swing idiom. PREREQ: Department approval required.

**MUS 144. MADRIGAL SINGERS (1-2).** A small ensemble with emphasis on Renaissance vocal music and contemporary vocal music written in a madrigal style. PREREQ: Departmental approval required.

**MUS 145. VOCAL ENSEMBLE: MISCELLANEOUS (1).** Various small vocal chamber music ensembles. (See *Schedule of Classes*.) Performance each term. PREREQ: Department approval required.

**MUS 150. SYMPHONIC BAND (1).** A select ensemble of approximately 80 wind and percussion players. Performance each term. (FA)

**MUS 151. CONCERT BAND (1).** Wind and percussion ensemble of approximately 70 players. Performance each term. Open to all students.

**MUS 153. MARCHING BAND (1-2).** A marching and playing unit of more than 160 musicians. Performs for home football games.

**MUS 154. BASKETBALL BAND (1).** An ensemble of approximately 50 players. Performs for home games.

**MUS 157. SMALL JAZZ ENSEMBLE (1).** Concentration on current jazz styles. Performance each term.

**MUS 158. LARGE JAZZ ENSEMBLE (1).** Concentration on current jazz styles. Performance each term.

**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. PREREQ: Department approval required. (FA)

**MUS 163. ACCOMPANYING (1).** Piano accompanying and chamber music skills, studio experience and weekly performance class. COREQ: MUS 190 or MUS 290. PREREQ: Department approval required. (FA)

**MUS 164. CHAMBER ENSEMBLE: STRINGS (1).** PREREQ: Department approval required.

**MUS 165. CHAMBER ENSEMBLE: WOODWINDS (1).** PREREQ: Department approval required.

**MUS 166. CHAMBER ENSEMBLE: BRASS (1).** PREREQ: Department approval required.

**MUS 167. CHAMBER ENSEMBLE: PERCUSSION (1).** PREREQ: Department approval required.

**MUS 168. CHAMBER ENSEMBLE: MISCELLANEOUS (1).** PREREQ: Department approval required.

**MUS 169. OPERA WORKSHOP (1).** PREREQ: Department approval required. (See *Schedule of Classes* for term offered.)

**MUS 177. GROUP LESSONS: PIANO (1).** Beginning Piano I, elementary group instruction in piano skills for non-majors. PREREQ: Departmental approval required.

**MUS 178. GROUP LESSONS: PIANO (1).** Beginning Piano II: Continuation of MUS 177, piano for non-majors. To be taken in sequence or with permission of instructor. PREREQ: Departmental approval required.

**MUS 179. GROUP LESSONS: PIANO (1).** Beginning Piano III. Continuation of MUS 177, MUS 178. Piano for non-majors. To be taken in sequence or with permission of instructor. PREREQ: Departmental approval required.

**MUS 180. GROUP LESSONS: PIANO (1).** (Basic Levels). Elementary group instruction in piano skills and basic theory. Must be taken in sequence. PREREQ: Department approval required.

**MUS 181. GROUP LESSONS: PIANO (1).** (Intermediate Levels). Group instruction in piano skills. (See *Schedule of Classes* for section offered.) PREREQ: Department approval required.

**MUS 184. GROUP LESSONS: ORCHESTRAL INSTRUMENTATION (1).** PREREQ: Department approval required.

**MUS 185. VOICE CLASS (1).** Students improve and strengthen voice as solo instrument. PREREQ: Department approval required.

**MUS 199. SPECIAL STUDIES (1-3).** (Freshman level). PREREQ: Department approval required.

**MUS 221,MUS 222,MUS 223. LITERATURE AND MATERIALS OF MUSIC (3,3,3).** Advanced harmony, techniques of analysis, musical form, composition. Continued study of the repertory of Western music through the mid-twentieth century. Keyboard skills integrated into course. Three lectures and one keyboard lab weekly. PREREQ: MUS 123 or department approval required. To be taken in sequence.

**MUS 234,MUS 235,MUS 236. AURAL SKILLS II (1,1,1).** Sight-singing; melodic and harmonic dictation. PREREQ: MUS 123 and MUS 136 or department approval required. To be taken in sequence.

**MUS 299. SPECIAL STUDIES (1-3).** (Sophomore level). PREREQ: Department approval.

### Upper Division Courses

**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. PREREQ: MUS 223, MUS 236, 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. PREREQ: MUS 315. To be taken in sequence.

**MUS 317. CHORAL CONDUCTING (2).** Continuation of MUS 315. Hand jesture technique, score reading, and score preparation of literature from all major historical periods. Focus upon principles of developing choral excellence. PREREQ: MUS 315. To be taken in sequence.

**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. PREREQ: MUS 315. To be taken in sequence.

**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. PREREQ: MUS 315.

**MUS 324,MUS 325,MUS 326. ^HISTORY OF WESTERN MUSIC (3,3,3).** Chronological survey of the Euro-American traditions in music to be taken in sequence. PREREQ: MUS 123; MUS 223 recommended. (Writing Intensive Course)

**MUS 337. JAZZ IMPROVISATION (1-3).** Instrumental and vocal improvisation including composition and arranging techniques. PREREQ: Two years college-level MUS 137 experience or equivalent. Departmental approval required.

**MUS 338. JAZZ COMPOSITION/ARRANGING (3).** Jazz composition utilizing techniques from five jazz composers. Performance. PREREQ: Department 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. PREREQ: Departmental approval required.

**MUS 341. UNIVERSITY SINGERS (1).** A mixed ensemble designed for the exploration and enjoyment of choral music. Performance each term. Students must have two years choral experience or equivalent. No audition required.

**MUS 342. VOCAL JAZZ ENSEMBLE (1).** A small ensemble with special emphasis given to music in the jazz/swing idiom. Students must have two years college-level vocal jazz ensemble experience or equivalent. PREREQ: Department approval required.

**MUS 344. MADRIGAL SINGERS (1-2).** A small ensemble with emphasis on Renaissance vocal music and contemporary vocal music written in a madrigal style. Students must have two years college-level vocal ensemble experience or equivalent. PREREQ: Departmental approval required.

**MUS 350. SYMPHONIC BAND (1).** A select ensemble of approximately 80 wind and percussion players. Performance winter and spring terms. 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. Students must have two years college-level band experience or equivalent.

**MUS 353. MARCHING BAND (1-2).** A marching and playing unit of more than 160 musicians. Performs for home football games. Students must have two years 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 band experience or equivalent.

**MUS 357. SMALL JAZZ ENSEMBLE (1).** Concentration on current jazz styles. Performance each term. Students must have 2 years college-level jazz band experience or equivalent.

**MUS 358. LARGE JAZZ ENSEMBLE (1).** Concentration on current jazz styles. Performance each term. Students must have 2 years college-level jazz band experience or equivalent.

**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. Students must have two years college-level orchestra experience or equivalent. PREREQ: Department approval required.

**MUS 363. ACCOMPANYING (1).** Piano accompanying and chamber music skills, studio experience, and weekly performance class. Students must have two years college level ensemble or equivalent. COREQ: MUS 390 or MUS 490. PREREQ: Department approval required.

**MUS 364. CHAMBER ENSEMBLE: STRINGS (1).** Students must have two years college-level ensemble experience or equivalent. PREREQ: Department approval required.

**MUS 365. CHAMBER ENSEMBLE: WOODWINDS (1).** Students must have two years college-level ensemble experience or equivalent. PREREQ: Department approval required.

**MUS 366. CHAMBER ENSEMBLE: BRASS (1).** Students must have two years college-level ensemble experience or equivalent. PREREQ: Department approval required.

**MUS 367. CHAMBER ENSEMBLE: PERCUSSION (1).** Students must have two years college-level ensemble experience or equivalent. PREREQ: Department approval required.

**MUS 368. CHAMBER ENSEMBLE: MISCELLANEOUS (1).** Students must have two years college-level ensemble experience or equivalent. PREREQ: Department approval required.

**MUS 369. OPERA WORKSHOP (1).** See *Schedule of Classes* for term offered. Students must have two years college-level vocal performance experience or equivalent. PREREQ: Department approval required.

**MUS 399. SPECIAL STUDIES (1-3).** Junior level. PREREQ: Department approval required.

**MUS 401/MUS 501. RESEARCH (1-6).** PREREQ: Department approval required.

**MUS 402/MUS 502. INDEPENDENT STUDY (1-6).** PREREQ: Department approval required.

**MUS 403/MUS 503. THESIS (1-6).** PREREQ: Department approval required.

**MUS 405/MUS 505. READING AND CONFERENCE (1-6).** PREREQ: Department approval required.

**MUS 406/MUS 506. PROJECTS (1-6).** PREREQ: Department approval required.

**MUS 407/MUS 507. SEMINAR (1-6).** PREREQ: Department approval required.

**MUS 408/MUS 508. WORKSHOP (1-6).** PREREQ: Department approval required.

**MUS 410/MUS 510. INTERNSHIP (3).** Provides experience in field settings, opportunity to develop personal and professional skills. May repeat up to 12 credits. See department for details. PREREQ: Departmental approval required.

**MUS 423/MUS 523. LITERATURE AND MATERIALS OF MUSIC (3).** A survey of western art music from 1945 to the present including techniques of analysis, musical form, composition, and ear training skills. PREREQ: MUS 223. Offered alternate years.

**MUS 441. PERIOD STUDIES (3).** Intensive study of music in the Baroque, Classic, Romantic, and Twentieth Century periods. See *Schedule of Classes* for topic. PREREQ: MUS 123.

**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. PREREQ: MUS 123.

**MUS 443/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. PREREQ: MUS 223.

**MUS 444/MUS 544. PIANO PEDAGOGY (3).** The study of basic principles of piano pedagogy.

**MUS 499. SPECIAL STUDIES (1-3).** PREREQ: Department approval required.

### Graduate Courses

**MUS 516/MUS 517. ADVANCED CONDUCTING: CHORAL (3).** Baton technique, interpretation and the study of major choral scores. PREREQ: MUS 317.

**MUS 518/MUS 519. ADVANCED CONDUCTING: INSTRUMENTAL (3).** Baton technique, interpretation and the study of major instrumental scores. PREREQ: 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 by audition.

**MUS 541. PERIOD STUDIES (3).** Intensive study of music in the Baroque, Classic, Romantic and Twentieth Century periods. See *Schedule of Classes* for topic. PREREQ: MUS 324.

**MUS 542. GENRE STUDIES (3).** Intensive study of selected genres, such as orchestra, chamber music, keyboard literature, vocal literature, music theatre and opera. PREREQ: MUS 223.

**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.

**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 by audition.

**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. COREQ: MUP 590.

**MUS 568. CHAMBER ENSEMBLE: MISCELLANEOUS (1).** 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 by audition.

**MUS 599. SPECIAL STUDIES (1-16).** PREREQ: Department approval required.

## ■ MUSIC EDUCATION

### Lower Division 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 pedagogic skills as they relate to a beginning instrumentalist rather than upon performance skills.

### Upper Division Courses

**MUED 372. SINGERS' DICTION I (2).** Pedagogical methods for the teaching of Latin and English diction for solo and ensemble singers using the International Phonetic Alphabet. Offered alternate years.

**MUED 373. SINGERS' DICTION II (2).** Continuation of Singers' Diction I, emphasizing French and German diction. Offered alternate years.

**MUED 401/MUED 501. RESEARCH (1-16).** PREREQ: Department approval required.

**MUED 402/MUED 502. INDEPENDENT STUDY (1-16).** PREREQ: Department approval required.

**MUED 405/MUED 505. READING AND CONFERENCE (1-16).** PREREQ: Department approval required.

**MUED 406/MUED 506. PROJECTS (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, videotapes. PREREQ: Department approval required.

**MUED 407/MUED 507. THEORY AND PRACTICUM SEMINAR (1-4).** Taken concurrently with MUED 413.

**MUED 408/MUED 508. WORKSHOP (1-16).** PREREQ: Department 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. One hour of MUED 407 to be taken concurrently.

**MUED 471/MUED 571. FUNDAMENTALS OF MUSIC FOR ELEMENTARY CLASSROOM TEACHERS (3).** Music activities for elementary teachers in training. Introductory course designed to build musicianship through experiences which are developmentally appropriate to the teaching of music in the primary elementary classroom.

**MUED 473/MUED 573. ELEMENTARY METHODS I (3).** Methods appropriate for music specialist to teach children from pre-primary through third grade. Presentation of Orff, Kodaly, and Education Through Music concepts; use of instruments and materials. PREREQ: MUED 472.

**MUED 474/MUED 574. ELEMENTARY METHODS II (3).** Continuation of MUED 473/573. Methods appropriate for music specialist to teach children from 4th through 8th grade. Introduction to vocal and instrumental ensembles, appropriate literature and available music technology. PREREQ: MUED 473/MUED 573.

**MUED 475/MUED 575. INSTRUMENTAL ENSEMBLES AND THEIR REPERTORY (3).** Repertory of bands (including stage band) and orchestra in the high school and community; program planning and administration. PREREQ: MUS 326.

**MUED 477/MUED 577. 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. PREREQ: MUS 222, MUS 234, MUS 319.

**MUED 478/MUED 578. TECHNIQUES FOR THE VOCAL INSTRUCTOR (2).** Vocal techniques for the public school music teachers. Offered alternate years. PREREQ: MUS 185 or permission of instructor.

**MUED 479/MUED 579. THE CHOIR AND ITS REPERTORY (3).** Repertory of choral groups in the high school, church and community; program planning and administration. PREREQ: MUS 222, MUS 234, MUS 319.

**MUED 499/MUED 599. SPECIAL STUDIES (1-16).** PREREQ: Departmental approval required.

### Graduate Courses

**MUED 510. INTERNSHIP: (1-15).** Full-time 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. PREREQ: Admission to the M.A.T. Program. 3 credits of seminar (MUED 507) must be taken concurrently with this course; see *Schedule of Classes* for specific course designator for seminar.

**MUED 591. FOUNDATIONS OF MUSIC EDUCATION (3).** Overviewing music education topics for music teachers in training, including purposes and foundations of music education, and introduction to research applicable to the teaching of music. Required course for MAT program.

**MUED 592. FOUNDATIONS OF MUSIC EDUCATION II: (3).** Music education topics for music teachers in training including research applicable to the teaching of music curricular designs and curricular development in public music education. Required course for MAT Program. PREREQ: MUED 591.

**MUED 593. MUSIC TECHNOLOGY (3).** Specific applications for teaching music incorporating appropriate software and hardware for curricular integration and curricular evolution.

### Lower Division Courses

**MUP 160. INDIVIDUAL LESSONS: BEGINNING PIANO (1-2).** Department approval required.

**MUP 161. INDIVIDUAL LESSONS: BEGINNING STRINGS (1-2).** Department approval required.

**MUP 162. INDIVIDUAL LESSONS: BEGINNING BRASS (1-2).** PREREQ: Department approval required.

**MUP 163. INDIVIDUAL LESSONS: BEGINNING WOODWINDS (1-2).** PREREQ: Department approval required.

**MUP 164. INDIVIDUAL LESSONS: BEGINNING VOICE (1-2).** PREREQ: Department approval required.

**MUP 170. INDIVIDUAL LESSONS: INTERMEDIATE PIANO (1-2).** PREREQ: Department approval required.

**MUP 171. INDIVIDUAL LESSONS: INTERMEDIATE STRINGS (1-2).** PREREQ: Department approval required.

**MUP 172. INDIVIDUAL LESSONS: INTERMEDIATE BRASS (1-2).** PREREQ: Department approval required.

**MUP 173. INDIVIDUAL LESSONS: INTERMEDIATE WOODWINDS (1-2).** PREREQ: Department approval required.

**MUP 174. INDIVIDUAL LESSONS: INTERMEDIATE VOICE (1-2).** PREREQ: Department approval required.

**MUP 190. INDIVIDUAL LESSONS: KEYBOARD (1-2).** PREREQ: Department approval required.

**MUP 191. INDIVIDUAL LESSONS: VOICE (1-2).** PREREQ: Department approval required.

**MUP 192. INDIVIDUAL LESSONS: STRINGS (1-2).** PREREQ: Department approval required.

**MUP 193. INDIVIDUAL LESSONS: WOODWINDS (1-2).** PREREQ: Department approval required.

**MUP 194. INDIVIDUAL LESSONS: BRASS (1-2).** PREREQ: Department approval required.

**MUP 195. INDIVIDUAL LESSONS: PERCUSSION (1-2).** PREREQ: Department approval required.

**MUP 196. INDIVIDUAL LESSONS: MISCELLANEOUS (1-2).** PREREQ: Department approval required.

**MUP 290. INDIVIDUAL LESSONS: KEYBOARD (1-2).** PREREQ: Department approval required.

**MUP 291. INDIVIDUAL LESSONS: VOICE (1-2).** PREREQ: Department approval required.

**MUP 292. INDIVIDUAL LESSONS: STRINGS (1-2).** PREREQ: Department approval required.

**MUP 293. INDIVIDUAL LESSONS: WOODWINDS (1-2).** PREREQ: Department approval required.

**MUP 294. INDIVIDUAL LESSONS: BRASS (1-2).** PREREQ: Department approval required.

**MUP 295. INDIVIDUAL LESSONS: PERCUSSION (1-2).** PREREQ: Department approval required.

**MUP 296. INDIVIDUAL LESSONS: MISCELLANEOUS (1-2).** PREREQ: Department approval required.

### Upper Division Courses

**MUP 390. INDIVIDUAL LESSONS: KEYBOARD (1-2).** PREREQ: Department approval required.

**MUP 391. INDIVIDUAL LESSONS: VOICE (1-2).** PREREQ: Department approval required.

**MUP 392. INDIVIDUAL LESSONS: STRINGS (1-2).** PREREQ: Department approval required.

**MUP 393. INDIVIDUAL LESSONS: WOODWINDS (1-2).** PREREQ: Department approval required.

**MUP 394. INDIVIDUAL LESSONS: BRASS (1-2).** PREREQ: Department approval required.

**MUP 395. INDIVIDUAL LESSONS: PERCUSSION (1-2).** PREREQ: Department approval required.

**MUP 396. INDIVIDUAL LESSONS: MISCELLANEOUS (1-2).** PREREQ: Department approval required.

**MUP 490. INDIVIDUAL LESSONS: KEYBOARD (1-2).** PREREQ: Department approval required.

**MUP 491. INDIVIDUAL LESSONS: VOICE (1-2).** PREREQ: Department approval required.

**MUP 492. INDIVIDUAL LESSONS: STRINGS (1-2).** PREREQ: Department approval required.

**MUP 493. INDIVIDUAL LESSONS: WOODWINDS (1-2).** PREREQ: Department approval required.

**MUP 494. INDIVIDUAL LESSONS: BRASS (1-2).** PREREQ: Department approval required.

**MUP 495. INDIVIDUAL LESSONS: PERCUSSION (1-2).** PREREQ: Department approval required.

**MUP 496. INDIVIDUAL LESSONS: MISCELLANEOUS (1-2).** PREREQ: Department approval required.

**Graduate Courses**

**MUP 590. INDIVIDUAL LESSONS: KEYBOARD (1-2).** PREREQ: Department approval required.

**MUP 591. INDIVIDUAL LESSONS: VOICE (1-2).** PREREQ: Department approval required.

**MUP 592. INDIVIDUAL LESSONS: STRINGS (1-2).** PREREQ: Department approval required.

**MUP 593. INDIVIDUAL LESSONS: WOODWINDS (1-2).** PREREQ: Department approval required.

**MUP 594. INDIVIDUAL LESSONS: BRASS (1-2).** PREREQ: Department approval required.

**MUP 595. INDIVIDUAL LESSONS: PERCUSSION (1-2).** PREREQ: Department approval required.

**MUP 596. INDIVIDUAL LESSONS: MISCELLANEOUS (1-2).** PREREQ: Department approval required.

## NATURAL RESOURCES

The College of Liberal Arts, in cooperation with the Colleges of Agricultural Sciences, Forestry, and Science, participates in offering a broad-based B.S. degree in Natural Resources. A student enrolls in the department most related to the specialty area he or she selects under the Natural Resources Program. See the Interdisciplinary Studies Section of this catalog for curriculum details.

## PEACE STUDIES

C/O Speech Communication
104 Shepard Hall
Oregon State University
Corvallis, OR 97331-6199
(541) 737-2461

**Faculty**
*Associate Professor* Gregg Walker

**Certificate Program**

Peace Studies

The Peace Studies Program offers undergraduate and graduate students focused, planned study of issues of conflict, peace, and war. The program includes hourly requirements roughly equivalent to an academic minor, leading to a certificate of peace studies.

The program promotes study in a number of areas, including (a) individual, cultural, systemic, and structural dimensions of conflict and conflict management; (b) personal, social, and international behavior; (c) alternative theories of change; (d) issues of war and peace; and (e) dispute resolution. Core and elective courses come from the Departments of Anthropology, Economics, Geography, History, Philosophy, Political Science, Psychology, Sociology, and Speech Communication.

### CERTIFICATE CURRICULUM

To earn a peace studies certificate, students must complete a minimum of 30 credits consisting of 12 credits minimum of core courses and 18 credits of elective courses.

**CORE REQUIREMENTS (12)**

PAX 201. Study of Peace & Causes of Conflict (3)
*Select three of the following:*
COMM 440. Theory of Conflict & Conflict Mgmt (3)
SOC 421. Social Change and Modernization (3)
HST 317. Why War: A Historical Perspective (3)
PS 205. Intro to International Relations (3)
PSY 468. Intl Behavior and Pol Psych (3)
*Select 18 credits from two of the following areas:*
(1) Theory, Research, and Practices in Peace (PAX courses)
(2) Processes of Change, Development, and Modernization
(3) Economic Dimensions of Peace and Conflict;
(4) Historical Dimensions of Peace and Conflict;
(5) Political Dimensions of Peace and Conflict; and
(6) Behavioral Dimensions of Peace and Conflict.

### COURSES

**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 the outside governments; prospects for world peace. Case studies in peace and conflict. (SS)

**Upper Division Courses**

**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.

**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.

**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.

**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.

**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.

**Graduate Courses**

**PAX 502. INDEPENDENT STUDY (1-16).** (See PAX 402 for description.)

**PAX 505. READING AND CONFERENCE (1-16).** (See PAX 405 for description.)

**PAX 507. SEMINAR (1-16).** (See PAX 407 for description.)

**PAX 510. PEACE STUDIES INTERNSHIP (1-16).** (See PAX 410 for description.)

**PAX 515. TOPICS IN PEACE STUDIES (1-16).** (See PAX 415 for description.)

## PHILOSOPHY

Kathleen D. Moore, Chair
208 Hovland Hall
Oregon State University
Corvallis, OR 97331-3902
(541) 737-2955

**Faculty**
*Professors* Borg, Leibowitz, List, Moore; *Associate Professors* Campbell, Hosoi, Scanlan, Uzgalis; *Assistant Professors* Pacheco, Ramsey; *Senior Instructor* Roberts

**Undergraduate Major**

**Philosophy (B.A., B.S.)**

**Minor**

**Philosophy (for nonmajors)**

**Certificate Program**

**Applied Ethics Certificate**

The Department of Philosophy offers an undergraduate program leading to the B.A. or B.S. degree, a minor program, and a certificate in Applied Ethics; and participates in the graduate program in Interdisciplinary Studies (M.A.I.S.) through the Graduate School.

The department also teaches general education courses for students interested in broadening their intellectual horizons, developing their abilities for intellectual criticism, and enlarging their understanding of social, ethical, religious, and aesthetic values in contemporary society and in world history.

An undergraduate degree in philosophy provides a broad education and intellectual skills useful in many occupations. The undergraduate major program also offers valuable background for graduate study in philosophy, and for advanced study in such professional fields as law and public service. The department invites students to combine a serious study of philosophy with the study of another discipline, by earning concurrent degrees.

For the philosophy minor, students may specialize in such areas as logic, philosophy of science, history of philosophy, philosophy of religion, contemporary philosophy, ethics, political philosophy, and philosophy of the arts. In addition the department offers a minor concentration in prelaw studies which includes courses relevant to the law.

### MAJOR PROGRAM (44)

*History of Philosophy:*
PHL 301 and PHL 302, plus one of the following: PHL 303, PHL 311, PHL 312, PHL 313, PHL 315, PHL 371, PHL 411, PHL 412
*Contemporary Philosophy–select two courses:*
PHL 207, PHL 316, PHL 331, PHL 342, PHL 399, PHL 417, PHL 436, PHL 451, PHL 455, PHL 470,or PHL 499
*Upper Division Value Theory–select one course:*
PHL 342, PHL 360, PHL 365, PHL 440, PHL 443, PHL 444, PHL 447 or PHL 461

*Logic:*
PHL 101 plus one of the following:
PHL 320, PHL 321, PHL 325, or PHL 421
*Seminar–select one course:*
PHL 407
*400-Level Elective: 3–4 credits*
*General electives:*
As many as needed to complete total credit requirement. PHL 201 strongly recommended.

**B.S. Requirement**
12 credits in computer science and quantitative studies.

## MINOR (27)

*History of Philosophy–Select one course from:*
PHL 301, PHL 302, or PHL 303
*Logic–Select one course from:*
PHL 101, PHL 121, PHL 320, PHL 321, PHL 325, or PHL 421
*Concentration:*
Students must arrange a minor area of concentration with approval of a faculty adviser.
*Electives:*
As many as needed to complete total credit requirement.
Total must include 12 credits of upper division with at least 3 credits 400-level.

## APPLIED ETHICS CERTIFICATE (28)

The undergraduate certificate in applied ethics builds upon the various courses in ethics taught in the Department of Philosophy 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 will earn a certificate in applied ethics by completing a minimum of 28 credits of approved course work.

**Core Requirements**
PHL 205. Ethics (4)
Any listed PHL course (3-4)
*9 credits from any of the following courses:*
PHL 280. Ethics of Diversity (4)
PHL 342. Contemporary Ethics (4)
PHL 405. Reading/Conference (3)
PHL 440. Environmental Ethics (3)
PHL 443. Worldviews/Environ. Values (3)
PHL 444. Biomedical Ethics (4)
PHL 470. Philosophy of Science (3)
PHL 447. Research Ethics (3)

*12 credits of applied ethics beyond the core courses.* There are three concentrations available:
Ethics and Scientific Inquiry
Ethics and the Environment
Ethics, Health and Medicine

The student's academic adviser and faculty of the Program for Ethics, Science, and the Environment will assist students in course selection from a list available in the Philosophy Department.

## COURSES

### Lower Division 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 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) (Writing Intensive Course)

**PHL 150. *GREAT IDEAS (3).** Philosophy explores the assumptions and deeper meanings of familiar concepts and experiences. This course is 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. The course is team-taught by philosophers with expertise in different areas of philosophy. (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. (Bacc Core Course)

**PHL 199. SPECIAL STUDIES (1-16).** Courses may be repeated as appropriate.

**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. (Bacc Core Course)

**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. (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. (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. (Bacc Core Course)

**PHL 230. *CHRISTIANITY AND WESTERN CULTURE (4).** An introduction to tradition, emphasizing the relationship between Christian construals of reality and culture, from the early church in the Roman Empire through the medieval synthesis to the birth of the modern world in the Reformation and Enlightenment. Not offered every year. (Bacc Core Course)

**PHL 280. *ETHICS OF DIVERSITY (4).** Uses moral philosophy to examine difference-based discrimination and prejudice in the human community. (Bacc Core Course)

### Upper Division Courses

**PHL 301,PHL 302,PHL 303. *HISTORY OF WESTERN PHILOSOPHY (4,4,4).** 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. PREREQ: 3 credits of philosophy recommended. (Bacc Core Course)

**PHL 311,PHL 312,PHL 313. *HISTORY OF NON-WESTERN RELIGIOUS IDEAS (4,4,4).** Study of ideas, beliefs, moral values, and comprehensive attitudes toward life through the history of religions. PHL 311: Before Philosophy; Prehistoric and primitive religions, Egypt, Mesopotamia, Greece, and India. PHL 312: Far East; Sankhya Yoga, Jainism, Buddhism, Taoism, Confucianism, Mohism, and Shinto. PHL 313: Near East, Zoroastrinism, Judaism, Christianity, mystery religions, and Islam. PREREQ: 3 credits of philosophy recommended. (Bacc Core Course)

**PHL 315. *PRECOLUMBIAN PHILOSOPHY (4).** Philosophical and religious thought and social structure in Mesoamerica prior to the European arrival. Focus primarily on the Maya civilizations of Guatemala and Mexico during the Classic Period, with some attention to Olmecs, Toltecs, Aztecs, and other indigenous societies. (Bacc Core Course)

**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 issues including NAFTA, immigration, and U.S.-Mexican relations.

**PHL 320. LEGAL REASONING (4).** A study of legal reasoning—the kinds of arguments judges give, the relationship between the reasons and the decisions, and the adequacy of these reasons as support for the decision. Designed to improve the students' analytical skills, especially those required for law school. PREREQ: Upper division standing, appropriate placement, or PHL 101. Offered every other year.

**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. PREREQ: Upper class 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 340. *SCIENCE, POLICY, AND SOCIETY (4).** Examination of the use of scientific knowledge in the setting and evaluation of policy. Includes study or risk assessment, advocacy and expert knowledge. Topics vary but include nuclear power, global warming, hazardous waste, and biotechnology. (Bacc Core Course)

**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. REC: PHL 205. Not offered every year.

**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. REC: 3 credits of philosophy, or upper division standing. Offered every other year. (Bacc Core Course)

**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. PREREQ: 3 credits of philosophy or upper division standing. Offered every other year. (Bacc Core Course)

**PHL 371. *PHILOSOPHIES OF CHINA (4).** A study of the traditional philosophies of China, including Confucianism, Taoism, Mohism, Legalism, and Buddhism. PREREQ: 3 credits of upper division philosophy. Not offered every year. (Bacc Core Course)

**PHL 380. *MIRRORS OF THE SELF: THE BODY (3).** An examination of the Western concept of embodiment through the experience of bodily differences and their manifestations in systems of inequality, with special focus on women, the aging, and the disabled. (Bacc Core Course)

**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. REC: 3 credits of upper division philosophy. Not offered every year. Course may be repeated as appropriate.

**PHL 402/PHL 502. INDEPENDENT STUDY (1-16).**

**PHL 405/PHL 505. READING AND CONFERENCE (1-16).**

**PHL 407/PHL 507. ^SEMINAR (1-16).** PREREQ: two upper-division philosophy courses or the equivalent. (Writing Intensive Course)

**PHL 410/PHL 510. INTERNSHIP (1-12).**

**PHL 411/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. PREREQ: 6 credits of philosophy. Need not be taken in sequence. Not offered every year.

**PHL 412/PHL 512. 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. PREREQ: 6 credits of philosophy. Need not be taken in sequence. Not offered every year. (H)

**PHL 417/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. PREREQ: 6 credits of philosophy or upper-division standing. CROSSLISTED as WS 417.

**PHL 421/PHL 521. 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 metamathematical analysis of axiomatic theories. PREREQ: PHL 321, or 6 credits of 400-level mathematics or computer science. Not offered every year.

**PHL 436/PHL 536. PHILOSOPHY AND RELIGION (3).** Examination of significant philosophical issues or movements and their relationship to theology and religion. PREREQ: 6 credits of philosophy.

**PHL 440/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 and plants; the uses of environmental ethics by environmental groups; and selected contemporary issues on the 342,PHL 365 or 6 credits of philosophy.

**PHL 443/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. PREREQ: One Introductory level science course. (Bacc Core Course)

**PHL 444/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. (Bacc Core Course)

**PHL 447/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. (Bacc Core Course)

**PHL 450/PHL 550. TOPICS (1).** This course 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. No prerequisites.

**PHL 451/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. PREREQ: 6 credits of philosophy. Not offered every year.

**PHL 455/PHL 555. DEATH AND DYING (3).** A multidisciplinary study of cultural, philosophical, and religious perspectives on death, dying, and grieving. PREREQ: 6 credits of philosophy or upper division standing. Not offered every year.

**PHL 461/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. Upper division standing recommended.

**PHL 470/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. PREREQ: 6 credits of philosophy (upper division philosophy recommended). Not offered every year.

**PHL 491/PHL 591. SUSTAINABLE FORESTRY: MULTIPLE PERSPECTIVES (3).** Examination of social, biological, and philosophical factors in natural resource management; includes concepts of sustainability and their consequences for forests and human communities. REQ: Field trip, group/individual projects. PREREQ: Upper division standing, must include a total of 6 credits in forestry, sociology, or philosophy. CROSSLIST: FS 491/FS 591, SOC 491/SOC 591.

**PHL 499/PHL 599. TOPICS IN CONTEMPORARY PHILOSOPHY (1-4).** Examination of the work of a contemporary philosopher or of a specific contemporary problem; e.g., Wittgenstein, determinism, perception. PREREQ: 6 credits of upper division philosophy. Not offered every year. Course may be repeated as appropriate.

### Graduate Courses

**PHL 501. RESEARCH (1-16).** Department approval required.

**PHL 503. THESIS (1-16).** PREREQ: Department approval required.

**PHL 525. PHILOSOPHICAL METHODOLOGY (3).** Examines diverse ways of approaching philosophical issues. Contains readings from different philosophical traditions. Develops understanding of the skills and conventions of philosophical argumentation.

## POLITICAL SCIENCE

James C. Foster, Chair
307 Social Science Hall
Oregon State University
Corvallis, OR 97331-6206
(541) 737-2811

**Faculty**

*Professors* Clinton, Dealy, Foster, Lunch; *Associate Professors* Sahr; *Assistant Professors* Banducci, Li, Simon, Terrio; *Instructor* Becker; *Extension Sea Grant Specialist* Pat Corcoran

**Undergraduate Major**

**Political Science (B.A., B.S.)**

**Minor**

Political Science

The Department of Political Science offers both a major and minor program; the major program leads to the B.A. or the B.S. degree. Course work in several subfields is offered, including American politics, public policy, public law, public administration, political theory, state and local government, international relations, women and politics, and comparative politics (for example, Latin America, Western Europe, Russia).

Either directly or after graduate study, political science graduates pursue careers in law, foreign service, management (all levels of government), international organizations, journalism, university teaching, research, political office, and—as with many other liberal arts graduates—in business.

Political Science majors must complete core requirements stated below. They may then choose either to concentrate in one or two subfields or to seek breadth by taking courses in a number of the subfields.

Political Science majors are encouraged to incorporate into their studies 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 International Internship programs.

The Political Science Department also participates in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) degree program. (See Graduate School.)

## MAJOR REQUIREMENTS

Students selecting a major in Political Science must complete 51 credits of political science course work, of which at least 35 credits must be upper division courses. As part of these overall credit totals, Political Science majors must complete:

**I. 5 Foundation Courses**

Normally, Foundation courses are taken in a student's first two years. The Department encourages students to take them in their first or second year.

PS 201. Introduction to United States Government (4)
PS 204. Introduction to Comparative Politics (4)
PS 205. Introduction to International Relations (4)
PS 206. Introduction to Political Thought (4)
PS 300. Political Analysis (4)

Majors must take the prerequisite Foundation course in a given subfield before enrolling in upper division subfield courses. (For example, PS 201 must be taken prior to enrolling in PS 321.)

**II. 4 Upper Division Subfield Courses**

(*One each from the four following subfields*):
American national government and politics, judicial politics, state and local politics, public policy, public administration;
comparative politics;
international relations;
political philosophy.

**III. The political field work requirement**

Either:
PS 398. Practical Politics OR
PS 406/PS 410. Projects/Internship OR
Petition the department in writing to accept other field political experience.

**IV. A capstone course experience**

Either:
A Writing Intensive Course (WIC) that usually is in the subdiscipline in which the student is interested
PS 419. Topics in American Politics (4)
PS 429. Topics in Judicial Politics (4)
PS 439. Topics in State and Local Politics (4)
PS 459. Topics in International Relations (4)
PS 479. Topics in Public Policy and Public Administration (4)OR
A three-term, three-course Senior Thesis sequence (PS 401. Research; PS 402. Independent Study; PS 403. Thesis.)

Majors are required to maintain a minimum cumulative 2.5 grade point average for all Political Science course work.

Candidates for a B.A. degree must complete the University foreign language requirement. Students pursuing a B.S. degree must complete 15 credits in science, computer science and quantitative studies (for students beginning fall 1997 or transfers beginning fall 1999) as follows:

1. Computer science (3–4 credits), and
2. Any course from the College of Science except math or statistics (3–4 credits), and
3. One of the following (8 credits):
   A. Any 8 credits of departmentally approved ST courses, 4 credits of which must be at the 300-level or above (8 credits).
   B. MTH 111 and MTH 112 (8 credits).
   C. Any 8 credits of MTH courses at the 200 level or above (not including MTH 211, 212, 213 391, or 392).
   D. MTH 241 or 251, and ST 351 (8 credits). Economics majors.

Courses used to satisfy the B.S. requirements may not also be used to satisfy baccalaureate core requirements. Many departments require specific courses to satisfy this set of requirements; consult your academic adviser for details.

Students with interest in graduate study are advised to acquire competence in statistics and computer data processing. Students interested in law school should consult James Foster, pre-law advisor.

No more than 12 credits from PS 402-PS 406 and PS 408 or PS 410 may be applied to the major.

## MINOR REQUIREMENTS

Students selecting a minor in political science must complete 27 credits of political science, of which at least 18 must be upper division. Five minor areas are available: a general minor, and specialized minors in American Government and Politics, Public Law, International Affairs, Public Policy and Public Administration. Descriptions of the minors are available from the Political Science Department. When declaring with the Registrar a Political Science minor, a student may request that the transcript identify the specific minor.

No more than 6 credits from PS 402-PS 406 and PS 408 or PS 410 may be applied to the minor.

## COURSES

### Lower Division Courses

**PS 200. *INTRODUCTION TO POLITICAL SCIENCE (4).** Assumptions, concerns, and major concepts in political science. Includes historical developments and subjects in political philosophy but emphasizes modern concepts and empirical questions. (SS)(Bacc Core Course)

**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. (Bacc Core Course)

**PS 203. STATE AND LOCAL GOVERNMENT (4).** Role, organization, and functions of government at the state and local level in the United States. Satisfies teaching certification requirements for course work in state and local government. (SS)

**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)

**PS 205. INTRODUCTION TO INTERNATIONAL RELATIONS (4).** Analysis of the international system and factors affecting world politics. REC: PS 201. (SS)

**PS 206. *INTRODUCTION TO POLITICAL THOUGHT (4).** Introduction to political philosophy. Major ideas and issues of selected political thinkers. (SS)(Bacc Core Course)

**PS 299. SPECIAL STUDIES (1-4).** Department approval required.

### Upper Division Courses

**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.

**PS 311. 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. PREREQ: PS 201.

**PS 312. 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. PREREQ: PS 201.

**PS 313. 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. PREREQ: PS 201.

**PS 317. GENDER AND POLITICS (4).** Sources, ideas, and organization of the women's movement in the United States and its impact on public policy. PREREQ: PS 201.

**PS 321,PS 322,PS 323. AMERICAN CONSTITUTIONAL LAW (4,4,4).** PS 321: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 322: The Supreme Court's work from 1876-1948; economic substantive due process, judicial formalism, incorporation doctrine, rise of administrative state, beginnings of Second Reconstruction. PS 323: 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. PREREQ: PS 201. (PS 321, PS 322, and PS 323 form a sequence, though each course may be taken independently.)

**PS 324. AMERICAN COURTS, POLITICS, AND JUSTICE (4).** Examination of dual system of American courts: local/state and federal. Major judicial actors, civil and criminal procedures, judicial decision making and policy making, social impacts of courts. PREREQ: PS 201.

**PS 331. STATE GOVERNMENT AND POLITICS (4).** Importance of states in total governmental process; role of the legislative, executive, judicial branches in shaping state government. Satisfies teaching certification requirement for course work in state and local government. PREREQ: PS 201 or PS 203.

**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. PREREQ: PS 204.

**PS 341. WESTERN EUROPEAN POLITICS (4).** Describes and analyzes the history of political development in Europe. 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. PREREQ: PS 204.

**PS 342. SOVIET POLITICS (4).** Emergence and development of the former USSR from 1917 up to the beginning of the Gorbachev era in 1985. PREREQ: PS 204. (PS 342 and PS 343 form a sequence, though either course may be taken independently of the other.)

**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). PREREQ: PS 204. Strongly Recommended: PS 342. (PS 342 and PS 343 form a sequence, though either course may be taken independently of the other.)

**PS 344. LATIN AMERICAN POLITICS (4).** Exploration of the regions political culture and of the forces contending for maintenance of the status quo, for reform, and for revolution. PREREQ: 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. PREREQ: PS 204. (Bacc Core Course).

**PS 346. 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" (NIC's) 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. PREREQ: PS 204.

**PS 347. EUROPEAN UNION POLITICS (4).** An overview of politics in the European Union (EU). Historical context and the underlying principles of the process of European integration. Political, economic, legal, and social aspects of the EU's policy making processes and workings of the EU's institutions. Relations with other countries and the EU's role in world affairs today and tomorrow. PREREQ: PS 204.

**PS 348,PS 349. CHINESE POLITICS: 1949 TO 1976 (4,4). PS 348:** The first of a two-course sequence on Chinese politics, the course examines how China changed under Mao Tse-Tung and the Chinese Communist Party. Topics include the formation of the Stalinist state, political institutions and policy processes, elite politics, economic development strategies, and state-society relations. PREREQ: PS 204. **PS 349:** CHINESE POLITICS: 1976 TO PRESENT (4). The second of a two-course sequence on Chinese politics, the course examines the dynamic changes that have taken place in China since the late 1970's under the leadership of Deng Xiaoping. Topics include the impulse for reform, the content of reform, their impact upon Chinese society, and their implications for the international economy and world order. PREREQ: PS 204. (PS 348 and PS 349 form a sequence, though each course may be taken independently.)

**PS 361. CLASSICAL POLITICAL THOUGHT (4).** Major political theorists from the pre-Socratics through the Scholastics. PREREQ: PS 206

**PS 362. MODERN POLITICAL THOUGHT (4).** Major political theorists from the Renaissance to the mid-nineteenth century. PREREQ: 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. Satisfies DPD Requirement. (Bacc Core Course)

**PS 364. MARXISM-LENINISM (4).** A review of Marxism-Leninism and its relationship to Bolshevik Revolution and early development of Soviet political-economic system. PREREQ: PS 206.

**PS 365. AMERICAN POLITICAL THOUGHT (4).** Political values and theoretical systems in the American tradition, from the Puritans to the present. PREREQ: PS 201, PS 206.

**PS 366. BUDDHIST POLITICAL CULTURE (4).** Relationship between vigorous values and political behavior in Asian context with special reference to Theravada Buddhist Society of Burma and Mahayana Buddhist Society of old Tibet. PREREQ: PS 206 or consent of instructor.

**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. PREREQ: 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. PREREQ: PS 201. Satisfies DPD Requirement. (Bacc Core Course)

**PS 398. PRACTICAL POLITICS (1-3).** Experience in various political activities (such as Project Vote Smart), government programs, or other public affairs. Requires some written work. Departmental approval required.

**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. Course may be repeated when topics vary. (Bacc Core Course)

**PS 401/PS 501. RESEARCH (1-16).** Departmental approval required.

**PS 402/PS 502. INDEPENDENT STUDY (1-16).** Departmental approval required.

**PS 403/PS 503. THESIS (1-16).** Departmental approval required.

**PS 405/PS 505. READING AND CONFERENCE (1-16).** Department approval required.

**PS 406/PS 506. PROJECTS (1-16).** Section 11: MU Field Training, 3 credits; Section 12 ASOSU Field Training, 3 credits; each graded P/NP. Section 1-5: Reading. Department approval required. Associated with the internship for which credit is given in PS 410. Completion of this course is required to receive credit for PS 410/510. COREQ: PS 410/510.

**PS 407/PS 507. SEMINAR (1-16).** Department approval required.

**PS 408/PS 508. WORKSHOP (1-16).** Department approval required.

**PS 409/PS 509. PRACTICUM (1-16).** Department approval required.

**PS 410/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. May be repeated for a maximum of 12 credits. COREQ: PS 406/506. sections 1-5. Department approval required.

**PS 414/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. PREREQ: PS 201.

**PS 415/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. PREREQ: PS 201.

**PS 416/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. PREREQ: PS 201

**PS 418/PS 518. ELECTORAL POLITICS (4).** Treatment of selected aspects of electoral politics in the United States: including, nominations, elections, campaign finance, and voting behavior. PREREQ: PS 201.

**PS 419/PS 519. TOPICS IN AMERICAN POLITICS (4).** Topics in American politics not covered in other courses. Course may be repeated when topics vary. PREREQ: PS 201 and at least one upper-division course in American politics.

**PS 424/PS 524. ADMINISTRATIVE LAW (4).** Origins of administrative state; elements of administratve law; assessment of judicial control of bureaucracy. PREREQ: PS 201 and at least one of PS 321, PS 322, PS 323, PS 324.

**PS 425/PS 525. GENDER AND 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. PREREQ: PS 201 and at least one of PS 321,PS 322,PS 323,PS 324, or comparable experience with the judicial process.

**PS 429/PS 529. ^TOPICS IN JUDICIAL POLITICS (4).** Topics in judicial politics not covered in other courses. Course may be repeated when topics vary. PREREQ: PS 201 and at least one of PS 321, PS 322, PS 323, PS 324. (Writing Intensive Course.)

**PS 439/PS 539. ^TOPICS IN STATE AND LOCAL POLITICS (4).** Topics in state and local politics not covered in other courses. Course may be repeated when topics vary. PREREQ: PS 331. (Writing Intensive Course)

**PS 449/PS 549. TOPICS IN COMPARATIVE POLITICS (4).** Topics in comparative politics not covered in other courses. Course may be repeated when topics vary. PREREQ: At least one upper division course in comparative politics.

**PS 451/PS 551. 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. PREREQ: PS 201 or PS 205.

**PS 452/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. PREREQ: PS 205.

**PS 453/PS 553. RUSSIAN FOREIGN POLICY (4).** Russian foreign policy from the Tsars to the present, with focus on the Soviet and post-Soviet periods. PREREQ: PS 205. REC: PS 342 and PS 343 (PS 453/PS 553 forms a sequence with PS 342 and PS 343, but may be taken independently of them.)

**PS 454/PS 554. INTERNATIONAL LAW AND ORGANIZATIONS (4).** Theories and historical development of international law and organizations; the United Nations system. PREREQ: PS 204 or PS 205.

**PS 455/PS 555. *THE UNITED STATES AS VIEWED FROM ABROAD (4).** Analysis of the historical and cultural bases for perceptions of the United States abroad and examination of how these perceptions influence relations between the United States and different countries and different areas of the world. (Bacc Core Course)

**PS 459/PS 559. ^TOPICS IN INTERNATIONAL RELATIONS (4).** Topics in International relations not covered in other courses. Course may be repeated when topics vary. PREREQ: PS 205 and at least one upper-division course in International relations. (Writing Intensive Course.)

**PS 469/PS 569. TOPICS IN POLITICAL PHILOSOPHY (4).** Topics in political philosophy not covered in other courses. Course may be repeated when topics vary. PREREQ: At least one upper-division course in political philosophy.

**PS 472/PS 572,PS 473/PS 573. PUBLIC ADMINISTRATION (4,4).** PS 472/PS 572: Principles of public administration, administrative organization and procedures, public relations. PREREQ: PS 201. PS 473/PS 573: Administrative functions, public personnel, and fiscal problems and practices. PREREQ: PS 201. (PS 472/PS 572 and PS 473/PS 573 form a sequence, though each course may be taken independently.)

**PS 474/PS 574. BUREAUCRATIC POLITICS (4).** Government and political organizations: public support and opposition to them and the policies they implement. Internal culture and conflicts that shape public response to bureaucracy. PREREQ: PS 201 or consent of instructor.

**PS 475/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. PREREQ: PS 201 or consent of instructor.

**PS 476/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. PREREQ: PS 201 or 6 credits of lower-division courses in political science or permission of instructor. (Bacc Core Course)

**PS 477. ECONOMICS, POLITICS, AND GOVERNMENT (3).** Why and how governments tax, spend, subsidize, regulate, and deregulate; applications of economics and public choice theory. PREREQ: ECON 201, ECON 202. CROSSLISTED as ECON 477, AREC 477.

**PS 479/PS 579. ^TOPICS IN PUBLIC POLICY AND PUBLIC ADMINISTRATION (4).** Topics in public policy or public administration not covered in other courses. Course may be repeated when topics vary. PREREQ: PS 201 and at least one upper-division course in public policy or public administration. (Writing Intensive Course.)

**PS 485/PS 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 HORT 485/HORT 585, ANS 485/ANS 585, SOC 485/SOC 585. (Bacc Core Course)

**PS 489/PS 589. TOPICS IN POLITICAL ANALYSIS (4).** Topics in political analysis and empirical methods not covered in other courses. Course may be repeated when topics vary. PREREQ: PS 300

## PSYCHOLOGY

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**Faculty**

*Professors* Gillis, Horowitz, Schaffer; *Associate Professors* Cruse, Derryberry, Lanning, Reed, Ryan, Saslow; *Assistant Professors* Edwards, Watkins, Wilson

### Undergraduate Major

**Psychology (B.A., B.S.)**

### Minor

Psychology

The curriculum in psychology explores scientific approaches to a wide range of psychological phenomena. Courses meet the needs of students (a) desiring a knowledge of psychology as part of their general education or professional background, (b) planning to secure entry-level jobs in human services occupations, or (c) preparing for graduate study in psychology or related fields. The Department offers a major program leading to a B.A. or B.S. degree in general psychology, a minor program for undergraduate students with majors in other disciplines, and participates in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) degree program offered by the Graduate School.

Graduates with bachelor degrees in psychology often find entry-level career positions in the human services, business, education, management, sales, and may also go on to graduate study in such fields as psychology, counseling, social work, public and business administration, and law.

### MAJOR PROGRAM (51-52)

PSY 201 and PSY 202. General Psychology (6)
Departmentally approved statistics course(s) (8)
PSY 301. Research Methods in Psychology (4)
*Select one of the following Writing Intensive courses: (3-4)*
- PSY 430. Animal Behavior
- PSY 440. Cognition Research
- PSY 460. Advanced Social Research Methods
- PSY 470. Psychometrics and Psychol Testing
- PSY 480. Case Study Methods

*Select a course from each of the following sets: (9)*
- PSY 330. Brain and Behavior *or*
- PSY 340. Cognition
- PSY 350. Human Lifespan Development *or*
- PSY 360. Social Psychology
- PSY 370. Personality *or*
- PSY 380. Human Adjustment

Seven additional courses in psychology (21),
(a) at least 4 must be at the 400 level,
(b) no more than 3 credits of individualized research and field experience may be applied to the major
B.S. candidates must complete an additional 15 credits from a list of CLA approved courses. Students must receive a grade of C– or better in any course applied towards the Major.

### MINOR (27)

PSY 201 and PSY 202. General Psychology (6)
*Two of the following courses: (6)*
- PSY 330. Brain & Behavior
- PSY 340. Cognition
- PSY 350. Human Lifespan Development
- PSY 360. Social Psychology
- PSY 370. Personality
- PSY 380. Human Adjustment

Five additional courses (15)
(a) at least four must be at the 400 level
(b) no more than 3 credits of individualized research and field experience may be applied to the minor.
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 towards the minor.

### MASTER OF ARTS IN INTERDISCIPLINARY STUDIES

Students design their own M.A.I.S. program around three fields or areas of study, and may use specific areas of psychology for one or more of these fields. At least three courses must be in each field. Students wishing to include psychology as one or more of their three M.A.I.S. specialty areas should submit the following to the department.
(a) GRE scores for the verbal, quantitative, and analytic segments of the examination
(b) Overall GPA
(c) A list of psychology courses taken and the grades achieved in each
(d) Transcripts of all previous university work
(e) Names of two references who can be contacted by the department
(f) 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 M.A.I.S. program students must obtain written consent of a faculty member in this department who agrees to serve as the field or area adviser, as well as meeting general Graduate School entrance requirements.

### COURSES

#### Lower Division Courses

**PSY 199. SPECIAL TOPICS (1-16).**

**PSY 201,PSY 202. *GENERAL PSYCHOLOGY (3,3).** Scientific study of behavior and experience. PSY 201: Biological bases of behavior; sensation and perception; conditioning, learning and memory; thinking, problem solving, language, and consciousness; cognitive, personal and social development. PSY 202: Motivation and emotion; personality; measurement of human differences; adjustment, psychopathology and psychotherapy; attitudes and social behavior. (Bacc Core Course)(SS)

#### Upper Division Courses

**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. PREREQ: PSY 201, 202; ST 211 or ST 351.

**PSY 330. BRAIN AND BEHAVIOR (3).** 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. PREREQ: PSY 201,PSY 202. (SS)

**PSY 340. COGNITION (3).** Theories, research and applications concerning cognition. Topics include perception, attention, memory, learning, thinking and language. PREREQ: PSY 201, PSY 202. (SS)

**PSY 350. HUMAN LIFESPAN DEVELOPMENT (3).** An introduction to physical, social, cognitive and linguistic development with an emphasis on theory and methodology. PREREQ: PSY 201, PSY 202. (SS)

**PSY 360. SOCIAL PSYCHOLOGY (3).** The study of behavior and experience in a social context. Topics include person 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. PREREQ: PSY 201, PSY 202. (SS)

**PSY 370. PERSONALITY (3).** An overview of major theories of personality is followed by an introduction to personality testing and research. PREREQ: PSY 201, PSY 202. (SS)

**PSY 380. HUMAN ADJUSTMENT (3).** The psychological processes of coping with the demands of modern life. Topics include personality dynamics, conflict and stress management, self-concept, interpersonal relationships, individual and family transitions, psychological disorders and psychotherapy. PREREQ: PSY 201, PSY 202. (SS)

**PSY 401/PSY 501. RESEARCH (1-16).** PREREQ: Departmental approval required.

**PSY 402/PSY 502. INDEPENDENT STUDY (1-16).** PREREQ: Departmental approval required.

**PSY 403/PSY 503. THESIS (1-16).** PREREQ: Departmental approval required.

**PSY 405/PSY 505. READING AND CONFERENCE (1-16).** PREREQ: Departmental approval required.

**PSY 406/PSY 506. PROJECT (1-16).** PREREQ: Departmental approval required.

**PSY 407/PSY 507. SEMINAR (1-16).**

**PSY 408/PSY 508. WORKSHOP (1-16).**

**PSY 421/PSY 521. HISTORY OF PSYCHOLOGY (3).** An examination of the development of psychology. Major psychological concepts, methods, and areas of investigation are viewed both from a historical perspective and from the perspective of the philosophy of science. PREREQ: Three upper-division courses in psychology or consent of instructor.

**PSY 422/PSY 522. SELECTED TOPICS IN PSYCHOLOGY (3).** Newly emerging or specialized topics which can only be offered occasionally or for particular purposes. As each offering will be structured with a syllabus, this course may be repeated. PREREQ: To be determined for each offering.

**PSY 426/PSY 526. GENDER DIFFERENCES (3).** Survey of theories, life cycles and contemporary problems of women and men in a social context. Emphasis on factors relating to differential self-concept and behaviors. Psychological research in differences between women and men. PREREQ: a 300-level course in psychology. May be offered in alternate years.

**PSY 430/PSY 530. ^ANIMAL BEHAVIOR (4).** Application of observational and experimental methods to studying species-specific behavior in animals, with emphasis on domestic animals, such as the cat, dog, horse, etc. Relation of species-specific behaviors to inherited differences in nervous, sensory and motor systems and effects of domestication on animal behavior. Labs/field trips/individual projects. PREREQ: PSY 301 or equivalent; PSY 330 or PSY 340 or course work in zoology or animal science. (Writing Intensive Course)

**PSY 432/PSY 532. PHYSIOLOGICAL PSYCHOLOGY (3).** Basic vertebrate neurophysiology and neuroanatomy in relation to behavior. Neural and hormonal correlates of sensation, learning, memory and motivation. PREREQ: PSY 330 or equivalent biological science background.

**PSY 433/PSY 533. PSYCHOPHARMACOLOGY (3).** Drug-brain-behavior interactions. Psychoactive drugs and their relationships to normal and abnormal behavior in humans. PREREQ: Upper division standing. Biological science background helpful.

**PSY 436/PSY 536. EMOTION (3).** Contemporary theory and research concerning the role of emotion in human thought and behavior. Topics include biological bases of emotion, temperament, emotional disorders, and the interactions between emotion, cognition, and arousal. PREREQ: PSY 301 and either PSY 330 or PSY 340. May be offered in alternate years.

**PSY 437/PSY 537. MOTIVATION (3).** Biological, learning, and cognitive approaches to human and animal motivation. Topics include evolution, homeostasis, drive, arousal, incentive motivation, achievement motivation, and social motivation. PREREQ: PSY 301 and either PSY 330 or PSY 340.

**PSY 440/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. PREREQ: PSY 301,PSY 340. (Writing Intensive Course)

**PSY 442/PSY 542. PERCEPTION (3).** 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. PREREQ: PSY 301; PSY 330 or PSY 340.

**PSY 444/PSY 544. LEARNING AND MEMORY (3).** Experimental and theoretical work on learning, conditioning, and memory in animals and humans. PREREQ: PSY 301,PSY 340.

**PSY 446/PSY 546. THINKING AND PROBLEM SOLVING (3).** Theories, research, and applications concerning thought processes. Topics will include problem solving, inductive and deductive reasoning, artificial intelligence, and creativity. PREREQ: PSY 301,PSY 340. May be offered in alternate years.

**PSY 448/PSY 548. CONSCIOUSNESS (3).** 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. PREREQ: PSY 301,PSY 340. May be offered in alternate years.

**PSY 454/PSY 554. COGNITIVE DEVELOPMENT (3).** This course 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. PREREQ: PSY 350 and upper-division standing. May be offered in alternate years.

**PSY 456/PSY 556. SOCIAL DEVELOPMENT (3).** This course 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; prosocial behavior; morality; self-control; and aggression. PREREQ: PSY 350 and upper-division standing. May be offered in alternate years.

**PSY 458/PSY 558. LANGUAGE ACQUISITION (3).** 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. PREREQ: PSY 350. May be offered alternate years.

**PSY 460/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. PREREQ: PSY 301, PSY 360. (Writing Intensive Course.)

**PSY 462/PSY 562. INTERPERSONAL RELATIONS & SMALL GROUP PROCESSES (3).** Factors influencing interpersonal and small group dynamics. Lecture and commentary used to develop awareness of processes affecting behavior, accomplishments and interpersonal relationships. PREREQ: PSY 360. May be offered in alternate years.

**PSY 464/PSY 564. SOCIAL COGNITION (3).** Research and theory concerning cognitive structures and processes underlying social judgment and social inference, person memory, schema-based information processing. PREREQ: PSY 360 and upper-division standing.

**PSY 470/PSY 570. ^PSYCHOMETRICS AND PSYCHOLOGICAL TEST (3).** 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. PREREQ: PSY 301 and either PSY 340, PSY 370, or PSY 380. (Writing Intensive Course)

**PSY 472/PSY 572. PERSONALITY ASSESSMENT AND RESEARCH (3).** Theoretical and methodological issues in the assessment of personality are examined. Applied problems of human judgment, test interpretation, and psychodiagnosis are considered. The contemporary state of research in personality is characterized. PREREQ: PSY 301, PSY 370.

**PSY 480/PSY 580. ^CASE STUDY METHODS (4).** Major assessment methods including self-monitoring, self-report, and direct observation strategies in addition to the clinical interview and mental status examination. Introduction to single-case research design methodology. Students develop and practice skills through out-of-class assignments in which they assess themselves and volunteer subjects. Required term paper in which students describe the assessment and treatment of a fictitious client (topic of their choosing) evaluated within a single-case design format. PREREQ: PSY 301 and either PSY 380 or PSY 483. (Writing Intensive Course.)

**PSY 481/PSY 581. ABNORMAL PSYCHOLOGY (3).** Survey of various forms of psychological disorders; theories regarding etiology and treatment. Special emphasis on research approaches to such disorders. PREREQ: PSY 201, PSY 202; a 300 level course in psychology; upper-division standing.

**PSY 482/PSY 582. PSYCHOTHERAPY (3).** Survey of the theory, techniques and research on the major contemporary systems of psychotherapy. PREREQ: One of the following: PSY 370, PSY 380 or PSY 481.

**PSY 485/PSY 585. BEHAVIOR MODIFICATION (3).** 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. Individual projects. PREREQ: PSY 350 or PSY 380 or equivalent work in family life or education.

**PSY 487/PSY 587. FIELD EXPERIENCE IN HUMAN SERVICES (3-15).** Practicum/internship placement in community human service agencies and programs related to the students learning objectives. Includes regular on-site supervision, relevant readings, projects, and faculty site visits. Department approval required.

**PSY 496/PSY 596. INDUSTRIAL AND ORGANIZATIONAL PSYCHOLOGY (3).** 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. PREREQ: PSY 350, PSY 360, PSY 370 or PSY 380. May be offered alternate years.

**PSY 498/PSY 598. HEALTH PSYCHOLOGY (3).** 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. PREREQ: PSY 380. May be offered alternate years.

## RUSSIAN STUDIES

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### Certificate Program

Russian Studies

The Russian Studies certificate program is designed for students who wish to combine their departmental majors with a basic knowledge and understanding of Russian affairs, past and present. This interdisciplinary program of courses, offered by four departments in the College of Liberal Arts, examines the language, history, politics, economics, and culture of Russia

from the tenth century to the present.

The Russian Studies certificate is awarded in conjunction with the B.A. or B.S. degree. Successful completion of the program is noted on the student's official transcript and an official certificate is awarded.

The Russian Studies certificate may enhance career opportunities in business, education, and various public or private agencies concerned with relations between the United States and the former Soviet Union. It also provides a background for undertaking graduate work in Russian studies at other universities.

### CERTIFICATE CURRICULUM

**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 departments: economics; history; political science.

**REQUIREMENTS:**

RUS 211, RUS 212, RUS 213. Second-Year Russian (12)
RUS 231. Russian Culture: Old Russia (3)
RUS 232. Russian Culture: 19th Century (3)
RUS 233. Russian Culture: 20th Century (3)

**ELECTIVE COURSES**

*HST 342. Christianity in Russia (3)
HST 343. Women in Russia (3)
HST 440/HST 540, HST 441/HST 541. History of Russia (4-8)
HST 445/HST 545. Society in Modern Russia (4)
EC 420/EC 520. Comparative Economic Systems: Ideology, Theory & Practice (3)
EC 422/EC 522. Soviet and Post-Soviet Economics (3)
PS 342. Soviet Politics (4)
PS 343. Russian Politics (4)
PS 364. Marxism-Leninism (4)
PS 453/PS 553. Russian Foreign Policy (4)

**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 departments: foreign languages; economics; history; political science.

**Requirements:**

RUS 111, RUS 112, RUS 113. First-year Russian (12)

**Elective Courses:**

RUS 233. Russian Culture: 20th Century (3)
*HST 342. Christianity in Russia (3)
HST 343. Women in Russia (3)
HST 441. History of Russia (4)
HST 445/HST 545. Society in Modern Russia (4)
EC 420/EC 520. Comparative Economic Systems: Ideology, Theory & Practice (3)
EC 422/EC 522. Soviet and Post-Soviet Economics (3)
PS 342. Soviet Politics (4)
PS 343. Russian Politics (4)
PS 364. Marxism-Leninism (4)
PS 453/PS 553. Russian Foreign Policy (4)

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.

## SCIENTIFIC AND TECHNICAL COMMUNICATION

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(541) 737-5399
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**Graduate Major**

**Scientific and Technical Communication (M.A., M.S.)**

**Graduate Minors**

Communication Studies
Writing Education

The College of Liberal Arts offers a Master of Arts degree and a Master of Science degree in Scientific and Technical Communication. The program is designed to educate students who will take on communication and to help those who have or aspire to have communication management responsibilities in business, industry, government, and education.

The degree requires completion of a minimum of 45 graduate credits and either a thesis or a program-oriented project.

Students will also have the opportunity to participate in internships and independent studies.

This program combines coursework in communication theory and practice with coursework in science studies and/or a specific science.

Successful applicants for the STC Program for Fall term 1998 and after must meet the following criteria:

a. Undergraduate GPA of at least 3.0 on a 4.0 scale.
b. GRE scores submitted to the STC program director.

The M.A./M.S. degree in Scientific and Technical Communication consists of a major in the core areas of communication and science studies, and a minor in one of the following areas: a technical area, a communication specialty area, or science studies, as approved by the candidate's graduate committee. Requirements include a minimum of 45 quarter credits. After candidates have established their competence in the major, they will have freedom, with the approval of their committee, to develop the rest of their program to fit individual strengths and needs.

Minors may be constructed of a minimum of 15 graduate credits from a technical area, from a communication specialty area or from the science studies area.

### COURSES

**Graduate Courses**

**STC 515. RESEARCH METHODS (3).** A review of research methods commonly employed in studies of mass communications. Content analysis, readability, readership, and statistical models in which mass communication behavior plays a role. Emphasis on surveys of populations. PREREQ: ST 444.

**STC 520. SCIENCE AND COMMUNICATION I (3).** An introduction to basic materials of communication theory and their application to contemporary sciecne.

**STC 521. SCIENCE AND COMMUNICATION II (3).** An introduction to the field of Science and Technologies Studies, focusing on the roles communication plays in contemporary science.

**STC 540. TECHNICAL EDITING (3).** Editing technical and scientific material for style, organization, accuracy, and readability, editing proposals, journal articles, technical reports, and books. PREREQ: WR 327.

**STC 560. PUBLICATION DESIGN, PRODUCTION, AND MANAGEMEnt (3).** Elements of design and typography. Print methods and electronic publishing; publications management.

## SOCIOLOGY

Rebecca Warner, Chair
307 Fairbanks Hall
Oregon State University
Corvallis, OR 97331-3703
(541) 737-2641

**Faculty**

*Professors* Hendricks, Klemke, Tiedeman; *Associate Professors* Cordray, Langford, Mitchell, Warner; *Assistant Professors* Conway, Cramer, Gallagher, Lach, Sanford, Edwards, Plaza

**Undergraduate Major**

**Sociology (B.A., B.S.)**

**Minor**

Sociology

Sociology is the study of human social behavior. Sociologists examine processes of interaction within and between groups and resulting social systems. The undergraduate program in the Department of Sociology provides a broad understanding of human societies and culture for persons in all fields, with integrated programs for majors and minors in Sociology leading to B.A. and B.S. degrees.

### MASTER OF ARTS IN INTERDISCIPLINARY STUDIES

The department serves as a field in the Master of Arts in Interdisciplinary Studies degree program and participates as a minor field in other advanced degree programs. The M.A.I.S. program is designed to meet the particular needs and interests of the individual student and features collaborative work in any two other pertinent departments. Sociology may serve as one or more of these fields of concentration and as major and minor foci. Contact department

for listing of required course work for either major or minor concentration at the graduate level and for application procedures.

## Preparation

High school students planning to major in sociology should take courses in history, social studies, and foreign languages. Substantial work in English composition and mathematics is also highly desirable.

## Careers

Students earning bachelor's degrees in sociology are found in a wide variety of vocations open to liberal arts graduates, including business, public administration, social services, recreation, criminal justice and teaching. Undergraduate education in sociology frequently serves as preparation for graduate/professional schools offering advanced degrees in law, urban planning and management, architecture, business administration, social work and other social sciences. Post baccalaureate education is usually required for those seeking careers as professional social scientists in program and policy analysis, marketing, and postsecondary education.

## Interest Areas

The clusters of courses listed illustrate ways in which undergraduate students may organize their upper division course work. Selecting courses around a topic or theme of interest adds meaning to one's education and strengthens the base of understanding from which one then pursues a career or further education.

### SOCIAL CHANGE, TECHNOLOGY & MODERNIZATION

SOC 360. Population Trends and Policy (3)
SOC 421. Social Change and Modernization (3)
SOC 456. Sci and Tech in Social Context (3)
SOC 460. Comparative Societies (3)
SOC 464. Sociology of Revolution (3)
SOC 466. Intntl Develop: Gender Issues (3)
SOC 475. Rural-Urban Sociology (3)
SOC 480. Environmental Sociology (3)
SOC 481. Society & Natural Resources (3)
SOC 485. Consensus and Natural Resources (3)
SOC 491x. Issues in Sustainable Forestry (3)

### DEVIANCE AND SOCIAL CONTROL

SOC 340. Deviant Behavior & Soc Control (3)
SOC 439. Welfare and Social Services (3)
SOC 440. Juvenile Delinquency (3)
SOC 441. Criminology and Penology (3)
SOC 448. Law and Society (3)

### SOCIAL POLICY

SOC 350. Health, Illness, and Society (3)
SOC 426. Social Inequality (3)
SOC 430. Gender and Society (3)
SOC 432. Sociology of Aging (3)
SOC 437. Minority Groups and Issues (3)
SOC 439. Welfare and Social Services (3)
SOC 448. Law and Society (3)

### INTERPERSONAL AND GROUP RELATIONS

SOC 324. Groups and Organizations (3)
SOC 418. Qualitative Sociology (3)
SOC 424. Social Psychology (3)
SOC 430. Gender and Society (3)
SOC 437. Minority Groups and Issues (3)
SOC 470. Collective Behvr and Soc Mvmts (3)

### CONTEMPORARY SOCIETY

SOC 312. Sociology of Family (3)
SOC 350. Health, Illness, and Society (3)
SOC 448. Law and Society (3)
SOC 450. Sociology of Education (3)
SOC 452. Sociology of Religion (3)
SOC 454. Leisure and Culture (3)

### SELF-DESIGNED INTEREST AREA

Students with interests not well matched to the areas listed above are encouraged to design a selection to suit their interests. Faculty advisers should be consulted in this process.

## Major Program (48)

Maximum of 9 credits from SOC 406, SOC 410.
SOC 204. Introduction to Sociology; prerequisite to all upper division sociology courses (3)
SOC 300. The Sociological Perspective; prerequisite to SOC 413, SOC 415, SOC 416 (3)
SOC 413. Sociological Theory (3)
SOC 415. Understanding Social Research (3)
SOC 416. Conducting Social Research (3)
Sociology electives (33)
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 300, SOC 413, SOC 415, and SOC 416.
It is strongly recommended that sociology majors also take WR 222 English Composition or WR 327 Technical Writing and PHL 201 Intro to Philosophy.

## Minor Program (27)

Undergraduate students may elect a minor in sociology to complement course work in their major discipline.
SOC 204. Introduction to Sociology; prerequisite to all upper division sociology courses (3)
SOC 300. The Sociological Perspective; prerequisite to SOC 413, SOC 415, SOC 416 (3)
SOC 413. Sociological Theory (3) and/or
SOC 415. Understanding Social Research (3)
Additional sociology courses as necessary to total 27 credits (15-18)
Transfer students may apply a maximum of 12 credits of lower division sociology credits toward a minor in sociology.
A minimum grade point average of 2.00 must be earned in sociology course work.

## Courses

### Lower Division Courses

**SOC 199. SPECIAL TOPICS (1-3).**

**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. (Bacc Core Course)

**SOC 205. *INSTITUTIONS AND SOCIAL CHANGE (3).** Sociological study of dynamic organizational nature of society through analysis of social change and major social institutions such as family, education, religions, the economy, and political systems. PREREQ: SOC 204. (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. (Bacc Core Course) (DPD Course) No Prereq.

**SOC 299. SPECIAL TOPICS (1-3).**

### Upper Division Courses

**SOC 300. THE SOCIOLOGICAL PERSPECTIVE (3).** Examination of social, historical, and philosophical roots of sociological thought and use of the scientific method in sociology. Special attention to relationship between theory and methods. Includes an introduction to critical thinking in sociology and emphasizes development of sociological imagination. PREREQ: SOC 204.

**SOC 312. *SOCIOLOGY OF THE FAMILY (3).** Examination of social problems with particular Variations in family structure and life style in the United States, interdependence between family and other institutions; forces for change in the family. PREREQ: SOC 204. (Bacc Core Course)

**SOC 324. GROUPS AND ORGANIZATIONS (3).** Analysis of group dynamics and individual behavior in organizations, including communication networks, leadership, interaction processes, sociometric techniques, and problems of bureaucratic structure and individual adaptation in organizations. PREREQ: SOC 204.

**SOC 340. DEVIANT BEHAVIOR AND SOCIAL CONTROL (3).** Current perspectives, research and theories of deviant behavior. Review and analysis of various approaches and programs designed to prevent and deal with deviant behavior. PREREQ: SOC 204.

**SOC 350. HEALTH, ILLNESS AND SOCIETY (3).** Social and cultural factors in the identification, course, and treatment of illness; analysis of selected health settings and professions. PREREQ: SOC 204.

**SOC 360. *POPULATION TRENDS AND POLICY (3).** Basic socio-demographic factors affecting population size, distribution, composition and change; examination of local, national, and international trends, and demographic policy. PREREQ: SOC 204. (Bacc Core Course)

**SOC 406/SOC 506. PROJECTS (1-16).** Departmental approval required.

**SOC 410. INTERNSHIP PRACTICUM (1-16).** Graded P/N. Departmental approval required.

**SOC 413/SOC 513. SOCIOLOGICAL THEORY (3).** Historical and philosophical foundations of sociological theory, major schools of thought and their major contributors. PREREQ: SOC 204, SOC 300.

**SOC 415/SOC 515. UNDERSTANDING SOCIAL RESEARCH (3).** 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. PREREQ: SOC 300, ST 201.

**SOC 416/SOC 516. ^CONDUCTING SOCIAL RESEARCH (3).** 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. PREREQ: SOC 415. (Writing Intensive Course)

**SOC 418/SOC 518. QUALITATIVE SOCIOLOGY (3).** Examines process of change in social scientific models with particular attention to naturalistic inquiry. Details approaches to qualitative analysis of naturally occurring social settings, including entry strategies, data recording, theory development, ethics and reporting. Qualitative field research required. PREREQ: SOC 204.

**SOC 421/SOC 521. 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. PREREQ: SOC 204.

**SOC 424/SOC 524. SOCIAL PSYCHOLOGY (3).** Examines individuals in social context; behavioral processes, causal factors, and results of interaction among persons and groups. Contemporary research design, problems, and findings pertinent to social psychology. PREREQ: SOC 204.

**SOC 426/SOC 526. *SOCIAL INEQUALITY (3).** 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. PREREQ: SOC 204. (Bacc Core Course)

**SOC 430/SOC 530. *GENDER AND SOCIETY (3).** 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. PREREQ: SOC 204. (Bacc Core Course)

**SOC 432/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. PREREQ: SOC 204.

**SOC 437/SOC 537. MINORITY GROUPS AND ISSUES (3).** Relations among majority and minority groups analyzed from a sociological perspective. U.S. focus. Special attention to American Indians and to minorities with African, Latin American, and Asian heritage. PREREQ: SOC 204.

**SOC 439/SOC 539. WELFARE AND SOCIAL SERVICES (3).** 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. PREREQ: SOC 204.

**SOC 440/SOC 540. JUVENILE DELINQUENCY (3).** Contemporary research and theories of juvenile delinquency. Review and evaluation of various strategies and programs designed to prevent delinquency or for treatment of delinquents. PREREQ: SOC 204.

**SOC 441/SOC 541. CRIMINOLOGY AND PENOLOGY (3).** 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. PREREQ: SOC 204.

**SOC 448/SOC 548. LAW AND SOCIETY (3).** Perspectives on law and legal proceedings in modern western societies; social, political and economic influences upon the formation, enforcement, implementation, and practice of the law and upon the judicial process; issues of access, evidence, and outcome in theory and practice; theories of criminal and social justice. PREREQ: SOC 204.

**SOC 450/SOC 550. SOCIOLOGY OF EDUCATION (3).** 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. PREREQ: SOC 204.

**SOC 452/SOC 552. SOCIOLOGY OF RELIGION (3).** Social patterns within U.S. religious groups, relation of religious groups to society, and the methodological problems in studying such groups. PREREQ: SOC 204.

**SOC 454/SOC 554. LEISURE AND CULTURE (3).** Examination of leisure in its utilitarian forms, as categories of time and activity, as contrasted to science, art, entrepreneurism and other creative endeavors.

**SOC 456/SOC 556. *SCIENCE AND TECHNOLOGY IN SOCIAL CONTEXT (3).** 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. PREREQ: SOC 204. (Bacc Core Course)

**SOC 460/SOC 560. COMPARATIVE SOCIETIES (3).** Comparative study of societies, with major emphasis upon societies of the non-Western world. Focus upon factors shaping social structure, patterns of change, and mutual influences among societies. PREREQ: SOC 204.

**SOC 466/SOC 566. INTERNATIONAL DEVELOPMENT: GENDER ISSUES (3).** 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. PREREQ: SOC 204. (NC)

**SOC 470/SOC 570. COLLECTIVE BEHAVIOR AND SOCIAL MOVEMENTS (3).** Focuses on responses of people in crowds and in unique social situations with special attention to fads, natural disasters, protest demonstrations, riots and spectators. Analysis of emergence and development of social movements. PREREQ: SOC 204.

**SOC 475/SOC 575. RURAL-URBAN SOCIOLOGY (3).** Views social life along the rural-urban continuum. Differences and similarities in social behavior, organization and ecology will be covered. Influence of urban ideas on smaller communities will be explored. World-wide focus. PREREQ: SOC 204.

**SOC 480/SOC 580. *ENVIRONMENTAL SOCIOLOGY (3).** Explores the evolution of environmental thought, paradigm shifts, and institutional structures associated with environmental concerns, social movements, and social impacts. PREREQ: SOC 204. (Bacc Core Course)

**SOC 481/SOC 581. SOCIETY AND NATURAL RESOURCES (3).** This course explores the complex interrelationships between humans and natural resources, emphasizing how management decisions and organizations are enmeshed in social and cultural contexts. PREREQ: SOC 204.

**SOC 485/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. PREREQ: SOC 204. CROSSLISTED as HORT 485/HORT 585, PS 485/PS 585, ANS 485/ANS 585. (Bacc Core Course)

**SOC 491/SOC 591. MULTIPLE PERSPECTIVES: SUSTAINABLE FORESTRY (3).** Examination of social, biological, and philosophical factors in natural resource management; includes concepts of sustainability and their consequences for forests and human communities. REQ: Field trip, group/individual projects. PREREQ: Upper division standing, must include a total of 6 credits in forestry, sociology, or philosophy. CROSSLIST: FS 491/FS 591, PHL 491/PHL 591.

**SOC 492/SOC 592. LEADERSHIP: UNDERSTANDING AND UTILIZING DIVERSITY (3).** Examination of individual differences, power and discrimination is studied in the context of a leadership perspective based on building personal power and building allies. Students will apply theory to campus or community organizations. PREREQ: SOC 204. CROSSLISTED as CSSA 492/592.

**SOC 499/SOC 599. SPECIAL TOPICS (1-3).** Selected topics of special or current interest not covered in other courses. For advanced undergraduate and graduate students. PREREQ: SOC 204.

## SPEECH COMMUNICATION

Gregg Walker, Chair
104 Shepard Hall
Oregon State University
Corvallis, OR 97331-6199
(541) 737-2461

**Faculty**

*Professors* Headrick, Weinman; *Associate Professors* Chesley, George, Iltis, Keith, Moore, Walker; *Assistant Professors* Bowker, Chadwick, Dollar, Knapp; *Senior Instructor* Leavitt, Wendt; *Instructors* Earl, Rossi

### Undergraduate Major

**Speech Communication (B.A., B.S.)**

*Options*
Communication
Theatre Arts

### Minors

Communication
Theatre Arts
Multimedia
Telemedia
Print

### Graduate Major

**Scientific & Technical Communication (M.A., M.S.)**

The Department of Speech Communication offers major programs leading to a B.A. or B.S. degree providing both theoretical and practical aspects of human oral communication as a liberal art, as a social science, as background for further study, or as preprofessional experience. Candidates for the B.S. degree must complete an additional 12 credits of approved science, social science, or professional courses as approved by the department. The department also participates in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) degree program; see Graduate School.

### MAJOR PROGRAM

The Communication major in the Speech Communication Department has an Undergraduate Prerequisite Core which must be completed satisfactorily before admission to the major.

**UNDERGRADUATE PREREQUISITE CORE**

The Undergraduate Prerequisite Core consists of the following requirements:

- The Communication Core
  Completion of COMM 1 1 1, COMM 1 14, COMM 218
- The Baccalaureate Core Writing Requirement
  Completion of the Writing I and Writing II requirements
- A cumulative GPA of 2.0 or better

After a student has successfully completed the Core courses, and if he or she has at least the minimum cumulative GPA requirements, he or she may apply for admission to the Communication Major.

**COMMUNICATION MAJOR**

The Major in Communication requires 48 credits of course work. Students will be required to complete the following course work and meet the following conditions as part of the requirement.

*COMM 320 and COMM 321

**One course from each of the following areas:*

**Communication Theory**

COMM 418,COMM 422,COMM 426, COMM 430,COMM 440

**Rhetorical Theory**

COMM 454,COMM 456,COMM 458, COMM 459

**Methods**

COMM 414,COMM 416,COMM 427,COMM 464 or other methods course from outside the Department, as approved by adviser.

- A Writing Intensive Course in the Major
- 2 additional courses (6 credits) at the 4xx level required
- 3 credits maximum of variable credit courses permitted
- 3 credits maximum of lxx and 2xx level coursework permitted
- A minimum of a 2.0 GPA in Major course work (includes Prerequisite Core)
- 48 credits (includes 9 credits from Communication Core in the Undergraduate Prerequisite Core)

**BROADCAST MEDIA COMMUNICATION**

The option was closed at the end of the 1991-92 academic year.

**THEATRE ARTS (48)**

TA 147. Introduction to the Theatre (3)
TA 244. Scene Crafts (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 stage manage a production.

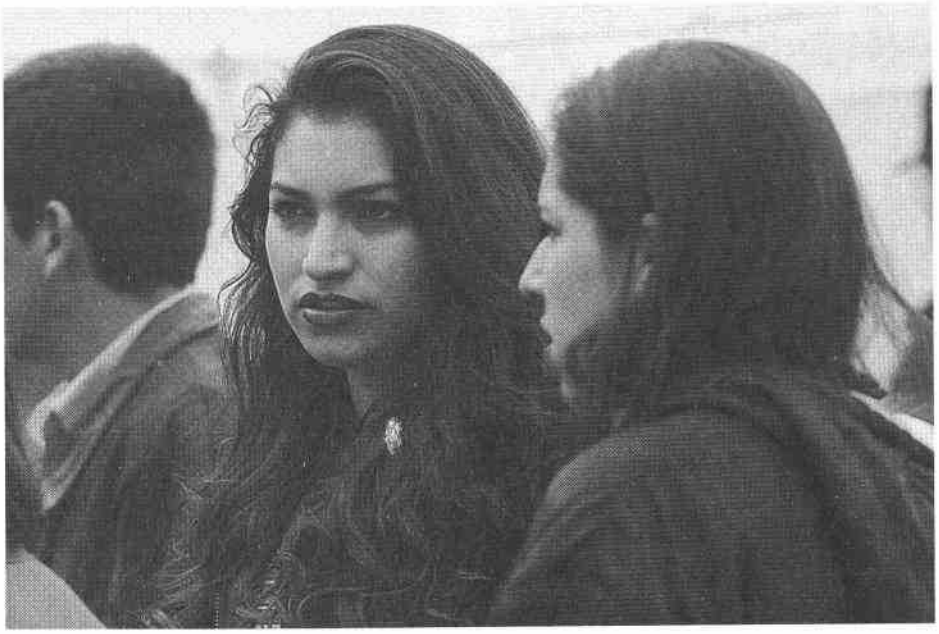
## MINOR PROGRAMS

**COMMUNICATION**

Communication minors must complete 27 credits, at least 15 of which must be upper division. They must complete COMM 111, COMM 114, COMM 218, and either COMM 320 or COMM 321 (previously COMM 220). 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 grade point average of 2.0 must be earned in Communication course work.

We are entering a new age: the Information Age, a time of significant changes in the media of communication which will affect all facets of our lives.

Digital technologies have transformed the print and broadcast media. New media are simultaneously competing with and extending traditional media. Community newspapers and national magazines have added frequently ambitious web sites in order to capture an emerging market as it grows. CD-ROM's have become a staple of publishing. Books often contain CD-ROM's.



CD-ROM's often replace books. The boundaries between traditional media and new media are often blurred and many media professionals must be able to work with several media and repurpose information originally gathered for one medium to suit a second or third medium. The proposed minors provide students the needed tools for media communications in the 21st Century.

In addition, because the program consists of a series of minors, it allows students to mix work in media communications with more extensive work in their major. Students are thus able to merge a familiarity with communication tools with expertise in a content field. The minors themselves are constructed in such a way that they recognize the overlap in a variety of different media and a single core program provides an efficient way to cover the overlapping material.

### CURRICULUM

The following minors will consist of 39–42 credits, at least 17 of them upper-division. The minors integrate work from computer science, art, English, and speech communication. It is possible for students to complete a 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 art, computer science, English, or speech communication, it is possible that there will be overlap between the requirements of the major and the minor. It is thus explicitly stated that the minor must include 27 credits not used as part of the student's major program, and that 12 of those 27 credits must be upper division.

All students take a 19–20 credit media communications core and select one of three minors.

**Media Communications Core (19–20)**

ART 120. Computers in Graphic Design (3)
ART 300. Visual Communication (3)
COMM 280. Media Communication in the Information Age (3)
CS 295. Authoring for the World Wide Web (4)
WR 201. Writing for the Media (3)
*One of the following:*
Senior Project (406) in the student's major field (3), or
Internship (410) in the student's major field (3), or
CS 495, Interactive Multimedia Projects, (4) [for Multimedia minor]

**Multimedia Minor (39–41)**

Media Communications Core (19–20)
COMM 382. Telemedia Design and Production (4)
COMM 486. Media Aesthetics (3)
CS 391. Social and Ethical Issues in Computer Science (3)
CS 395. Interactive Multimedia (4)
*Two of the following:*
ART 222. Graphic Design I (3)
COMM 322. Small Group Problem Solving (3)
COMM 385. Communication & Culture in Cyberspace (3)
COMM 484. Media Criticism (3)
CS 151. Introduction to 'C' Programming (4)
MUS 105. Sound and Silence (3)

**Telemedia Minor (41–42)**

Media Communications Core (19–20)
COMM 382. Telemedia Design and Production (4)
COMM 480. History of Media Communication (3)
COMM 482. The Media in Culture and Society (3)
COMM 484. Media Criticism (3)
COMM 486. Media Aesthetics (3)
*One of the following:*
COMM 368. Propaganda and Social Control (3)
COMM 385. Communication & Culture in Cyberspace (3)
One additional course in advanced media techniques (3)

**Print Media Minor (39–40)**
Media Communications Core (19–20)
COMM 482. The Media in Culture and Society (3)
COMM 484. Media Criticism (3)
WR 301. Copyediting (4)
WR 305. Reporting (4)
*Two of the following:*
ART 263. Digital Photography (3)
WR 327. Technical Writing (3)
WR 414. Advertising and Public Relations Writing (3)
WR 448. Magazine Article Writing (3)
WR 449. Critical Reviewing (3)
WR 462. Science Writing (3)
The minor must include 27 total credits not used as part of the student's major program. Twelve of those credits must be upper division.

**THEATRE ARTS**

Students minoring in theatre arts must complete the following course work:
TA 144. Playreading (1) (May be repeated once for a total of 2 credits)
TA 147. Intro to Theatre Arts (3)
TA 244. Scenecrafts (3)
TA 248. Fundamentals of Acting (3)
TA 344. Playscript Analysis (3)
Plus 15 additional credits of the student's choice, 12 of which must be at upper division level
Activity credits (TA 250-350) may not be counted toward the minor.
Minors are strongly encouraged to participate fully backstage, on stage, and in stage management.

## GRADUATE PROGRAM

The Department of Speech Communication offers graduate work applicable to the Master of Arts in Interdisciplinary Studies degree (M.A.I.S.) and the Master of Arts and Master of Science in Scientific and Technical Communication (MA/MS STC). See the Graduate School for details. COMM 520 AND COMM 514 OR COMM 564 are recommended for all M.A.I.S. students with Speech Communication as their dominant subject of study.

## COURSES

### ■ COMMUNICATION

**Lower Division 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. (Bacc Core Course)

**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. (Bacc Core Course)

**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 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 221. FORENSICS (3).** Laboratory experience in debate, public speaking, and interpretation of literature. Preparation for intercollegiate debate and forensics participation.

**COMM 267. PARLIAMENTARY PROCEDURE (3).** The principles and practice of parliamentary procedure to develop skills in conducting business during meetings.

**COMM 269. *SOCIAL EFFECTS OF OFFENSIVE COMMUNICATION (3).** Examination of the use of slurs, cursing, profanity, and other wicked words. Study of social and individual factors making wicked words powerful, offensive, and harmful. (Bacc Core Course)

**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.

**Upper Division Courses**

**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. PREREQ: COMM 114 or COMM 111.

**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. PREREQ: COMM 114. (H)

**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. PREREQ: COMM 111. (SS)

**COMM 318. ADVANCED INTERPERSONAL COMMUNICATION (3).** Advanced theory and practice in communication in interpersonal relations. PREREQ: COMM 218. (SS) (H)

**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. PREREQ: COMM 218. (SS)

**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 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.

**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. *RHETORIC AND SEMIOTICS OF VISUAL COMMUNICATION (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. (Bacc Core Course) (H)

**COMM 377. SIGN LANGUAGE COMMUNICATION (3).** A study of issues associated with being deaf. Teaching basic mastery of Oregon Signed English and manual alphabet.

**COMM 379. SIGN LANGUAGE II (3).** This course expands the student's signing vocabulary and contrasts grammatical structures of Signing Exact English (SEE), American Sign Language (ASL), and Pidgin Signed English (PSE). Issues associated with hearing impairment will be discussed in depth. PREREQ: COMM 377.

**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.

**COMM 385. COMMUNICATION & 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 401. RESEARCH (1-16).** PREREQ: Department approval required.

**COMM 402. INDEPENDENT STUDY (1-16).** PREREQ: Department approval required.

**COMM 403/COMM 503. THESIS (1-16).** PREREQ: Department approval required.

**COMM 405/COMM 505. READING AND CONFERENCE (1-16).** PREREQ: Department approval required.

**COMM 406. PROJECTS (1-16).** Section 95: PROJECT FILMS. (3) Instructor consent. PREREQ: Department approval required. Graded P/N.

**COMM 407/COMM 507. SEMINAR (1-16).** PREREQ: Department approval required.

**COMM 408/COMM 508. WORKSHOP (1-16).** PREREQ: Department approval required.

**COMM 410/COMM 510. 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 department faculty member(s) provide academic evaluation. 12 credits maximum. COMM 410 PREREQ: Major with minimum of 21 credits. Department approval required. COMM 510 PREREQ: Graduate committee approval required. Graded P/N.

**COMM 412/COMM 512. TOPICS IN SPEECH COMMUNICATION (3).** Contemporary issues in speech communication: appraisal and discussion of current theories, trends, research methods, problems, or applications. May be repeated for up to 9 credits. PREREQ: 9 credits of speech communication.

**COMM 414/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. PREREQ: COMM 321 or instructor approval.

**COMM 416/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. PREREQ: COMM 321. (SS)

**COMM 418/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. PREREQ: COMM 321 or instructor approval. (Writing Intensive Course) (SS)

**COMM 422/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. PREREQ: COMM 321 or instructor approval. (Writing Intensive Course) (SS)

**COMM 426/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. PREREQ: COMM 321 or instructor approval. (SS)

**COMM 430/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. PREREQ: COMM 321 or instructor approval. (Writing Intensive Course) (SS)

**COMM 432/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. PREREQ: COMM 321 or instructor approval. (Writing Intensive Course)

**COMM 440/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. PREREQ: COMM 321 or instructor approval. (SS)

**COMM 442/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. PREREQ: COMM 321 or instructor approval. (SS)

**COMM 444/COMM 544. THIRD PARTIES IN DISPUTE RESOLUTION: MEDIATION (3).** AND ARBITRATION 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) PREREQ: COMM 321 or instructor approval.

**COMM 446/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. PREREQ: COMM 321 or instructor approval. (Bacc Core Course) (SS)

**COMM 454/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. PREREQ: COMM 320 or instructor approval. (H)

**COMM 456/COMM 556. ^RHETORIC: 500 BC TO 500 AD (3).** History and philosophy of rhetorical principles. PREREQ: COMM 320 or instructor approval. (Writing Intensive Course) (H)

**COMM 458/COMM 558. ^RHETORIC: 500 AD TO 1900 (3).** History and philosophy of rhetorical principles. PREREQ: COMM 230 or instructor approval. (Writing Intensive Course) (H)

**COMM 459/COMM 559. ^CONTEMPORARY THEORIES OF RHETORIC (3).** A survey of contemporary rhetorical theories from 1900 to the present. PREREQ: COMM 320 or instructor approval. (Writing Intensive Course)

**COMM 460/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. PREREQ: COMM 320 or instructor approval. (H)

**COMM 462/COMM 562. THE RHETORIC OF REVOLUTIONARIES AND (3).** REACTIONARIES: 1900 TO PRESENT Speech criticism; great American speakers; relation of their speaking to the history of idea; rhetoric and political, social, and religious movements. PREREQ: COMM 320 or instructor approval. (H)

**COMM 464/COMM 564. ^RHETORICAL CRITICISM (3).** Explores the approaches to the criticism of rhetoric, including aesthetic, social movement, genre, feminist, and other modes of criticism. PREREQ: COMM 320 or instructor approval. (Writing Intensive Course) (H)

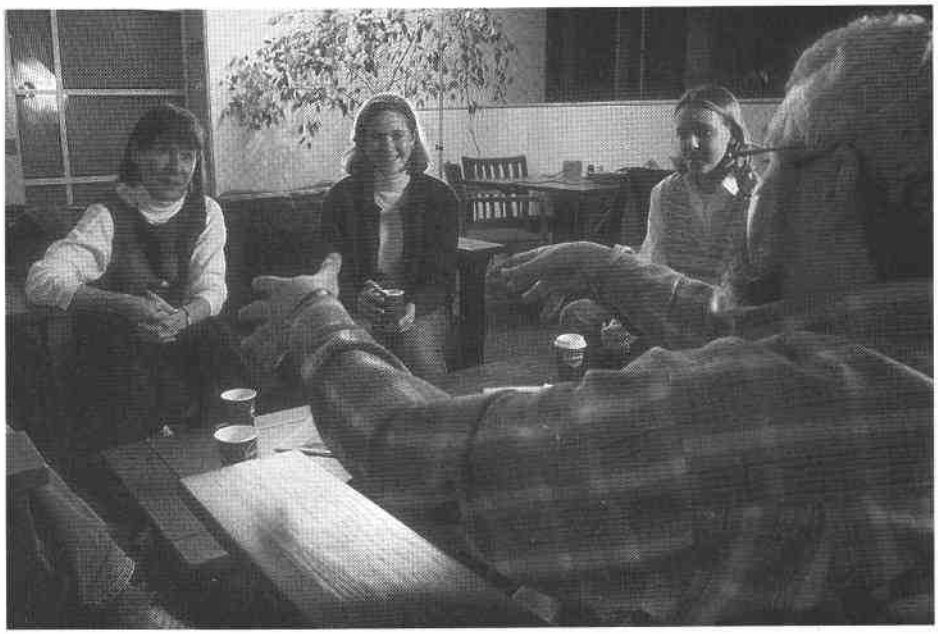
**COMM 466/COMM 566. ETHICS OF RHETORIC (3).** Examines the ethical questions raised by the use of persuasive discourse, including the derivation of standards of ethical persuasion and approaches to ethical judgment about persuasion. PREREQ: COMM 320 or instructor approval. (H)

**COMM 471. TELEVISION CRITICISM (3).** Critical analysis of television based on critical methodologies in rhetoric, cultural studies, television aesthetics, and myth. (H)

**COMM 472/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 and the influences they exert. (H)

**COMM 476/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. PREREQ: COMM 320 or instructor approval. (H)

**COMM 478/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. PREREQ: COMM 320 or instructor approval.



**COMM 480/COMM 580. HISTORY OF MEDIA COMMUNICATION (3).** The study of the changing nature, character and structure of the national and multinational media systems. The past, present, and future of mediated communication technology, the production-process-distribution of information, public policy and regulation, and audiences. PREREQ: COMM 280. (SS)

**COMM 482/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. PREREQ: COMM 280. (SS)

**COMM 484/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. PREREQ: COMM 280. (SS)

**COMM 486/COMM 586. MEDIA AESTHETICS (3).** Aesthetics and the visual/aural media. Theories and principles of creating and structuring visual and aural imagery. Analysis of creative film, video works and artists.

### Graduate Courses

**COMM 506. PROJECTS (1-16).** Departmental 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 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. CROSSLISTED as STC 524.

## ■ THEATRE ARTS

### Lower Division 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 122. ORAL INTERPRETATION II (3).** Continued analysis and presentation of literature, with and expanded range of literary genres of performance styles. Should be taken in sequence. PREREQ: TA 121.

**TA 144. PLAYREADING (1).** Reading/discussion/examination of plays from world theatre of past and present from the perspective of production and theatre history. May be repeated once.

**TA 147. *INTRODUCTION TO THE THEATRE (3).** Origins, history, nature, elements, and style of theatre production; function of artists and craftspersons of the theatre. (Bacc Core Course) (FA)

**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. PREREQ: TA 147, TA 242

**TA 244. SCENECRAFTS (3).** Constructing scenery and stage properties; practical experience in backstage procedures and scene painting. (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. PREREQ: TA 244.

**TA 247. STAGE MAKEUP (3).** Basic principles and theory with laboratory experience in most-used applications of theatrical makeup. 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. PREREQ: TA 147, or instructor approval required. (FA)

**TA 249. FUNDAMENTALS OF ACTING II (3).** Continued work in the basic principles and techniques of acting. Emphasis on improvsation character analysis and creation, the balance between truth and technique. Must be taken in sequence. PREREQ: TA 248; instructor approval required. (FA)

**TA 250. WORKSHOP: THEATRE ARTS (1-3).** Practical experience in performance, technical theatre, or design. Maximum for graduation of 6 credits. PREREQ: Department approval required.

### Upper Division Courses

**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. PREREQ: TA 121.

**TA 330, TA 331, TA 332. *^HISTORY OF THE THEATRE (3, 3, 3).** The rise and development of the composite arts of the theatre in their cultural and social context. TA 330: Origins to 1500. TA 331: 1500 to 1870. TA 332: 1870 to present. Offered alternate years. No prerequisite. TA 144 and TA 147 are recommended. (Bacc Core Course), (Writing Intensive Course).

**TA 344. PLAYSCRIPT ANALYSIS (3).** Study of major approaches to playscript analysis and detailed application of these systems to the theatrical production process. PREREQ: TA 144,TA 147.

**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. PREREQ: TA 147,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. PREREQ: TA 248; 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. PREREQ: TA 248; 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. PREREQ: Department approval required.

**TA 351. PRINCIPLES OF PLAYWRITING (3).** Basic principles and techniques of playwriting. Offered alternate years. PREREQ: TA 144,TA 344.

**TA 352. PLAYWRITING WORKSHOP (3).** Intensive work on student playscripts generated in TA 351, through re-writes, revision and rehearsals. PREREQ: TA 351. Offered alternate years.

**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. PREREQ: TA 244,TA 248; 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). (Bacc Core Course)

**TA 401. RESEARCH (1-16).** PREREQ: Department approval required.

**TA 402/TA 502. INDEPENDENT STUDY (1-16).** PREREQ: Department approval required.

**TA 403. THESIS (1-16).** PREREQ: Department approval required.

**TA 405/TA 505. READING AND CONFERENCE (1-16).** PREREQ: Department approval required.

**TA 406/TA 506. PROJECTS (1-16).** PREREQ: Department approval required.

**TA 407/TA 507. SEMINAR (1-16).** PREREQ: Department approval required.

**TA 408/TA 508. WORKSHOP (1-16).** PREREQ: Department 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 class theatre arts majors and graduate students approved by faculty and selected by intern agency. PREREQ: 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. PREREQ: must be arranged with instructor prior to registration. Departmental approval required.

**TA 416/TA 516. TOPICS IN THEATRE ARTS (3).** An integrated series of lectures on contemporary theories, issues, research methods, problems, or applications of theatre arts. Concentrated research and discussion of selected topics. May be repeated once. Offered as demand and staffing allow. PREREQ: 9 credits of Theatre Arts, or consent.

**TA 443/TA 543. COSTUME DESIGN (3).** Theory and practice of designing costumes for a theatrical production. PREREQ: TA 243, TA 343.

**TA 444/TA 544. THEORY AND CRITICISM OF THEATRE ARTS (3).** Major theories which have influenced and motivated theatre practice in western civilization throughout its development. Offered on alternate years. PREREQ: 6 credits of theatre history, or 6 credits of dramatic literature.

**TA 450/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. PREREQ: 9 credits of upper-division theatre arts. Departmental approval required.

**TA 454/TA 554. ADVANCED PLAY DIRECTION (3).** Expanded exploration of directing theories and techniques. Practical application through the production of one-act play in laboratory theatre. Offered alternate years. PREREQ: TA 354; instructor approval required.

**TA 464/TA 564. THEATRE MANAGEMENT (3).** Managerial theory and practices of theatre operations, including organizational structure, financial practices, program promotion, and legal concerns. PREREQ: 6 credits of upper division theatre arts courses of equivalent; junior or senior standing. Offered alternate years.

**TA 465/TA 565. THEATRE AND AUDITORIUM DESIGN AND PLANNING (3).** A study of the major theories, forms, and concepts of theatre and auditorium design, with emphasis on the relationship of the physical environment to the form and style of the production. PREREQ: TA 244. Offered alternate years.

**Graduate Courses**

**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 class theatre arts majors and graduate students approved by faculty and selected by intern agency. PREREQ: 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.

## TWENTIETH CENTURY STUDIES

Center for the Humanities
Oregon State University
811 S.W. Jefferson Ave.
Corvallis, OR 97333-4506
(541) 737-2450

**Certificate Program**

Twentieth Century Studies

The certificate program in Twentieth Century Studies allows students to study the experience of contemporary social life in the developed West and in non-Western societies as a complex, evolving whole. The program explores the complex unity of modern social experience from the vantage points of separate disciplines, and, through a series of core courses and thematic courses, from a perspective which integrates the humanities and social sciences.

### CERTIFICATE CURRICULUM

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 200. 20th-Century American Realities (3)
TCS 201. 20th-Century American Dreams (3)
TCS 300. World Community in the 20th Century: Development (3)
TCS 301. World Community in the Twentieth Century: Underdevelopment (3)

**Thematic Interdisciplinary Courses (9)**[13]

**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.

### COURSES

**Lower Division Courses**

**TCS 200. *TWENTIETH CENTURY REALITIES: The U.S. (3).** An examination of life in the contemporary U.S., emphasizing ways in which the parts of life—family, school, work, and leisure—reinforce and sustain one another in reproducing the social, cultural, political, and economic relations that characterize contemporary U.S. society. (Bacc Core Course) (H, SS)

**TCS 201. *TWENTIETH CENTURY DREAMS: THE U.S. (3).** An examination of the historical emergence and the continuing influence of the ideas and values that inform cultural aspirations and experiences in the U.S. These dreams—formed around the notions of individualism, success, democracy, and equality—are presented as modes of consciousness that have real consequences in the lives of typical people in the U.S. (Bacc Core Course) (H, SS)

**Upper Division Courses**

**TCS 300. *WORLD COMMUNITY IN THE TWENTIETH CENTURY: DEVELOPMENT (3).** An examination of the underlying processes which gave rise to rapid technological advancement in world centers and which resulted in the integrated relationship characteristic of much of the contemporary world. A comparative analysis of social, cultural, political, and economic relations in industrialized societies. (Bacc Core Course) (H, SS)

**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) (H, SS, NC)

**TCS 407/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 pass/no pass and carry 1 credit; other sections will be graded A-F and will carry variable credit.

## WOMEN STUDIES

Janet Lee, Director
200 Social Science Hall
Oregon State University
Corvallis, OR 97331-6208
(541) 737-2826

*Associate Professor* Lee; *Instructor* Shaw
Program faculty in departments throughout the university.

Women Studies is the multi-disciplinary study of 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 orientation play in women's everyday lives. We hope you will find women studies to be academically challenging and personally rewarding. It is our goal to provide a program that is intellectually sound and vocationally useful, as well as one that encourages personal growth. Women Studies offers a minor, a certificate and the M.A.I.S. with specialization in Women Studies.

### LIBERAL STUDIES OPTION CURRICULUM

The B.A. in Liberal Studies gives students the opportunity to specialize in Women Studies as primary or secondary areas of the degree. While students who major in Liberal Studies must complete a total of 45 credits, at least 24 credits are required for primary specialization, and at least 15 for secondary specialization in Women Studies. Students work out their own specific program of course work in Women Studies in consultation with a faculty adviser and in conjunction with the Director of Liberal Studies.

### MINOR CURRICULUM (30)

The minor in women studies facilities systematic study of women studies knowledge. It provides the exploration of gender as a focal point of analysis in determining differentials of power and opportunity, and recognizes the interaction of gender with a complex matrix of such fundamental categories as class, race, age, ethnicity, nationality, and sexual identity. Students are expected to take the bulk of their course work toward the minor from core and elective courses offered by the Women Studies Program. A total of 27 credits is required for the minor, with at least 12 credits at the upper division level.

**CORE REQUIREMENTS (18)**

WS 223. Women: Self and Society (3)
WS 224. Women: Personal and Social Change (3)
WS 410. Internship (3)
WS 414. Systems of Oppression in Women's Lives (3)
WS 416. Theories of Feminism (3) *or* WS 417. Feminist Philosophies (3)
WS 480. International Women (3)

The remaining 9 credits may be taken from women studies electives (with the WS prefix) and from approved program courses offered in other departments. However, no more than 6 credits of approved program courses may be used toward the minor. 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 Studies Program, and has been approved as fullfilling the requirements of a Women Studies Program course. Please refer to elective courses in women studies and approved program course electives listed below. No more than 3 credits of WS 402, Independent Study, and a total of 6 credits of WS 410, Internship, may count toward the minor.

**Certificate Curriculum (27)**

The Certificate in Women Studies is designed to a 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 departments where courses on gender are taught. While core course work taught by the Women Studies Program is required, students are expected to take the bulk of their elective course work form approved Women Studies Program classes offered throughout the different departments on campus. A total of 27 credits is required for the certificate, with at least 12 of these credits at the upper-division level.

**Core Requirements (9):**
WS 223. Women: Self and Society (3)
WS 410. Internship (3)
WS 416. Theories of Feminism (3) *or*
WS 417. Feminist Philosophies (3)

The remaining 18 credits can be taken from elective courses offered by the Women Studies Program (with a WS prefix) and from approved program courses offered in any department at OSU. However, at least 12 of these 18 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 Studies Program, and has been approved as fulfilling the requirements of a Women Studies Program course. Refer to elective courses in women studies and approved program course electives listed below. No more than 3 credits of WS 402, Independent Study, and a total of 6 credits of WS 410, Internship, may count toward the Certificate in Women Studies.

**Women Studies Electives**
WS 199. Special Studies (1-3)
WS 270. Violence Against Women (3)
WS 299. Topics in Women Studies (3)
WS 340. Gender and Science (3)
WS 402. Independent Study (1-16)
WS 406. Projects (1-16)
WS 407. Seminar (1-16)
WS 450. Ecofeminism (3)
WS 460. Women and Sexuality (3)
WS 470. Multicultural Alliances (3)
WS 490. Self-Esteem and Personal Power (3)
WS 499. Topics (3)

**Women Studies Program Course Electives**
Courses are approved on an ongoing basis. Please check with the Women Studies Program for an updated list of approved program courses.
ANTH 430/ANTH 530. Gender and Archeology (3)
COMM 432/COMM 532. Gender and Communication (3)
EC 383. Economics of Discrimination (3)
ENG 362. Women's Voices in American Literature (3)
ENG 416/ENG 516. Power and Representation (3)
H 465/H 565. Public Health and Women: Social and Political Issues (3)
HDFS 445/HDFS 545. American Families: Gender, Race, and Class (3)
HST 363. Women in U.S. History (3)
HST 496/HST 596. Gender, Family, Politics, in Chinese History (3)
PHL 280. Ethics of Diversity (3)
PS 363. Gender and Race, American Politics (4)
PSY 426. Gender Differences (3)
SOC 430/SOC 530. Gender and Society
SOC 466/OSC 566. International Development: Gender Issues (3)

## Graduate Study in Women Studies

Women Studies are recognized areas in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) Program with specializations in contemporary women's issues; gender, race, and class; and international women's issues. Participating students who declare Women Studies as their primary area are required to take a minimum of 18 credits in Women's Studies, including WS 514. Systems of Oppression in Women's Lives; WS 516. Theories of Feminism; WS 580. International Feminism; WS 510. Internship; and WS 518. Feminist Research (thesis option only). The balance of courses is selected from the graduate Women's Studies courses, projects, and research/thesis.

Students may also choose Women Studies as both their primary and one secondary areas, or as secondary area(s) alone in the M.A.I.S. Program. They must complete a minimum of 12 credits including WS 516, and WS 514 or WS 580 for a secondary area.

The graduate minor in Women's Studies is available to graduate students as they work toward a masters or Ph.D. in departments which offer these degrees. Students working on the graduate minor in Women Studies must complete 12 credits at the Masters level and 18 credits at the Ph.D. level, including WS 514, WS 516, WS 518 and WS 580. The balance of the course work is selected from the graduate women's studies courses (listed above), projects, or research.

For more information about graduate work in women studies, contact the Director of the Women Studies Program, 200 Social Science Hall.

## Courses

### Lower Division Courses

**WS 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 studies. May be repeated as topics vary.

**WS 223. *WOMEN: SELF AND SOCIETY (3).** Multidisciplinary introduction to women 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. (Bacc Core Course) (H)

**WS 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. (Bacc Core Course) (H)

**WS 270. VIOLENCE AGAINST WOMEN (3).** This course 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.

**WS 299. TOPICS IN WOMEN STUDIES (3).** Current topics related to women. Description and analysis of different realms of knowledge about gender issues. May be repeated as topics vary.

### Upper Division Courses

**WS 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. (Bacc Core Course)

**WS 399. TOPICS (3).** Current topics on women and gender role issues. May be repeated as topics vary.

**WS 402/WS 502. INDEPENDENT STUDY (1-16).** PREREQ: Department approval required.

**WS 406/WS 506. PROJECTS (1-16).** Department approval required.

**WS 407. SEMINAR (3).**

**WS 410/WS 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 WS program. PREREQ: Department approval required.

**WS 414/WS 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 lesbians, older women, and those who differ in ability and appearance. WS 414 PREREQ: WS 223 or WS 224 or consent. (Bacc Core Course)

**WS 416/WS 516. THEORIES OF FEMINISM (3).** 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. WS 416 PREREQ: WS 223 or WS 224 or consent.

**WS 417/WS 517. FEMINIST PHILOSOPHIES (3).** Diverse forms of feminist philosophy, including a variety of critiques, especially those based on race and class, in-depth consideration of selected social issues, such as rape and pornography. PREREQ: 6 credits of philosophy or upper-division standing. CROSSLISTED as PHL 417.

**WS 450/WS 550. ECOFEMINISM (3).** Focuses on the ecological and feminist principles that mediate humanity's relationship with nature. PREREQ: Upper-division standing.

**WS 460/WS 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. WS 460 PREREQ: WS 223 or WS 224 or consent.

**WS 470/WS 570. WOMEN: CREATING MULTICULTURAL ALLIANCES (3).** Connections between women across different cultures and ethnic identities within the United States, and exploration of issues related to coalition and alliance building. PREREQ: Upper-division standing.

**WS 480/WS 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 injustice and studies key definitions and theoretical assumptions relevant to the subject of global feminism. WS 480 PREREQ: WS 223 or WS 224 or consent. (Bacc Core Course)

**WS 490/WS 590. SELF ESTEEM AND PERSONAL POWER (3).** This course explores ways to improve self esteem and develop personal power. It will focus on issues of self and identify, contextualizing these in the ways gender is constructed in society. PREREQ: Upper-division standing.

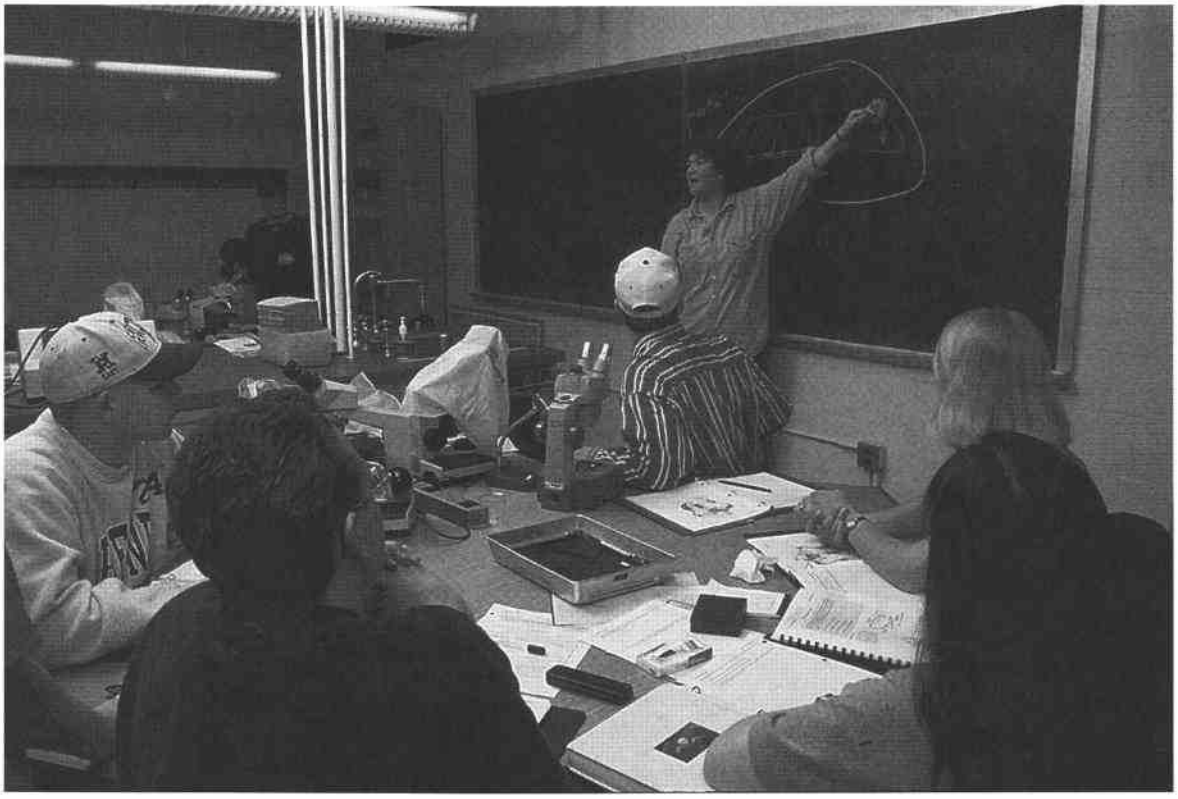
**WS 499/WS 599. *TOPICS (3).** Topics on contemporary research on women and related public policies. May be repeated as topics vary. PREREQ: Upper-division standing. (Bacc Core Course)

### Graduate Courses

**WS 501. RESEARCH (1-16).**

**WS 503. THESIS (1-16).**

# College of Science



*One of the largest academic units on campus, with 14 departments and programs, the College of Science offers undergraduate and graduate degrees in classical disciplines and in integrated cross-disciplinary areas. In addition, twelve preprofessional programs in the college prepare students who wish to enter a medical profession or another health-related field. Moreover, the College of Science offers the 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 have been informally divided into the following groups:

### Biological Sciences

Biochemistry & Biophysics, Biology, Botany & Plant Pathology, Entomology, Microbiology, Molecular and Cellular Biology (graduate only), Zoology

### Geosciences

Geography, Geology

### Interdisciplinary Science

Environmental Science
International Studies
Natural Resources

### Mathematical Sciences

Mathematical Sciences, Mathematics, Statistics (graduate only)

### Physical Sciences

Biochemistry and Biophysics, Chemistry, Physics

### Teaching

Sciences & Mathematics Education (graduate only)

## International Degree

Undergraduates with majors in the College of Science can earn a second degree in International Studies. See the Interdisciplinary Studies section of this catalog for more information.

## Preprofessional Programs

Special programs in health-related fields are offered by the College of Science to help students meet entrance requirements for professional schools in: Dental Hygiene, Dentistry, Medical Technology, Medicine, Nursing, Occupational Therapy, Optometry, Osteopathy, Physical Therapy, Physician Assistant, Podiatry, Radiation Therapy, and Veterinary Medicine.

The WICHE Professional Student Exchange Program assists students in thirteen western states in obtaining access to professional programs not available in their home states. WICHE students receive preference in admission and pay resident tuition at state-supported institutions or reduced tuition at private institutions. See Academic Services and Special Programs for more information.

## Curricula in Science

Curricula in science lead to the degrees of Bachelor of Arts (B.A.), Bachelor of Science (B.S.), Master of Arts (M.A.), Master of Science (M.S.), Master of Arts in Teaching (M.A.T), and Doctor of Philosophy (Ph.D.). (See Graduate School for statement of requirements for advanced degrees.) The College also participates in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) program.

## Degree Requirements

To graduate with a B.S. degree in the College of Science, undergraduate students must fulfill the following requirements:

**University Baccalaureate Core (48)**

**College of Science Requirements[1]**

Computer science (variable credit)[2]
Mathematical sciences (12)
Physical, earth, and/or biological sciences (15)[3]
Department requirements (see each department)

Some departments also grant a B.A. degree which 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.

## Department Requirements

The College of Science requires a minimum 2.00 GPA in the major; 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 Department and College approval (e.g., CH 121, CH 122, CH 123, for CH 221, CH 222, CH 223). Unless otherwise indicated, the conditions and credits for research, thesis, reading and conference, and seminar are to be arranged with the instructor involved.

## Teacher Certification

All professional teacher education at OSU occurs at the post-baccalaureate level following completion of a bachelor's degree in an academic major (e.g., biology, chemistry, mathematics, physics). Students planning to teach in the elementary schools may use the curriculum designed for that purpose. (See General Science/Pre-M.A.T. for Elementary Education Option.)

Special mathematics courses (MTH 211, MTH 212, MTH 213, MTH 391) are highly recommended for students who plan to teach elementary or secondary mathematics. See Education section for admission to the M.A.T. program and education courses.

128 Kidder Hall
Oregon State University
Corvallis, OR
97331-4608
(541) 737-4811

**ADMINISTRATION**

**Frederick H. Horne**
*Dean*

**Justus F. Seely**
*Associate Dean*

**Richard W. Thies**
*Associate Dean*
*Head Adviser*

Footnotes for this section on page 179.

## 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 Term Bulletin.*

## Scholarships

See the Scholarship section in the front of this catalog for a list of scholarships. The College of Science offers a variety of scholarships to deserving students who have taken at least 30 credits in the college. Additional information and application forms are available from the College of Science.

# Biochemistry and Biophysics

Christopher Mathews, Chair
2011 Ag and Life Sciences
Oregon State University
Corvallis, OR 97331-7305
(541) 737-4511
http://www.orst.edu/dept/biochem/

**Faculty**

*Professors* Anderson, Baird, Frei, Gamble, Ho, Mathews, Pearson, Schimerlik; *Associate Professors* McFadden, Merrill; *Assistant Professors* Hsu, Wong; *Instructor* Ahern

**Undergraduate Major**

**Biochemistry and Biophysics (B.S.)**

**Graduate Major**

**Biochemistry and Biophysics (M.S., Ph.D.)**

*Graduate Areas of Concentration*
Biochemistry
Biophysics

The major in biochemistry and biophysics 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 B.S. 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, pharmacology, physiology, toxicology, and nutrition as well as in biochemistry or biophysics.

## 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—Ph.D. or a professional degree. This is essential for anyone who wants to direct an independent research program.

Four or five members of the faculty serve as undergraduate advisers; these faculty members are most familiar with undergraduate program requirements and career opportunities. The present advisers are Drs. Ahern, Gamble, Hsu, McFadden, and Mathews. Also, the student is 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 B.S. degree with a major in biochemistry and biophysics. All degree programs must include at least one year of a foreign language; German, French, Spanish, or Russian is recommended. 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). Upper division students are strongly encouraged to carry out a research project in the laboratory of a faculty member.

## Graduate Studies

The Department of Biochemistry and Biophysics offers graduate work leading to the Master of Science and Doctor of Philosophy degrees. Most graduate students are admitted for study leading to the Doctor of Philosophy degree, although the Master of Science can be awarded. The Ph.D. program includes course work in both biochemistry and biophysics, passing written and oral examinations, participation 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 teaching or 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 Ph.D. candidates only.

## Curriculum

**Freshman Year**
CH 221, CH 222, CH 223. Gen Chemistry (15)
MTH 251, MTH 252, MTH 253. Calculus (12)
WR 121. English Composition (3)
HHP 231. Fitness (3)
BI 211, BI 212, BI 213. Biology (12)
Electives (3)

**Sophomore Year**
BI 214. Cell and Molecular Biology (3)
CH 334, CH 335, CH 336. Organic Chem (9)
CH 361, CH 362. Experimental Chemistry (6)
MTH 254. Vector Calculus (4)
PH 211, PH 212, PH 213. General Physics (12)
Electives (8)

***Junior Year**
BB 490, BB 491, BB 492. Biochemistry (9)
BB 493, BB 494, BB 495. Biochemistry Lab (9)
BI 311. Genetics (4)
CH 440, CH 441, CH 442. Physical Chem (9)
Electives (14)

**Senior Year**
BB 481, BB 482, BB 483. Biophysics (9)
Electives (36)

*CH 361 and 362 can be taken in the junior year with BB 493-494-495 being taken in the senior year.

**Lower Division**

**BB 100. THE MOLECULES OF LIFE (2).** A brief introduction to molecular biology for nonspecialists. Subjects vary, but have included biochemical basis of origin of life, biochemical genetics, biochemical aspects of memory and behavior, mutagenesis, bioenergetics and nutrition, and environmental biochemistry.

**Upper Division Courses**

**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 an 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) PREREQ: CH 122, CH 202, or CH 222.

**BB 350. ELEMENTARY BIOCHEMISTRY (4).** Service course for students desiring a short introduction to biochemistry. Four lectures weekly. PREREQ: CH 331 or equivalent. Concurrent registration in CH 332 or its equivalent is recommended.

**BB 351. *ELEMENTARY BIOCHEMISTRY (5).** A short introduction to biochemistry for non-majors. Structures of biomolecules, bioenergetics, intermediary metabolism, structure and expression of genetic information, experimental basis for current concepts. Four lectures and one 3 hr lab. Satisfies Baccalaureate Core requirement for a biological science. PREREQ: CH 331 or equivalent. Concurrent registration in CH 332 or its equivalent is recommended.

**BB 401. UNDERGRADUATE RESEARCH (1-16).**

**BB 405. READING AND CONFERENCE (1-16).**

**BB 407. BIOCHEMISTRY/BIOPHYSICS SEMINAR (1).** Informal seminars presenting information about research problems and careers and research programs on campus in biochemistry or biophysics.

**BB 410/BB 510. INTERNSHIP (1-16).**

**BB 450/BB 550, BB 451/BB 551, BB 452/BB 552. GENERAL BIOCHEMISTRY (4,4,4).** Sequence course for students with a limited background in physical chemistry. Must be taken in order. BB 450/ BB 550, three lectures and one recitation; BB 451/BB 551 and BB 452/BB 552, three lectures. PREREQ: CH 332 or (preferably) CH 336.

**BB 481/BB 581, BB 482/BB 582, BB 483/BB 583. BIOPHYSICS (3,3,3).** Sequence professional course covering quantitative properties of biological systems and biological phenomena using concepts derived from mathematics and physics. Must be taken in order. PREREQ: CH 442.

**BB 490/BB 590, BB 491/BB 591, BB 492/BB 592. BIOCHEMISTRY (3,3,3).** Sequence professional course to meet the requirements of majors in biochemistry and biophysics. Must be taken in order. PREREQ: CH 336. COREQ: CH 440, CH 441, CH 442.

**BB 493/BB 593, BB 494/BB 594, BB 495/BB 595. ^BIOCHEMISTRY LABORATORY (3,3,3).** Laboratory to accompany BB 450, BB 451, BB 452 or BB 490, BB 491, BB 492. Should be taken in order. Lec/lab. (Writing Intensive Course)

### Graduate Courses

**BB 501. RESEARCH (1-16).**

**BB 503. THESIS (1-16).**

**BB 505. READING AND CONFERENCE (1-16).**

**BB 507. SEMINAR (1-2).** Section 1: Descriptions of campus research programs in biochemistry and biophysics, 1 credit fall. Should be taken by all entering departmental graduate students. Graded P/N. Section 2: Student presentations of current research literature, 1 credit winter and spring. Should be taken by all first-year graduate students. Section 3: Research presentations by visiting scientists, OSU faculty, and advanced graduate students, 1 credit any term. Graded P/N. Section 4: Presentation of departmental research seminar, 2 credits any term. Ph.D. 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.

**BB 536. MOLECULAR VIROLOGY (4).** A survey of representative viruses with an emphasis on the molecular mechanisms involved in replication, transcription, and pathogenesis. CROSSLISTED as GEN 536, MB 536, MCB 536. Offered alternate years.

**BB 601. RESEARCH (1-16).**

**BB 603. THESIS (1-16).**

**BB 605. READING AND CONFERENCE (1-16).**

**BB 607. SEMINAR (1-16).** Section 1: Descriptions of campus research programs in biochemistry and biophysics, 1 credit fall. Should be taken by all entering departmental graduate students. Graded P/N. Section 2: Student presentations of current research literature, 1 credit winter and spring. Should be taken by all first-year graduate students. Section 3: Research presentations by visiting scientist, OSU faculty, and advanced graduate students, 1 credit any term. Graded P/N. Section 4: Presentation of departmental research seminar, 2 credits any term. Ph.D. 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.

**BB 650, BB 651. SELECTED TOPICS IN BIOCHEMISTRY (3,3).** Nonsequence courses designed to acquaint student with current research in biochemistry. Courses include molecular toxicology, enzyme kinetics, metabolism, neurochemistry, trace element metabolism, biological oxidations, and bioenergetics. Most courses offered alternate years.

**BB 652. SELECTED TOPICS IN BIOCHEMISTRY (3).** Nonsequence courses designed to acquaint student with current research in biochemistry. Courses include enzyme kinetics, metabolism, neurochemistry, trace element metabolism, biological oxidations, and bioenergetics. Most courses offered alternate years.

**BB 653. PLANT BIOCHEMISTRY (3).** Chemical processes and metabolism in plant systems. PREREQ: BB 451/BB 551, BB 492/BB 592, or equivalent. Offered alternate years.

**BB 654. PROTEINS (3).** Advanced treatment of protein structure and function. PREREQ: BB 451/BB 551, BB 492/BB 592, or equivalent.

**BB 655. DNA-PROTEIN INTERACTIONS (3).** Structures of DNA-protein complexes. Proteins and enzymes involved in replication, transcription, repair, recombination, regulation, and restriction. PREREQ: BB 451/BB 551, BB 492/BB 592, or equivalent. Offered alternate years.

**BB 657. NUCLEOTIDES (3).** Chemistry, enzymology, and metabolism of nucleotides, emphasizing experimental methods, genetic regulation, antimetabolites, and biological control mechanisms. PREREQ: BB 451/BB 551, BB 492/BB 592, or equivalent. Offered alternate years.

**BB 660. EUKARYOTIC TRANSCRIPTION (3).** Molecular details of gene regulation in higher organisms, emphasizing current literature and experimental methods. PREREQ: BB 451, BB 492, or equivalent. Offered alternate years.

**BB 662. HORMONE ACTION (3).** Mechanisms of action of peptide and steroid hormones and related compounds at the cellular level. PREREQ: BB 452/BB 552, BB 492/BB 592, or equivalent. Offered alternate years.

**BB 664. PHYSICAL METHODS IN BIOPHYSICS AND BIOCHEMISTRY (3).** Important techniques for studying biopolymers and biological systems. PREREQ: BB 483/BB 583. Not offered every year.

## BIOLOGY PROGRAM

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(541) 737-2993

**Faculty**
Faculty members are listed under the biological science departments.

### Undergraduate Major

**Biology (B.S.)**
*Option*
**Marine Biology**
**Minor**
**Biology**

The undergraduate biology major is available for students who wish to obtain broad, interdisciplinary training in the biological sciences rather than enter into a traditional biological subdiscipline represented by the Departments of Biochemistry and Biophysics, Botany and Plant Pathology, Entomology, Microbiology, and Zoology at OSU. Biology students may transfer to one of these departments if their interests change as they progress in their undergraduate studies.

### CURRICULUM

#### CORE PROGRAM

**Freshman Year**
BI 198. Seminar (1)
BI 211, BI 212, BI 213. Principles of Biology (12)
CH 221, CH 222, CH 223. Gen Chemistry (15)
WR 121. English Composition (3)
MTH 251, MTH 252. Calculus (8) or MTH 251, MTH 268. (8)
HHP 231. Lifetime Fitness for Health (3)
Required courses and/or electives (3)

**Sophomore Year**
CH 331, CH 332, CH 337. Organic Chem (10)
BI 214. Cell and Molecular Biology (3)
PH 201, PH 202, PH 203. General Physics (15)
Required courses and/or electives (17)

**Junior Year**
BB 450, BB 451. General Biochemistry (7)
ST 351, ST 352. Intro to Statistical Methods (8)
BI 311. Genetics (4)
BI 370. Ecology (3)
MB 302, MB 303. General Microbiology (5)
Organismal Biology (4–5) One course from the following: BOT 321, BOT 416, BOT 461, ENT 350, Z 361/Z 362, Z 371/Z 372

**Senior Year**
BI 445. Evolution (3)
BI 460. Cell Biology (3)
BI 461. Cell Biology Lab (2)
Physiology (3–5) One course from BI 450/ BI 451, BOT 331, ENT 416, Z 423, Z 430, Z 431 or Z 432.
History of Science (3) One course from HSTS 415, HSTS 417, or HSTS 425.
Writing intensive course (3) One course from BI 333, BI 371, BI/BOT 489, HSTS 415, HSTS 417, or HSTS 425.
Additional upper division courses (5–6)
Other required courses and electives (40)

#### MARINE BIOLOGY OPTION

**TRACK I (21)**
BI 450, BI 451. Marine Biology (16)
*At least 5 credits from the following:*
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)
FW 465. Marine Fisheries (4)
OC 331, OC 332, or OC 333 (3,3,3) (Only one of the OC courses is acceptable for the option.)

**TRACK II (21)**
Z 351. Marine Ecology (3)
Z 352. Marine Ecology Lab (2)
Z 361. Invertebrate Biology (3)
Z 362. Invertebrate Biology Lab (2)
BOT 416. Aquatic Botany (4)
BI 358. Symbiosis and the Environment (3)
FW 465. Marine Fisheries (4)

#### PREPROFESSIONAL PROGRAMS

The following preprofessional programs may be accommodated within the biology major: Dentistry, Medicine, Medical Technology, Optometry, Podiatry, and Veterinary Medicine. Please consult with an adviser in the College of Science office to plan your program.

## MINOR

The minor in biology requires 27 credits, which includes an introductory biology sequence with a chemistry prerequisite or corequisite (BI 211, 212, 213), a course in cell and molecular biology (BI 214) and at least 12 credits of upper division credits from courses offered under subject areas listed below. **No upper division course used to satisfy a major requirement can be used to fulfill a minor requirement.**

1. BI 211, BI 212, BI 213, BI 214 (4,4,4,3)
2. One course in each of the following subject areas[4]:

a. PHYSIOLOGY
BOT 331 (5), BOT 488 (3), ENT 416 (3), Z 423 (4), Z 430 (4), or Z 431 (5)

b. ECOLOGY and SYSTEMATICS
BI 370 (3), BOT 341 (4), BOT 425 (3), ENT 420 (3), MB 448 (3), Z 348 (3), Z 351 (3), or Z 361 (3)

c. EVOLUTION
BI 445 (3), HSTS 415 (3), or Z 345 (3)

d. GENETICS
BI 311 (4)

## COURSES

### Lower Division

**BI 101. *GENERAL BIOLOGY (4).** An introductory course in the principles and methods of biology, intended for majors in fields other than the biological sciences. Diversity of life, ecology, population biology, and human environmental impacts. Lec/lab. (Bacc Core Course)

**BI 102. *GENERAL BIOLOGY (4).** An introductory course in the principles and methods of biology, intended for majors in fields other than the biological sciences. Mendelian genetics, genetic engineering, evolution, and behavior. Lec/lab. (Bacc Core Course)

**BI 103. *GENERAL BIOLOGY (4,4,4).** An introductory course in the principles and methods of biology, intended for majors in fields other than the biological sciences. Plant anatomy and physiology, human anatomy and physiology, and human diseases. Lec/lab. (Bacc Core Course)

**BI 107. HEALTH PROFESSIONS: DENTAL (1).** Discussion of matters relating to careers in dentistry by local dentists. Includes application procedures, the importance of various requirements, admission, professional school curricula, financing education and related matters. Graded P/N.

**BI 108. HEALTH PROFESSIONS: ALLIED (1).** Broad overview of various medical and allied health professions such as nursing, occupational therapy, and medical technology. Includes application procedures, the importance of various requirements, admission, professional school curricula, financing education and related matters. Graded P/N.

**BI 109. HEALTH PROFESSIONS: MEDICAL (1).** Discussion of matters relating to careers in medicine. Includes application procedures, the importance of various requirements, admissions, professional school curricula, financing education, and related matters. Graded P/N.

**BI 198. DISTINGUISHED BIOLOGY SCHOLARS SEMINAR SERIES (1).** Presentations made by eminent teachers and researchers who will discuss various aspects of biology. Open to FR in the College of Science. Graded P/N.

**BI 199. SELECTED TOPICS (1-8).**

**BI 211. *PRINCIPLES OF BIOLOGY (4,).** Origins of life, energy transformations, plant and animal diversity. PREREQ/COREQ: General Chemistry. For life science majors and preprofessional students. Lec/lab. (Bacc Core Courses)

**BI 212. *PRINCIPLES OF BIOLOGY (4,).** Cell Biology, organ systems, plant and animal physiology. PREREQ/COREQ: General Chemistry. For life science majors and preprofessional students. Lec/lab. (Bacc Core Courses)

**BI 213. *PRINCIPLES OF BIOLOGY (4,).** Genetics, evolution, natural selection, and ecology. PREREQ: General Chemistry. For life science majors and preprofessional students. Lec/lab. (Bacc Core Courses)

**BI 214. CELL AND MOLECULAR BIOLOGY (3).** Fundamental concepts of prokaryotic and eukaryotic cell biology. Emphasizes cell structure and function at the molecular level. PREREQ: One year of general college chemistry; BI 211, BI 212, and BI 213; CH 331. COREQ: CH 332.

**BI 268. MATHEMATICAL IDEAS IN BIOLOGY (4).** Basic calculus, particularly differential equations, as applied to biological systems and especially ecology. Difference equations, chaos, and cellular automata will be introduced in a biological context. PREREQ: MTH 251 or equivalent. CROSSLISTED as ENT 268, MTH 268.

**BI 298. RESEARCH IN THE BIOLOGICAL SCIENCES (1).** Presentations made by faculty who will describe their research and its significance. Open to SO and JR undergraduate majors in biology, biochemistry, botany, entomology, environmental science, microbiology, and zoology. Course may be repeated for 2 credits. Graded P/N.

### Upper Division Courses

**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. (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. PREREQ: One year of college biology or chemistry. Junior Standing required. (Bacc Core Course)

**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. PREREQ: One year of college biology and chemistry. Departmental approval required. (Bacc Core Course, Writing Intensive Course)

**BI 311. GENETICS (4).** Fundamentals of Mendelian, quantitative, population, molecular, and developmental genetics. PREREQ: One year each of biology and chemistry; BI 214 is strongly recommended.

**BI 333. *^UNDERSTANDING ENVIRONMENTAL PROBLEMS (3).** Case studies of complex environmental problems are first reviewed in the context of scientific inquiry. Subsequently, the social, political, and cultural factors involved in creating and solving such problems are analyzed. Junior or Senior standing required. PREREQ: One year each of college chemistry and biology. (Bacc Core Course and Writing Intensive Course)

**BI 350. ANIMAL BEHAVIOR (3).** Concepts of behavior; sensory receptors, internal mechanisms, governing responses; learning and habituation; social organization and communication. PREREQ: One year of biological science. CROSSLISTED AS Z 350

**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. PREREQ: One year of biology, one year of chemistry. Lec.

**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. PREREQ: One year of biology.

**BI 371. ^ECOLOGICAL METHODS (3).** Experimental design, data collection, analysis and synthesis in ecological studies; local ecosystems emphasized. PREREQ: BI 370. (Writing Intensive Course) May have field trip fee.

**BI 399. SPECIAL TOPICS (1-16).** May be repeated for credit.

**BI 401. RESEARCH (1-16).** PREREQ: Departmental approval required.

**BI 405/BI 505. READING AND CONFERENCE (1-16).** PREREQ: Departmental approval required.

**BI 407. SEMINAR (1).** Section 1: Junior/Senior Seminar (1). How to prepare and present scientific information; how to apply for graduate school or other position. PREREQ: Junior or senior standing in Botany or Biology. CROSSLISTED as BOT 407, Section 1.

**BI 410. INTERNSHIP (1-16).** PREREQ: Departmental approval. Offered in A-F and P/N sections.

**BI 434/BI 534. FIELD PHOTOGRAPHY (3).** Photographic techniques utilized in accurately recording natural phenomena in the field and presenting the results in an attractive and professional manner. The laboratory is devoted exclusively to field work and practical applications of techniques and procedures learned. PREREQ: Two years of biological science. Field trip fee. Lec/Lab.

**BI 445/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. PREREQ: BI 311; BI 370.

**BI 450/BI 550. MARINE BIOLOGY (8).** (Hatfield Marine Science Center). A comprehensive introduction to the flora and fauna of the marine environment approached from the level of the cell to the whole organism. Ecological patterns and processes characteristic of marine communities will be emphasized. PREREQ: A one-year course in biology or equivalent courses in introductory botany or zoology. Departmental approval required. COREQ: BI 451/551. Admission to BI 450/BI 451 and BI 550/BI 551 is by application only.

**BI 451/BI 551. MARINE BIOLOGY LABORATORY (8).** Hatfield Marine Science Center. Laboratories and field experience with flora and fauna of the marine environment, microbes, physiological and biochemical characteristics and adaptations of marine organisms, ecological patterns and processes of marine populations, communities, and ecosystems. Must be taken concurrently with BI 450/BI 550. Departmental approval required. Field trip fee.

**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. Junior+ standing required. PREREQ: One year of biological science. PREREQ/COREQ: BI 214, BB 350; or BB 450, BB 451.

**BI 461. CELL BIOLOGY LABORATORY (2).** Laboratory experiments to study the structure and functions of eukaryotic cells. PREREQ/COREQ: BI 460.

**BI 466/BI 566. ELECTRON MICROSCOPY (3).** Transmission and scanning EM as well as X-ray instrument theory and design, sample preparation, and applications to biological and materials microstructural studies. PREREQ: Introductory college physics; junior standing.

**BI 468. DEVELOPMENTAL STRATEGIES OF PLANTS AND ANIMALS (3).** The developmental strategies of eukaryotic organisms ranging from fungi to plants and animals, emphasizing molecular mechanisms and genetic control, are compared. PREREQ: One year Principles of Biology (BI 211, 212, 213 or equivalent), BI 214 or equivalent, and Genetics (BI 311).

**BI 489/BI 589. *^ANALYSIS OF ENVIRONMENTAL ISSUES (3).** Introduces students to the process of analyzing environmental issues by developing their capacity to acquire facts, synthesize ideas, and communicate their knowledge. Students work within a group and prepare a written analysis. PREREQ: One year of chemistry or biology. Open to Juniors and Seniors in the College of Science. CROSSLISTED as BOT 489/BOT 589. (Bacc Core Course)

**Graduate Courses**

**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. PREREQ: A course in ecology; ST 412/ST 512 or equivalent; calculus. Lec/lab.

**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. PREREQ: A course in ecology; ST 412/ST 512 or equivalent; calculus. Lec/lab.

**Upper Division Courses**

**BI LDT. (1-16).**

**BI UDT. (1-16).**

## BIORESOURCE RESEARCH

Bioresource Research students acquire research experience and broadly-based knowledge in interdisciplinary fields of agricultural, environmental, food, and forest sciences. Students determine their fields of study by choosing among ten different option areas. After two years of research in the program of a faculty mentor, each student writes a senior thesis. In addition to research expertise, students graduate with strong basic science backgrounds and problem-solving and communication skills. Many will become industrial or academic research professionals, in areas of science where there will be a shortage of qualified individuals for the foreseeable future. Others will enter graduate and professional schools in the life sciences, or become highly effective secondary school science teachers. There are over one hundred Bioresource Research faculty mentors, from fifteen departments in the colleges of Agricultural Science, Forestry, and Science: Agricultural Chemistry, Animal Science, Bioresource Engineering, Botany and Plant Pathology, Chemistry, Crop and Soil Science, Entomology, Fisheries and Wildlife, Food Science and Technology, Forest Resources, Forest Science, Horticulture, Microbiology, Rangeland Resources, and Zoology. The faculty are organized into ten interdepartmental option groups according to their research interests. See complete description under Interdisciplinary Studies.

## BOTANY AND PLANT PATHOLOGY

Stella Coakley, Chair
2082 Cordley Hall
Oregon State University
Corvallis, OR 97331-2902
(541) 737-3451

**Faculty**

*Professors* Armstrong, Arp, Coakley, Hansen, Meints, Mills, Mundt, Powelson, Rickson, Risser, Smiley, Spotts, Winner, Zobel; *Associate Professors* Crowe, Hamm, E. Ingham, R. Ingham, Johnson, Lajtha, Liston, Lomax, McCune, Muir, Pscheidt, Rivin, Sugar, Wilson, Wolpert; *Assistant Professors* Brunet, Ciuffetti, Dolja, Fowler, Hyman, Ocamb, Sayavedra-Soto, Spatafora, Stone; *Senior Instructors* Soeldner; *Instructors* Halse, Putnam

**Courtesy Faculty:**

*Professors* Linderman, Loper, Neilson; *Associate Professor* Martin, Pfender; *Assistant Professors* Alderman, Mahaffee, Meinke

### Undergraduate Major

**Botany (B.S.)**

### Minor

**Botany**

### Graduate Major

**Botany and Plant Pathology (M.A., M.S., Ph.D.)**

*Graduate Areas of Concentration*
Ecology and Systematics
Plant Molecular Biology and Genetics
Plant Pathology
Plant Physiology
Structural Botany

## UNDERGRADUATE STUDIES

The field of plant biology, which encompasses botany and plant pathology, involves the study of plants at levels of organization ranging from the molecular to the global ecosystem. 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 emphasize studies in plant biology and receive a B.S. degree in botany. Students may also have an undergraduate major in biology or environmental science and emphasize botany courses in their upper division work.

Completion of the undergraduate curriculum 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.

It is desirable that prospective botany majors 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 can make up these deficiencies early in their college careers.

## CURRICULUM

The required curriculum meets the course requirements of the University and the College of Science and provides opportunity for specialized study in one or more principal areas of plant science. The undergraduate major, in regular consultation with a faculty adviser, prepares an academic program which meets University requirements, provides adequate scientific background, and fulfills individual goals and interests.

**B.S. DEGREE IN BOTANY**

**Freshman and Sophomore**
BI 211, BI 212, BI 213. Biol (12)
CH 121, CH 122, CH 123, or CH 221, CH 222, CH 223. Gen Chem (15)
CH 331, CH 332. Organic Chem (8)
MTH 251 and MTH 252 or MTH 241 and MTH 245. Mathematics (8)
BOT 321. Introduction to Plant Systematics (4)

**Baccalaureate Core**
Writing and speech (9)
Fitness (3)
Perspectives (15)

**Electives (14-16)**

**Junior and Senior**
PH 201, PH 202, PH 203. General Physics (15)
ST 351. Statistics (4)
BB 350 or BB 351 or BB 450 and BB 451. Biochem (4-7)
BI 214. Cell and Molecular Biology (3)
BOT 416 or BOT 461 or BOT 465. Biology of Non-Vascular Plants (4)
BOT 413. Plant Anatomy (4)
BOT 331. Plant Physiology (5)
BOT 341. Plant Ecology (4)
BOT 350 or MB 302. Plant Pathology or Microbiology (3-4)
BI 311. Genetics (4)
Additional upper division biology (4)
(College of Science courses, outside of Botany and Plant Pathology)

**Baccalaureate Core**
Synthesis (6)
Writing Intensive Course (3)

**Electives (26-30)**

**TOTAL (180)**

## MINOR (27)

BOT 321. Introduction to Plant Systematics (4)
BOT 331. Plant Physiology (5)
BOT 341. Plant Ecology (4)
BI 311. Genetics (4)
Any additional 10 credit hours of upper division BOT courses

The minor requirements listed above are subject to the following constraints:
Courses required for a major taken in the major department may not count toward a minor.
An individual course may not count toward more than one minor.

## GRADUATE STUDIES

The Department of Botany and Plant Pathology offers graduate programs leading to the Master of Arts, Master of Science, and Doctor of Philosophy degrees.

Ecology and systematics, plant molecular biology and genetics, plant pathology, plant physiology, and structural botany comprise the five major disciplines within the department.

**Ecology and Systematics** includes physiological, population, community, ecosystem and global ecology, and molecular and morphological systematics of fungi, lichens, and plants.

**Plant Molecular Biology and Genetics** includes analysis of genomic diversity in plants; plant gene regulation; and molecular, classical and population genetics of plant-associated microorganisms.

**Plant Pathology** includes nematology, bacteriology, virology, forest pathology, epidemiology, physiology of parasitism, and the genetics and biochemistry of host-pathogen interactions.

**Plant Physiology** includes nitrogen metabolism, synthesis and mode of action of phytohormones, and the biochemical and physiological control of gene expression during differentiation and morphogenesis.

**Structural Botany** includes cytology, anatomy, and morphology of various plant groups with associated techniques in cytology, histology and light and electron microscopy.

Students with majors in any one area can incorporate into their programs 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 and genetics are also available.

The Ph.D. and M.S. (thesis options) 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. In addition, Ph.D. candidates must pass a written and oral preliminary examination upon completion of their course work and complete two quarters as a graduate teaching assistant. A non-thesis M.S. degree is also available. The M.A. 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.

## COURSES

### Lower Division

**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)

### Upper Division Courses

**BOT 321. INTRODUCTION TO 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. PREREQ: BI 213. Lec/lab.

**BOT 331. PLANT PHYSIOLOGY (5).** Physiological and metabolic processes of plants. Survey of photosynthesis and plant metabolism, mineral nutrition and ion uptake, water relations, transport processes, regulation of plant growth and development, and whole plant physiology. PREREQ: BI 213; CH 223 or CH 123. Lec/lab.

**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. PREREQ: BI 213. REC: BOT 321. Lec/lab. (Writing Intensive Course when taken with BOT 342.)

**BOT 342. ^WRITING ABOUT PLANT ECOLOGY (1).** Introduction to the kinds of writing used by plant ecologists, with practice in their use and production. With BOT 341, a Writing Intensive course for botany majors only. PREREQ/COREQ: BOT 341. (Writing Intensive Course.)

**BOT 350. INTRODUCTORY PLANT PATHOLOGY (4).** Symptoms, causal agents, diagnosis, and prevention of plant diseases, with emphasis on fungi, bacteria, nematode, and virus pathogens. PREREQ: BI 213. Lec/lab.

**BOT 401. RESEARCH (1-16).**

**BOT 405. READING AND CONFERENCE (1-16).**

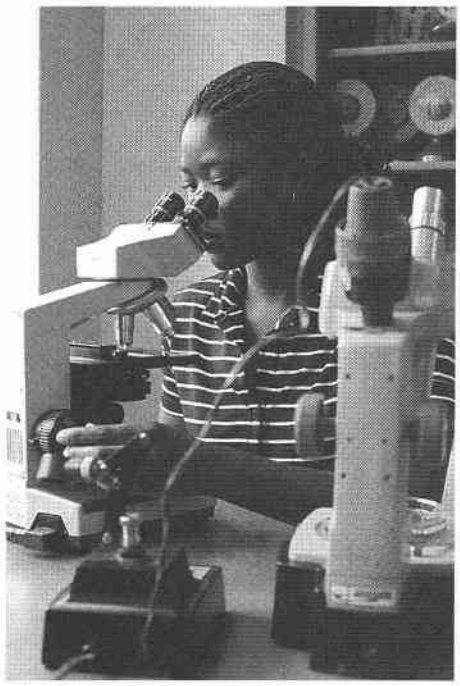
**BOT 407. SEMINAR (1).** Section 1: Departmental seminar. Section 2: Junior/Senior Seminar (1). Intended to instruct students on proper techniques for presentation of scientific material. Each student is expected to prepare and present a scientific seminar, and a statement of professional goals. PREREQ: Junior or Senior standing in botany or biology. CROSSLISTED as BI 407. 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. PREREQ: Consent of instructor. Graded P/N.

**BOT 410. INTERNSHIP (1-16).** PREREQ: Consent of Instructor.

**BOT 413/BOT 513. PLANT ANATOMY (4).** Origin, structure and development of the tissues of vascular plants. PREREQ: BI 213. Lec/lab.

**BOT 414/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 tribe. PREREQ: BOT 321. Lec/lab.

**BOT 415/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. PREREQ: BI 213. CROSSLISTED as ENT 415/ENT 515. Lec/rec/lab.



**BOT 416/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. PREREQ: BI 213. Lec/lab.

**BOT 421/BOT 521. ADVANCED PLANT SYSTEMATICS (4).** Experimental plant systematics. Methods of phylogenetic reconstruction. Collection and analysis of taxonomically informative characters, including structural, cytological, genetic, biochemical, and molecular data. PREREQ: BOT 321, BI 311 or CSS 430. Lec/lab.

**BOT 425/BOT 525. PLANT TAXONOMY (3).** Use of taxonomic keys; floral structure relationships and diagnostic characteristics of vascular plants. Field trips. PREREQ: BI 213. Lec/lab.

**BOT 433/BOT 533. HORMONAL REGULATION OF PLANT GROWTH AND DEVELOPMENT (3).** Roles of hormones, inhibitors, and phytochrome in the regulation of growth and development of seed plants. The biochemistry of growth substances and phytochrome; effects of physical environment upon specific growth and developmental events and the salient biochemical changes correlated with those events. PREREQ: BOT 331. Offered alternate years.

**BOT 441/BOT 541. PLANT AUTECOLOGY (3).** The nature of the environment and plant responses to major environmental factors; physiological plant ecology. Field trip. PREREQ: BOT 341; BOT 331. Lec/lab.

**BOT 442/BOT 542. PLANT POPULATION ECOLOGY (3).** Ecological aspects of plant form and reproduction; demography and population modelling; species interactions, including competition, mutualism, and herbivory. PREREQ: BOT 341 or equivalent. Lec/lab.

**BOT 443/BOT 543. PLANT COMMUNITY ECOLOGY (3).** The structure, diversity, and successional dynamics of terrestrial plant communities; methods of analysis. PREREQ: BOT 341 or equivalent. Lec/lab.

**BOT 452/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. PREREQ: BOT 350 or 550. Offered alternate years. Lec/lab.

**BOT 453/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. PREREQ: BOT 350 or BOT 550. Offered alternate years in summer term. Lec/lab.

**BOT 461/BOT 561. INTRODUCTORY MYCOLOGY (4).** 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. PREREQ: BI 213. Lec/lab.

**BOT 465/BOT 565. LICHENS AND BRYOPHYTES (4).** Biology of lichens and bryophytes; includes structure, life histories, classification, and ecology. PREREQ: BI 213 and two botany courses or consent of instructor. Field trip fee. Lec/Lab.

**BOT 470/BOT 570. MICROTECHNIQUE (4).** Techniques of cytology, cytochemistry, histochemistry, and autoradiography. PREREQ: BI 213. Lec/lab.

**BOT 488/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. PREREQ: One course in plant physiology or one course in ecology. Lec/lab.

**BOT 489/BOT 589. *^ANALYSIS OF ENVIRONMENTAL ISSUES (3).** Introduces the students to the process of analyzing environmental issues by developing their capacity to acquire facts, synthesize ideas, and communicate their knowledge. Students work within a group and prepare a written analysis. PREREQ: One year chemistry or biology. CROSSLISTED as BI 489/BI 589. (Bacc Core and Writing Intensive Course)

**BOT 490/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. PREREQ: BOT 461/BOT 561. May be repeated for credit.

### Graduate Courses

**BOT 501. RESEARCH (1-16).**

**BOT 503. THESIS (1-16).**

**BOT 505. READING AND CONFERENCE (1-16).**

**BOT 507. SEMINAR (1).** Section 1: Departmental seminar. Section 2: Lichens and Bryophytes Research. Weekly one-hour meetings for reporting and discussions of proposal research, review and discussion of recent literature, and mini-workshops on particular problems. PREREQ: Graduate or consent of instructor. Section 3: Graduate Teaching Seminar. Covers technical aspects of serving as a graduate teaching assistant. Required for first-time teaching assistants supervised by the Department of Botany and Plant Pathology. Open to teaching assistants from other biological science departments. May be repeated for credit. Graded P/N.

**BOT 508. WORKSHOP (1-16).**

**BOT 544. PLANT GEOGRAPHY (3).** Description and control of species distribution. Characteristics, distribution, history and environmental limitations of the major units of vegetation, with emphasis on the Americas. PREREQ: BOT 221 or BOT 321; a graduate course in ecology. Offered alternate years. Lec/lab.

**BOT 550. PLANT PATHOLOGY (4).** Causal agents of plant disease, diagnosis, pathogenesis, epidemiology, and disease management principles and strategies. Field trips. PREREQ: BI 213. Lec/rec/lab.

**BOT 551. 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. PREREQ: BOT 550. Offered alternate years. CROSSLISTED as MCB 551.

**BOT 554. PLANT PATHOGENIC NEMATODES (2).** Survey of nematodes which cause plant disease. Includes: taxonomy; identification; life cycles; symptomology; interactions with other plant pathogens; and how nematodes cause plant disease. PREREQ: BOT 550; 6 credits of upper-division biology. Offered alternate years. Lec/lab.

**BOT 555. PLANT VIROLOGY (3).** Nature and properties; symptomology; transmission; inhibitors; purification; electron microscopy; serology; control. PREREQ: BOT 550; 6 credits of upper division biology. Offered alternate years.

**BOT 556. PLANT PATHOGENIC FUNGI (3).** Biology of fungi which cause disease of cultivated plants. Includes: reproduction, dissemination, interactions with host and vectors, classification, and structure. Field trips. PREREQ: BOT 550 or BOT 561 or consent of instructor. Offered alternate years. Lec/lab.

**BOT 557. PLANT PATHOGENIC BACTERIA (2).** Identification/classification, biology of pathogens; symptoms; prokaryote interactions on and within plants. PREREQ: BOT 550. Offered alternate years. Lec/lab.

**BOT 593. SELECTED TOPICS IN PLANT CELL AND MOLECULAR BIOLOGY (1-3).** In seminar and discussion format. Recent advances in cellular and molecular approaches to the study of plant functions of ecological and physiological significance. Topics vary from year to year. May be repeated for credit. CROSSLISTED as MCB 593.

**BOT 601. RESEARCH (1-16).**

**BOT 603. THESIS (1-16).**

**BOT 605. READING AND CONFERENCE (1-16).**

**BOT 607. SEMINAR (1-16).**

**BOT 608. WORKSHOP (1-16).**

**BOT 616. FOREST PATHOLOGY (3).** Advanced topics in Forest Pathology with an emphasis on field problems facing managers of forest resources. Field trips. PREREQ: BOT 415/BOT 515 or BOT 550. Offered alternate years. Lec/lab.

**BOT 625. PLANT MOLECULAR GENETICS (3).** Structure, expression and interactions of the plant nuclear, chloroplast and mitochondrial genomes. Critical examination of the current literature on gene regulation, mobile genetic elements and biotechnology in higher plants. PREREQ: MCB 555 or equivalent and BB 451, or consent of instructor. Offered alternate years. CROSSLISTED as GEN 625, MCB 625.

**BOT 664. HOST PARASITE INTERACTIONS: GENETICS AND PHYSIOLOGY (3).** Mendelian and molecular analysis of host-pathogen genetics. Biochemical and physiological basis of plant disease. Topics include gene organization and function, chromosome mapping, parasexuality and genetic models for plant disease resistance. Also, host-parasite recognition, pathogenicity and host response to infection. PREREQ: BB 451/BB 551 and GEN 555 or MCB 555 or consent of instructor. Offered alternate years. CROSSLISTED as MCB 664, GEN 664.

**BOT 668. HOST-PARASITE INTERACTIONS: POPULATIONS (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. PREREQ: BOT 550; ST 412. Offered alternate years.

**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. May be repeated for credit. PREREQ: Graduate level ecology.

**BOT 692. SELECTED TOPICS: PLANT PATHOLOGY (1-3).** Seminar and discussion of selected topics in plant pathology, emphasizing current literature and theory. Topics vary from year to year. May be repeated for credit. PREREQ: BOT 550 or equivalent. CROSSLISTED as MCB 692.

## CHEMISTRY

Carroll DeKock, Chair
153 Gilbert Hall
Oregon State University
Corvallis, OR 97331-4003
(541) 737-2081

**Faculty**

*Professors* Barofsky, Deinzer, DeKock, Evans, Freeman, Gould, F. Horne, Ingle, Keszler, Loveland, Nibler, Schuyler, Sleight, Thies, Westall, White; *Associate Professors* Gable, D. Horne, Lerner, Loeser, Watson; *Assistant Professors* Kong; *Senior Instructors* Albrecht, Pastorek; *Instructors* Nafshun, Travers, Walker; *Courtesy Professors:* Field, Gerwick

### Undergraduate Major

**Chemistry (B.A., B.S.)**

### Minor

Chemistry

### Graduate Major

**Chemistry (M.A., M.S., Ph.D.)**

***Graduate Areas of Concentration***

Analytical Chemistry
Inorganic Chemistry
Nuclear and Radiation Chemistry
Organic Chemistry
Physical Chemistry
Solid State Chemistry

The Department of Chemistry offers the degrees of Bachelor of Science, Bachelor of Arts, Master of Science, Master of Arts, Master of Arts in Interdisciplinary Subjects, and Doctor of Philosophy in Chemistry.

A major in chemistry may serve the undergraduate student as preparation for professional work in chemistry and related sciences such as biochemistry, agricultural chemistry, oceanography, and environmental or atmospheric sciences, or as a core for preprofessional training in a field such as medicine or dentistry.

The major in chemistry helps students prepare for graduate work in pure or applied chemistry, for positions as research chemists and technical experts in commercial laboratories and chemical industries, for positions with the federal government, and for teaching positions in universities, colleges, community colleges, and high schools.

The chemistry core curriculum consists of general, organic, analytical, physical, and inorganic chemistry course work, plus three years of laboratory work in chemistry. The remainder of the B.S. program consists of 12 credits of approved career-supportive electives, of which at least three are to be in laboratory courses or research. (For the B.A. program, it is 9 credits, including at least three in lab or research.)

Experimental Chemistry I and II is a six-term laboratory course sequence that consists of 23 project styled 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 four projects each term and each project includes a component of synthesis, analysis, theory and report writing spanning all areas of modern chemistry. One aim of the program is to involve students in an 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 can be an exciting way to apply to ideas and skills acquired in formal coursework. Students make contact directly with faculty members to set up such projects and work closely with the faculty member and other members of the research group. The student registers for CH 401 or CH 403; the hours per week are flexible. Areas of research available are highly varied and include: synthesis of new compounds and materials, development of instrumentation and its application to practical problems, studies in photochemistry, laser applications, surface science, mechanisms of molecular action in biological processes, fundamental properties of molecules, polymer materials, environmental chemistry, and nuclear chemistry. Research experience is helpful in making the decision about entering graduate work in chemistry and provides valuable experience for entering the job market.

The B.S. degree is normally taken by students intending to carry out graduate work in chemistry or to find employment as a chemist. The B.A. degree is normally taken by students who desire a broader range of courses, with a reduced number of chemistry and mathematics courses. The B.A. may be appropriate for students interested in health-related, or other professional careers.

The facilities, faculty, and curricular offerings of this department are approved by the American Chemical Society. Graduates who have fulfilled all departmental requirements for the B.S. degree are eligible for certification by the chairman of the department to become members of the Society after two years of professional experience.

## 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. All students are required, early in their graduate study, to demonstrate a certain level of competence in three of the above fields, or in two of them plus either biochemistry, physics, environmental chemistry, or material science. Such competence is generally demonstrated by completing in each field two 3-credit "core" courses at the 500 level. The required written preliminary examinations for the Ph.D. take the form of a number of "cumulative examinations," except for a single written examination required for the major in nuclear and radiation chemistry. The major emphasis of the Ph.D. program is on research. A non-thesis Masters degree is available. Most graduate students in chemistry are supported either as graduate teaching assistants or as graduate research assistants.

## Minor (27)

The requirements for a minor in chemistry include a minimum of 27 credits of chemistry (CH) courses. These credits must include a complete general chemistry sequence (CH221, CH222, CH223) (CH224, CH225, CH226) (CH201, CH202, CH123 or CH223) (CH121, CH122, CH123). In addition, a minimum of 4 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. CH374, CH401/501, CH403/503, CH407/507, CH410/510, CH595, and CH596 cannot be used to fulfill the upper division credits and CH 130 does not count toward the minor.

## Curriculum

### B.S. Degree

Perspectives courses (15), Synthesis courses (6), Writing courses (9), and the fitness course (3) are baccalaureate core requirements. The quarters in which these are taken are flexible, except that Synthesis courses must be taken at the junior-senior level. The timing of the biology courses is flexible, also.

Nine or more credits of independent research are strongly recommended. These may be taken as CH 401 Research or as CH 403 Thesis. The latter leads to a senior thesis, submitted to the chemistry faculty.

Chemistry majors may not use S/U grading in courses that meet Department of Chemistry or College of Science requirements.

**Freshman Year**
CH 221, CH 222, CH 223. Gen Chem (15)
MTH 251, MTH 252. Calculus (8)
MTH 254. Vector Calculus I (4)
Writing I (3)
HHP 231 (3)
Perspectives (6)
PH 211, PH221. General Physics (5)

**Sophomore Year**
CH 334, CH 335, CH 336. Organic Chem (9)
CH 361, CH 362. Experimental Chemistry I (6)
MTH 253. Infinite Series and Sequences (4)
MTH 256. Applied Differential Equations (4) or MTH 341. Linear Algebra (3)
PH 212, PH 213, and PH 222, PH 223. General Physics (10)
PH 314 or BB 490 or BB 450 (4 or 3)
Writing II (3)
Perspectives (6)

**Junior Year**
CH 421, CH 422. Analytical Chemistry (6)
CH 440, CH 441, CH 442. Physical Chem (9)
CH 461, CH 462, CH 463. Exper Chem II (9)
BI 211 or BI 101. Biology (4)
Perspectives and synthesis (6)
Writing III/speech (3)
Electives (9)

**Senior Year**
CH 411, CH 412. Inorganic Chemistry (6)
Approved career-supportive electives (must include 3 credits of lab and be approved by the adviser and the department by the end of the winter quarter of the junior year.) (12)
CH 464. Experimental Chemistry II (3)
Synthesis course (3)
Electives (21)

### B.A. Degree

Perspectives courses (15), synthesis courses (6), writing courses (9), and the fitness course (3) are baccalaureate core requirements. The quarters in which these are taken are flexible, except that synthesis courses must be taken at the junior-senior level. The timing of the language and biology courses is flexible, also. The elective courses must include 9 credits of approved courses in the College of Liberal Arts.

Independent research is recommended. This may be taken as CH 401 Research or as CH 403 Thesis. The latter leads to a Senior thesis, submitted to the chemistry faculty.

Chemistry majors may not use S/U grading in courses that meet Department of Chemistry or College of Science requirements.

**Freshman Year**
CH 221, CH 222, CH 223. Gen Chem (15)
MTH 251, MTH 252. Calculus (8)
Writing I (3)
HHP 231 (3)
Perspectives (6)
Electives (10)

**Sophomore Year**
CH 334, CH 335, CH 336. Organic Chem (9)
CH 361, CH 362. Experimental Chemistry I (6)
MTH 254. Calculus (4)
PH 211, PH 212, PH 213 and PH 221, PH 222, PH 223, or PH 201, PH 202, PH 203. General Physics (15)
Writing II (3)
Perspectives (3)
Electives (3)

**Junior Year**
CH 324. Analyt Chem (4)
The Combination of CH 421, 422, CH 461 may be substituted.
CH 440, CH 441, CH 442. Physical Chem (9)
CH 463. Experimental Chemistry II (3)
BI 211 or BI 101. Biology (4)
Perspectives and synthesis (6)
Writing III/speech (3)
Language (1st year) (12)
Electives (3)

**Senior Year**
CH 411, CH 412. Inorganic Chemistry (6)
Approved career-supportive electives (must be approved by the adviser and the department by the end of the winter quarter of the junior year.) (9)
Synthesis Course (3)
Language (2nd year) (9-12)
Electives (15-18)

## COURSES

### Lower Division Courses

**CH 121, CH 122, CH 123. GENERAL CHEMISTRY (5,5,5).** 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. Must be taken in order. Lec/Lab/Rec. (CH 122, CH 123 are Bacc Core Courses)

**CH 130. GENERAL CHEMISTRY OF LIVING SYSTEMS (0-4).** 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. PREREQ: CH 122 or CH 202. Lec/Lab/Rec. Does not count toward a chemistry minor.

**CH 199. SPECIAL TOPICS (1-3).** PREREQ: Departmental approval required.

**CH 201, CH 202. *CHEMISTRY FOR ENGINEERING MAJORS (3,3).** A sequence of selected chemistry topics for pre-engineering students. This sequence prepares students to take advanced laboratory courses in chemistry. (CH 121 is accepted in lieu of high school chemistry as a prerequisite for this sequence.) Must be taken in order. PREREQ: One year of high school chemistry and acceptable aptitude test scores. Lec/Lab/Rec. (Bacc Core Course)

**CH 219. GENERAL CHEMISTRY LABORATORY (2).** Laboratory work to supplement the instruction in CH 121, CH 122, CH 123 and CH 201, CH 202, CH 203 and to prepare students for more advanced laboratory courses such as CH 324, CH 325, CH 337, CH 361. PREREQ: CH 203 or CH 123. Lec/lab.

**CH 221, CH 222, CH 223. *GENERAL CHEMISTRY (5,5,5).** A general chemistry sequence for students majoring in most sciences, pharmacy, and chemical engineering. CH 121 is accepted in lieu of high school chemistry as a prerequisite for this sequence. Must be taken in order. PREREQ: One year of high school chemistry and acceptable aptitude test scores. Lec/lab/rec. (Bacc Core Course)

**CH 224, CH 225, CH 226. *HONORS GENERAL CHEMISTRY (5,5,5).** CH 224, CH 225, CH 226 is a general chemistry sequence for students in the University Honors College. PREREQ: One year of high school chemistry, admission to the University Honors College and demonstrated mathematical ability,. Lec/lab/rec. (Bacc Core Course)

### Upper Division Courses

**CH 324. QUANTITATIVE ANALYSIS (4).** A basic course in modern chemical analysis. PREREQ: one year of college chemistry. Lec/lab. CH 130 does not meet the prerequisites for this course.

**CH 331, CH 332. ORGANIC CHEMISTRY (4,4).** Service course covering aliphatic and aromatic chemistry. Introduction to nomenclature, mechanism and synthesis. Must be taken in order. PREREQ: One year of college chemistry. Lec/rec. CH 130 does not meet the prerequisites for this course.

**CH 334, CH 335, CH 336. ORGANIC CHEMISTRY (3,3,3).** Professional sequence for majors in chemistry and 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. Must be taken in order. PREREQ: One year college chemistry. CH 130 does not meet the prerequisites for this course.

**CH 337. ORGANIC CHEMISTRY LABORATORY (3).** Laboratory course in organic chemistry for nonmajors, designed to supplement CH 331, CH 332 and CH 334, CH 335, CH 336. PREREQ: CH 332 or CH 336.

**CH 361, CH 362. EXPERIMENTAL CHEMISTRY I (3,3).** First integrated laboratory course for majors in chemistry and related disciplines, covering experimental techniques of analytical, inorganic, organic and physical chemistry. Must be taken in order. COREQ: CH 334, 335. Lec/lab.

**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 requirement for chemistry minor.

**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. PREREQ: One year of chemistry.

**CH 401. RESEARCH (1-16).**

**CH 403. THESIS (1-16).**

**CH 405. READING AND CONFERENCE (1-16).**

**CH 407. SEMINAR (1-16).**

**CH 410/CH 510. INTERNSHIP (1-16).**

**CH 411/CH 511, CH 412/CH 512, CH 413/CH 513. INORGANIC CHEMISTRY (3,3,3).** Structure and bonding of inorganic compounds, chemistry of nontransition elements from the standpoint of the periodic table and atomic structure, ligand field theory and descriptive chemistry of transition metal compounds, bioinorganic chemistry, group theory and x-ray crystallographic methods. Need not be taken in order. PREREQ: CH 442/CH 542.

**CH 418/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. COREQ: CH 440/CH 540 or PH 314.

**CH 419/CH 519. RADIOACTIVE TRACER METHODS (4).** Radionuclides, radioactivity, and radiotracer methods as research tools in physical and biological science. PREREQ: Two years of college chemistry. Lec/lab.

**CH 421/CH 521, CH 422/CH 522. ANALYTICAL CHEMISTRY (3,3).** A two-course professional sequence for majors in chemistry. Chemical equilibrium, analytical electrochemistry, separations, spectroscopy, basic electronics and instrumentation, and treatment of data. Need not be taken in order. PREREQ: One year of college chemistry, one year of college physics; COREQ: CH 440/CH 540, CH 441/CH 541.

**CH 428/CH 528. INSTRUMENTAL ANALYSIS (4).** Service course covering instrumental analytical techniques, designed for graduate students in other departments. PREREQ: Two years of college chemistry or consent of instructor. Lec/lab.

**CH 435/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. PREREQ: CH 336, CH 442/CH 542.

**CH 440/CH 540, CH 441/CH 541, CH 442/CH 542. PHYSICAL CHEMISTRY (3,3,3,3,3,3).** Thermodynamics, electrochemistry, solutions, kinetic theory of gases, chemical kinetics, quantum theory and statistical mechanics, molecular structure and spectroscopy. Must be taken in order. PREREQ: One year of college chemistry, one year of college physics; MTH 254.

**CH 445/CH 545. PHYSICAL CHEMISTRY OF MATERIALS AND SURFACES (3).** Physical chemistry of materials, surface chemistry, polymers, catalysis. PREREQ: CH 442/CH 542.

**CH 448/CH 548. COLLOID AND SURFACE CHEMISTRY (3).** Colloids: optical properties, rheology, etc. Physical properties of interfaces and monolayers. Electrodes and electrokinetics. Adhesion. Molecular self assembly: membranes, vesicles, micromulsions. PREREQ: CH 442/CH 542.

**CH 450/CH 550. INTRODUCTORY QUANTUM CHEMISTRY (3).** Elementary wave mechanics and matrix mechanics of atoms and molecules. Quantum basis of chemical structure. PREREQ: CH 442, one year college physics.

**CH 453/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. PREREQ: CH 442/CH 542.

**CH 461, CH 462, CH 463, CH 464. EXPERIMENTAL CHEMISTRY II (3,3,3,3).** Second integrated laboratory course for majors in chemistry and related disciplines, covering experimental techniques of analytical, inorganic, organic and physical chemistry. Must be taken in order. PREREQ: CH 361, CH 362; COREQ: CH 421, CH 422;CH 440, CH 441, CH 442. Lec/lab. (CH 463 is Writing Intensive Course)

**CH 467/CH 567. MOLECULAR SPECTROSCOPY (4).** Infrared, Raman, electronic, NMR and ESR spectroscopy, identification and analysis applications, determination of molecular structures and other molecular parameters. PREREQ: CH 442/CH 542. Lec/lab.

**CH 490/CH 590. COMPUTER PROGRAMMING FOR SCIENTISTS (3).** Programing, numerical and graphical analysis, problem solving, simulations and use of data bases for information handling and retrieval. Applications to problems in chemistry. PREREQ: Two years of college chemistry.

### Graduate Courses

**CH 501. RESEARCH (1-16).**

**CH 503. THESIS (1-16).**

**CH 505. READING AND CONFERENCE (1-16).**

**CH 507. SEMINAR (1-16).** Student should enroll in the seminar section which meets the specific divisional requirements for credit hour and grading scheme.

**CH 514, CH 515, CH 516. SELECTED TOPICS IN INORGANIC CHEMISTRY (3,3,3).** 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.

**CH 530, CH 531, CH 532, CH 533. ADVANCED ORGANIC CHEMISTRY (3,3,3,3).** Molecular orbital bonding theory, orbital symmetry, reaction mechanisms, stereoisomerism, conformational analysis, and advanced methods of synthesis. PREREQ: CH 336, CH 442/CH 542.

**CH 536, CH 537, CH 538. SELECTED TOPICS IN ORGANIC CHEMISTRY (3,3,3).** 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. PREREQ: CH 533. Need not be taken in order. Not offered every year.

**CH 551. QUANTUM MECHANICS OF ATOMS AND MOLECULES (3).** PREREQ: CH 450/CH 550.

**CH 552. QUANTUM MECHANICS OF MOLECULAR SPECTROSCOPY (3).** PREREQ: CH 551.

**CH 560. 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. PREREQ: CH 442/CH 542.

**CH 561. CHROMATOGRAPHY (3).** Theory, instrumentation, and practice of all forms of chromatography and related techniques; handling and interpretation of chromatographic data. PREREQ: Three years of college chemistry. Sample preparation techniques.

**CH 562. ANALYTICAL ELECTROCHEMISTRY (3).** Study of current, voltage and time relationships in electrochemical cells. PREREQ: CH 442/CH 542. Offered alternate years.

**CH 563, CH 564, CH 565. ADVANCED LABORATORY IN ANALYTICAL CHEMISTRY (1,1,1).** Optional laboratory to supplement CH 560, CH 561, CH 562. For majors in analytical chemistry. COREQ: CH 560, CH 561, CH 562.

**CH 576. ACTIVATION ANALYSIS (4).** Theory; various methods of activation emphasizing neutron activation, fundamentals of radioactivity detection, instrumental and radiochemical methods; applications to physical, chemical, biological, geochemical fields, etc. Instrumentation and laboratory techniques include use of beta-ray and gamma-ray detectors, and use of multichannel analyzers. PREREQ: CH 419/CH 519 or senior standing in chemistry or physics, or graduate standing in science or engineering disciplines.

**CH 577. EXPERIMENTAL NUCLEAR CHEMISTRY (3).** Individualized instruction in experimental nuclear chemistry and activation analysis. Advanced activation analysis, nuclear spectroscopy, nuclear reaction studies, radiochemistry, advanced radiotracer methodology, and low-level techniques. Original research problem. PREREQ: CH 418/CH 518, CH 419/CH 519, or CH 576.

**CH 580, CH 581, CH 582. SELECTED TOPICS IN PHYSICAL CHEMISTRY (2,2,2).** 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. PREREQ: Graduate standing.

**CH 583, CH 584, CH 585. SELECTED TOPICS IN ANALYTICAL CHEMISTRY (2,2,2).** Nonsequence courses designed to acquaint the advanced graduate student with recent advances in analytical chemistry. PREREQ: Graduate standing or consent of instructor.

**CH 586, CH 587, CH 588. SELECTED TOPICS IN NUCLEAR AND RADIATION CHEMISTRY (2,2,2).** Nonsequence courses designed to acquaint the advanced graduate student with recent advances in nuclear and radiation chemistry. PREREQ: Graduate standing or consent of instructor. CH 595.

**CH 591. ENVIRONMENTAL CHEMISTRY OF ORGANIC SUBSTANCES (3).** Structure, properties, reactivity of organic compounds and their relation to the molecular interactions and macroscopic transport phenomena that determine the spatial and temporal distribution of these compounds in the environment. PREREQ: CH 336 and CH 442; or equivalent. Offered alternate years.

**CH 595. ELECTRONICS FOR SCIENTISTS (4).** Electronics. Studies of the principles of basic and digital electronics. Topics include a.c. and d.c. circuits, operational amplifiers, switching, signal conditioning, analog/digital conversion, and simple digital circuits.

**CH 596. COMPUTER INTERFACING (4).** Introduction to the use of micro-computers for data acquisition and data manipulation in the laboratory. The emphasis will be on the use of software and hardware for the IBM PC class of personal computer. Programming in Visual Basic and Windows will be covered as well as use of commercial software and hardware. Familiarity with analog signal conditioning simple digital circuitry will be assumed.

**Upper Division Courses**

**CH LDT. (1-16).**

**CH UDT. (1-16).**

## ENTOMOLOGY

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**Faculty**

*Professors* AliNiazee, Anderson, Berry, Burgett, Croft, Fisher, Kogan, Krantz, Lattin, McEvoy, Miller, Reed, Riedl, Rossignol, Schowalter, Stephen, Westigard; *Associate Professor* DeAngelis; *Assistant Professors* Brower, Giebultowicz; *Courtesy Professors* Beckwith, Daterman, J. Fisher, McMurtry, Nielsen, Poinar, Radovsky, Torgerson, Wickman

### Undergraduate Major

**Entomology (B.A., B.S.)**
*Options*
General Entomology
Pest Management

### Minors

Entomology
Insect Pest Management

### Graduate Major

**Entomology (M.A., M.S., Ph.D.)**
*Graduate Areas of Concentration*
Acarology
Agricultural Entomology
Apiculture
Aquatic Entomology
Biological Control
Entomology
Forest Entomology
Insect Biosystematics
Insect Ecology
Insect Molecular Biology
Insect Physiology
Insect Systematics
Insect Toxicology
Integrated Pest Management
Medical Entomology
Pollination Biology

Entomologists continue to be at the forefront of basic and applied research in molecular biology, ecology, evolutionary biology and biodiversity. 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 considerable demand for graduates who have acquired entomological expertise. The Department of Entomology at OSU spans all of these disciplinary areas and we offer undergraduate and graduate programs, and a range of courses to meet the needs of a wide variety of students.

The undergraduate major in entomology is intended for students with an academic and vocational interest in insect biology and the diverse career and continuing educational opportunities available. Two options are offered: (a) general entomology and (b) pest management. Both curricula are designed to qualify students for graduate study in entomology or for employment with state or federal government, or with agencies or industries dealing with insects and their management.

The options are technically and academically broad enough to qualify students for research and employment in a broader range of areas than entomology alone.

Students enrolled in either option complete the same core requirements during their freshman and sophomore years. During the junior and senior years, emphasis for students in general entomology is placed on development of more advanced knowledge in entomology and biological sciences, students in pest management develop more advanced entomological knowledge in fields related to agriculture and public health.

The department also offers two minors: insect pest management for students majoring in agriculture, and entomology for students majoring in the biological sciences. Students enrolled in environmental sciences may also specialize in applied entomology.

The department also now accommodates double majors and we feel that this offers considerable benefit to students that wish to develop a specialized area of knowledge and skill, in addition to a more general basic or applied science degree.

In consultation with an academic adviser, each undergraduate entomology major prepares a course of study that consists of a minimum set of required courses plus elective courses compatible with the student's background, interests, and career objectives.

The B.A. degree requires 12 credits of foreign language and 9 credits of approved electives in the College of Liberal Arts. Program modification for the B.A. degree necessitates exclusion of 21 credits of course work in the major that are normally included in the B.S. degree requirements. Choice of courses to be excluded should be made with care and in consultation with academic advisers.

The Department of Entomology is a component of the Agricultural Experiment Station, which has many research facilities for students and staff, including the entomology farm, greenhouses, an aquatic insect laboratory, and forest insect research laboratory. The department is a member of the Biology Computing Consortium and has excellent computer facilities including linkages to the University Local Area Network, to microcomputers in the department, and to an information network serving all counties and branch agricultural experiment stations in Oregon. In addition to the OSU faculty, state and federal entomologists stationed in the vicinity are available for consultation in their fields of specialization. The Systematic Entomology Laboratory has more than 2,500,000 specimens of insects and mites and is a recognized center for research in insect biodiversity.

Training in entomology emphasizes areas of strength at OSU and includes acarology, agricultural entomology, apiculture, aquatic entomology, biological control, evolutionary biology, forest entomology, biosystematics, ecology, physiology, integrated pest management, medical entomology, and pollination biology.

NOTE: Our course program is under revision and we recommend consulting the OSU Department of Entomology web site for up to date information.

## Curriculum

Perspectives courses (15), synthesis courses (6), writing courses (9), and a fitness course (3) are Baccalaureate Core requirements. The year in which these are taken is flexible except for the synthesis courses, which must be taken at the junior/senior level. Entomology majors may not use S/U grading in courses taken to meet Department of Entomology or College of Science requirements.

### REQUIRED COURSES[9]

**Freshman and Sophomore Years**

CH 121, CH 122, CH 123, or CH 221, CH 222, CH 223. General Chemistry (15)
CH 331, CH 332, CH 337. Organic Chem (10)
BB 350. Biochemistry (4)
MTH 251, MTH 252 or MTH 241, MTH 245. Mathematics (8)
BI 211, BI 212, BI 213. Biology (12)
ENT 350. Biology of Insects (4)
Writing (9)
Perspectives (15)
HHP 231. Fitness (3)
Electives (10)

## Options

### GENERAL ENTOMOLOGY OPTION

**Junior and Senior Years**

ENT 416. Insect Physiology (3)
ENT 453. Systematics and Morphology of Adult Insects (4)
ENT 420. Insect Ecology (3)
Select 12 credits from the following required upper division entomology alternative courses: ENT 433, ENT 435, ENT 442, ENT 452, ENT 455
BI 311. Genetics (4)
BI 370. General Ecology (3)
BI 371. Ecological Methods (3)
Z 361, Z 362. Invertebrate Biology (5)
BOT 331. Plant Physiology (5)
ST 351, ST 352. Principles of Statistics (8)
PH 201, PH 202. General Physics (10)
Synthesis (6)
Electives (24)

### PEST MANAGEMENT OPTION

**Junior and Senior Years**

ENT 311. Intro to Insect Pest Management (5)
ENT 312. Use of Computers in Integrated Pest Management (3)
ENT 442, ENT 443. Principles of Integrated Pest Management I, II (7)
ENT 453. Systematics and Morphology of Adult Insects (4)
ENT 416. Insect Physiology (3)
ENT 420. Insect Ecology (3)
*Select one of the following required upper-division alternative courses:*
ENT 362, ENT 415, ENT 435, ENT 455 (3)
BI 311. Genetics (4)
BI 370. General Ecology (3)
BI 371. Ecological Methods (3)
CSS 300. Intro. to Crop Production or HORT 301. Princ. of Horticulture Technology (4)
CSS 305. Principles of Soils Science (5)
CSS 440. Weed Control (5)
BOT 350. Introductory Plant Pathology (4)
ST 351, ST 352. Principles of Statistics (8)
Synthesis (6)
Electives (20)

## Minors

The Department of Entomology offers two minors designed for students from other departments: Entomology and Insect Pest Management. A minimum of 27 credits is required for the minor. Students may elect to have their minor designated on their transcript.

**Core Courses**

ENT 350. Biology of Insects (4)
ENT 416. Insect Physiology (3)
ENT 420. Insect Ecology (3)
ENT 442. Princ of Integrated Pest Mgmt I: Systems Design (4)
ENT 453. Systematics and Morphology of Adult Insects (4)
*Select 10 credits from the following:*
ENT 300. Plagues, Pests & Politics (3)
ENT 433. Aquatic Entomology (4)
ENT 455. Field Studies in Insect Biology (8)
ENT 443. Princ of Integrated Pest Mgmt II: Biological Control (3)

### INSECT PEST MANAGEMENT

**Core Courses**

ENT 311. Introduction to Pest Management (5)
ENT 312. Use of Computers in Integrated Pest Management (3)
ENT 442. Princ of Integrated Pest Mgmt I: Systems Design (4)
ENT 443. Princ of Integrated Pest Mgmt II: Biological Control (3)
ENT 453. Systematics and Morphology of Adult Insects (4)
*Select 8 credits from the following:*
ENT 362. Apiculture (3)
ENT 415. Forest Insect & Disease Mgmt (5)
ENT 435. Med & Pub Hlth Entomol (3)
ENT 444. Princ of Integrated Pest Mgmt III: Agric Systems (4)
ENT 455. Field Studies in Insect Biol (8)

## Courses

**Upper Division**

Courses numbered 500 and above may be taken for graduate credit.

**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. (Bacc Core Course)

**ENT 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. PREREQ: One year college biology.

**ENT 312. USE OF COMPUTERS IN INTEGRATED PEST MANAGEMENT (3).** Theory and hands-on use of computers for problem solving, modeling, databases, the world-wide-web, and decision support systems. PREREQ: ENT 311 and AG 111 or consent of instructor.

**ENT 350. 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.

**ENT 362. APICULTURE (3).** The biology and commercial management of the honey bee Apis mellifera L.; relationship of honey bees to current agricultural production; problems of pesticide usage, disease, and changing agricultural systems. PREREQ: One year college biology. Offered alternate years. Not offered 1998-99.

**ENT 401. RESEARCH (1-16).** Work on approved problems carried on in the library, laboratory or field. Approval of instructor required.

**ENT 405. READING AND CONFERENCE (1-16).** Reading and discussions on special topics. Approval of instructor required.

**ENT 407. SEMINAR (1-2).** Graded P/N.

**ENT 410. INTERNSHIP (1-16).** Department approval required.

**ENT 415/ENT 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. PREREQ: BI 213. CROSSLISTED as BOT 415.

**ENT 416/ENT 516. 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. PREREQ: ENT 311 or ENT 350; BI 211 or 213; or consent of instructor.

**ENT 420/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, predatory-prey, parasite-host, competition, and mutualism; diversity, food web structure, agricultural ecology, exercises merge models, experiments, and sampling. PREREQ: ENT 350, BI 370 or equivalent. Offered alternate years.

**ENT 421/ENT 521. INSECT-PLANT COMMUNITIES (3).** Dynamics of arthropod assemblages and species interactions. Ecological consequences of insect-plant interactions including vegetative succession, nutrient cycling, and ecosystem stability. PREREQ: ENT 350; BI 213 or consent of instructor. Offered alternate years. Not offered 1998-99.

**ENT 433/ENT 533. AQUATIC ENTOMOLOGY (4).** Biology, ecology, collection, and identification of aquatic insects. PREREQ: Upper division standing.

**ENT 435/ENT 535. MEDICAL AND PUBLIC HEALTH ENTOMOLOGY (3).** Arthropod pests of humans and domestic animals, including biology of pests, disease transmission mechanisms, epidemiology of important arthropod-borne diseases, and prevention and control of pest-related problems, PREREQ: Two terms of biology or general zoology. CROSSLISTED as H 435/H 535.

**ENT 442. PRINCIPLES OF INTEGRATED PEST MANAGEMENT I: SYSTEMS DESIGN (4).** Use of systems analysis techniques in designing and implementing an integrated pest management system with focus on ecological systems, crop production, environmental and biological monitoring, modeling of tactics and implementation. Students will design an IPM system using tools from the internet, extension, literature, and group discussion. The first course of a sequence for advanced undergraduates and graduates in integrated pest management. PREREQ: ENT 311.

**ENT 443/ENT 543. PRINCIPLES OF INTEGRATED PEST MANAGEMENT II: BIOLOGICAL CONTROL (3).** Biology of predaceous insects and entomopathogens. Fundamentals of insect ecology and its application to biological control case histories. The second course of a sequence for advanced undergraduates and graduates to acquaint students with biologically rational methods of suppressing insect pests and the biology of beneficial insects in integrated pest management. Prerequisite: ENT 311 or ENT 350; or consent of instructor.

**ENT 444/ENT 544. PRINCIPLES OF INTEGRATED PEST MANAGEMENT III AGRICULTURAL SYSTEMS (4).** Quantification in pest management, including sampling, monitoring, and prediction; population dynamics (dispersal, life histories), environmental effects, and systems approach. PREREQ: ENT 311, ENT 443/ENT 543; BI 370, BI 371; ST 412/ST 512. Not offered every year. Not offered 1996-97.

**ENT 452/ENT 552. INSECT MORPHOLOGY (3).** Structure and function of insects, stressing morphological features of biological and taxonomic importance. PREREQ: ENT 350. Offered alternate years. Not offered every year.

**ENT 453/ENT 553. SYSTEMATICS AND MORPHOLOGY OF ADULT INSECTS (4).** Identification, systematics, literature, distribution, and biology of the major families of insects. PREREQ: ENT 350.

**ENT 470/ENT 570. URBAN ENTOMOLOGY (3).** Study of insects and related arthropods that have a significant impact on human property and health. This course examines the biology and management of arthropods affecting people, structures, and the urban landscape. PREREQ: ENT 350 or consent of instructor. Not offered every year.

**Graduate Courses**

**ENT 501. RESEARCH (1-16).** Work on approved problems carried on in the library, laboratory or field. Approval of instructor required.

**ENT 503. THESIS (1-16).**

**ENT 505. READING AND CONFERENCE (1-16).** Reading and discussions on special topics. Approval of instructor required.

**ENT 507. SEMINAR (1-2).** Graded P/N.

**ENT 508. WORKSHOP (1-16).**

**ENT 542. PRINCIPLES OF INTEGRATED PEST MANAGEMENT I: SYSTEMS DESIGN (4).** Use of systems analysis techniques in designing and implementing an integrated pest management system with focus on ecological systems, crop production, environmental and biological monitoring, modeling of tactics and implementation features. Students will design an IPM system using tools of the internet, extension, literature, group discussion, etc. The first course of a sequence for advanced undergraduates and graduates in integrated pest management. PREREQ: ENT 311.

**ENT 543. PRINCIPLES OF INTEGRATED PEST MANAGEMENT II: BIOLOGICAL CONTROL (3).** Biology of predaceous insects and entomopathogens. Fundamentals of insect ecology and its application to biological control case histories. The second course of a sequence for advanced undergraduates and graduates to acquaint students with biologically rational methods of suppressing insect pests and the biology of beneficial insects in integrated pest management. PREREQ: ENT 311 or ENT 350; or consent of instructor.

**ENT 544. PRINCIPLES OF INTEGRATED PEST MANAGEMENT III AGRICULTURAL SYSTEMS (4).** Students will survey examples of research and implementation of IPM at field sites in region and interact with scientists who are involved with local production and human infrastructure. The third course of a sequence for advanced undergraduates and graduates in integrated pest management. This class will involve traveling to research stations and production sites throughout the region on a weekly schedule. Prerequisites: ENT 311; consent of instructor. Summer (alternate years)..

**ENT 591. SELECTED TOPICS IN ENTOMOLOGY (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.

**ENT 601. RESEARCH (1-16).**

**ENT 603. THESIS (1-16).**

**ENT 605. READING AND CONFERENCE (1-16).**

**ENT 607. SEMINAR (1-16).**

**ENT 691. SELECTED TOPICS IN ENTOMOLOGY (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.

## ENVIRONMENTAL SCIENCE

See the Interdisciplinary Studies section of this catalog for more information.

## GENERAL SCIENCE

Richard W. Thies, Associate Dean
and Head Adviser
College of Science
128 Kidder Hall
Oregon State University
Corvallis, OR 97331-4608
(541) 737-4811

### Undergraduate Major

**General Science (B.S.)**
*Options*
Earth Science
Pre-Elementary Education

The College of Science grants certain types of undergraduate degrees in General Science. The **Earth Science Option**, advised in the Department of Geosciences, consists of a blend of geology, geography, oceanography, and atmospheric science courses. This option provides the appropriate background for middle-school earth science teaching, for military careers, and for other careers requiring a broad earth science background.

What was earlier offered as an **Environmental Science Option** is now a separate degree. Please see "Environmental Sciences" in the Interdisciplinary Studies section of this catalog.

The **Pre-Elementary Education Option** provides a degree appropriate for entry into the Master of Arts in Teaching (M.A.T.) degree program in elementary or middle school education. Admission into the M.A.T. degree programs is competitive. The pre-professional core is a common set of courses used in such degrees in science, liberal arts, or home economics.

Some students who complete one of the pre-professional programs, e.g., pre-physical therapy, can receive a degree in General Science.

### CURRICULUM

The required courses below can be taken in any order.

**Freshman Year**
Writing I (3)
CH 121, CH 122, CH 123, or CH 221, CH 222, CH 223. General Chemistry (15)
Approved mathematical science (12)[6]
Fitness (3)
Required courses and/or electives (12)

**Sophomore Year**
General physics or physical science (12-15)
General biology (12)
Writing II (3)
Required courses and/or electives (15-18)

**Junior and Senior Years**
HSTS course, History of science (6)
Writing III (3)
Synthesis (6)
Option and/or required courses and/or electives (75)[7]

## OPTIONS

### EARTH SCIENCE OPTION

**Lower Division**

GEO 101, GEO 102. Earth Science or GEO 201, GEO 202. Geology (8)

**Upper Division Earth Science (at least 24 credits)**

Four courses for at least 12 credits in one of the following:

Physical Geography (prerequisite GEO 101, GEO 102, or GEO 301)

Geology courses numbered 310 or above

Atmospheric Science or Oceanography (must be at 400 or above level and may not include biological oceanography—it may include geography climate courses)

And at least two additional courses from the areas not used above. Courses with ATS or OC designators are counted in the 24-credit total as long as they are 400 level or above.

### PRE-M.A.T. FOR ELEMENTARY EDUCATION OPTION

*Mathematical Science*

MTH 111. College Algebra (4)

MTH 211, MTH 212, MTH 213. Foundations Elementary Math (9)

MTH 391. Elementary Problem Solving (3)

CS 101. Computers: Applications & Implications (4)

*Pre-professional Core (nonscience)*

HST 203 and two additional history classes (9)

PSY 201, PSY 202. Psychology (6)

GEO 105, GEO 106. Geography (6)

Three English courses from Baccalaureate Core courses (9)

PSY 350. Human Lifespan Development (3)

ED 309. Field Practicum (3)

ED 312. Introduction to Curriculum & Instruction (3)

ED 313. Trends and Issues in Education (3)

*Upper Division (at least 24)*

Must consist of at least 30 credits of upper division science courses (including 6 credits of History of Science) that are pre-approved by the head adviser in the College of Science. No more than 6 credits of unstructured courses numbered 401, 403, 405, 407, and 410 may be included in the major option. The major must include an approved WIC course.

*Recommendations:*

Foreign Language is strongly recommended, especially Spanish.

## CERTIFICATE PROGRAMS

Contact Paul Farber, 306B Milam , (541) 737-1273, for more information about the Science, Technology, and Society Certificate program; it combines topics in the history, philosophy, and sociology of science and technology with science policy studies, environmental studies, and anthropology. The thrust of the program is in understanding science and technology as a process, an institution, and a component of culture.

### REQUIREMENTS

To complete the curriculum, students are required to take 30 credits consisting of 9 credits of a general core and 21 credits or approved electives.

## COURSES

**Lower Division Courses**

**GS 199. SPECIAL STUDIES (1-16).**

**Upper Division Courses**

**GS 401. RESEARCH (1-16).**

**GS 403. THESIS (1-16).**

**GS 405. READING AND CONFERENCE (1-16).**

**GS 407. SEMINAR (1-16).** One-credit sections. Graded P/N.

**GS 410. SCIENCE INTERNSHIP (1-12).** Supervised scientific work experience at selected cooperating institutions, agencies, laboratories, or companies. PREREQ: Upper division standing in appropriate major.

# GEOSCIENCES

Sherman H. Bloomer, Chair
Gordon E. Matzke, Associate Chair
104 Wilkinson Hall
Oregon State University
Corvallis, OR 97331-5506
(541) 737-1201

**Faculty**

*Professors* Bloomer, Kimerling, Matzke, Muckleston, Niem, Nolan, Rosenfeld, Taylor; *Associate Professors* Clark, Dilles, Grunder, Jackson, Jones, Lawrence, Lillie; *Assistant Professor* Haggerty, Wright; *Courtesy Appointments* Agnew, Boucot, Charles, Csuti, Duncan, Freemark, Glasmann, Good, Grant, Kiester, King, Levi, Marks, Moore, Nielsen, Pearson, Ripple, Santelmann, Stankey, Swanson, White

### Undergraduate Majors

**Geography (B.A., B.S.)**
*Option*
Earth Information Science and Technology
Geology (B.A., B.S.

### Minors

Earth Information Science and Technology
Environmental Geosciences
Geology
Regional Studies
Resource Geography
Rural and Resource Planning

### Graduate Majors

**Geography (M.A., M.S., Ph.D.)**
***Graduate Areas of Concentration***
Geographic Techniques
Physical Geography
Resource Geography

**Geology (M.A., M.S., Ph.D.)**
***Graduate Areas of Concentration***
Glacial Geology—Geomorphology—Hydrogeology
Igneous Petrology—Volcanology
Mineral Deposits—Geochemistry
Sedimentology—Sedimentary Petrology
Structural Geology—Tectonics—Geophysics

The Department of Geosciences offers two undergraduate and graduate degree programs, geography and geology, and advises students in the Earth Science option General Science degree and the Geosciences option of the Natural Resource degree. The program in geography emphasizes the earth's land surfaces and people's interaction with the earth. Geology is concerned with the internal and external processes of the earth over time. These two programs merge in broad areas relating to surficial processes, remote sensing, earth resources, and the application of computers to natural and man-made phenomena. The department offers a minor in environmental geosciences appropriate for students in the interdisciplinary environmental science major who want a strong earth science element in their program. The department also has a strong international commitment that includes the study of the global environment.

## ■ GEOGRAPHY PROGRAM

Gordon E. Matzke, Director
Mary Lee Nolan, Head Advisor

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 techniques, and physical geography and in statistics and disciplines related to geography like geology, forestry, and anthropology. The Department has strengths in the broad areas of resource and physical geography as well as geographic information science. 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.

## CAREERS

Study in geography provides students with the background necessary to pursue a very diverse range of professions. The skills of pattern analysis and recognition developed in the study of Geography find application in both professional geography careers and in a variety of related professions. Professional geographers work in land use planning, environmental analysis, government research groups, university research and teaching, professional cartography, and geographic information science for private,

city, state and Federal agencies. It also provides an excellent background for student interested in teaching at the secondary and elementary levels, management, studies, tourism, and public policy.

## Undergraduate Degree Programs

The Geography Program offers Bachelor of Science and Bachelor of Arts degrees in Geography.

The Bachelor of Science degree program in geography is designed for students seeking to acquire scientific and technical depth in an undergraduate geography major. Outside of the geography curriculum, students will develop their mathematical, statistical, and computer skills and meet the core curriculum of the University. Students will become acquainted with each of the aspects of geography offered by the department, but will place special emphasis on geographic information science, resource geography and physical geography. This degree program focuses on the scientific and technical training of professional geographers. It is an appropriate choice for students preparing to enter a teacher training program or to pursue graduate studies in geographic techniques, resource use and land planning, physical geography, or environmental science.

The Bachelor of Arts degree program is intended for students looking for substantial breadth in an undergraduate geography major. In addition to the geography curriculum, students will work to develop their communication skills, study a foreign language and satisfy the core curriculum of the University. Students will become acquainted with each of the aspects of geography offered by the department, but will place special emphasis on regional, cultural, and resource geography. This degree program is an appropriate choice for students preparing to enter a teacher training program with a social science emphasis, management studies, or employment in the non-technical areas of professional geography, such as the tourist industry. It is well suited for students preparing for graduate studies outside the areas of physical geography and geographic information science.

Students interested in geography can also study in the Department through Minors in Environmental Geosciences, Earth Information Science and Technology, Regional Studies, Resource Geography, or Rural and Resource Planning and through specializations in the Environmental Science, Natural Resources, and General Science degree programs. Students interested in these possibilities should talk to the Director or Head Advisor of the Program.

## Graduate Degrees

Graduate programs leading to the MS, MA, and Ph.D. degrees in Geography are available. Students specialize in resource geography, physical geography, or geographic techniques. There is a thesis and a non-thesis option for the MS and MA degrees. Geography can be a minor program for an MAIS degree. Comprehensive written and oral examinations must be passed before the student can become a candidate for the Ph.D. degree. Independent research is required for the Ph.D. degree and the MS with thesis degree.

## Preparation

Students interested in Geography should develop a sound background in basic mathematics, introductory cultural geography, and introductory physical geology or physical geography as soon as possible. Students planning to transfer to OSU from a two-year program should try to complete their work in statistics and the equivalent of GEO 105, GEO 106, GEO 201, and GEO 202 before they begin their work in the Department. High school or transfer students interested in the programs at OSU should contact the Director or Head Advisor as soon as possible.

## Advising

Every undergraduate major is assigned an advisor from the Geography program. Each student should meet with their advisor prior to registration each quarter. The advisor assists in determining transfer course equivalency, in planning the curriculum and can help develop minor variations in the requirements for the degree. Those variations must, however, be discussed with the advisor and approved by the Program early in the planning process. The Department offers a variety of individual and group discussions to help juniors and seniors plan for employment or graduate studies when they complete their degree work.

## Requirements

All undergraduate degree candidates must meet the University and College of Science requirements for graduation (see the Baccalaureate Core and College of Science sections in this catalog). For the Bachelor of Science degree, students must complete ST 351, ST 352, MTH 112 (or an approved Math elective), BI 370, and a cluster of 9 credits of upper division course work in a field approved by the Geography advisor. Geography majors must also complete GEO 105, GEO 106, GEO 201, GEO 202, GEO 301, GEO 312, GEO 322, GEO 323, GEO 324, GEO 360, GEO 420, GEO 423, GEO 424, GEO 462 at least three credits in an advanced techniques course, at least three credits in a regional or population geography course, and at least 9 credits of approved electives at the 400-level or above.

Candidates for the Bachelor of Arts degree must complete, in addition to the University and College requirements, ST 351, ST 352, MTH 112 (or an approved Math elective); GEO 105; GEO 106; GEO 201 or GEO 101; GEO 202 or GEO 102; GEO 301; GEO 360; GEO 418; GEO 462; one of GEO 322;, GEO 323 or GEO 324; GEO 300; GEO 420; 9 credits of upper division resource geography courses and 12 credits of upper division regional geography courses. Students must also complete 9 additional credits in the College of Liberal Arts and complete or demonstrate proficiency in the second year of a foreign language.

## Geography Minor Program (27)

Students perusing other degrees may choose one of five geography minors: environmental geosciences, resource geography, regional studies, rural and resource planning or Earth Information Science and Technology.

For a minor field to be listed on the transcript, students must take 27 credits of minor courses, none of which can be in the student's major program. Twelve credits must be upper division. Specific requirements are listed below.

## Environmental Geosciences Minor

### Core Requirements

GEO 101. The Solid Earth (4) or GEO 202 Physical Geology (4)
GEO 102 The Surface of the Earth (4) or GEO 201 Earth System Science (4)
GEO 300 Environmental Conservation (3)
GEO 322 Surface Processes (4)

### Specialty Requirements

*Four courses from the following:*
GEO 306 Mineral, Energy, Water, and the Environment (3)
GEO 323 Climatology (4)
GEO 324 Biogeography (4)
GEO 424 Water Resources Geography (3)
GEO 425 Water Resources Management (3)
GEO 431 Applied Climatology (3)
GEO 432 Applied Geomorphology (3)
GEO 434 Field Research in Physical Geog (3)
GEO 439 Topics in Physical Geography (3)
GEO 482 Forest Geomorphology (3)
GEO 483 Geomorphology of Mt. Streams (3)
GEO 487 Hydrogeology (4)

## Geography Minors

### Core Requirements

GEO 101. The Solid Earth (4) or GEO 202 Physical Geology (4) or GEO 102 The Surface of the Earth (4) or GEO 201 Earth System Science (4)
GEO 105 Geography of the Non-western world (3) or GEO 106 Geography of the western world (3)
GEO 300 Environmental Conservation (3)
GEO 301 Map and Image Interpretation (4)

## Regional Studies Minor

Geography Minor Core Requirements (14)
GEO 105 or GEO 106 (3); whichever course not taken as part of core
Four courses from: GEO 313, GEO 325, GEO 326,
GEO 327, GEO 328, GEO 329, GEO 339 (12)

### Resource Geography Minor

Geography Minor Core Requirements (14)
GEO 420 Geography of Resource Use (3)
Four courses from: GEO 350, GEO 422, GEO 423,
GEO 424, GEO 425, GEO 429, GEO 459, GEO 485
(12)

### Rural and Resource Planning Minor

Geography Minor Core Requirements (14)
GEO 423 Land Use (3)
GEO 451 Environmental Site Planning (3)
GEO 452 Principles and Practices of Rural and Resource Planning (3)
GEO 453 Resource Planning Methods/EIS (3)
One course from GEO 420, GEO 424, GEO 425, GEO 459, GEO 462 (3)

### Sample Curriculum (BS Degree)

Appropriate for transfer students or students who become interested in geography after their freshman year at OSU.

#### Freshman Year

GEO 105 Geog. of the Non-Western World (3)
GEO 106 Geog. of the Western World (3)
GEO 201 Earth System Science (4)
Mathematics (3)
Writing 121 (3)
Writing II (3)
Fitness (3)
Biological Science (4)
Perspectives (9)
Electives (10)

#### Sophomore Years

GEO 202 Physical Geology (4)
GEO 301 Map and Image Interpretation (4)
Mathematics (MTH 112 or higher) (4)
ST 351, ST 352. Statistics (8)
Perspectives (9)
Writing/Speech III (3)
Electives (6)

#### Junior Years

GEO 312 Human Geography (3)
GEO 322 Surface Processes (4)
GEO 323 Climatology (3)
GEO 324 Biogeography (3)
GEO 360 Cartography (4)
Regional or population geography (3)
GEO 462 Geosciences Field Methods (4)
Upper divisor cluster in non-geography field (9)
Synthesis (3)
Electives (9)

#### Senior Years

GEO 420 Resource Use (3)
GEO 423 Land Use (3)
GEO 424 Water Resource Geography (3)
Advanced geographic techniques courses (4)
400-level or higher Geoscience elective (3)
400-level or higher Geoscience elective (3)
400-level or higher Geoscience elective (3)
Synthesis (3)
Electives (20)

## ■ Geology Program

Sherman H. Bloomer, Director
Robert D. Lawrence, Head Advisor

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 building 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.

### Careers

Study in geology provides students with the background necessary to pursue a variety of careers including resource exploration and extraction; environmental assessment and remediation; research in volcanology, earthquakes, hydrogeology and diverse geologic disciplines; engineering geology; and resource planning and study for governments at the local, State and Federal levels. A geology degree is also an excellent background for students interested in environmental law, earth science and environmental policy, and secondary education in the physical sciences.

### Undergraduate Degree Programs

The Geology Program offers Bachelor of Science and Bachelor of Arts degrees in Geology.

The Bachelor of Science degree program in geology provides essential education for careers in energy resources and mining companies, geotechnical and environmental firms, state and federal government agencies, and in earth science research. The B.S. program has the depth necessary for successful graduate school entrance examinations and breadth appropriate to a variety of graduate-level specialties. Students are advised to obtain an advanced degree before pursuing a professional career.

The Bachelor of Arts degree program is intended for students who want a diverse, interdisciplinary education. The B.A. program is a good choice for students interested in careers in science education or elementary education, technical writing, journalism, lay, land-use planning, environmental protection, philosophy of science, or physical geography.

Students interested in earth sciences can also study in the Department through Minors in Environmental Geosciences, Geology, or Earth Information Science and Technology and through specializations in the Environmental Science, Natural Resources, and General Science degree programs. Students interested in these possibilities should talk to the Director or Head Advisor of the Program.

### Graduate Degrees

Graduate programs leading to the M.S., M.A., and Ph.D. degrees in Geology are available. All degrees require independent research in sedimentology-sedimentary petrology; igneous petrology-volcanology; mineral deposits-geochemistry; Quaternary geology-geomorphology; hydrogeology; or structural geology-tectonics-geophysics. Most graduate research includes field study. An approved field course of at least 9 quarter-credits (or equivalent experience) is prerequisite to candidacy for an advanced degree. Dual majors can be arranged in some areas; a minor in water resources is possible. The MS and MA degrees require a thesis. Comprehensive written and oral examinations must be passed before the student can become a candidate for the Ph.D. degree.

### Preparation

Students interested in geology should begin to develop a solid background in mathematics, chemistry, and physics as soon as possible. The minimum recommended background in those subjects for an undergraduate degree is mathematics through integral calculus, one year of college chemistry, and one year of college physics, preferably calculus-based. Students planning to transfer to OSU from a two-year program should complete as much of the work in related science as possible, and should complete at least one introductory geology course. High school or transfer students interested in the programs at OSU should contact the Director or Head Advisor as soon as possible.

### Advising

Every undergraduate major is assigned an advisor from the Geology Program. Each student should meet with their advisor prior to registration each quarter. The advisor assists in planning the curriculum and can help develop minor variations in the requirements for the degree. Those variations must, however, be discussed with the advisor and approved by the Program early in the planning process. The Department offers a variety of individual and group discussions to help juniors and seniors plan for employment or graduate studies when they complete their degree work.

### Requirements

All undergraduate degree candidates must meet the University and College of Science requirements for graduation (see the Baccalaureate Core and College of Science sections in this catalog). For the Bachelor of Science degree, students must complete MTH 251, MTH 252 and one mathematics

elective; CH 121 or CH 221; CH 122 or CH 222; PH 201 or PH 211; PH 202 or PH 212; and one of PH 203 (or PH 213) or CH 123 (or CH 223). Students planning on graduate study in Geology are advised to complete one full year of both Physics and Chemistry. Geology students must complete GEO 201, GEO 202, GEO 203, GEO 301, GEO 310, GEO 315, GEO 322, GEO 340, GEO 415, GEO 430, GEO 462, GEO 463, GEO 470, GEO 495, and at least 9 credits of approved electives at the 400-level or above.

Candidates for the Bachelor of Arts degree must complete, in addition to the University and College requirements, MTH 112 and MTH 245 or ST 201 and ST 202; CH 121 or CH 221; CH 122 or 222; PH 104 and PH 106 or PH 201 and PH 202; GEO 201, GEO 202, GEO 203, GEO 310, GEO 315, GEO 322, GEO 340; GEO 462, GEO 470, and GEO 411. Students must also complete 9 additional credits in the College of Liberal Arts and complete or demonstrate proficiency in the second year of a foreign language.

## Geology Minor Program (27)

An 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. The geology minor requires GEO 201 or GEO 101; GEO 202 or GEO 102; GEO 203; GEO 310; GEO 315; and two geology courses (of at least 3 credits each) from GEO 320 or above to total 7 credits. See department for a list of approved courses. For students interested in advanced geology degrees, GEO 340 Structural Geology and GEO 462 Geosciences Field Methods are recommended for the minor.

SAMPLE CURRICULUM (BS DEGREE)
Appropriate for transfer students or students who become interested in geology after their freshman year at OSU.

**FRESHMAN YEAR**

CH 121, CH 122 or CH 221, CH 222 (10); General
Chemistry
Math 112 or appropriate Math elective (4)
GEO 201 Earth System Science (4)
GEO 202 Physical Geology (4)
Writing 121 (3)
Writing II (3)
Fitness (3)
Perspectives (6)
Electives (8)
Sophomore Years
PH 211, PH 212 or PH 201, PH 202 (10)
Third quarter of Physics or Chemistry (PH 203, PH
213, CH 123, or CH 223) (5)
Biological Science (4)
Math 251, Math 252 (8)
GEO 203 Evolution of the Earth (4)
Perspectives (9)
Writing/Speech m (3)
Electives (3)

**JUNIOR YEARS**

GEO 301 Map and Image Interpretation (4)
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 462 Geosciences Field Methods (4)
GEO 470 Stratigraphy and Sedimentation (4)
Synthesis (3)
Electives (10)

**SUMMER AFTER JUNIOR YEAR**

GEO 495. Field Geology (9)

**SENIOR YEARS**

GEO 463 Geophysics and Tectonics (4)
GEO 415 Earth Materials III: Igneous Petrog (4)
GEO 430 Geochemistry (3)
400-level or higher Geoscience elective (3)
400-level or higher Geoscience elective (3)
400-level or higher Geoscience elective (3)
Synthesis (3)
Electives (17)

## Courses

### Lower Division 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 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. Lec/Lab. CROSSLISTED as OC 103. (Bacc Core Course)

**GEO 105. *GEOGRAPHY OF THE NON-WESTERN WORLD (3).** An introduction to the rich variety of peoples, traditions, and landscapes in Asia, the Pacific Islands, the Middle East, Africa, and Latin America. Emphasis is on the origins and evolution of the diverse cultural heritages of these regions and on present interaction between these peoples and their environments. Lec/rec. (Bacc Core Course)

**GEO 106. *GEOGRAPHY OF THE WESTERN WORLD (3).** The evolution and present status of cultures and environments in Europe and North America. Australia and New Zealand will also be considered as a region with Western traditions. Lec/rec. (Bacc Core Course)

**GEO 199. SPECIAL STUDIES (1-16).**

**GEO 201. *EARTH SYSTEM SCIENCE (4).** Surficial processes (glaciers, rivers), climate, soils, vegetation, and their inter-relationships. Field trip(s) required; transportation fee charged. Lec/lab. (Bacc Core Course)

**GEO 202. *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 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 (3).** Introductory geology emphasizing rocks, minerals, geologic hazards (landslides, earthquakes, flooding), soils, and environmental problems (groundwater, coastlines, glaciers). Field trip(s) required; transportation fee charged. Lec/lab.

**GEO 265. GEOGRAPHIC INFORMATION SYSTEM (GIS) PRACTICUM (3).** Practicum experience in using a widely popular geographic information system for spatial data input, analysis, and display.

### Upper Division Courses

**GEO 300. *ENVIRONMENTAL CONSERVATION (3).** Geography of human relationships to the earth's systems with an emphasis on human induced charge, both unintended and purposeful. Lec/Rec. (Bacc Core Course)

**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. COREQ; CS 101 or equivalent. Lec/lab.

**GEO 305. GEOLOGY OF THE VOLCANIC CASCADES (3).** The role of plate tectonics, earthquakes, volcanism, and glaciation in the development of Cascade landforms. Geology of Rainier, Crater lake, and Lassen National Parks; Mount St. Helens, eruption hazards, geothermal energy. PREREQ: One term introductory-level geology. Offered alternate years.

**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 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 310. EARTH MATERIALS I: MINEROLOGY (4).** Principles of crystal morphology, and structure. Characteristics, identification, and origins of minerals. PREREQ: GEO 202 or GEO 221. COREQ: CH 121 or Ch 221. Lec/lab.

**GEO 312. HUMAN GEOGRAPHY (3).** Origins, diffusions, and spatial variations in languages, religions, political systems, resource use and environmental perception. PREREQ: GEO 105 and GEO 106 or equivalent.

**GEO 313. GEOGRAPHY OF THE PACIFIC NORTHWEST (3).** Physical, human and economic geography of the Pacific Northwest with special reference to Oregon.

**GEO 315. EARTH MATERIALS II: PETROLOGY (4).** Origin, identification and classification of igneous, sedimentary, and metamorphic rocks. Field trip(s) required, transportation fee charged. PREREQ: GEO 310. Lec/lab.

**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. PREREQ: GEO 102 OR GEO 202. Lec/lab.

**GEO 323. CLIMATOLOGY (4).** Systematic analysis of global and regional climates. Physical principles of climate, climate classifications, and distribution and characteristics of climate regimes. PREREQ: GEO 101 and GEO 102. Lec/lab.

**GEO 324. BIOGEOGRAPHY (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. (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. (Bacc Core Course)

**GEO 328. *GEOGRAPHY OF LATIN AMERICA (3).** This course 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. (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 339. AREA STUDIES (3).** Physical and cultural processes that give geographical identity to and influence people's organization and use of selected world areas. Areas vary; number may be repeated (from 1-6 hrs) with consent of adviser. PREREQ: 3 credits of lower-division geography. Not offered every year.

**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. COREQ: GEO 301. Lec/lab.

**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. PREREQ: Upper class standing. Offered alternate years. (Bacc Core Course)

**GEO 360. CARTOGRAPHY (4).** Basic cartographic principles. Design, compilation, and construction of maps. Lec/lab.

**GEO 380. *EARTHQUAKES IN THE PACIFIC NORTHWEST (3).** Earthquake hazards in the Northwest; responses to reducing earthquake risk at state, local, and personal levels.

**GEO 400/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. GEO 400 PREREQ: Department approval. Graded P/N.

**GEO 401/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. GEO 401 PREREQ: Department approval required.

**GEO 403/GEO 503. THESIS (1-16).** Independent, original study that culminates in a senior thesis. Faculty sponsor must be prearranged. GEO 403 PREREQ: Department approval required.

**GEO 405/GEO 505. READING AND CONFERENCE (1-16).** Independent reading in specialized topics guided by and discussed in faculty conferences. Faculty sponsor must be prearranged. GEO 405 PREREQ: Department approval required.

**GEO 407/GEO 507. SEMINAR (1-16).** GEO 407: PREREQ: Departmental approval required. Graded P/N.

**GEO 408/GEO 508. WORKSHOP (1-16).** GEO 408: PREREQ: Departmental approval required.

**GEO 410/GEO 510. INTERNSHIP (1-15).** Pre-career professional experience under joint faculty and employer supervision. PREREQ: 12 credits of upper division geography. GEO 410 PREREQ: Department approval required. Graded P/N.

**GEO 411/GEO 511. *^DEVELOPMENT OF GEOLOGIC THOUGHT (3).** Analysis of scientific method in earth science using important early papers in geology. Discussion of philosophy of science issues in geology. Observation, inference, data, hypothesis, and theory in geology. Ethical standards in research and application of results. PREREQ: GEO 101, GEO 102 or GEO 201, GEO 202. Offered alternate years. (Bacc Core Course; Writing Intensive Course)

**GEO 412/GEO 512. IGNEOUS PETROLGY (4).** Petrogenesis of igneous rocks. Petrographic analysis using polarizing microscopes. PREREQ: GEO 315, GEO 415. Lec/lab.

**GEO 413/GEO 513. SEDIMENTARY PETROLOGY (4).** Field occurrence, description, and petrogenesis of sedimentary rocks, petrographic analysis using polarizing microscope, mechanical analysis of sediments. Field trip may be required, transportation fee charged. PREREQ: GEO 415. Lec/lab.

**GEO 415. EARTH MATERIALS III: IGNEOUS PETROGRAPHY (4).** Study of minerals and igneous rocks using microscopes. Representation and interpretation of igneous processes. PREREQ: GEO 310, GEO 315. Lec/lab.

**GEO 418/GEO 518. GEOGRAPHIC PHOTO INTERPRETATION (3).** Measurement and interpretation techniques with an emphasis on applications of aerial photography to mapping, resource evaluation, and field research. Covers photographic theory, flight planning, basic photogrammetry, and applications. PREREQ: MTH 112. Lec/lab.

**GEO 419/GEO 519. ROCK-FORMING MINERALS (3).** Identification, structure, and phase petrology of silicate, oxide, carbonate, and other important groups of rock-forming minerals. PREREQ: GEO 315. Offered alternate years.

**GEO 420/GEO 520. GEOGRAPHY OF RESOURCE USE (3).** Functional concepts of resources, institutions affecting resource use, role of resources; resource supply, bases of controversy. PREREQ: 9 credits of upper division geography.

**GEO 421/GEO 521. HUMANS AND THEIR WILDLIFE ENVIRONMENT (3).** Examines research themes associated with the interface of humans and wildlife resources. Includes discussions of resource use conflicts, differing philosophies of wildlife, wildlife ownership, patterns of both illegal and legal use, and alternative strategies for incorporating wildlife in planning. PREREQ: 9 credits of upper-division geography. Offered alternate years.

**GEO 422/GEO 522. ECOLOGICAL KNOWLEDGE AND ENVIRONMENTAL PROBLEMS (3).** Ecological principles applied to environmental problems. Case studies of human impacts on terrestrial, aquatic ecosystems. PREREQ: 9 credits of upper division geography. Offered alternate years.

**GEO 424/GEO 524. WATER RESOURCES GEOGRAPHY (3).** Geographical analysis of the spatial relations among biophysical factors, human factors, and water resource developments. Comparison of water use systems in developed and developing countries and in planned and unplanned economies. The spatial consequences of various water uses. PREREQ: 9 credits of upper division geography. Offered alternate years.

**GEO 425/GEO 525. WATER RESOURCES MANAGEMENT IN THE UNITED STATES (3).** Geographic analysis of various water management techniques, institutional processes; multiple, conflicting, and complementary uses of water; spatial consequences of various water management strategies; research problems. PREREQ: 9 credits of upper-division geography. Offered alternate years.

**GEO 426/GEO 526. THIRD-WORLD RESOURCE DEVELOPMENT (3).** Examines alternative resource development strategies used in less developed countries. Alternatives in agriculture, forestry, fisheries, energy, wildlife management, mineral development, land use, disease control, and population manipulation are examined. Offered alternate years.

**GEO 427/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. PREREQ: GEO 315. Offered alternate years. (Writing Intensive Course)

**GEO 429/GEO 529. TOPICS IN RESOURCE GEOGRAPHY (3).** Fundamental problems with stress upon methods of analysis. Topics vary; number may be repeated (from 1-3 times) with consent of major professor. PREREQ: 9 credits of upper division geography. Not offered every year.

**GEO 430/GEO 530. GEOCHEMISTRY (3).** Principles of geochemistry applied to problems of earth science. PREREQ: GEO 315; CH 121 and CH 122 or CH 221 and CH 222. Offered alternate years.

**GEO 431/GEO 531. APPLIED CLIMATOLOGY (3).** Geographic climatology with a focus on human/climate relationships. Techniques of climate classification and data analysis for applied use. Special reference to climate systems of North America. PREREQ: GEO 323. Offered alternate years.

**GEO 432/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. PREREQ: GEO 322.

**GEO 434/GEO 534. FIELD RESEARCH IN PHYSICAL GEOGRAPHY (3).** Exposure to the broad spectrum of physical environments in Oregon, focusing on a variety of research problems in physical geography, environmental planning, and conservation. Course consists of field experience and several seminars. Field trip(s) required; transportation and field guide fee charged.

**GEO 436/GEO 536. METAMORPHIC PETROLOGY (4).** Field occurrence, description, and petrogenesis of metamorphic rocks. Use of mineral reactions for thermometry, barometry and fluid equilibria. PREREQ: GEO 315 and GEO 415. Lec/lab. Offered alternate years.

**GEO 439/GEO 539. TOPICS IN PHYSICAL GEOGRAPHY (3).** Fundamental problems with stress upon methods of analysis. Topics vary; number may be repeated (from 1-3 times) with consent of major professor. PREREQ: GEO 462. Not offered every year.

**GEO 440/GEO 540. ECONOMIC GEOLOGY (4).** Principles of the origin, distribution, and importance of metallic mineral deposits formed by magmatic, hydrothermal, and sedimentary processes. PREREQ: GEO 315, GEO 450. Lec/lab.

**GEO 441/GEO 541. SPATIAL VARIATION IN ECOLOGY AND EARTH SCIENCE (3).** Objectives and techniques of spatial analysis in earth sciences and ecology. Moving windows, geostatistics, and related techniques. PREREQ: ST 411/511. Offered alternate years.

**GEO 444/GEO 544. REMOTE SENSING (3).** Physical principles; theory and operation of remote sensing systems; imagery interpretation and applications. Introduction to satellite remote sensing and digital image processing. PREREQ: GEO 418/GEO 518.

**GEO 445/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. PREREQ: GEO 360; MTH 112. Lec/lab.

**GEO 451/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 452/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. PREREQ: GEO 423/523 and graduate standing. Offered alternate years.

**GEO 453/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. PREREQ: GEO 452. Offered alternate years.

**GEO 454/GEO 554. ADVANCED STRUCTURAL GEOLOGY (3).** Mechanical principles of brittle and ductile rock deformation. Analysis of stress and strain in rocks. Advanced structural analysis of folds and faults. PREREQ: GEO 340; PREREQ OR COREQ: GEO 315. Lec/lab.

**GEO 456/GEO 556. WESTERN CORDILLERAN TECTONICS (3).** Regional structural geology and tectonic evolution of western North America in a plate-tectonic framework. Emphasis on Mesozoic and Cenozoic. Description of individual structural provinces and comparison to modern analogs such as the Western Pacific. Field trip required, transportation fee charged. PREREQ: GEO 340. Offered alternate years.

**GEO 457/GEO 557. TECTONOSTRATIGRAPHIC TERRANES (2).** Identification of terranes; processes of terrane amalgamation, accretion, and dispersion; determining terrane source regions; relationship between terranes and resources (ores and petroleum). PREREQ: GEO 450. Offered alternate years.

**GEO 458/GEO 558. PLATE TECTONICS OF CONTINENTAL COLLISION (3).** Comparative tectonics of selected regions of the world. Tectonics of strike-slip faults and transform zones, convergent and collision regions, foreland fold-and- thrust belts, metamorphic hinterland thrust belts, ophiolite emplacement, melange and suture zones. Comparison of currently active deformation zones to past orogenic belts. PREREQ: GEO 340. Offered alternate years.

**GEO 459/GEO 559. TOPICS IN LAND USE (3).** Recent developments in approaches to selected land use problems; environmental constraints and impacts, conflicts, and planning criteria; processes and implementation techniques. Topics vary and number can be repeated (up to 2 times). PREREQ: GEO 452/ GEO 552, GEO 465/GEO 565. Not offered every year.

**GEO 460/GEO 560. MAP DESIGN AND PRODUCTION (4).** Perceptual principles of map design. Laboratory experience with photomechanical map production techniques. Materials fee charged. PREREQ: GEO 360. Lec/lab.

**GEO 461/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. PREREQ: GEO 340. Offered alternate years.

**GEO 462/GEO 562. ^GEOSCIENCES FIELD METHODS (4).** Field course. Measurements, mapping and reports basic to geography and geology. Field trip(s) required; transportation fee charged. PREREQ: GEO 201, GEO 202, GEO 301 or equivalent. Lec/lab. (Writing Intensive Course)

**GEO 463/GEO 563. ^GEOPHYSICS AND TECTONICS (4).** Geophysical observations as constraints on geologic interpretation. Field trip(s) required; transportation fee charged. PREREQ: MTH 251, PH 202 or PH 212 or equivalent. CROSSLISTED as GPH 463/GPH 563. Lec/lab. (Writing Intensive Course)

**GEO 464/GEO 564. ^SEISMIC REFLECTION INTERPRETATION (4).** Seismic reflection data used to interpret subsurface geology. Integration of reflection data with other geophysical and geological data to interpret the structure and stratigraphy of sedimentary basins and the gross structure of the earth's crust. Overview of wave propagation theory and acquisition and processing procedures. Laboratory includes computer modeling of reflection data and interpretation of profiles from various tectonic settings. For students with backgrounds in either geology or geophysics. CROSSLISTED as GPH 464/ GPH 564. PREREQ: GEO 463/563 or GPH 463/GPH 563 or consent of instructor. Lec/lab. Offered alternate years. (Writing Intensive Course)

**GEO 465/GEO 565. GEOGRAPHIC INFORMATION SYSTEMS (3).** Collecting, structuring, manipulating, and graphically displaying data using Geographic Information Systems. Practical experience with a commonly used GIS such as ArcInfo in a class project setting. PREREQ: GEO 360. Lec/lab.

**GEO 466/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. PREREQ: GEO 444/GEO 544. Offered alternate years.

**GEO 469/GEO 569. TOPICS IN GEOGRAPHIC TECHNIQUES (3).** Advanced and specialized geographic information processing techniques, procedures, and applications. Topics vary; number may be repeated (up to 2 times) with consent of major professor. Not offered every year.

**GEO 470/GEO 570. STRATIGRAPHY AND SEDIMENTOLOGY (4).** Historical development; lithostratigraphy; the stratigraphic code; correlation; sequence magneto and seismic stratigraphy; sedimentary processes, structures, facies, and depositional environments; field and laboratory procedures. Field trip(s) may be required; transportation fee charged. PREREQ: GEO 315, GEO 340. Lec/lab.

**GEO 479/GEO 579. CLAY MINERALOGY (3).** Nature, properties, occurrence, genesis, and applications of clay minerals in geologic and soil environments. Field trip required; transportation fee charged. Lec/lab. Offered alternate years.

**GEO 481/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. PREREQ: GEO 201. Lec/lab. Offered alternate years.

**GEO 482/GEO 582. FOREST GEOMORPHOLOGY (3).** Interdisciplinary approach to analysis of roles of landforms and geomorphic processes in upland, riparian, and fluvial ecosystems. Field trip(s) required; transportation fee charged. PREREQ: Basic background in physical and biological sciences. Offered alternate years.

**GEO 483/GEO 583. GEOMORPHOLOGY OF MOUNTAIN STREAMS (3).** Processes and landforms in high-gradient streams, including fluvial hydraulics, sediment transport and channel bed morphology at various scales. Interactions between geomorphic and biotic processes and stressed. Field trip(s) required; transportation fee charged. PREREQ: Upper division course work in physical or biological sciences. Offered alternate years.

**GEO 484/GEO 584. TRAVEL AND TOURISM IMPACTS (3).** Physical, economic, and socio-cultural impacts of tourism development are considered from a geographical perspective. PREREQ: Senior or graduate standing and appropriate topical background. Offered alternate years.

**GEO 485/GEO 585. TOURISM AND RECREATION RESOURCES (3).** Geographic analysis of world tourism and recreation resources. PREREQ: Senior or graduate standing and appropriate topical background. Offered alternate years.

**GEO 486/GEO 586. ENGINEERING GEOLOGY (3).** Application of geologic principles and processes to the study of rock and soil materials and to subsurface fluids; includes site investigations for buildings and dams, routes for tunnels and pipelines and highways; earth materials for construction; surface and groundwater resources and pollution; and evaluation of geologic hazards. PREREQ: GEO 201, GEO 202, or GEO 221, GEO 487. Offered alternate years.

**GEO 487/GEO 587. HYDROGEOLOGY (4).** Movement of water through porous media. Darcy's Law and groundwater flow equation. Development of groundwater resources. Computer models. PREREQ: GEO 202, MTH 252. Lec/lab.

**GEO 488/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. PREREQ: GEO 481/GEO 581, or consent of instructor. Offered alternate years.

**GEO 489/GEO 589. ROLE OF FLUIDS IN GEOLOGIC PROCESSES (3).** Principles of fluid/solid mechanics and heat/mass transport as applied to geologic processes. Topics include compaction; oil/mineral emplacement; faulting. PREREQ: GEO 487 or CE 412, MTH 252.

**GEO 495/GEO 595. FIELD GEOLOGY (9).** Six week summer program in central Oregon. Collect field data to make geological maps, cross-sections, columns, and reports. Fee charged. PREREQ: GEO 315, GEO 340, GEO 462.

**GEO 497/GEO 597. FIELD MAPPING OF ORE DEPOSITS (3).** Eight-day field trip over spring vacation to a mineral district in the westem 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. PREREQ: GEO 440, GEO 495. Not offered every year.

### Graduate Courses

**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. PREREQ: 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. PREREQ: GEO 495.

**GEO 517. GEOLOGIC REPORT WRITING (2).** Construction of geologic reports and research proposals. Clarity, integrity, and criticism in written communication.

**GEO 528. MICROPROBE ANALYSIS (3).** Theory and application of electron microprobe analysis to problems in geology, engineering, chemistry, physics, and biology. CROSSLISTED as OC 528.

**GEO 546. ADVANCED LANDSCAPE ECOLOGY (3).** Pattern-process interactions in large scale ecological and physical systems. Hypothesis testing, field techniques, spatial models/statistics, GIS/remote sensing. PREREQ: 9 graduate science credits.

**GEO 580. ADVANCED GIS APPLICATIONS IN THE GEOSCIENCES (3).** Geographic information systems (GIS) literature review, discussions and projects involving geography, geology, and coastal and marine studies. PREREQ: GEO 465/GEO 565.

**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. May be repeated. (1-5 times)

**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.

**GEO 601. RESEARCH (1-16).**

**GEO 603. THESIS (1-16).**

**GEO 605. READING AND CONFERENCE (1-16).**

**GEO 606. PROJECTS (1-16).**

**GEO 607. SEMINAR (1-16).** Graded P/N.

**GEO 608. WORKSHOP (1-16).**

**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. PREREQ: GEO 412. Offered alternate years.

**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. PREREQ: Graduate standing in geology or related fields. Offered alternate years.

**GEO 646. MAGMATIC AND HYDROTHERMAL ORE DEPOSITS (4).** High-temperature metallic mineral deposits considered in terms of geologic and petrochemical indicators of genesis, features of exploration significance, and economic relevance. Lec/lab. Offered alternate years.

**GEO 672. ADVANCED SEDIMENTOLOGY (3).** Ancient and modern clastic and/or carbonate environments, non-marine and marine processes of sedimentation, interpretation of sedimentary structures and facies, relationship between tectonism and basin development. Field trip(s) may be required, transportation fee charged. PREREQ: GEO 470. Offered alternate years.

**GEO 680. ADVANCED SEDIMENTARY PETROLOGY (4).** Examination and interpretation of siliciclastic and/or carbonate sedimentary rocks using petrographic microscope, luminoscope, fluoroscope, scanning electron microscope, X-ray diffraction, and other analytical techniques. Composition, texture, diagenesis, geochemistry and provenance, depositional and tectonic settings of sandstone, shale, and carbonate rocks and treated. Field trip(s) may be required, transportation fee charged. Can be repeated once. PREREQ: GEO 413. Lec/lab. Offered alternate years.

**GEO 691. MASS AND HEAT TRANSPORT IN THE ENVIRONMENT (4).** Quantitative treatment of processes affecting transport in lakes, streams, and groundwater: advection; diffusion; dispersion. PREREQ: GEO 487 or CE 412 or equivalent; MTH 256; FORTRAN. Offered alternate years. Lec/lab.

**GEO 692. TOPICS IN IGNEOUS PETROLOGY (1).** Survey of recent research and advanced concepts in igneous petrology. Can be repeated (from 1-6 hrs.)

**GEO 694. TOPICS IN ORE GENESIS (3).** In-depth examination of published research on selected mineral deposits to build an understanding of environments and processes of ore formation. Can be repeated (from 3-6 hrs.) PREREQ: GEO 440. Offered alternate years.

**GEO 695. TOPICS IN TECTONICS (2).** Topics of current interest in regional structural geology, mechanics of rock deformation, or tectonics. Subjects will vary in different years. Can be repeated once. PREREQ: GEO 340. Offered alternate years.

### Lower Division 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 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. Lec/Lab. CROSSLISTED as OC 103. (Bacc Core Course)

**GEO 105. *GEOGRAPHY OF THE NON-WESTERN WORLD (3).** An introduction to the rich variety of peoples, traditions, and landscapes in Asia, the Pacific Islands, the Middle East, Africa, and Latin America. Emphasis is on the origins and evolution of the diverse cultural heritages of these regions and on present interaction between these peoples and their environments. Lec/rec. (Bacc Core Course)

**GEO 106. *GEOGRAPHY OF THE WESTERN WORLD (3).** The evolution and present status of cultures and environments in Europe and North America. Australia and New Zealand will also be considered as a region with Western traditions. Lec/rec. (Bacc Core Course)

**GEO 199. SPECIAL STUDIES (1-16).**

**GEO 201. *EARTH SYSTEM SCIENCE (4).** Surficial processes (glaciers, rivers), climate, soils, vegetation, and their inter-relationships. Field trip(s) required; transportation fee charged. Lec/lab. (Bacc Core Course)

**GEO 202. *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 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 (3).** Introductory geology emphasizing rocks, minerals, geologic hazards (landslides, earthquakes, flooding), soils, and environmental problems (groundwater, coastlines, glaciers). Field trip(s) required; transportation fee charged. Lec/lab.

**GEO 265. GEOGRAPHIC INFORMATION SYSTEM (GIS) PRACTICUM (3).** Practicum experience in using a widely popular geographic information system for spatial data input, analysis, and display.

### Upper Division Courses

**GEO 300. *ENVIRONMENTAL CONSERVATION (3).** Geography of human relationships to the earth's systems with an emphasis on human induced charge, both unintended and purposeful. Lec/Rec. (Bacc Core Course)

**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. COREQ; CS 101 or equivalent. Lec/lab.

**GEO 305. GEOLOGY OF THE VOLCANIC CASCADES (3).** The role of plate tectonics, earthquakes, volcanism, and glaciation in the development of Cascade landforms. Geology of Rainier, Crater lake, and Lassen National Parks; Mount St. Helens, eruption hazards, geothermal energy. PREREQ: One term introductory-level geology. Offered alternate years.

**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 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 310. EARTH MATERIALS I: MINEROLOGY (4).** Principles of crystal morphology, and structure. Characteristics, identification, and origins of minerals. PREREQ: GEO 202 or GEO 221. COREQ: CH 121 or Ch 221. Lec/lab.

**GEO 312. HUMAN GEOGRAPHY (3).** Origins, diffusions, and spatial variations in languages, religions, political systems, resource use and environmental perception. PREREQ: GEO 105 and GEO 106 or equivalent.

**GEO 313. GEOGRAPHY OF THE PACIFIC NORTHWEST (3).** Physical, human and economic geography of the Pacific Northwest with special reference to Oregon.

**GEO 315. EARTH MATERIALS II: PETROLOGY (4).** Origin, identification and classification of igneous, sedimentary, and metamorphic rocks. Field trip(s) required, transportation fee charged. PREREQ: GEO 310. Lec/lab.

**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. PREREQ: GEO 102 OR GEO 202. Lec/lab.

**GEO 323. CLIMATOLOGY (4).** Systematic analysis of global and regional climates. Physical principles of climate, climate classifications, and distribution and characteristics of climate regimes. PREREQ: GEO 101 and GEO 102. Lec/lab.

**GEO 324. BIOGEOGRAPHY (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. (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. (Bacc Core Course)

**GEO 328. *GEOGRAPHY OF LATIN AMERICA (3).** This course 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. (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 339. AREA STUDIES (3).** Physical and cultural processes that give geographical identity to and influence people's organization and use of selected world areas. Areas vary; number may be repeated (from 1-6 hrs) with consent of adviser. PREREQ: 3 credits of lower-division geography. Not offered every year.

**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. COREQ: GEO 301. Lec/lab.

**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. PREREQ: Upper class standing. Offered alternate years. (Bacc Core Course)

**GEO 360. CARTOGRAPHY (4).** Basic cartographic principles. Design, compilation, and construction of maps. Lec/lab.

**GEO 380. *EARTHQUAKES IN THE PACIFIC NORTHWEST (3).** Earthquake hazards in the Northwest; responses to reducing earthquake risk at state, local, and personal levels.

**GEO 400/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. GEO 400 PREREQ: Department approval. Graded P/N.

**GEO 401/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. GEO 401 PREREQ: Department approval required.

**GEO 403/GEO 503. THESIS (1-16).** Independent, original study that culminates in a senior thesis. Faculty sponsor must be prearranged. GEO 403 PREREQ: Department approval required.

**GEO 405/GEO 505. READING AND CONFERENCE (1-16).** Independent reading in specialized topics guided by and discussed in faculty conferences. Faculty sponsor must be prearranged. GEO 405 PREREQ: Department approval required.

**GEO 407/GEO 507. SEMINAR (1-16).** GEO 407: PREREQ: Departmental approval required. Graded P/N.

**GEO 408/GEO 508. WORKSHOP (1-16).** GEO 408: PREREQ: Departmental approval required.

**GEO 410/GEO 510. INTERNSHIP (1-15).** Pre-career professional experience under joint faculty and employer supervision. PREREQ: 12 credits of upper division geography. GEO 410 PREREQ: Department approval required. Graded P/N.

**GEO 411/GEO 511. *^DEVELOPMENT OF GEOLOGIC THOUGHT (3).** Analysis of scientific method in earth science using important early papers in geology. Discussion of philosophy of science issues in geology. Observation, inference, data, hypothesis, and theory in geology. Ethical standards in research and application of results. PREREQ: GEO 101, GEO 102 or GEO 201, GEO 202. Offered alternate years. (Bacc Core Course; Writing Intensive Course)

**GEO 412/GEO 512. IGNEOUS PETROLGY (4).** Petrogenesis of igneous rocks. Petrographic analysis using polarizing microscopes. PREREQ: GEO 315, GEO 415. Lec/lab.

**GEO 413/GEO 513. SEDIMENTARY PETROLOGY (4).** Field occurrence, description, and petrogenesis of sedimentary rocks, petrographic analysis using polarizing microscope, mechanical analysis of sediments. Field trip may be required, transportation fee charged. PREREQ: GEO 415. Lec/lab.

**GEO 415. EARTH MATERIALS III: IGNEOUS PETROGRAPHY (4).** Study of minerals and igneous rocks using microscopes. Representation and interpretation of igneous processes. PREREQ: GEO 310, GEO 315. Lec/lab.

**GEO 418/GEO 518. GEOGRAPHIC PHOTO INTERPRETATION (3).** Measurement and interpretation techniques with an emphasis on applications of aerial photography to mapping, resource evaluation, and field research. Covers photographic theory, flight planning, basic photogrammetry, and applications. PREREQ: MTH 112. Lec/lab.

**GEO 419/GEO 519. ROCK-FORMING MINERALS (3).** Identification, structure, and phase petrology of silicate, oxide, carbonate, and other important groups of rock-forming minerals. PREREQ: GEO 315. Offered alternate years.

**GEO 420/GEO 520. GEOGRAPHY OF RESOURCE USE (3).** Functional concepts of resources, institutions affecting resource use, role of resources; resource supply, bases of controversy. PREREQ: 9 credits of upper division geography.

**GEO 421/GEO 521. HUMANS AND THEIR WILDLIFE ENVIRONMENT (3).** Examines research themes associated with the interface of humans and wildlife resources. Includes discussions of resource use conflicts, differing philosophies of wildlife, wildlife ownership, patterns of both illegal and legal use, and alternative strategies for incorporating wildlife in planning. PREREQ: 9 credits of upper-division geography. Offered alternate years.

**GEO 422/GEO 522. ECOLOGICAL KNOWLEDGE AND ENVIRONMENTAL PROBLEMS (3).** Ecological principles applied to environmental problems. Case studies of human impacts on terrestrial, aquatic ecosystems. PREREQ: 9 credits of upper division geography. Offered alternate years.

**GEO 424/GEO 524. WATER RESOURCES GEOGRAPHY (3).** Geographical analysis of the spatial relations among biophysical factors, human factors, and water resource developments. Comparison of water use systems in developed and developing countries and in planned and unplanned economies. The spatial consequences of various water uses. PREREQ: 9 credits of upper division geography. Offered alternate years.

**GEO 425/GEO 525. WATER RESOURCES MANAGEMENT IN THE UNITED STATES (3).** Geographic analysis of various water management techniques, institutional processes; multiple, conflicting, and complementary uses of water; spatial consequences of various water management strategies; research problems. PREREQ: 9 credits of upper-division geography. Offered alternate years.

**GEO 426/GEO 526. THIRD-WORLD RESOURCE DEVELOPMENT (3).** Examines alternative resource development strategies used in less developed countries. Alternatives in agriculture, forestry, fisheries, energy, wildlife management, mineral development, land use, disease control, and population manipulation are examined. Offered alternate years.

**GEO 427/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. PREREQ: GEO 315. Offered alternate years. (Writing Intensive Course)

**GEO 429/GEO 529. TOPICS IN RESOURCE GEOGRAPHY (3).** Fundamental problems with stress upon methods of analysis. Topics vary; number may be repeated (from 1-3 times) with consent of major professor. PREREQ: 9 credits of upper division geography. Not offered every year.

**GEO 430/GEO 530. GEOCHEMISTRY (3).** Principles of geochemistry applied to problems of earth science. PREREQ: GEO 315; CH 121 and CH 122 or CH 221 and CH 222. Offered alternate years.

**GEO 431/GEO 531. APPLIED CLIMATOLOGY (3).** Geographic climatology with a focus on human/climate relationships. Techniques of climate classification and data analysis for applied use. Special reference to climate systems of North America. PREREQ: GEO 323. Offered alternate years.

**GEO 432/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. PREREQ: GEO 322.

**GEO 434/GEO 534. FIELD RESEARCH IN PHYSICAL GEOGRAPHY (3).** Exposure to the broad spectrum of physical environments in Oregon, focusing on a variety of research problems in physical geography, environmental planning, and conservation. Course consists of field experience and several seminars. Field trip(s) required; transportation and field guide fee charged.

**GEO 436/GEO 536. METAMORPHIC PETROLOGY (4).** Field occurrence, description, and petrogenesis of metamorphic rocks. Use of mineral reactions for thermometry, barometry and fluid equilibria. PREREQ: GEO 315 and GEO 415. Lec/lab. Offered alternate years.

**GEO 439/GEO 539. TOPICS IN PHYSICAL GEOGRAPHY (3).** Fundamental problems with stress upon methods of analysis. Topics vary; number may be repeated (from 1-3 times) with consent of major professor. PREREQ: GEO 462. Not offered every year.

**GEO 440/GEO 540. ECONOMIC GEOLOGY (4).** Principles of the origin, distribution, and importance of metallic mineral deposits formed by magmatic, hydrothermal, and sedimentary processes. PREREQ: GEO 315, GEO 450. Lec/lab.

**GEO 441/GEO 541. SPATIAL VARIATION IN ECOLOGY AND EARTH SCIENCE (3).** Objectives and techniques of spatial analysis in earth sciences and ecology. Moving windows, geostatistics, and related techniques. PREREQ: ST 411/511. Offered alternate years.

**GEO 444/GEO 544. REMOTE SENSING (3).** Physical principles; theory and operation of remote sensing systems; imagery interpretation and applications. Introduction to satellite remote sensing and digital image processing. PREREQ: GEO 418/GEO 518.

**GEO 445/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. PREREQ: GEO 360; MTH 112. Lec/lab.

**GEO 451/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 452/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. PREREQ: GEO 423/523 and graduate standing. Offered alternate years.

**GEO 453/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. PREREQ: GEO 452. Offered alternate years.

**GEO 454/GEO 554. ADVANCED STRUCTURAL GEOLOGY (3).** Mechanical principles of brittle and ductile rock deformation. Analysis of stress and strain in rocks. Advanced structural analysis of folds and faults. PREREQ: GEO 340; PREREQ OR COREQ: GEO 315. Lec/lab.

**GEO 456/GEO 556. WESTERN CORDILLERAN TECTONICS (3).** Regional structural geology and tectonic evolution of western North America in a plate-tectonic framework. Emphasis on Mesozoic and Cenozoic. Description of individual structural provinces and comparison to modern analogs such as the Western Pacific. Field trip required, transportation fee charged. PREREQ: GEO 340. Offered alternate years.

**GEO 457/GEO 557. TECTONOSTRATIGRAPHIC TERRANES (2).** Identification of terranes; processes of terrane amalgamation, accretion, and dispersion; determining terrane source regions; relationship between terranes and resources (ores and petroleum). PREREQ: GEO 450. Offered alternate years.

**GEO 458/GEO 558. PLATE TECTONICS OF CONTINENTAL COLLISION (3).** Comparative tectonics of selected regions of the world. Tectonics of strike-slip faults and transform zones, convergent and collision regions, foreland fold-and- thrust belts, metamorphic hinterland thrust belts, ophiolite emplacement, melange and suture zones. Comparison of currently active deformation zones to past orogenic belts. PREREQ: GEO 340. Offered alternate years.

**GEO 459/GEO 559. TOPICS IN LAND USE (3).** Recent developments in approaches to selected land use problems; environmental constraints and impacts, conflicts, and planning criteria; processes and implementation techniques. Topics vary and number can be repeated (up to 2 times). PREREQ: GEO 452/ GEO 552, GEO 465/GEO 565. Not offered every year.

**GEO 460/GEO 560. MAP DESIGN AND PRODUCTION (4).** Perceptual principles of map design. Laboratory experience with photomechanical map production techniques. Materials fee charged. PREREQ: GEO 360. Lec/lab.

**GEO 461/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. PREREQ: GEO 340. Offered alternate years.

**GEO 462/GEO 562. ^GEOSCIENCES FIELD METHODS (4).** Field course. Measurements, mapping and reports basic to geography and geology. Field trip(s) required; transportation fee charged. PREREQ: GEO 201, GEO 202, GEO 301 or equivalent. Lec/lab. (Writing Intensive Course)

**GEO 463/GEO 563. ^GEOPHYSICS AND TECTONICS (4).** Geophysical observations as constraints on geologic interpretation. Field trip(s) required; transportation fee charged. PREREQ: MTH 251, PH 202 or PH 212 or equivalent. CROSSLISTED as GPH 463/GPH 563. Lec/lab. (Writing Intensive Course)

**GEO 464/GEO 564. ^SEISMIC REFLECTION INTERPRETATION (4).** Seismic reflection data used to interpret subsurface geology. Integration of reflection data with other geophysical and geological data to interpret the structure and stratigraphy of sedimentary basins and the gross structure of the earth's crust. Overview of wave propagation theory and acquisition and processing procedures. Laboratory includes computer modeling of reflection data and interpretation of profiles from various tectonic settings. For students with backgrounds in either geology or geophysics. CROSSLISTED as GPH 464/ GPH 564. PREREQ: GEO 463/563 or GPH 463/GPH 563 or consent of instructor. Lec/lab. Offered alternate years. (Writing Intensive Course)

**GEO 465/GEO 565. GEOGRAPHIC INFORMATION SYSTEMS (3).** Collecting, structuring, manipulating, and graphically displaying data using Geographic Information Systems. Practical experience with a commonly used GIS such as ArcInfo in a class project setting. PREREQ: GEO 360. Lec/lab.

**GEO 466/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. PREREQ: GEO 444/GEO 544. Offered alternate years.

**GEO 469/GEO 569. TOPICS IN GEOGRAPHIC TECHNIQUES (3).** Advanced and specialized geographic information processing techniques, procedures, and applications. Topics vary; number may be repeated (up to 2 times) with consent of major professor. Not offered every year.

**GEO 470/GEO 570. STRATIGRAPHY AND SEDIMENTOLOGY (4).** Historical development; lithostratigraphy; the stratigraphic code; correlation; sequence magneto and seismic stratigraphy; sedimentary processes, structures, facies, and depositional environments; field and laboratory procedures. Field trip(s) may be required; transportation fee charged. PREREQ: GEO 315, GEO 340. Lec/lab.

**GEO 479/GEO 579. CLAY MINERALOGY (3).** Nature, properties, occurrence, genesis, and applications of clay minerals in geologic and soil environments. Field trip required; transportation fee charged. Lec/lab. Offered alternate years.

**GEO 481/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. PREREQ: GEO 201. Lec/lab. Offered alternate years.

**GEO 482/GEO 582. FOREST GEOMORPHOLOGY (3).** Interdisciplinary approach to analysis of roles of landforms and geomorphic processes in upland, riparian, and fluvial ecosystems. Field trip(s) required; transportation fee charged. PREREQ: Basic background in physical and biological sciences. Offered alternate years.

**GEO 483/GEO 583. GEOMORPHOLOGY OF MOUNTAIN STREAMS (3).** Processes and landforms in high-gradient streams, including fluvial hydraulics, sediment transport and channel bed morphology at various scales. Interactions between geomorphic and biotic processes and stressed. Field trip(s) required; transportation fee charged. PREREQ: Upper division course work in physical or biological sciences. Offered alternate years.

**GEO 484/GEO 584. TRAVEL AND TOURISM IMPACTS (3).** Physical, economic, and socio-cultural impacts of tourism development are considered from a geographical perspective. PREREQ: Senior or graduate standing and appropriate topical background. Offered alternate years.

**GEO 485/GEO 585. TOURISM AND RECREATION RESOURCES (3).** Geographic analysis of world tourism and recreation resources. PREREQ: Senior or graduate standing and appropriate topical background. Offered alternate years.

**GEO 486/GEO 586. ENGINEERING GEOLOGY (3).** Application of geologic principles and processes to the study of rock and soil materials and to subsurface fluids; includes site investigations for buildings and dams, routes for tunnels and pipelines and highways; earth materials for construction; surface and groundwater resources and pollution; and evaluation of geologic hazards. PREREQ: GEO 201, GEO 202, or GEO 221, GEO 487. Offered alternate years.

**GEO 487/GEO 587. HYDROGEOLOGY (4).** Movement of water through porous media. Darcy's Law and groundwater flow equation. Development of groundwater resources. Computer models. PREREQ: GEO 202, MTH 252. Lec/lab.

**GEO 488/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. PREREQ: GEO 481/GEO 581, or consent of instructor. Offered alternate years.

**GEO 489/GEO 589. ROLE OF FLUIDS IN GEOLOGIC PROCESSES (3).** Principles of fluid/solid mechanics and heat/mass transport as applied to geologic processes. Topics include compaction; oil/mineral emplacement; faulting. PREREQ: GEO 487 or CE 412, MTH 252.

**GEO 495/GEO 595. FIELD GEOLOGY (9).** Six week summer program in central Oregon. Collect field data to make geological maps, cross-sections, columns, and reports. Fee charged. PREREQ: GEO 315, GEO 340, GEO 462.

**GEO 497/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. PREREQ: GEO 440, GEO 495. Not offered every year.

### Graduate Courses

**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. PREREQ: 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. PREREQ: GEO 495.

**GEO 517. GEOLOGIC REPORT WRITING (2).** Construction of geologic reports and research proposals. Clarity, integrity, and criticism in written communication.

**GEO 528. MICROPROBE ANALYSIS (3).** Theory and application of electron microprobe analysis to problems in geology, engineering, chemistry, physics, and biology. CROSSLISTED as OC 528.

**GEO 546. ADVANCED LANDSCAPE ECOLOGY (3).** Pattern-process interactions in large scale ecological and physical systems. Hypothesis testing, field techniques, spatial models/statistics, GIS/remote sensing. PREREQ: 9 graduate science credits.

**GEO 580. ADVANCED GIS APPLICATIONS IN THE GEOSCIENCES (3).** Geographic information systems (GIS) literature review, discussions and projects involving geography, geology, and coastal and marine studies. PREREQ: GEO 465/GEO 565.

**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. May be repeated. (1-5 times)

**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.

**GEO 601. RESEARCH (1-16).**

**GEO 603. THESIS (1-16).**

**GEO 605. READING AND CONFERENCE (1-16).**

**GEO 606. PROJECTS (1-16).**

**GEO 607. SEMINAR (1-16).** Graded P/N.

**GEO 608. WORKSHOP (1-16).**

**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. PREREQ: GEO 412. Offered alternate years.

**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. PREREQ: Graduate standing in geology or related fields. Offered alternate years.

**GEO 646. MAGMATIC AND HYDROTHERMAL ORE DEPOSITS (4).** High-temperature metallic mineral deposits considered in terms of geologic and petrochemical indicators of genesis, features of exploration significance, and economic relevance. Lec/lab. Offered alternate years.

**GEO 672. ADVANCED SEDIMENTOLOGY (3).** Ancient and modern clastic and/or carbonate environments, non-marine and marine processes of sedimentation, interpretation of sedimentary structures and facies, relationship between tectonism and basin development. Field trip(s) may be required, transportation fee charged. PREREQ: GEO 470. Offered alternate years.

**GEO 680. ADVANCED SEDIMENTARY PETROLOGY (4).** Examination and interpretation of siliciclastic and/or carbonate sedimentary rocks using petrographic microscope, luminoscope, fluoroscope, scanning electron microscope, X-ray diffraction, and other analytical techniques. Composition, texture, diagenesis, geochemistry and provenance, depositional and tectonic settings of sandstone, shale, and carbonate rocks and treated. Field trip(s) may be required, transportation fee charged. Can be repeated once. PREREQ: GEO 413. Lec/lab. Offered alternate years.

**GEO 691. MASS AND HEAT TRANSPORT IN THE ENVIRONMENT (4).** Quantitative treatment of processes affecting transport in lakes, streams, and groundwater: advection; diffusion; dispersion. PREREQ: GEO 487 or CE 412 or equivalent; MTH 256; FORTRAN. Offered alternate years. Lec/lab.

**GEO 692. TOPICS IN IGNEOUS PETROLOGY (1).** Survey of recent research and advanced concepts in igneous petrology. Can be repeated (from 1-6 hrs.)

**GEO 694. TOPICS IN ORE GENESIS (3).** In-depth examination of published research on selected mineral deposits to build an understanding of environments and processes of ore formation. Can be repeated (from 3-6 hrs.) PREREQ: GEO 440. Offered alternate years.

**GEO 695. TOPICS IN TECTONICS (2).** Topics of current interest in regional structural geology, mechanics of rock deformation, or tectonics. Subjects will vary in different years. Can be repeated once. PREREQ: GEO 340. Offered alternate years.

## HISTORY OF SCIENCE

Full descriptions of the History of Science courses (HSTS) are listed in the Liberal Arts section of the catalog with the History listings. They can be used for upper division science credit and HSTS 415, HSTS 416, HSTS 417, HSTS 418, and HSTS 419 are approved as WIC courses for General Science and Biology degrees.

## HORTICULTURE

(See the College of Agricultural Sciences for description.)

## MATHEMATICS

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(541) 737-4686

**Faculty**

*Professors* Burton, Chen, Dick, Dray, B. I. Fein, Flaherty, Garity, Guenther, Higdon, Lee, Parks, Petersen, Schori, Solmon, Waymire; *Associate Professors* Bogley, Faridani, Finch, Flahive, Murphy, Ossiander, Pohjanpelto, Reichstein, Robson, Thomann, Weideman; *Courtesy Associate Professor* Manogue; *Assistant Professors* Edwards, Escher, B. Y. Fein, King, Reddy, Schmidt

### Undergraduate Major

**Mathematics (B.S.)**
*Options*
Actuarial Science
Applied Mathematics
Comprehensive
General Mathematics
Numerical Analysis
Pure Mathematics

**Mathematical Sciences (B.S.)**
*Minor*
Mathematical Sciences

### Minors

Mathematics
Actuarial Science

### Graduate Major

**Mathematics (M.A., M.S., Ph.D.)**
*Graduate Areas of Concentration*
Algebra
Analysis
Applied Mathematics
Computational Mathematics
Geometry
Mathematics Education
Mechanics
Numerical Analysis
Probability
Topology

The department offers programs leading to the B.S., M.A., M.S., M.A.I.S., and Ph.D. degrees in mathematics. Minors are offered in mathematics and in actuarial science. In addition, the department offers the B.S. degree in mathematical sciences. The mathematical sciences degrees are offered with the cooperation of the Departments of Computer Science and Statistics. The Computer Science Department also offers a separate undergraduate degree. The Statistics Department offers graduate degree programs. There is also a minor in mathematical sciences.

The Comprehensive Option under the mathematics major is intended primarily for those students preparing for careers in teaching mathematics at the secondary level. Such students should contact the Department of Mathematics and arrange for an advising session.

Additional information pamphlets about both the undergraduate and graduate programs are available from the Mathematics Department office. The graduate program is also described in the OSU *Graduate Catalog*.

### MATHEMATICS DEGREE (B.S)

Courses of study are offered in all the principal branches of pure and applied mathematics. As indicated in the degree requirements below, an option system helps students to focus their programs toward specific interests and career goals. Interdisciplinary programs with other departments are strongly encouraged. Possibilities exist for joint programs with computer science, statistics, and numerous other departments within the College of Science and the Colleges of Engineering, Oceanography, Business, Forestry, and Agricultural Sciences.

The department also sponsors an internship program at the undergraduate and graduate levels. Internships provide planned and supervised training at selected governmental, industrial, or business placement sites.

### REQUIREMENTS

In addition to fulfilling the University baccalaureate core requirements and the College of Science requirements, an undergraduate mathematics major must complete the mathematics core and at least one option.

**Mathematics Core**

*Lower division:* Calculus: MTH 251-MTH 255; Discrete Math: MTH 235; Ordinary Differential Equations: MTH 256, PH 211 One year approved courses in the physical or biological sciences may include PH 211. Proficiency in a high level computer programming language.

*Upper division:* At least 36 credits, at least a grade of C- and GPA of 2.25 in all required upper division courses: Advanced Calculus: MTH 311, MTH 312, MTH 313; Linear Algebra: MTH 341, MTH 342; 12 credits from MTH 411 through MTH 467 and one course each from two of the following three lists:

- *Analysis:* MTH 351, MTH 361, MTH 362, MTH 365, MTH 367, MTH 411-MTH 428, MTH 451-MTH 467
- *Algebra:* MTH 393, MTH 440, MTH 441, MTH 447, MTH 448, MTH 491
- *Geometry and Topology:* MTH 333, MTH 338, MTH 339, MTH 434-437, MTH 492, MTH 493

*Note:* For those in the Comprehensive Option, MTH 313 is not required and MTH 491, MTH 492, MTH 493 and ST 422 meet the 12-credit requirement. ST 422 also is allowed in the 12-credit requirement for the Actuarial Option.

### MATHEMATICS MAJOR OPTIONS

**ACTUARIAL SCIENCE OPTION**

Any two of: MTH 351, MTH 361, MTH 365, ST 411, ST 412, ST 448; all of the following: MTH 463, MTH 464, MTH 467; ST 421, ST 422.

**APPLIED MATHEMATICS OPTION**

PH 211, PH 212, PH 213; MTH 256 and MTH 351; two sequences, which have no course in common, selected from:
MTH 417, MTH 419, MTH 420
MTH 421, MTH 422, MTH 423
MTH 419, MTH 427, MTH 428
MTH 451, MTH 452, MTH 453
MTH 463, MTH 464, MTH 465
MTH 417 and or MTH 420 and two of MTH 427, MTH 428, MTH 451, MTH 463

**COMPREHENSIVE OPTION**

MTH 235; MTH 361; ST 351; MTH 337, MTH 338, MTH 392, MTH 393; MTH 491, MTH 492, MTH 493

#### GENERAL MATHEMATICS OPTION

MTH 235, MTH 256; 42 upper division credits in mathematics.

#### NUMERICAL ANALYSIS OPTION

MTH 256; MTH 351, MTH 352, MTH 451, MTH 452, MTH 453

#### PURE MATHEMATICS OPTION

One of MTH 333, MTH 345, MTH 351, or MTH 361; both of MTH 417 and MTH 441; two sequences, which have no course in common, selected from the following:
MTH 411, MTH 412, MTH 413
MTH 421, MTH 422, MTH 423
MTH 434, MTH 435 and one of MTH 436 or MTH 437
MTH 441, MTH 447, MTH 448
MTH 451, MTH 452, MTH 453
MTH 463, MTH 464, MTH 465
Select three of MTH 419, MTH 420, MTH 427, MTH 428.

## SAMPLE MATHEMATICS CURRICULUM

The following schedule indicates how the requirements above may be incorporated in a four year program of study:

#### Freshman and Sophomore Years

Mth 251, MTH 252, MTH 253, MTH 254, MTH 255. Calculus (20)
MTH 235. Discrete Math and MTH 256. Appl Diff Eqns (7)
Computer proficiency in a high level lang (3-4)
PH 211, PH 212, PH 213. Physics (12)
College of Science & University requirements & electives (47)

#### Junior and Senior Years

GPA of 2.25 or better in all upper division required courses
MTH 311, MTH 312, MTH 313. Adv Calc (9)
MTH 341, MTH 342. Linear Algebra (6)
4 quarters approved 400 level course work (12)
Additional approved breadth and option requirements (9-18) (credits required will depend on the chosen option)
College of Science & University requirements & electives (45-54)

## MATHEMATICS MINORS

The department offers both a minor in mathematics and a minor in actuarial science.

The requirements for the minor in mathematics are 30 credits of MTH courses numbered 235 or higher, including 15 credits numbered 300 or higher. Either MTH 311 or MTH 341 must be included.

The requirements for the minor in actuarial science are MTH 251, MTH 252, MTH 253, MTH 254, MTH 255, MTH 341, ST 421, and two of MTH 351, MTH 467, ST 422, ST 412, ST 415, ST 448.

## MATHEMATICAL SCIENCES DEGREE

The mathematical sciences degree provides breadth of training in the three areas of computer science, mathematics, and statistics. The major in mathematical sciences allows concentration in applied mathematics, mathematical statistics, applied analysis, assemblers and compilers, and operating systems. The program is designed to provide employment opportunities in industry and government and to prepare students for graduate work in areas requiring a quantitative background without narrow specialization.

Students begin by taking a common group of courses. Areas of specialization are developed in the junior and senior years.

A pamphlet describing the mathematical sciences degree program in more detail is available at the Mathematics Department main office.

## REQUIREMENTS

In addition to fulfilling the University baccalaureate core requirements and the College of Science requirements, a mathematical sciences major must complete the following:

*Lower division:* MTH 251, MTH 252, MTH 253, MTH 254, MTH 255, MTH 256 and CS 131, CS 161, CS 162, ECE 271, CS 261.

*Upper division:* A grade point average of at least 2.25 in all upper division courses required below. Upper division courses must include MTH 311, MTH 341, MTH 351, and one of MTH 312 and MTH 342; ST 351, ST 421, ST 422, and ST 448; CS 325, CS 361 or CS 381; any upper division prerequisite for the chosen senior sequence; and a senior sequence chosen from the following list:

- *Numerical analysis:* MTH 451, MTH 452, MTH 453
- *Continuum mechanics:* MTH 421, MTH 422, MTH 423
- *Applied mathematics:* MTH 417, MTH 419, MTH 420
- *Systems programming:* CS 411 and two of CS 420-CS 480
- *Probability:* MTH 463, MTH 464, MTH 465
- *Applied statistics:* ST 411, ST 412, ST 413
- *Operations research I:* ST 441, ST 443, ST 445
- *Operations research II:* ST 481, ST 483, ST 485

## MATHEMATICAL SCIENCES SAMPLE CURRICULUM

The following schedule indicates how the requirements above may be incorporated in a four year program of study:

#### Freshman and Sophomore Years

MTH 251, MTH 252, MTH 253, MTH 254, MTH 255. Calculus (20)
MTH 256. Applied Differential Equations (4)
CS 161, CS 162. Intro. to Prog. Methods and Data Structures (8)
CS 131. Intro. to Fortran Programming (4)
CS 261. Advanced Data Structures (3)
College of Science & University requirements & electives

#### Junior and Senior Years

GPA of 2.25 or better in required math science courses
MTH 311, MTH 341, MTH 351 and one of MTH 312, MTH 342 (12)
CS 325, CS 361 or CS 381 (15)
ST 351, ST 421, ST 422, ST 423 ST 448 (15)
Approved senior sequence (see list above) (9-12)
College of Science & University requirements & electives

## MATHEMATICAL SCIENCES MINOR

The requirements for the minor in mathematical sciences are a total of ten courses, totaling at least 30 credits, selected from either the mathematical sciences major or MTH 345, MTH 361, MTH 362, MTH 365, MTH 367, ST 431. These must include 15 upper division credits and two courses each from computer science, mathematics, and statistics. Restriction: No upper division course used to satisfy a requirement in the student's major can be used to satisfy mathematical sciences minor requirements of the student.

## COURSES

#### Lower Division 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. (Offered only through CHE.)

**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. PREREQ: MTH 65 (Offered only through CHE.)

#### Lower Division Courses

**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. PREREQ: MTH 95 or equivalent high school preparation. (Bacc Core Course)

**MTH 111. *COLLEGE ALGEBRA (4).** Polynomial equations and inequalities, polynomial functions and graphs, inverse functions, exponential and logarithmic functions, systems of equations in three or more unknowns and inequalities, matrix algebra, rational functions and graphs. PREREQ: MTH 95 or equivalent high school preparation. (Bacc Core Course)

**MTH 112. *ELEMENTARY FUNCTIONS (4).** Triangle trigonometry, circular functions and graphs, trigonometric equations and identities, complex numbers, exponential and logarithmic functions and graphs, conic sections, polar coordinates, composite and inverse functions. PREREQ: MTH 111. (Bacc Core Course)

**MTH 199. *TOPICS IN MATHEMATICS (1-16).** Maximum 3 credits per term, 9 credits total. Does not meet University group requirement in physical science. (Bacc Core Course)

**MTH 211. *FOUNDATIONS OF ELEMENTARY MATHEMATICS (3).** Introduction to problem solving, sets, whole numbers, number theory, fractions, decimals, percent, ratio and proportion, integers. Intended primarily for prospective elementary teachers. PREREQ: MTH 95. (Bacc Core Course)

**MTH 212. *FOUNDATIONS OF ELEMENTARY MATHEMATICS (3).** Rational and real numbers, probability, statistics, and informal geometry. PREREQ: MTH 211. (Bacc Core Course)

**MTH 213. *FOUNDATIONS OF ELEMENTARY MATHEMATICS (3).** Measurement, congruence, similarity, coordinate and transformational geometry. PREREQ: MTH 212. (Bacc Core Course)

**MTH 231, MTH 232. *ELEMENTS OF DISCRETE MATHEMATICS (4,4).** Elementary logic, mathematical induction, functions and sequences, finite and infinite sets, counting techniques, basic matrix algebra, relations, graphs, trees, semigroups. MTH 231 and MTH 235 cannot both be taken for credit. MTH 231 PREREQ: Placement in MTH 251; MTH 232: MTH 231. (Bacc Core Course)

**MTH 235. *DISCRETE MATHEMATICS (3).** Elementary logic, mathematical induction, functions and sequences, finite and infinite sets, counting techniques, relations, graphs, trees, and semigroups. MTH 231 and MTH 235 cannot both be taken for credit. PREREQ: MTH 251. (Bacc Core Course)

**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. PREREQ: MTH 111. (Bacc Core Course)

**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. PREREQ: MTH 111. (Bacc Core Course)

**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. PREREQ: MTH 112. (Bacc Core Course)

**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. PREREQ: MTH 251. (Bacc Core Course)

**MTH 253. *INFINITE SERIES AND SEQUENCES (4).** Indeterminate forms. 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. Brief introduction to functions of several variables, partial derivatives, the chain rule, and double integrals in rectangular coordinates. PREREQ: MTH 252. (Bacc Core Course)

**MTH 254. *VECTOR CALCULUS I (4).** Vectors and vector functions. Surfaces, partial derivatives, gradients, and directional derivatives. Multiple integrals with applications. Related matrix and linear algebra concepts. PREREQ: MTH 252. (Bacc Core Course)

**MTH 255. *VECTOR CALCULUS II (4).** Double integrals in polar coordinates, triple integrals in rectangular, cylindrical, and spherical coordinates. Introduction to vector analysis: divergence, curl, line integrals and work, surface integrals, conservative fields, and the theorems of Gauss and Stokes. PREREQ: MTH 254. (Bacc Core Course)

**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. Introduction to linear systems of differential equations, eigenvalues and normal modes. Related matrix and linear algebra concepts. Solution methods and applications appropriate for science and engineering. PREREQ: MTH 254. (Bacc Core Course)

**MTH 268. *MATHEMATICAL IDEAS IN BIOLOGY (4).** Basic calculus, partial differential equations, as applied to biological systems and especially ecology, Difference equations, chaos, and cellular automata will be introduced in a biological content. PREREQ: MTH 251 or equivalent.

**MTH 299. *TOPICS IN MATHEMATICS (1-16).** Maximum 3 credits per term, 9 credits total. (Bacc Core Course)

### Upper Division Courses

**MTH 311, MTH 312, MTH 313. *ADVANCED CALCULUS (3,3,3).** Limits and continuity in $R^n$ and foundations of one variable differential and integral calculus, including uniform continuity and convergence. Foundations of multivariable differential and integral calculus, including the implicit and inverse function theorems. PREREQ: for MTH 311: MTH 235 or equivalent experience with proofs; for MTH 312: MTH 311 and COREQ: MTH 341; for MTH 313: MTH 312. (Bacc Core Course)

**MTH 321. *APPLIED DIFFERENTIAL EQUATIONS (3).** Systems of differential equations, stability and bifurcation analysis, introduction to chaos, applications in science and engineering. PREREQ: MTH 256. (Bacc Core Course)

**MTH 322. INTRODUCTION TO PARTIAL DIFFERENTIAL EQUATIONS (3).** Fourier series, separation of variables, applications to the heat, wave, and Laplace's equations, boundary-value problems, and Sturm-Liouville theory. PREREQ: MTH 256 and MTH 341.

**MTH 333. *^FUNDAMENTAL CONCEPTS OF TOPOLOGY (3).** Open and closed sets, continuity, compactness, connectedness, winding number, fixed point theorems in the plane. PREREQ: MTH 254. (Bacc Core Course/ Writing Intensive Course)

**MTH 337. *EUCLIDEAN GEOMETRY (3).** Tilings, investigations of the properties of polyhedra and other 3-dimensional solids, their intersections and plane cross-sections, Eulers formula, the incidence of points, lines and planes in space, tesselations. Major results of Euclidean geometry. Intended primarily for prospective secondary teachers. PREREQ: MTH 252 and MTH 235. (Bacc Core Course)

**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. PREREQ: MTH 252. (Bacc Core Course/Writing Intensive Course)

**MTH 339. *TOPICS IN GEOMETRY (3).** Selected topics in Euclidean and non-Euclidean geometry. (Bacc Core Course)

**MTH 341. *LINEAR ALGEBRA (3).** Vector spaces, linear transformations and matrices, systems of linear equations. PREREQ: MTH 254. (Bacc Core Course)

**MTH 342. *LINEAR ALGEBRA (3).** Determinants, eigenvalues and vectors, similarity, inner-product spaces and their transformations. PREREQ: MTH 254. (Bacc Core Course)

**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. PREREQ: MTH 253 and programming experience. (Bacc Core Course)

**MTH 352. *INTRODUCTION TO NUMERICAL ANALYSIS (3).** Introduction to numerical linear algebra, elements of approximation theory including data fitting and fast Fourier transform. PREREQ: MTH 254, MTH 351. (Bacc Core Course)

**MTH 361. *INTRODUCTION TO PROBABILITY (3).** Overview of probability and the laws of random events 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. PREREQ: MTH 253. (Bacc Core Course)

**MTH 391. *ELEMENTARY PROBLEM SOLVING (3).** Mathematical problem solving techniques from the approach of George Polya. Problems will be drawn from the areas of number theory, algebra, geometry, probability, and the real number system. Intended primarily for prospective elementary teachers. PREREQ: MTH 213. (Bacc Core Course)

**MTH 392. *PROBLEM SOLVING (3).** Mathematical problem solving techniques from the approach of George Polya. Problems will be drawn from the areas of number theory, geometry, probability, and calculus. Intended primarily for prospective secondary teachers. PREREQ: MTH 253. (Bacc Core Course)

**MTH 393. *NUMBER THEORY AND THEORY OF EQUATIONS (3).** Mathematical induction, divisibility and primes, congruences, basic properties of groups, rings, and fields, rings of polynomials, roots and factors of polynomials. PREREQ: MTH 235 and MTH 253. (Bacc Core Course)

**MTH 401/MTH 501. *^RESEARCH (1-16).** Departmental approval required. (Bacc Core Course/ Writing Intensive Course)

**MTH 403/MTH 503. *THESIS (1-16).** Departmental approval required. (Bacc Core Course)

**MTH 405/MTH 505. *READING AND CONFERENCE (1-16).** Departmental approval is required. (Bacc Core Course)

**MTH 406/MTH 506. *PROJECTS (1-3).** Departmental approval is required. (Bacc Core Course)

**MTH 407/MTH 507. *SEMINAR (3).** Departmental approval required. (Bacc Core Course)

**MTH 410/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 adviser. PREREQ: Junior standing in mathematics, cumulative 3.00 GPA in mathematics, head adviser/ departmental approval required. Graded P/N. (Bacc Core Course)

**MTH 411/MTH 511, MTH 412/MTH 512, MTH 413/ MTH 513. *REAL ANALYSIS (3,3,3).** 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, $L^p$ spaces, Fubinis theorem, and applications such as to Fourier transforms and probability. PREREQ: MTH 313 and 341. (Bacc Core Course)

**MTH 417. *COMPLEX VARIABLES (3).** Introduction to the complex differential and integral calculus: Cauchys theorem and formula, the residue calculus, power series and Laurent series, harmonic functions, conformal mapping, and applications. PREREQ: MTH 311. (Bacc Core Course)

**MTH 418. *FOURIER ANALYSIS (3).** Linear differential operators and separation of variables; Fourier series; convergence and completeness; Sturm-Liouville problems; other orthogonal expansions; and applications. PREREQ: MTH 256, MTH 417. (Bacc Core Course)

**MTH 419/MTH 519. *INTEGRAL TRANSFORMS (3).** Fourier and Laplace transforms; discrete Fourier transforms and the FFT (Fast Fourier Transform); generalized functions and distributions; and applications. PREREQ: MTH 418. (Bacc Core Course)

**MTH 420. *TENSORS AND DIFFERENTIAL FORMS (3).** Introduction to tensor algebra and the algebra of exterior differential forms with emphasis on Euclidean space; differentiation of tensors and forms; integration of forms; selected applications from hydrodynamics, elastic media, electromagnetism, and Yang-Mills fields. PREREQ: MTH 256 and MTH 341. (Bacc Core Course)

**MTH 421/MTH 521, MTH 422/MTH 522, MTH 423/ MTH 523. *PRINCIPLES OF CONTINUUM MECHANICS (3,3,3).** Review of tensors; axioms of continuum mechanics; strain, stress, motion, thermodynamics of continuous media; construction of constitutive equations for real materials. Applications to problems in fluid dynamics, and elasticity. PREREQ: MTH 312. Must be taken in order. (Bacc Core Course)

**MTH 428/MTH 528. *VARIATIONAL PROBLEMS (3).** Basic problems in the calculus of variations, first and second variation of functionals and the Euler-Lagrange equations, applications to physical problems and conservation laws, Ritz-Galerkin methods and other direct methods of the calculus of variations. PREREQ: MTH 256 and MTH 312. (Bacc Core Course)

**MTH 435/MTH 535, MTH 436/MTH 536. *DIFFERENTIAL GEOMETRY (3,3).** Local curve theory; global curve theory; exterior surface theory; fundamental forms, curvatures, geodesics; differentiable 2-manifolds; differential forms, exterior products, and derivatives, integration of forms. PREREQ: MTH 312 and MTH 341. (Bacc Core Course)

**MTH 437/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. PREREQ: MTH 311. REC: MTH 434. (Bacc Core Course)

**MTH 440/MTH 540. *COMPUTATIONAL NUMBER THEORY (3).** Primality testing and methods of factoring integers. Application to cryptology. The necessary elementary number theory is developed in the course. PREREQ: MTH 231 or MTH 235. (Bacc Core Course)

**MTH 441/MTH 541, MTH 442/MTH 542. *APPLIED AND COMPUTATIONAL ALGEBRA (3,3).** Applications of the fundamental algebraic systems to topics such as factorization of polynomials, finding roots of polynomials, error correcting codes. PREREQ: MTH 342 or MTH 440/MTH 540 or instructor consent. (Bacc Core Course)

**MTH 443/MTH 543. *ABSTRACT LINEAR ALGEBRA (3).** Abstract vector spaces. Linear transformations, eigenvalues and eigenvectors, the Jordan canonical form, inner product spaces. PREREQ: MTH 342 (Bacc Core Course)

**MTH 451/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. PREREQ: MTH 341 and programming experience. REC: MTH 342, MTH 351. (Bacc Core Course)

**MTH 452/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. PREREQ: MTH 256, MTH 451/MTH 551. (Bacc Core Course)

**MTH 453/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. PREREQ: MTH 452. (Bacc Core Course)

**MTH 458. *^NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS (4).** The mathematical topics for this course are the same as those for MTH 452. In addition, several project reports are expected. PREREQ: MTH 451/MTH 551, REC: MTH 256. (Bacc Core Course/Writing Intensive Course)

**MTH 463/MTH 563, MTH 464/MTH 564, MTH 465/MTH 565. *THEORY OF PROBABILITY (3,3,3).** Random variables, central limit theorem; distributions of standard statistics; Markov chains, continuous and discontinuous stochastic processes. PREREQ: MTH 312 and MTH 341; COREQ: MTH 313. (Bacc Core Course)

**MTH 467/MTH 567. *ACTUARIAL MATHEMATICS (3).** Foundations of actuarial science from the point of view of mathematical models which arise in the design and management of insurance systems. Most models will be life insurance based. PREREQ: MTH 463/MTH 563 or ST 421. (Bacc Core Course)

**MTH 468/MTH 568. *LIFE CONTINGENCIES I (3).** Construction and use of probability models in financial contingencies. Course will cover life tables and their use for financial transactions that commence or terminate at death. PREREQ: MTH 463/MTH 563 or ST 421. (Bacc Core Course)

**MTH 469/MTH 569. *LIFE CONTINGENCIES II (3).** Construction and use of probability models in financial contingencies. Course will cover the models for long term funding and reserving. PREREQ: MTH 468/MTH 568. (Bacc Core Course)

**MTH 470/MTH 570. *LIFE CONTINGENCIES III (3).** Construction and use of probability models in financial contingencies. Course will cover the extensions to contingencies other than death, and more general reserving theories. The material constitutes the mathematical core of the life actuarial theories. PREREQ: MTH 469/MTH 569. (Bacc Core Course)

**MTH 473/MTH 573. *^HISTORY OF MATHEMATICS (3).** Selected topics from the history of mathematics. PREREQ: 6 credits of upper division mathematics. (Bacc Core Course/Writing Intensive Course)

**MTH 481/MTH 581, MTH 482/MTH 582, MTH 483/MTH 583. MATHEMATICAL METHODS FOR ENGINEERS AND SCIENTISTS (3,3,3). MTH 481/MTH 581:** Linear and nonlinear systems of ordinary differential equations, elementary stability theory, higher order equations, boundary value problems, series solution of ordinary differential equations. **MTH 482/MTH 582:** Partial differential equations. Bessel's and Legendre's equations, Fourier analysis, separation of variables, transform methods. **MTH 483/MTH 583:** 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. PREREQ: for MTH 481/MTH 581, MTH 482/MTH 582, and MTH 483/MTH 583: MTH 256.

**MTH 487/MTH 587, MTH 488/MTH 588, MTH 489/MTH 589. *NUMERICAL METHODS FOR ENGINEERS AND SCIENTISTS (3,3,3).** Interpolation, numerical integration, root-finding, Fourier series, fundamentals of numerical linear algebra and numerical solution of ordinary and partial differential equations. Emphasis on the practical implementation of numerical algorithms. PREREQ: MTH 256, MTH 341, MTH 482, and programming experience. REC: MTH 351. (Bacc Core Course)

**MTH 490. *INTENSIVE SUMMER RESEARCH IN MATHEMATICS (12).** Combination of seminar, lectures, and individual research projects designed to introduce students to research mathematics. PREREQ: This course is open to participants in the OSU Undergraduate Summer Research Program in Mathematics (REU program). (Bacc Core Course)

**MTH 491/MTH 591, MTH 492/MTH 592, MTH 493/MTH 593. ALGEBRA AND GEOMETRIC TRANSFORMATIONS (3,3,3). MTH 491/MTH 591:** Groups and their properties, particular examples of groups of geometric transformations, Lagrange's Theorem and its consequences, group homomorphisms and isomorphisms, rings, integral domains, fields, ordered fields, the rational, real and complex number fields, algebraic and transcendental numbers, constructible points and numbers and the classical geometric constructions. Intended primarily for prospective secondary teachers. **MTH 492/MTH 592:** Isometries and similitudes of the plane (translations, rotations, reflections, glide reflections, dilations), groups and cosets of isometries, representations of isometries, similitudes, and inversions as functions of a complex variable. Intended primarily for prospective secondary teachers. **MTH 493/MTH 593:** Matrix representations of transformations in Euclidian space, spherical transformations and projections, genealogy of geometric transformations, invariants, group structure, applications of projective transformations to computer graphics. Intended primarily for prospective secondary teachers. PREREQ: for MTH 491/MTH591: MTH 341 and MTH 393; for MTH 492/MTH 592: MTH 491/MTH 591 and MTH 337; and for MTH 493/MTH 593: MTH 492/MTH592.

### Graduate Courses

**MTH 514, MTH 515, MTH 516. COMPLEX ANALYSIS (3,3,3).** Basic theory of analytic functions of a complex variable, including Cauchy's theorem, residue theorem, analytic continuation, conformal mappings, entire, and meromorphic functions. PREREQ: MTH 411/MTH 511 or MTH 417. Must be taken in order.

**MTH 524, MTH 525, MTH 526. DIFFERENTIAL EQUATIONS AND DYNAMICAL SYSTEMS (3,3,3).** Basic existence, uniqueness, and continuous dependence results for systems of ordinary differential equations, extendibility of solutions, stability theory, geometric theory including the Poincare-Bendixson theorem, phase space dynamical systems and chaos. PREREQ: MTH 411/MTH 511.

**MTH 529, MTH 530, MTH 531. DIFFERENTIAL AND INTEGRAL EQUATIONS OF MATHEMATICAL PHYSICS (3,3,3).** Partial differential equations of physics, including those of potential theory, wave propagation, and heat flow, treated by classical means, generalized functions and variational principles. $L^2$ methods and integral equations. PREREQ: 6 credits of senior-level analysis. Must be taken in order.

**MTH 544, MTH 545. ABSTRACT ALGEBRA (3,3).** Group theory, rings and fields, Galois theory. PREREQ: Graduate standing in mathematics or a related field, or consent of instructor. REC: MTH 441/MTH 541 or MTH 443/MTH 543.

**MTH 554, MTH 555, MTH 556. NUMERICAL ANALYSIS (3,3,3).** Theory and algorithms for approximations in normed spaces, optimization. Theory of approximate solution of equations. Numerical solution of differential equations. PREREQ: MTH 412/MTH 512, MTH 451/MTH 551. Normally offered alternate years.

**MTH 558. COMPUTATIONAL MATHEMATICS (3).** Introduction to mathematical software packages such as Mathematical, Matlab, and Maple. Examples of advanced mathematical topics that can be illuminated by computation examples and experimentation. Exploration of how numerical and symbolic computation can aid research in mathematics and related areas. PREREQ: Graduate standing in mathematics or a related field, or consent of instructor.

**MTH 559. TOPICS IN MATHEMATICAL MODELING (3).** Mathematical treatment of topics of current interest in the physical and biological sciences and technology. May be repeated for credit, if taken with different topics. PREREQ: PASCAL or FORTRAN and consent of instructor.

**MTH 579. TOPICS IN ACTUARIAL SCIENCE (3).** A variety of probabilistic and statistical methods applied to risks of financial uncertainty, including insurance. May be repeated for credit. PREREQ: MTH 463/MTH 563 or ST 421/ST 521, or equivalent and departmental approval required.

**MTH 590. 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. PREREQ: MTH 253 and consent of instructor.

**MTH 594. 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. PREREQ: MTH 337 or consent of instructor.

**MTH 595. 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. PREREQ: Consent of instructor.

**MTH 596. 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. PREREQ: Consent of instructor.

**MTH 597. 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. PREREQ: Ability to program in either BASIC or PASCAL; MTH 392 or consent of instructor.

**MTH 598. 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. PREREQ: MTH 392 or consent of instructor.

**MTH 599. TOPICS IN MATHEMATICS EDUCATION (3).** Topics may vary. May be repeated for credit. Consent of instructor required.

**MTH 601. RESEARCH (1-16).** Departmental approval required.

**MTH 603. THESIS (1-16).** Departmental approval required.

**MTH 605. READING AND CONFERENCE (1-16).** Departmental approval required.

**MTH 607. SEMINAR (1-16).** Departmental approval required.

**MTH 614, MTH 615, MTH 616. FUNCTIONAL ANALYSIS (3,3,3).** Topological vector spaces, generalized functions, operator theory. PREREQ: MTH 513. Must be taken in order. Normally offered altemate years.

**MTH 617, MTH 618, MTH 619. PARTIAL DIFFERENTIAL EQUATIONS (3,3,3).** Advanced theory including existence proofs and distributional approach. PREREQ: MTH 513. Normally offered alternate years.

**MTH 620. TOPICS IN ANALYSIS (3).** May be repeated for credit.

**MTH 629. TOPICS IN APPLIED MATHEMATICS (3).** May be repeated for credit.

**MTH 630. TOPICS IN TOPOLOGY (3).** May be repeated for credit.

**MTH 631, MTH 632, MTH 633. GENERAL TOPOLOGY AND FUNDAMENTAL GROUPS (3,3,3).** 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. PREREQ: MTH 411/MTH 511. Must be taken in order.

**MTH 634, MTH 635, MTH 636. ALGEBRAIC TOPOLOGY (3,3,3).** Simplicial and singular homology, products, and cohomology; applications to fixed-point and separation theorems. Topics selected from homotopy, manifold and obstruction theory. PREREQ: MTH 632. Must be taken in order. Normally offered alternate years.

**MTH 637, MTH 638, MTH 639. DIFFERENTIAL GEOMETRY OF MANIFOLDS (3,3,3).** Differentiable manifolds, connections in linear bundles, Riemannian manifolds and submanifolds. Selected topics such as variational theory of geodesics, harmonic forms, and characteristic classes. PREREQ: MTH 341 and MTH 411/MTH 511. Must be taken in order. Normally offered alternate years.

**MTH 640. TOPICS IN GEOMETRY (3).** May be repeated for credit.

**MTH 649. TOPICS IN ALGEBRA AND NUMBER THEORY (3).** May be repeated for credit.

**MTH 659. TOPICS IN NUMERICAL ANALYSIS (3).** May be repeated for credit.

**MTH 661, MTH 662, MTH 663. STOCHASTIC PROCESSES (3,3,3).** Random processes occurring in the physical and biological sciences, engineering, and management. PREREQ: MTH 463/563 or MTH 361 and MTH 413/513. Must be taken in order. Normally offered alternate years.

**MTH 665, MTH 666, MTH 667. ADVANCED PROBABILITY THEORY (3,3,3).** General theory of probability measures and random variables, including the law of large numbers, central limit theorems, law of the iterated logarithm, Levys stable laws, conditional expectation, infinitely divisible distributions, martingales and limit theorems under dependence. PREREQ: MTH 411/MTH 511. Offered alternate years. CROSSLISTED as ST 665, ST 666, ST 667.

**MTH 669. TOPICS IN PROBABILITY (3).** May be repeated for credit.

**MTH 699. TOPICS IN MATHEMATICS EDUCATION (3).** May be repeated for credit.

## METEOROLOGY

See Atmospheres Sciences in College of Oceanic and Atmospheric Sciences.

## MICROBIOLOGY

J. C. Leong, Chair
220 Nash Hall
Oregon State University
Corvallis, OR 97331-3804
(541) 737-4441

**Faculty**

*Professors* Bottomley, Brown, Hruby, Leong, Rohrmann; *Associate Professors* Dreher, Geller, Giovannoni, Ream, Reno, Trempy; *Assistant Professors* Field, Rocky, Vella; *Senior Instructors* Burke, Williams

### Undergraduate Major

**Microbiology (B.S.)**
*Minor*
Microbiology

### Graduate Major

**Microbiology (M.A., M.S., Ph.D)**
*Graduate Areas of Concentration*
Food and Dairy Microbiology
Immunology and Virology
Microbial Ecology
Microbial Genetics and Molecular Biology
General Microbiology
Pathogenic Microbiology

Microbiology is concerned with the forms and activities of bacteria, yeasts, molds, 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 aspects such as the physiology, systematics, structure, or genetics of microorganisms; the applications of microbiology concerned with soil fertility, food and dairy production and processing, sanitation, immunology, and human, animal and plant diseases. Undergraduate studies in these areas will prepare students for admission to professional schools, graduate programs in microbiology and for positions as health officers, sanitarians, and biotechnicians for private industry and government.

High school students or community college transfers 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 the department's chief adviser or other 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. Many students gain practical experience through internships, particularly in food microbiology. Several scholarships are available for microbiology majors. For more information, contact the microbiology chief adviser.

### GRADUATE STUDIES

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 in the department include molecular biology, microbial physiology; genetics; plant and animal virology; dairy, soil, freshwater, and marine microbiology; immunology; and pathogenic microbiology, including bacteria and viruses. The department also participates in the Master of Arts in Interdisciplinary Studies and the Masters of Agriculture graduate programs. Students in both the Master's and Ph.D. programs are required to complete a research project leading to a thesis. Students pursuing the Ph.D. degree must complete both written and oral examinations. All students are expected to participate to a limited degree in the teaching program of the department. Teaching and research assistantships are available, and salaries are very competitive.

For additional information, contact the chair of the department, J. C. Leong, or other faculty members conducting research in areas which are of interest.

## CURRICULUM (B.S.)

To receive a B.S. degree in microbiology, a student must complete all university baccalaureate core requirements plus departmental requirements which include CH 221, CH 222, CH 223, CH 331, CH 332, CH 337, CH 324; MTH 251 and MTH 252; CS 101 or higher; PH 201, PH 202 and PH 203; BI 211, BI 212, BI 213, and BI 214 and BB 450 and BB 451. Majors must have 36 hours in microbiology with a minimum grade average of 2.0. They must receive a C or better in all required microbiology courses (MB 302, MB 303, MB 304, MB 306, MB 307, and MB 416. They must complete one course each in the applied or environmental area and the medical area of microbiology. They must also have 2 laboratory courses in microbiology beyond MB 303 and MB 307. A 2 hour seminar course is required (MB 407). Research (MB 401), Reading and Conference (MB 405) and Special Projects (MB 406) cannot account for more than 3 of the required 36 microbiology hours. Additional hours in these subjects will count toward elective credits. All required science courses must be taken for a grade. CH 324 may be taken S/U. An exit interview is given prior to graduation.

**Freshman Year**
CH 221, CH 222, CH 223. Gen Chemistry (15)
MTH 251, MTH 252. Calculus (8)
Writing I, II (6)
Fitness (3)
LS 190 (1)
BI 211, 212, 213 (12)

**Sophomore Year**
CH 331, CH 332, CH 337. Organic Chem (10)
BI 214 Cellular and Molecular Biology (3)
CH 324. Quantitative Analysis (4)
MB 302, MB 303. General Microbiology (5)
CS 101. Computers: Appl and Impl (4)
Perspectives (12)
Writing III/Speech (3)
Electives (4)

**Junior Year**
MB 304, MB 306. Adv Gen Microbi (6)
MB 307. Critical Think & Exper (3)
PH 201, PH 202, PH 203. General Physics (15)
BB 450, BB 451. General Biochemistry (7)
Synthesis (6)
Perspectives (3)
Electives (5)

**Senior Year**
Approved 400-level microbiology (21)
MB 407. Senior Seminar (2)
Electives, upper division (mathematics, foreign languages, chemistry and biology for those planning advanced studies in microbiology. Microbiology majors planning advanced professional training in medicine, consult a premedical, medical technology or other appropriate adviser) (22)

## MINOR (27)

The microbiology minor is designed for students from other majors who have an additional interest in microbiology. The curriculum consists of a required core of MB 302, MB 303, MB 304, MB 306, MB 307, MB 407, and MB 416 plus twelve additional credits of upper division microbiology courses, (one of which must be a laboratory course) selected after consultation with the chief adviser in the Department of Microbiology. All of these courses must be graded, not S/U.

## COURSES

### Lower Division Courses

**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)

### Upper Division Courses

**MB 302. GENERAL MICROBIOLOGY (3).** Emphasis on cytology, physiology, genetics, virology, growth and control of growth with coverage of the role of microorganisms in nature, disease and as useful tools. PREREQ: CH 331, CH 322, BI 214.

**MB 303. GENERAL MICROBIOLOGY LABORATORY (2).** Development of laboratory techniques; exercises designed to reinforce concepts covered in MB 302. PREREQ: Two terms organic chemistry; COREQ: MB 302 or BI 213.

**MB 304. ADVANCED GENERAL MICROBIOLOGY (3).** Structure, function, metabolism, and physiology of prokaryotes. Must be taken in order. PREREQ: MB 302, COREQ: BB 450, BB 451.

**MB 306. ADVANCED GENERAL MICROBIOLOGY (3).** Genetic and molecular analysis of prokaryotes. Must be taken in order. PREREQ: MB 302 and MB 304 or consent of instructor. COREQ: BB 450, BB 451.

**MB 307. ^CRITICAL THINKING AND EXPERIMENTATION IN MICROBIOLOGY (3).** Exercises in the physiology and genetics of microorganisms. PREREQ or COREQ: MB 306. (Writing Intensive Course)

**MB 390. *THE WORLD ACCORDING TO MICROBES (3).** Explores the impact microbes have on human societies and the contemporary global issues surrounding the uses and abuses of microbes. From biological warfare to the foods we consume to the reduction of pollution, microbes are eager participants in our lives. Social, legal, economical, political, and ethical issues surrounding the exploitation of microbes will be debated. PREREQ: Upper division standing. (Bacc Core Course)

**MB 401. RESEARCH (1-16).** Graded P/N.

**MB 403. THESIS (1-16).** Graded P/N.

**MB 405. READING AND CONFERENCE (1-16).** Conference: Instruction in microbiology.

**MB 406. PROJECTS (1-16).** Reading and Conference/Instructor in Microbiology. Must have adviser approval before signing up for these credits.

**MB 407. SEMINAR (1-16).** Graded P/N.

**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. Certain prerequisites may be needed. Permission of microbiology chief adviser required. Graded P/N.

**MB 416/MB 516. IMMUNOLOGY (3).** Basic theory and applications of immunochemistry, immunogenetics, and cellular immunology. Examination of immunologically related diseases. PREREQ: MB 306, BB 451.

**MB 417/MB 517. IMMUNOLOGY LABORATORY (2).** Laboratory on the applications of current immunological techniques. PREREQ or COREQ: MB 306, MB 451.

**MB 420/MB 520. MICROBIAL DIVERSITY (3).** Evolution and diversity of bacteria and lower eukaryotes. Molecular phylogeny and conventional techniques in microbial systematics and diagnostics. PREREQ: MB 302, MB 304, MB 306; BB 450, BB 451. Offered alternate years.

**MB 421/MB 521. MICROBIAL DIVERSITY LABORATORY (2).** Techniques for the enrichment and isolation of bacteria. Microbial identification using molecular probes. PREREQ or COREQ: MB 420/MB520. Offered alternate years.

**MB 430/MB 530. PATHOGENIC MICROBIOLOGY (3).** Bacteria pathogenic for humans, emphasizing the structural, physiological and genetic mechanisms of pathogenesis. Role of the immune system in pathogenesis and protection. PREREQ: MB 302.

**MB 431/MB 531. PATHOGENIC MICROBIOLOGY LABORATORY (2).** Laboratory instruction in classical methods of identification of important human pathogenic bacteria. PREREQ: MB 303; two years of chemistry.

**MB 434/MB 534. VIROLOGY (3).** Properties of viruses, serological reactions, cultivation. Emphasis on animal viruses, including the major groups and their relation to disease. PREREQ: MB 306, MB 430/MB 530; BB 350 or BB 450, BB 451.

**MB 435/MB 535. VIROLOGY LABORATORY (2).** Laboratory experiments to accompany MB 434/MB 534. Offered alternate years.

**MB 440/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. PREREQ: MB 302, MB 303 or equivalent.

**MB 441/MB 541. FOOD MICROBIOLOGY LABORATORY (2).** Laboratory techniques to accompany MB 440/MB 540. PREREQ or COREQ: MB 440/MB 540.

**MB 442/MB 542. DAIRY MICROBIOLOGY (3).** Advanced techniques important to dairy and food microbiologists; control of microorganisms in production and handling; emphasis on bacteria, yeasts, molds, and bacteriophages in cultured milks and cheese; metabolism and genetics of lactic acid bacteria. PREREQ: MB 302.

**MB 448/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. PREREQ: MB 302.

**MB 449/MB 549. MICROBIAL ECOLOGY LABORATORY (2).** Laboratory studies to accompany MB 448/MB 548. PREREQ or COREQ:MB 448/MB 548.

**MB 454. MICROBIAL GENETICS (4).** Principles of microbial genetics. Topics include prokaryotic genetics, DNA replication, transcription, translation, plasmids and transposons, DNA repair and gene regulation. PREREQ: Two terms of biochemistry or consent of instructor. CROSSLISTED as GEN 454.

**MB 456/MB 556. PLASMID BIOLOGY (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 host-parasite and host-symbiotic interaction in both procaryotes and eucaryotes. PREREQ: MB 302; BB 350 or BB 450, BB 451.

**MB 479/MB 579. FOOD BIOTECHNOLOGY (3).** Principles and applications of genetic engineering for food and beverage production. PREREQ: BB 450, MB 302, or by consent of instructor. CROSSLISTED as FST 479/FST 579.

**MB 492/MB 592. DISEASES OF FISH (3).** Diagnosis, prevention, and treatment of the economically important disease agents of fish emphasizing microbiology, parasitology, pathology, immunology, and serology. PREREQ: Two years of biology.

**MB 493/MB 593. DISEASES OF FISH LABORATORY (2).** PREREQ or COREQ: MB 492/MB 592. Offered alternate years.

### Graduate Courses

**MB 501. RESEARCH (1-16).**

**MB 503. THESIS (1-16).**

**MB 505. READING AND CONFERENCE (1-16).**

**MB 507. SEMINAR (1).** Graded P/N.

**MB 510. INTERNSHIP (1-16).**

**MB 536. MOLECULAR VIROLOGY (4).** A survey of representative viruses with an emphasis on the molecular mechanisms involved in replication, transcription, and pathogenesis. CROSSLISTED as BB 536, MCB 536, GEN 536. Offered alternate years.

**MB 554. MICROBIAL GENETICS (4).** Principles of microbial genetics. Topics include prokaryotic genetics, DNA replication, transcription, translation, plasmids and transposons, DNA repair and gene regulation. PREREQ: Two terms of biochemistry or consent of instructor. CROSSLISTED as GEN 554, MCB 554.

**MB 601. RESEARCH (1-16).** Graded P/N.

**MB 603. THESIS (1-16).**

**MB 605. READING AND CONFERENCE (1-16).** Graded P/N.

**MB 607. SEMINAR (1).** Graded P/N.

**MB 662. SELECTED TOPICS IN MOLECULAR GENETICS AND VIROLOGY (3).** Current topics in molecular biology, genetics, plasmid biology and virology. Specific course content will be determined by the instructor(s). PREREQ: MB 534. Offered alternate years.

**MB 664. MICROBIAL CELL BIOLOGY (3).** Molecular mechanisms of cellular functions. Current, primary journal articles on both eukaryotic and prokaryotic biologists are read, presented, and discussed. Offered alternate years.

**MB 666. CURRENT TOPICS IN ENVIRONMENTAL MICROBIOLOGY (3).** Recent advances in our understanding of the development and functioning of symbiotic associations between microorganisms and plants. A broad spectrum of topics will be covered from genetics to applied agricultural issues. Offered alternate years.

**MB 668. MOLECULAR EVOLUTION AND CELLS AND ORGANELLES (4).** Analytical concepts in gene sequence analysis and their applications to cellular evolution. Current topics in molecular phylogeny, including the evolution of eubacteria, archaebacteria and lower eukaryotes, with emphasis on microbial diversity and symbiosis. Subjects will also include the origins of mitochondria and plastids, intron evolution in prokaryotes, genome evolution, mechanism of genetic change at the nucleotide level, and RNA editing. A course project and a computer lab will be used to introduce students to critical concepts, data bases, and the newest analytical software. Offered alternate years.

**MB 670. MOLECULAR AND CELLULAR IMMUNOLOGY (3).** Major concepts in immunochemistry, molecular immunology and cellular immunology utilizing primary literature sources. Analysis of the use of current and historic immunological methodologies in resolving theoretical and practical immunological problems. Offered alternate years.

## MOLECULAR AND CELLULAR BIOLOGY

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(541) 737-3799
(541) 737-3045 (FAX)

**Affiliate Faculty**
Sixty-five faculty drawn from thirteen departments in five colleges participate in the MCB program.

### Graduate Major

**Molecular and Cellular Biology (Ph.D.)**
*Graduate Areas of Concentration*
Cell Biology
Genetics
Virology
Structural Biology
Biotechnology

The interdepartmental Molecular and Cellular Biology Program coordinates graduate studies related to molecular biology. Students receive Ph.D. degrees and training in molecular and cellular biology. Students in the MCB program complete a core curriculum consisting of MCB 511, MCB 525, MCB 553, MCB 554, MCB 555, MCB 556 and MCB 607. Additional requirements include seminar presentations, journal club participation, research rotations, teaching assistance and at least 9 additional units of relevant course work.

MCB 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 adviser and committee.

### COURSES

**Graduate Courses**

**MCB 510. INTERNSHIP (1-16).**

**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. PREREQ: BB 451 or equivalent. May not be taken concurrently with MCB 525. Graded P/N.

**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 which emphasizes experimental continuity. The course requires 2 weeks of intensive full-time involvement. Departmental approval required.

**MCB 536. MOLECULAR VIROLOGY (4).** A survey of representative viruses with an emphasis on the molecular mechanisms involved in replication, transcription, and pathogenesis. CROSSLISTED as BB 536, GEN 536, MB 536. Offered alternate years.

**MCB 541. PLANT TISSUE CULTURE (4).** Principles, methods, and applications of plant organ, tissue, cell, and protoplast culture. Laboratory is important part of the course. Topics include callus culture, regeneration, micropropagation, anther culture, mutant selection, somatic hybridization, and transformation. CROSSLISTED as HORT 541.

**MCB 551. 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. PREREQ: BOT 550. Offered alternate years. CROSSLISTED as BOT 551.

**MCB 553. STRUCTURE AND FUNCTION OF EUKARYOTIC CELLS (3).** Examination of structural elements in eukaryotic cells and their relationship to function. Topics include methods for cellular analysis, membranes, organelles, intracellular sorting, cytoskeleton, cell signaling, and cell cycles. Lecture/discussion format. PREREQ: Two terms of biochemistry and genetics, or consent of an instructor.

**MCB 554. MICROBIAL GENETICS (4).** Principles of microbial genetics. Topics include prokaryotic genetics, DNA replication, transcription, translation, plasmids and transposons, DNA repair, and gene regulation. PREREQ: Two terms of biochemistry or consent of instructor. CROSSLISTED as MB 554 and GEN 554.

**MCB 555. EUKARYOTIC MOLECULAR GENETICS (4).** Current concepts of eukaryotic molecular genetics with an emphasis on gene structure and regulation of gene expression. Topics include recombinant DNA techniques, eukaryotic gene structure transcription and translation, post-translational modifications, genome evolution and genetic engineering. PREREQ: Two terms of biochemistry and genetics, or consent of instructor. MCB 553 and MCB 554 recommended. CROSSLISTED as GEN 555.

**MCB 556. CELL SIGNALING AND DEVELOPMENT (3).** Current concepts of integrated cellular function in multicellular organisms, presented in an integrated manner. Topics such as cell cycle development and receptor signaling in both animals and plants will be covered. PREREQ: Two terms of biochemistry and genetics, or consent of instructor. MCB 553, MCB 554, MCB 555 recommended. CROSSLISTED as GEN 556.

**MCB 573. CYTOGENETICS (4).** Effects of variations in chromosome structure and number. PREREQ: GEN 430/GEN 530 or consent of instructor. Offered alternate years. CROSSLISTED as GEN 573, HORT 573.

**MCB 593. SELECTED TOPICS IN PLANT CELL AND MOLECULAR BIOLOGY (1-3).** Seminar and discussion format. Recent advances in cellular and molecular approaches to the study of plant functions of ecological and physiological significance. Topics vary from year to year. May be repeated for credit. CROSSLISTED as BOT 593.

**MCB 595. SELECTED TOPICS IN MOLECULAR VIROLOGY (1-3).** Seminar and discussion format. Recent advances in Molecular Virology with heavy reliance on the current literature. Topics vary from term to term. May be repeated for credit.

**MCB 601. RESEARCH (1-16).**

**MCB 603. THESIS (1-16).**

**MCB 605. READING AND CONFERENCE (1-16).**

**MCB 607. SEMINAR: SCIENTIFIC SKILLS AND ETHICS (1-3).**

**MCB 609. PRACTICUM (1-16).**

**MCB 610. INTERNSHIP (1-9).** Laboratory rotation. For MCB graduate students only.

**MCB 625. PLANT MOLECULAR GENETICS (3).** Structure, expression, and interactions of the plant nuclear, chloroplast, and mitochondrial genomes. Critical examination of the current literature on gene regulation, mobile genetic elements, and biotechnology in higher plants. PREREQ: MCB 555 or equivalent and BB 451 or consent of the instructor. Offered alternate years. CROSSLISTED as BOT 625, GEN 625.

**MCB 691. SELECTED TOPICS IN MOLECULAR AND CELLULAR BIOLOGY (1-5).**

**MCB 692. SELECTED TOPICS: PLANT PATHOLOGY (1-3).** Seminar and discussion of selected topics in plant pathology, emphasizing current literature and theory. Topics vary from year to year. May be repeated for credit. PREREQ: BOT 550 or equivalent. CROSSLISTED as BOT 692.

**MCB 664. HOST PARASITIC INTERACTIONS: GENETICS AND PHYSIOLOGY (3).** Mendelian and molecular analysis of host-pathogen genetics. Biochemical and physiological basis of plant disease. Topics include gene organization and function, chromosome mapping, parasexuality, and genetic models for plant disease resistance. Host-parasite recognition, pathogenicity, and host responses to infection. PREREQ: BB 451/551 and GEN 555 and MCB 555 or consent of the instructor. Offered alternate years. CROSSLISTED as BOT 664, GEN 664.

**MCB 691. SELECTED TOPICS IN MOLECULAR AND CELLULAR BIOLOGY (1-5).**

**MCB 692. SELECTED TOPICS: PLANT PATHOLOGY (1-3).** Seminar and discussion of selected topics in plant pathology, emphasizing current literature and theory. Topics vary from year to year. May be repeated for credit. PREREQ: BOT 550 or equivalent. CROSSLISTED as BOT 692.

## NATURAL RESOURCES

The College of Science, in cooperation with the Colleges of Agricultural Sciences, Forestry, and Liberal Arts participates in a broad-based B.S. degree in Natural Resources. A student enrolls in the department most-related to the specialty area selected under the Natural Resources Program. See the Interdisciplinary Studies Section of this catalog for curriculum details.

## PHYSICS

Kenneth Krane, Chair
301 Weniger Hall
Oregon State University
Corvallis, OR 97331-6507
(541) 737-4631

**Faculty**
*Professors* Gardner, Griffiths, Jansen, Kocher, Krane, Landau, Siemens, Stetz, Warren, Wasserman; *Associate Professors* Hetherington, Manogue, McIntyre, Tate; *Assistant Professors* Giebultowicz, Welch; *Courtesy Faculty:* Barofsky, Coakley, Dray, Goodnick, Gunther, Kong, Laramee, Plant, Rudd, Sleight, Subramanian, Thomas, Van Vechten, Vong, Wager, Warnes, Watson

### Undergraduate Major

**Physics (B.A., B.S.)**
*Minor*
Physics
*Options*
Applied Physics
Biophysics
Chemical Physics
Computational Physics
Geophysics
Mathematical Physics
Optical Physics

### Graduate Major

**Physics (M.A., M.S., Ph.D.)**
*Graduate Areas of Concentration*
Atomic Physics
Computational Physics
Nuclear Physics
Optical Physics
Particle Physics
Solid State 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 which prepare students for graduate work or employment in an allied field, such as applied physics, biophysics, computational physics, geophysics, atmospheric physics, chemical physics, or physical oceanography. An Engineering Physics curriculum in the College of Engineering encompasses advanced study both in physics and in one of the engineering disciplines. Other programs are offered which train students for careers in physics teaching. A physics minor is available for students majoring in other areas of science and engineering.

The Physics Department has recently introduced a completely new upper-division curriculum, Paradigms in Physics. Many of the junior-year courses are taught in 2 credit intensive modules, meeting 7 hours a week for about 3 weeks.

### GRADUATE DEGREES

Graduate programs leading to the M.A., M.S., and Ph.D. 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 M.S. 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, oceanography, 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) 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 adviser, 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 adviser and approved at an early stage in curriculum planning. Near the end of the degree program, the adviser can help the student to apply for employment or admission to graduate programs.

### REQUIREMENTS

All undergraduate students must satisfy the university requirements for graduation (see the description of the Baccalaureate Core in this catalog) and the college requirements (see the descriptions in the College of Science or College of Engineering section). Specific requirements for the degree in engineering physics may be found in the course descriptions of the College of Engineering. All physics majors must complete the following lower-division courses: PH 211, PH 212, PH 213, MTH 251, MTH 252, MTH 253, MTH 254, MTH 255, MTH 256, CH 221, CH 222, CH 223, and one approved course in computer programming. Seniors must complete at least 3 credits of PH 401 and PH 403 to satisfy the WIC requirement.

For graduation under the basic physics option, upper-division course requirements include MTH 341, PH 314, PH 321, PH 322, PH 323, PH 411, PH 412, PH 424, PH 425, PH 426, PH 427, PH 428, PH 429, PH 431, PH 435, PH 441, PH 451, PH 461, PH 481, and either PH 415 or PH 465. At least one additional course must be chosen from: Ph 415, PH 465, PH 466, PH 475, PH 482, PH 483, PH 485, PH 495.

To qualify for the Bachelor of Arts degree in physics, the student must complete PH 314, PH 321, PH 322, PH 323, PH 424, PH 425, PH 426, PH 427, PH 428, PH 429; at least one of: PH 431, PH 435, PH 441, PH 451, PH 461; and at least 7 additional credits chosen from among the non-blanket 400-level courses listed for the B.S. 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 physics courses required for the physics major. Courses in which a lower grade is received must be repeated until a satisfactory grade is received.

## 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 adviser 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 401 and PH 403 to satisfy the WIC requirements.

### Applied Physics Option

PH 314, PH 321, PH 322, PH 323, PH 424, PH 425, PH 426, PH 427, PH 428, PH 411, PH 412, PH 415, PH 431, PH 435 or PH451, PH461, PH 481

Plus: 15 credits of upper division work in an engineering discipline which could include PH 482 and PH 483. It also may include one of: PH 475, PH 485, PH 495. (The engineering courses must be approved in advance by a Department of Physics adviser.) Engineering Science (ENGR) courses cannot be used to satisfy this option.

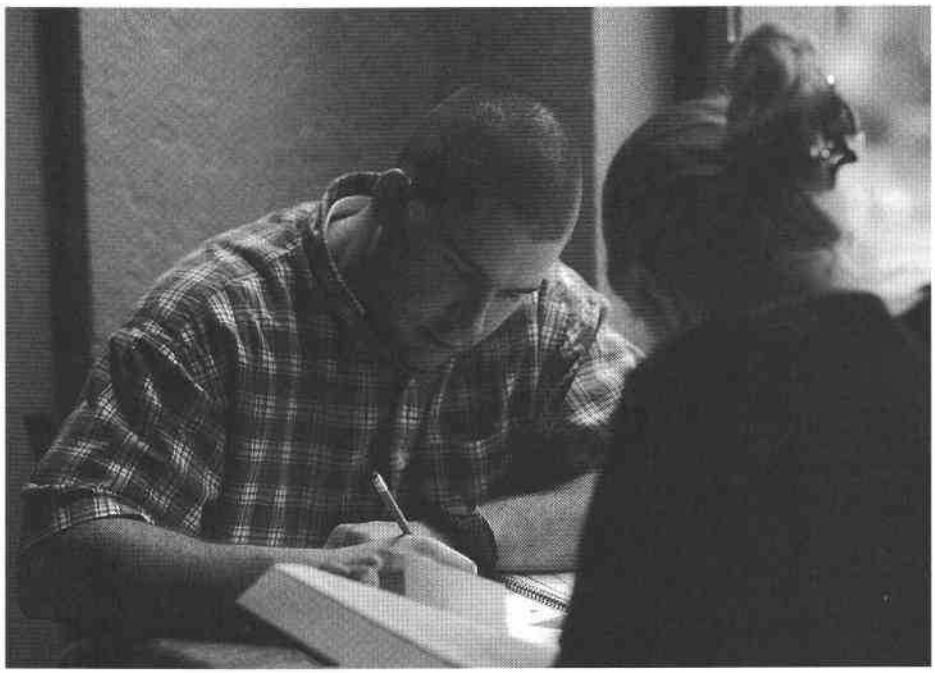
### Biophysics Option

PH3 14, PH 321, PH 322, PH 323, PH 424, PH 425, PH 426, PH 427, PH 411, PH 412, PH 415, PH 431, PH 435 or PH 451, PH 461, PH 481, CH 440, CH 441, CH 442, BB 481, BB 482, BB 483

### Chemical Physics Option

PH 314, PH 321, PH 322, PH 323, PH 424, PH 425, PH 426, PH 427, PH 428, PH 411, PH 412, PH 415, PH 431, PH 435, PH 441 or CH 440, PH4 51, PH 461

Plus 12 credits of approved upper-division work in chemistry, including at least one lab course.



### Computational Physics Option

PH 314, PH 321, PH 322, PH 323, PH 424, PH 425, PH 426, PH 428, PH 411, PH 412, PH 415, PH 431, PH 461, PH 465, PH 466, PH 481

Plus 15 credits of upper-division work constituting a coherent program in computational science.

### Geophysics Option

PH 314, PH 321, PH 322, PH 323, PH 424, PH 426, PH 428, PH 411, PH 412, PH 415, PH 431, PH 435, PH 441, PH 461, PH 481

Plus 15 credits selected from ATS 411, ATS 412, ATS 475, GE0 463, GE0 464, OC 430

### Mathematical Physics Option

PH 314, PH 321, PH 322, PH 323, PH 424, PH 425, PH 426, PH 428, PH 429, PH 411, PH 412, PH 431, PH 435, PH 441, PH 451, PH 461, PH 465

Plus 12 credits of approved upper-division work in mathematics.

### Optical Physics Option

PH 314, PH 321, PH 322, PH 323, PH 424, PH 425, PH 426, PH 427, PH 428, PH 429, PH 411, PH 412, PH 415, PH 431, PH 435, PH 441, PH 451, PH 461, PH 481, PH 482, PH 483

### Physics Minor

The physics minor requires completion of 16 credits of introductory physics (PH 211, PH 212, PH 213, PH 314), plus at least 12 credits of upper-division courses selected, after consultation with an adviser, from the following lists, and including at least one theory course (PH 321, PH 322, PH 323, PH 424, PH 425, PH 426, PH 427, PH 428, PH 429, PH 431, PH 435, PH 441, PH 451, PH 461, PH 481, PH 482, PH 483) and at least one experimental course (PH 411, PH 412, PH 415, PH 465, PH 466, PH 481, PH 482, PH 483).

## Engineering Physics

Students selecting the engineering physics program should register in the College of Engineering. Engineering physics students complete a slightly reduced curriculum of physics courses, and in addition take a curriculum of advanced courses in the engineering discipline of their choice. A detailed description of the engineering physics degree program can be found in the College of Engineering section of this catalog. Engineering physics majors have the option of simultaneously earning two degrees, a B.S. in physics (through the College of Science) and a B.S. in engineering physics (through the College of Engineering). Arrangements for this curriculum must be made through a Department of Physics adviser.

## Astronomy

The Department of Physics offers an introductory sequence in astronomy, PH 205, PH 206, PH 207, which covers a full range of topics in astronomy. A less rigorous descriptive course, PH 104, is also available. 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.

## Sample Curriculum

**Freshman Year**

PH 211. General Physics with Calculus (4)
PH 221. Physics Recitation (1)
MTH 251, MTH 252, MTH 254. Calculus (12)
CH 221, CH 222, CH 223. Gen Chemistry (15)
Fitness (3)
Writing I (3)
Perspectives (3)
Computer Programming (4)

**Sophomore Year**
PH 212, PH 213. Gen Physics with Calculus (8)
PH 222, PH 223. Physics Recitation (2)
PH 314. Introductory Modern Physics (4)
MTH 253, MTH 255, MTH 256. Calculus and Differential Equations (12)
Biological Science (4)
Writing II, III (6)
Perspectives (9)

**Junior Year**
PH 411, PH 412. Electronics Laboratory (6)
PH 321, PH 322, PH 323, PH 424, PH 425, PH 426, PH 427, PH 428, PH 429. Paradigms in Physics (18)
PH 415. Computer Interfacing (3)
PH 435. Classical Mechanics (3)
MTH 341. Linear Algebra (3)
Perspectives (3)
Synthesis (3)
Electives (6)

**Senior Year**
PH 431. Electromagnetism (3)
PH 441. Thermal and Statistical Physics (3)
PH 451. Quantum Physics (3)
PH 461. Mathematical Physics (3)
PH 465. Computational Physics (3)
PH 401. Research (1)
PH 403. Thesis (2)
PH 481. Optics (4)
Synthesis (3)
Physics Elective (3)
Electives (19)

## COURSES

### Lower Division Courses

**PH 101. PHYSICS ORIENTATION (1).** An introduction to the profession of physics, including a survey of study curricula, research fields, and career opportunities. Required of and open only to freshman or first-year transfer physics and engineering majors.

**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. (Bacc Core Course)

**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. (Bacc Core Course)

**PH 199. SPECIAL STUDIES (1-16).** One-credit sections are graded pass/no pass.

**PH 201, PH 202, PH 203. *GENERAL PHYSICS (5,5,5).** 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. PREREQ: MTH 111, MTH 112. Must be taken in order. (Bacc Core Course)

**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 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 208. OPTICS FOR TECHNICIANS (3).** Laboratory and lecture course in basic optics and applied optical instrumentation intended for optical technicians working in industry. PREREQ: College algebra, trigonometry and noncalculus-based introductory physics with lab. Department approval required.

**PH 211, PH 212, PH 213. *GENERAL PHYSICS WITH CALCULUS (4,4,4).** 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. Concurrent enrollment in a recitation section is strongly recommended. PREREQ: MTH 251 for PH 211; MTH 252 and PH 211 for PH 212; MTH 254 and PH 212 for PH 213. COREQ: MTH 252 for PH 211, MTH 254 for PH 212. Lec/lab. (Bacc Core Course)

**PH 221, PH 222, PH 223. RECITATION FOR PHYSICS 211, 212, 213 (1,1,1).** One-hour weekly session for the development of problem- solving skills in calculus-based general physics. COREQ: PH 211 or PH 211H for PH 221; PH 212 for PH 222; PH 213 for PH 223.

### Upper Division Courses

**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. PREREQ: Upper-division standing and 12 credits of introductory science. (Bacc Core Course)

**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. PREREQ: PH 213. COREQ: MTH 256.

**PH 321. PARADIGMS IN PHYSICS 1: HARMONIC OSCILLATIONS (2).** Dynamics of small oscillations in mechanical and electrical systems, Fourier spectral analysis, vector spaces, coupled oscillators, damped and driven oscillators, resonance. PREREQ: PH 213.

**PH 322. PARADIGMS IN PHYSICS 2: 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, computational techniques and computer visualizations. PREREQ: PH 213. COREQ: MTH 255.

**PH 323. PARADIGMS IN PHYSICS 3: ENERGY AND ENTROPY (2).** Energy and entropy in heat engines, refrigerators, heat pumps, thermodynamic potentials, phase transitions, applications. PREREQ: PH 212.

**PH 331. *SOUND, HEARING, AND MUSIC (3).** Basic course in the physics, technology, and societal implications of sound. Intended for students in non-technical majors. Topics include wave motion, hearing and the perception of sound, noise pollution, music and musical instruments, architectural acoustics, and sound recording and reproduction. PREREQ: Upper division standing and one year of university science, or consent of instructor. (Bacc Core Course)

**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 non-technical majors. PREREQ: Upper-division standing and one year of university science, or consent of an instructor. (Bacc Core Course)

**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. (Writing Intensive Course)

**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)

**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.

**PH 407. SEMINAR (1-16).** Departmental seminars or colloquium.

**PH 410/PH 510. INTERNSHIP (1-16).**

**PH 411/PH 511, PH 412/PH 512. ANALOG AND DIGITAL ELECTRONICS (3,3).** 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. Must be taken in order. PREREQ or COREQ: PH 314.

**PH 415/PH 515. COMPUTER INTERFACING AND INSTRUMENTATION (3).** Applications of computers as scientific instruments, with emphasis on hardware and instrumentation, on-line data acquisition, and computer control of experiments. PREREQ: Upper division or graduate standing; PH 412/PH 512 or equivalent background in electronics; and consent of instructor. Departmental approval required.

**PH 424/PH 524. PARADIGMS IN PHYSICS 4: 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, continuous bases. PREREQ: PH 314, PH 321.

**PH 425/PH 525. PARADIGMS IN PHYSICS 5: QUANTUM MEASUREMENTS AND SPIN (2).** Quantum postulates and sequential measurements, superposition and basis transformations, Stern-Gerlach experiment, matrices and commutators, quantum uncertainly and statistical ensembles. PREREQ: PH 314, PH 424/PH 524. COREQ: MTH 341.

**PH 426/PH 526. PARADIGMS IN PHYSICS 6: CENTRAL FORCES (2).** Central forces-gravitational and electrostatic, angular momentum and spherical harmonics, separation of variables in classical and quantum mechanics, hydrogen atom. PREREQ: PH 314, PH 322.

**PH 427/PH 527. PARADIGMS IN PHYSICS 7: PERIODIC SYSTEMS (2).** Quantum waves in one-dimensional periodic systems; Bloch waves, band structure, phonons and electrons in solids, reciprocal lattice, x-ray diffraction. PREREQ: PH 314, PH 424/524

**PH 428/PH 528. PARADIGMS IN PHYSICS 8: RIGID BODIES (2).** Rigid body dynamics, invariance, angular momentum, rotational motion, tensors and eigenvalues. PREREQ: PH 314, PH 426/526.

**PH 429/PH 529. PARADIGMS IN PHYSICS 9: REFERENCE FRAMES (2).** Inertial frames of reference, collisions, rotations, Special Relativity, Galilean and Lorentz transformations, symmetrics and conversation laws, invariants, non-intertial frames, equivalence principle. PREREQ: PH 314.

**PH 431/PH 531. CAPSTONES IN PHYSICS: ELECTROMAGNETISM (3).** Static electric and magnetic fields in matter, electrodynamics. Maxwell equations, electromagnetic waves, wave guides, dipole radiation. PREREQ: PH 424/524, PH 426/PH 526.

**PH 435/PH 535. CAPSTONES IN PHYSICS: CLASSICAL MECHANICS (3).** Hamiltonian and Lagrangian formulation of classical mechanics, systems of particles, scattering, noninertial reference frames, continuous systems. PREREQ: PH 424/PH 524, PH 426/PH 526.

**PH 441/PH 541. CAPSTONES IN PHYSICS: THERMAL AND STATISTICAL PHYSICS (3).** Entropy and temperature, Boltzmann distribution, thermal radiation, ideal gas, Fermi and Bose gases, chemical reactions, phase transformations, kinetic theory. PREREQ: PH 323, PH 451/PH 551.

**PH 461/PH 561. CAPSTONES IN PHYSICS: MATHEMATICAL METHODS (3).** Complex algebra, special functions, partial differential equations, series solutions, complex integration, calculus of residues. PREREQ: PH 424/PH 524, PH 426/PH 526, MTH 256.

**PH 465/PH 565, PH 466/PH 566. COMPUTATIONAL PHYSICS (3,3).** 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. PREREQ: Mathematical physics, such as PH 461/PH 561, 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 435/PH 535, PH 431/PH 531, and PH 451/PH 551 is assumed.

**PH 475/PH 575. INTRODUCTION TO SOLID STATE PHYSICS (3).** Solid state phenomena: electric, magnetic, optical, thermal and mechanical. Band structure, phonons, conductivity, magnetoresistance, spectroscopies, Fermi surfaces, magnetism. Descriptions in terms of simple models. PREREQ: PH 451/PH 551 COREQ: PH 427/PH 527.

**PH 481/PH 581. PHYSICAL OPTICS (4).** Wave propagation, polarization, interference, diffraction, and selected topics in modern optics. PREREQ: PH 432/PH 532 or equivalent.

**PH 482/PH 582. OPTICAL ELECTRONIC SYSTEMS (4).** Laser theory, laser systems, photodetectors, coherent optical detection. PREREQ: ECE 391 or PH 481/PH 581 or equivalent. Crosslisted as ECE 482.

**PH 483/PH 583. GUIDED WAVE OPTICS (4).** Optical fibers, fiber mode structure and polarization effects, fiber interferometry, fiber sensors, conventional and coherent fiber communications, coherent OTDR, integrated opto-electronic devices. PREREQ: ECE 391 or PH 481/PH 581 or equivalent. Lec/lab. CROSSLISTED as ECE 483.

**PH 485/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. PREREQ: PH 431/PH 531, PH 451/PH 551.

**PH 495/PH 595. INTRODUCTION TO NUCLEAR AND PARTICLE PHYSICS (3).** Elementary particles and forces, nuclear structure and reactions. PREREQ: PH 429/PH 529, PH 441/PH 541, PH 451/PH 551.

**PH 499/PH 599. SELECTED TOPICS IN PHYSICS (3).** Topics vary from year to year. May be repeated for credit. Not offered every year.

### Graduate Courses

**PH 501. RESEARCH (1-16).**

**PH 503. THESIS (1-16).**

**PH 505. READING AND CONFERENCE (1-16).**

**PH 507. SEMINAR (1-16).** PH 507 Section 1: Departmental Colloquium. PH 507 Section 2, PH 507, Section 3: Nuclear and Particle Physics. PH 507, Section 4, PH 507, Section 5: Atomic, Molecular, and Optical Physics. PH 507, Section 6, PH 507, Section 7: Solid State Physics. PHY 507 Section 8, PH 507, Section 9: Computational Physics. One-credit options are graded P/N.

**PH 601. RESEARCH (1-16).**

**PH 603. THESIS (1-16).**

**PH 605. READING AND CONFERENCE (1-16).**

**PH 607. SEMINAR (1-16).** PH 607, Section 1: Departmental Colloquium. PH 607, Section 2, PH 607, Section 3: Nuclear and Particle Physics. PH 607, Section 4, PH 607, Section 5: Atomic, Molecular, and Optical Physics. PH 607, Section 6, PH 607, Section 7: Solid State Physics. PH 607, Section 8, PH 607, Section 9: Computational Physics. One-credit options are graded P/N.

**PH 621. DYNAMICS OF SINGLE- AND MULTI-PARTICLE SYSTEMS (3).** Methods of Lagrange, Hamilton, Jacobi, and others for treatment of motion of one, two, and many particles. Canonical transformation theory. PREREQ: PH 423/PH 523 or equivalent.

**PH 631, PH 632, PH 633. ELECTROMAGNETIC THEORY (3,3,3).** Electrostatics; multipole expansion; magnetostatics; radiation fields; dynamics of relativistic particles and electromagnetic fields. PREREQ: PH 432/PH 532 or equivalent. Must be taken in order.

**PH 641, PH 642. STATISTICAL THERMOPHYSICS (3,3).** Macroscopic thermodynamics and kinetic theory. Classical and quantal statistical ensembles; partition functions. Applications to atoms and molecules, clustering, solids, radiation. PREREQ: PH 621.

**PH 651, PH 652, PH 653. QUANTUM MECHANICS (3,3,3).** Basic principles of nonrelativistic quantum theory and applications. Schroedinger theory, quantum theory of angular momentum, matrix mechanics, perturbation theory, identical particles, scattering. PREREQ: PH 423/PH 523 and PH 453/PH 553 or equivalents. Must be taken in order.

**PH 654, PH 655, PH 656. ADVANCED QUANTUM THEORY (3,3,3).** Scattering theory, second quantization and many body theory, relativistic quantum mechanics, quantization of fields, quantum electrodynamics, and elementary particles. PREREQ: PH 653. Must be taken in order.

**PH 671, PH 672, PH 673. SOLID STATE PHYSICS (3,3,3).** Band theory and methods; Fermi gas; theory of metals; particle interactions and quasiparticles; optical and transport properties of metals and semiconductors; theory of magnetism and superconductors. PREREQ: PH 653. Should be taken in sequence. Offered in alternate years.

**PH 681, PH 682, PH 683. ATOMIC, MOLECULAR, AND OPTICAL PHYSICS (3,3,3).** Atomic and molecular structure, atomic scattering, interaction with radiation lasers, nonlinear optics, guided-wave optics. PREREQ: PH 653. Not offered every year.

**PH 691, PH 692, PH 693. NUCLEAR AND PARTICLE PHYSICS (3,3,3).** Nuclear forces, elements of nuclear structure, and models of complex nuclei; nuclear scattering, reactions, and decays; elementary particles; quark model. PREREQ: PH 656. Should be taken in sequence. Offered in alternate years.

**PH 699. SELECTED TOPICS IN PHYSICS (3).** Topics vary from year to year. May be repeated for credit. PREREQ: PH 653. Not offered every year.

## PREPROFESSIONAL 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, veterinary, or dental school, and for those choosing careers in dental hygiene, nursing, medical technology, occupational therapy, optometry, physical therapy, physician assistant, podiatry, and radiation therapy.

Completion of some preprofessional programs, such as premedicine, lead to either a preprofessional bachelor's degree in general science or a bachelor's degree in one of the departmental majors (e.g., biology, biochemistry, zoology). The programs for dental hygiene and nursing lead to a bachelor's degree obtained at the professional school (for example, the Oregon Health Sciences University), while the program in medical technology leads to a bachelor's degree in medical technology from Oregon State University. Some of the preprofessional programs allow a student to enter the professional school after three years at OSU and still receive a bachelor's degree from OSU upon completion of the first year at the professional school.

### DENTAL HYGIENE (PREPROFESSIONAL)

Chere Pereira, Chief Adviser

Students who wish to become dental hygienists may attend OSU for two years prior to entering the School of Dentistry at the Oregon Health Sciences University (OHSU) for professional training. Upon completion of dental hygiene certification, students are awarded a bachelor's degree from the School of Dentistry. A bachelor's degree program is also offered by the Oregon Institute of Technology in Klamath Falls; students should consult with the adviser for more details. Admission to dental hygiene programs is competitive. The following curriculum includes prerequisites for admission as well as electives.

### CURRICULUM

**Freshman Year**
WR 121. English Composition (3)
CH 121, CH 122, CH 130. Gen Chemistry (14)
COMM 111. Public Speaking (3)
MTH III. College Algebra (4)
SOC 204. Intro to Sociology (3)
PSY 201. General Psychology (3)
Humanities electives (9)
Required courses and electives (7)

**Sophomore Year**
English composition (3)
BI 101, BI 102, BI 103. Biological Science (12)
NFM 225. Human Nutrition (4)
ANTH 110. Intro to Cultural Anthropology (3)
Required courses and electives (23)

**Junior and Senior Years**
(in a Dental Hygiene program)

## DENTISTRY
**(PREPROFESSIONAL)**

Chere Pereira, Chief Adviser

The College of Science offers a three- or four-year predental curriculum leading to a bachelor's degree in general science which satisfies the requirements for admission to the School of Dentistry at the Oregon Health Sciences University and to most other dental schools. The majority of students who are admitted to dental school complete a baccalaureate degree prior to entry; however, many dental schools accept a few students after they complete 90 credits of undergraduate work. Students planning to elect this option would complete a three-year predental curriculum and would qualify for a bachelor's degree in general science from OSU after one year of dental school.

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 departmental adviser 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 predental committee is assigned to each student as an adviser.

### CURRICULUM

**Freshman Year**
WR 121. English Composition (3)
MTH 251, MTH 252. Calculus (8)
CH 221, CH 222, CH 223. Gen Chemistry (15)
BI 107. Predental Orientation (1)
Required courses and electives (18)

**Sophomore Year**
CH 331, CH 332, CH 337. Organic Chem (11)
BI 211, BI 212, BI 213. Biology (12)
BI 214. Cell and Molecular Biology (3)
ST 201 or ST 351. Statistics (3-4)
Required courses and electives (15-16)

**Junior Year**
BB 450, BB 451 or BB 351. Biochemistry (5-7)
PH 201, PH 202, PH 203. General Physics (15)
BI 311. Genetics (4)
HSTS (any 400-level History of Science) (3)
Required courses and electives (16-18)

**Senior Year* ***
BI 460, BI 461. Cell Biology (3,2)
Z 425. Embryology (5)
Required Courses and electives (35)

## MEDICAL TECHNOLOGY (B.S.)

Susan Williams, Chief Adviser

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 one year of training at an accredited professional school of medical technology. Oregon currently has one such school at the Oregon Health Sciences University (OHSU); Washington and California have several; and other schools are located throughout the U.S. Most medical technology schools require a bachelor of science degree for admission to their educational program; however, some schools (notably OHSU) accept students who have had three years of appropriate college work.

The curriculum in the OSU premedical technology program was developed in cooperation with nearby medical technology schools, and OSU students have shown a high success rate in these schools. Most premedical technology students complete the B.S. degree in a field closely related to medical technology, such as microbiology, biochemistry, or zoology, and then attend medical technology school (4+1 program). OSU will award a second B.S. degree in medical technology to students who complete their professional training. Students who enroll in an accredited medical technology school after three years of college work (3+1 program) can qualify for a B.S. degree in Medical Technology from OSU after completion of their professional training.

### CURRICULUM

**Freshman Year**
CH 221, CH 222, CH 223. Gen Chemistry (15)
BI 211, BI 212, BI 213. Biology (12)
WR 121. English Composition (3)
MTH 251, MTH 252. Calculus (8)
HHP 231. Lifetime Fitness (3)
Required courses (4)

**Sophomore Year**
CH 331, CH 332, CH 337. Organic Chem (11)
BI 214. Cell and Molecular Biology (3)
MB 302, MB 303. General Microbiology (5)
CS 101. Computers: Appl and Implicat (4)
Required courses and electives (22)

**Junior Year**
MB 416, MB 417. Immunology (5)
MB 430, MB 431. Pathogenic Microbiology (5)
Z 332, Z333. Human Anatomy and Physiology (6)
CH 324. Quantitative Analysis (4)
PH 201, PH 202, PH 203. General Physics (15)
Required courses and electives (10)

One year in an accredited medical technology school or completion of courses in major field of study, followed by one year in an accredited medical technology school. Suggested electives include Genetics (BI 311), Biochemistry (BB 350), Introduction to Human Diseases (H 320), Epidemiology (H 425), Virology (MB 434, MB 435), Statistics (ST 201), Food Microbiology (MB 440), Dairy Microbiology (MB 442), Medical Terminology (PHAR 210).

## MEDICINE AND OSTEOPATHY
**(PREPROFESSIONAL)**

Chere Pereira, Chief Adviser

The College of Science premedical curriculum prepares students for entrance into standard (allopathic) and osteopathic medical schools (see Academic Programs and Support Services for WICHE information that applies to osteopathy schools). Allopathic medical schools grant the M.D. degree, while osteopathic medical schools grant the D.O. degree. Osteopathic schools include training in manipulative therapy. The preprofessional training is identical for both.

Admission to medical school is very competitive. Students are chosen according to grades; scores on the Medical College Admission Test administered by the Association of American Medical Colleges; references from instructors, counselors, and others; and apparent motivation for medicine.

A member of the premedical committee is assigned to each student as an adviser.

### PREMEDICAL PROGRAM

The curriculum described below satisfies the entrance requirements for most medical schools in the United States and elsewhere, and leads to a bachelor's degree in general science. The book, *Medical School Admission Requirements*, published by the Association of Medical Colleges, lists the specific requirements for all U.S. and Canadian medical schools.

Many variations on the suggested curriculum are possible. Premedical students should obtain a copy of the Premedical Guide from the College of Science and consult with their adviser to arrange a program suited to their individual needs.

### CURRICULUM

**Freshman Year**
WR 121. English Composition (3)
CH 221, CH 222, CH 223. Gen Chemistry (15)
MTH 251, MTH 252. Calculus (8)
BB 100. Molecules of Life (2)
BI 109. Premedical Orientation (1)
ENG (any ENG course) (3)
Required courses and electives (13)

**Sophomore Year**
CH 334, CH 335, CH 336, CH 337 (12) or
CH 331, CH 332, CH 337. Organic Chem (11)
BI 211, BI 212, BI 213. Biology (12)
BI 214. Cell and Molecular Biology (3)
Social Science (3)
Required courses and electives (15-16)

**Junior Year**
BB 450, BB 451. Biochemistry (7)
ST 201 or ST 351. Statistics (3-4)
BI 311. Genetics (4)
CH 324. Quantitative Chemistry (4)
HSTS (any 400-level HSTS course) (3)
ENG (any ENG course) (3)
PH 201, PH 202, PH 203. General Physics (15)
Required courses and electives (5-6)

**Senior Year**
Z 425. Embryology (5)
BI 460, BI 461. Cell Biology (3,2)
Required courses and electives (35)

Students should plan their senior year in consultation with a premedical adviser. Graduation in premedicine requires a total of 41 credits of upper division courses in science.

Since the basic entrance requirements for most medical schools include a year of biology, physics, math, general chemistry, and organic chemistry, this course work can easily be combined with many other majors. Many medical schools have indicated a preference for such a departmental major.

## NURSING

**(PREPROFESSIONAL)**

Mary Ann Matzke, Chief Adviser

The College of Science offers a preparatory curriculum designed to meet the general requirements for admission to a baccalaureate degree nursing program. One or two years of prenursing followed by two or three years of professional training at a school of nursing lead to a bachelor of science degree in nursing (B.S.N.). Satisfactory completion of the prenursing requirements does not guarantee admission to a B.S.N. program, since applicants are accepted on a competitive basis.

B.S.N. programs in the state of Oregon are offered by the Oregon Health Sciences University (OHSU) School of Nursing in Portland, which also administers the BSN programs at Eastern Oregon State University (EOSU) in LaGrande, at Oregon Institute of Technology (OIT) in Klamath Falls, and at Southern Oregon University (SOU) in Ashland. Private schools are the University of Portland School of Nursing, Linfield-Good Samaritan School of Nursing, and Walla Walla College School of Nursing in Portland. Application for admission to these schools is usually made in the sophomore year.

Associate degrees in nursing (A.D.N.) are offered by community colleges in Oregon. Nurses with associate degrees are qualified to provide direct patient care. To become a Registered Nurse, both B.S.N. and A.D.N. graduates must pass a licensing examination administered by the State Board of Nursing.

### CURRICULUM

The courses listed below are recommended to fulfill the general requirements for admission to a B.S.N. program. However, requirements vary from school to school, so students planning a program must check the specific requirements of the B.S.N. programs to which they plan to transfer.

**Freshman Year**
WR 121, WR 222. English Composition (6)
CH 121, CH 122, CH 130. Gen Chemistry (14)
MTH 111. College Algebra (4)
NFM 225. Human Nutrition (4)
PSY 201, PSY 202. General Psychology (6)
SOC 204. General Sociology (3)
ANTH 110. Cultural Anthropology (3)
Literature and Arts (6)

**Sophomore Year**
Students should consult with the prenursing adviser to plan their sophomore year.
Z 331, Z 332, Z 333. Anatomy and Physio (9)
Z 341, Z 342, Z 343. Anatomy and Physiology Lab (6)
MB 230. Microbiology (4)
PSY 350. Human Lifespan Development (3)
ST 201. Statistics (3)
Other required courses[8] and electives (22)

## OCCUPATIONAL THERAPY

**(PREPROFESSIONAL)**

Mary Ann Matzke, Chief Adviser

Occupational therapy uses occupation (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 preprofessional program designed to meet the requirements for admission to bachelor's degree programs around the country. For programs at the bachelor's degree level, students must meet both preprofessional 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.

With an additional year of study, students in the pre-occupational therapy curriculum can 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.

Financial assistance is available for students in some western states, including Oregon, through the WICHE program (see Academic Services and Special Programs for WICHE information).

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.

### CURRICULUM

**Freshman Year**
BI 101 and BI 102 or BI 103. General Biology (8)
MTH 111. College Algebra (4)
PSY 201, PSY 202. General Psychology (6)
WR 121. English Composition (3)
SOC 204. Intro to Sociology (3)
SOC 206. Social Problems and Issues (3)
PH 106 or PH 201. Physics (4-5)
COMM 111. Public Speaking (3)
EXSS 132. Pretherapy (2)
ANTH 110. Cultural Anthropology (3)
HHP 231. Lifetime Fitness (3)
Applied Art and/or humanities (3)

**Sophomore Year**
Z 331, Z 332, Z 333. Human Anatomy and Physiology (9)
Z 341, Z 342, Z 343. Human Anat. and Phys. Labs (6)
PSY 350. Human Life Span Development (3)
PSY 380. Human Adjustment (3)
WR 222. English Composition (3)
CS 101. Computers: Appl. and Implic. (4)
ST 201, ST 211. Statistics (4)
PHAR 210. Terminology of the Health Sciences (2)
Physical Activity Courses (PAC) (3)
Applied Art and/or humanities (8)

**Junior Year**
WR 323. English Composition (3)
ST 352. Intro to Stat Methods (4)
Research Methods in Psychology (4)
PSY 330. Brain and Behavior or PSY 340 Cognition (3)
PSY 481. Abnormal Psychology (3)
EXSS 333. Practicum (2)[10]
Cultural Diversity (3)
Non-Western Culture (3)
Applied Art and/or humanities (17)
Electives (6)

## OPTOMETRY

**(PREPROFESSIONAL)**

Carl Kocher, Chief Adviser

To prepare for optometry, 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 of the 17 accredited optometry schools in the United States (see Academic Programs and Support Services for WICHE information). Applicants to optometry schools are accepted on a competitive basis and are occasionally admitted at the end of their junior year of undergraduate residence. Preoptometry majors interested in working toward a biology or zoology degree should see those majors.

### CURRICULUM

**Freshman Year**
CH 221, CH 222, CH 223. General Chemistry (15)
MTH 251, MTH 252. Calculus (8)
Writing I, II (6)
HHP 231. Lifetime Fitness (3)
Perspectives (6)
CS 101. Computers (4)
Electives (2)

**Sophomore Year**
CH 331, CH 332, CH 337. Organic Chem (11)
BI 211, BI 212, BI 213. Biology (12)
PH 201, PH 202, PH 203 or PH 211, PH 212, PH 213. General Physics (15)
PSY 201, PSY 202. General Psychology (6)
Writing III/Speech (3)

**Junior Year**
BI 214. Cell and Molecular Biology (3)
Z 331, Z 332, Z 333. Anatomy & Physiology and Z 341, Z 342, Z 343. Anatomy & Physiology Lab (15) *or* Z 422 Comparative Anatomy and Z 430, Z 436 Principles of

Physiology (11)
MB 302, MB 303. General Microbiology (5)
ST 201, ST 209 or ST 351. Statistics (4)
Perspectives (9)
WR 327. Technical Report Writing (3)
HSTS 417. (3)
Synthesis (3)
Electives (0-4)

**Senior Year**
Upper-division science electives (3-11)
Electives (33-41)
Students who undertake a four-year program should plan their senior year in consultation with their adviser. Two study plans are available:

1) A departmental major may be completed in any department of the College of Science.

2) Students without a departmental major may earn a bachelor's degree in general science; a total of 41 credits of upper division courses in science are required. Recommended science electives: Molecular Biology (BB 331, BB 332); Biochemistry (BB 450, BB 451, BB 452); Cell Biology (BI 460, BI 461); General Ecology (BI 370); Physical Chemistry (CH 440, CH 441, CH 442); Population and Quantitative Genetics (GEN 430); History of Science (HSTS 412, HSTS 413); History of Medicine (HSTS 417); Advanced General Microbiology (MB 304, MB 306, MB 307); Immunology (MB 416, MB 417); Pathogenic Microbiology (MB 430, MB 431); Virology (MB 434, MB 435); Calculus and Differential Equations (MTH 253, MTH 254, MTH 256); Brain and Behavior (PSY 330); Perception (PSY 442); Physiological Psychology (PSY 432); Embryology (Z 425); Comparative Anatomy (Z 422); Vertebrate Physiology (Z 431, Z 432, Z 436); Behavioral Neurobiology (Z 438); Histology (Z 461).

## Physical Therapy

**(PREPROFESSIONAL)**

Mary Ann Matzke, Chief Adviser

The College of Science offers a preparatory program designed to meet the general requirements for admission to physical therapy schools. Students in some western states, including Oregon, can apply for financial assistance from the WICHE program to attend physical therapy school. (see Academic Services and Special Programs for WICHE information).

Satisfactory completion of the OSU course work facilitates, but does not guarantee, admission to a school of physical therapy, since individual applicants are selected on a competitive basis. Students who complete the four-year prephysical therapy program earn a baccalaureate degree in general science. In some cases, a student may substitute up to 48 credits of the first year of physical therapy school for the senior year to complete a bachelor of science degree in general science from OSU.

### Curriculum[11]

**Freshman Year**
CH 121, CH 122, CH 123 or CH 221, CH 222, CH 223. General Chemistry (15)
Math (at least through MTH 112) (4)
SOC 204. General Sociology (3)
PSY 201, PSY 202. General Psychology (6)
WR 121. English Composition (3)
EXS 132. Pretherapy (2)
Required courses and/or electives (12)

**Sophomore Year**
CH 331, CH 332, CH 337. Organic Chem (11)
BI 211, BI 212, BI 213. General Biology (12)
CS 101. Computers: Apps & Implications (4)
ST 201. Statistics (3)
PSY 350. Human Lifespan Development (3)
WR 222. English Composition (3)
Required courses and/or electives (9)

**Junior Year**
PH 201, PH 202, PH 203. General Physics (15)
Z 331, Z 332, Z 333. Human Anat and Phys (9)
Z 341, Z 342, Z 343. Human Anat and Phys Lab (6)
PSY 481. Abnormal Psychology (3)
EXSS 322. Anatomical Kinesiology (4)
EXSS 323. Biomech of Sports & Exer (4)
WR 323 English Composition (3)
Required courses and/or electives (1)

**Senior Year**
MB 302. Microbiology (3)
BI 311. Genetics (4)
EXSS 411. Mvmnt Skill Learning & Control (4)
EXSS 324. Physiology of Exercise (3)
HSTS (approved WIC course) (3)
H 320. Intro to Human Disease (3)
Required courses and/or electives (25)

## Physician Assistant

**(PREPROFESSIONAL)**

Mary Ann Matzke, Chief Adviser

Physician assistants are highly trained members of the health care team who practice medicine with the supervision of a licensed physician. This curriculum is designed to meet the requirements for physician assistant study at Oregon Health Science University (OSHU) or Pacific University. Students who complete the four year program at OSU earn a bachelor's degree in general science with a pre-physician assistant option. Entrance to PA programs is competitive and experience in a health care setting is required.

### Curriculum

**Freshman Year**
CH 121, CH 122, CH 123 or CH 221, CH 222, CH 223. General Chemistry (15)
BI 211, BI 212, BI 213. General Biology (12)
Math Sciences (at least through MTH 112) (4)
SOC 204. General Sociology (3)
PSY 201, PSY 202. General Psychology (6)
WR 121. English Composition (3)
BI 108 or BI 109 or EXSS 132. Orientation (1-2)

**Sophomore Year**
CH 331, CH 332, CH 337. Organic Chemistry (11)
Z 331, Z 332, Z 333. Hum Anat and Phys (9)
Z 341, Z 342, Z 343. Hum Anat and Phys Lab (6)
MB 302, MB 303. Microbiology (5)
WR 222. English Composition (3)
Bacc. Core courses (humanities) (9)
HHP 231. Lifetime Fitness (3)
BI 214. Cell and Molecular biology (recommended) (3)

**Junior Year**
PH 201, PH 202, PH 203. General Physics (15)
BB 350 or BB 450, BB 451. Biochemistry (4-7)
CS 101. Computers: Applic. & Implica. (4)
ST 201, and ST 209 or ST 211 or ST 202. Statistics (4–6)
PSY 350. Human Lifespan Development (3)
PSY 481. Abnormal Psychology (3)
H 321. Intro. Human Disease (3)
PHAR 210. Medical Terminology (2)
Bacc. Core (WR III, Diff. Power & Discrim.) (6)

**Senior Year**
BI 311. Genetics (4)
History of Science (approved WIC course) (3)
Contemporary Global Issues (*e.g.*, H 312) (3)
Approved upper division science, psychology or health (9)
Required courses and electives (25-27)

## Podiatry

**(PREPROFESSIONAL)**

Chere Pereira, Chief Adviser

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 (D.P.M.) at one of seven schools of podiatric medicine in the United States (see Academic Programs and Support Services for WICHE information). These schools are located in California, Florida, Illinois, Iowa, New York, Ohio, and Pennsylvania. To practice in Oregon, a D.P.M. must also take the qualifying examination administered by the State Board of Podiatric Examiners.

**Preparing for Podiatric Medicine**
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. Students in the College of Science may combine departmental requirements to major in a scientific discipline, such as biology or zoology, and the prepodiatry curriculum; or they may enroll in prepodiatry and receive a B.S. degree in general science upon completion of the curriculum shown below. The preparatory program at OSU will satisfy requirements for entrance to all the schools.

### Curriculum

**Freshman Year**
WR 121. English Composition (3)
CH 221, CH 222, CH 223. Gen Chemistry (15)
Math Sciences (at least through MTH 112) (8)
Required courses and electives (19)

**Sophomore Year**
CH 331, CH 332, CH 337. Organic Chem (11)
BI 211, BI 212, BI 213. Biology (12)
ST 201 or ST 202 or ST 351, ST 352 (6-8)
Required courses and electives (14-16)

**Junior Year**
BB 450, BB 451. Biochemistry (7)
BI 311. Genetics (4)
PH 201, PH 202, PH 203. General Physics (15)
HSTS (any 400-level HSTS course) (3)
Required courses and electives (16)

**Senior Year**
Courses should be planned in consultation with student's adviser; graduation in prepodiatry requires a total of 36 credits of upper division science, to include at least two courses in anatomy, physiology, histology, or embryology.

## RADIATION THERAPY

**(PREPROFESSIONAL)**

Mary Ann Matzke, Chief Adviser

The 2-year curriculum shown is designed to meet the requirements for entrance into the Bachelor of Science degree program in Radiation Therapy Technology at Oregon Health Sciences University (OHSU) in Portland. Admission to radiation therapy programs is competitive. In addition to completing the required courses for admission, students should obtain experience by observing radiation therapists at work.

**Freshman Year**
WR 121,WR 222. English Composition (6)
MTH 111. College Algebra (4)
CH 121, CH 122, CH 130. General Chemistry (14)
NFM 225. Human Nutrition (4)
PSY 201, PSY 202. General Psychology (6)
SOC 204. General Sociology (3)
ANTH 110. Cultural Anthropology (3)
COMM 111 or COMM 218. Speech (3)
Electives (2)

**Sophomore Year**
BI 211, BI 212, BI 213. General Biology or Z 331, Z 332, Z 333, Z 341, Z 342, Z 343. Human Anatomy and Physiology (15)
PH 106 or PH 201. Physics (4-5)
PSY 350. Human Development (3)
Social Science elective (3)
Arts and Letters (recommend English literature, philosophy, second year foreign language) (15)
CS 101. Computer literacy (4)
Electives (0-1)

## VETERINARY MEDICINE

**(PREPROFESSIONAL)**

Chere Pereira, Head Adviser

The College of Science offers a preprofessional 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.

Preveterinary students may select a major in general science or any other discipline while completing the admission requirements for veterinary school. Scientific disciplines such as biology, microbiology, zoology, or animal science in the College of Agricultural Sciences are most frequently chosen, but areas outside of science are also acceptable. A student who is accepted into a veterinary school after three years of preprofessional 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. Completion of a bachelor's degree is required before one can receive a Doctor of Veterinary Medicine degree.

Admission to schools of veterinary medicine is competitive, and completion of the preveterinary 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.

The OSU College of Veterinary medicine requires the general test of the Graduate Record Exam (GRE). Personal characteristics include motivation, seriousness of purpose, and determination. In addition, an applicant's experience in working with animals and an understanding of the veterinary profession are important considerations in the selection process. Applicants should have significant veterinary medical exposure and experience by November 1 of the year of application. Such experience could involve breeding, rearing, feeding, and showing animals or work in biomedical research laboratories, veterinary clinics, and hospitals.

The OSU College of Veterinary Medicine is part of the Washington-Oregon-Idaho Regional Program in Veterinary Medical Education. Each year, 28 residents of Oregon and eight residents from the WICHE compact states begin their veterinary training on the OSU campus (see Academic Programs and Support Services for WICHE information). Additional information regarding application and professional education may be found in the veterinary medicine section of this catalog.

### CURRICULUM

The required courses necessary for admission to veterinary school include mathematics through trigonometry; year-long courses with laboratory in general chemistry, organic chemistry, and biology; and courses in physics, biochemistry and genetics. All science courses required for veterinary school admission must be taken for a letter grade. The following is a recommended course of study leading to a degree in General Science.

**Freshman Year**
BI 211, BI 212, BI 213. General Biology (12)
CH 221, CH 222, CH 223 or CH 121, CH 122, CH 123. General Chemistry (15)
Math (at least through MTH 112) (8)
WR 121. English Composition (3)
VM 110. Preveterinary Medicine (1)
Required courses and electives (6)

**Sophomore Year**
CH 331, CH 332, CH 337. Organic Chem (11)
BI 214. Cell and Molecular Biology (3)
ANS 121. Introduction to Animal Science (4)
Writing/Speech (6)
CS 101. Computers (4)
Z 410. Occupational Internship (0-6)
Required courses and electives (11-17)

**Junior Year**
PH 201, PH 202, PH 203 General Physics (15)
BB 350 or BB 351 or BB 450, BB 451. Biochemistry (4-7)
BI 311 or ANS 378. Genetics (4-5)
Required courses and electives (18-22)

**Senior Year**
First year in veterinary school or completion of courses in major field of study. Courses should be planned in consultation with an adviser. A minimum of 32 credits in upper division science courses is required for students who wish to complete a bachelor's degree in general science, preveterinary medicine option. Courses in microbiology, genetics, anatomy, physiology, embryology animal behavior, and animal science are recommended.

# SCIENCE AND MATHEMATICS EDUCATION

Margaret Niess, Chair
237 Weniger
Oregon State University
Corvallis, OR 97331-6508
(541) 737-4031

**Faculty**
*Professor* Lederman, Niess; *Associate Professor* Erickson; *Assistant Professor* Flick, Crawford

**Graduate Major**

**Mathematics Education (M.A.T., M.S., M.A., Ph.D.)**
**Science Education (M.A.T., M.S., M.A., Ph.D.)**

The Department of Science and Mathematics Education offers the M.A.T., M.S., M.A., and Ph.D. degrees. The Master of Arts in Teaching (M.A.T.) is designed solely for the preparation of beginning science and mathematics teachers for grades 3-12. Students must complete a 72-credit prescribed set of course work of which 48 graduate credits are approved for the M.A.T. degree. Completion of the 54 credit requirements result in recommendation for the Oregon teacher initial licensure for the appropriate authorization level (option 1 - elementary, middle; option 2 - middle, high) in the endorsement area (mathematics, advanced mathematics, integrated science, biology, chemistry, or physics). The Oregon teacher continuing licensure is recommended when the M. A. T. Degree is completed..

Within the Master of Science (M. S.) and Master of Arts (M.A.) degrees in science education or mathematics education, three options are provided: (A) preparation for secondary science and mathematics teacher standard license, or for secondary science and mathematics teachers preparing as secondary curriculum specialists, department heads, or other supervisory or research-oriented positions; (B) preparation for teaching at the community college level or becoming educational trainers in business/industry; (C) preparation for teaching elementary or middle level science or mathematics.

Students must complete 45 quarter credits of approved graduate courses. Two-thirds of the work must be in the major and one-third in the minor. Major fields include science education or mathematics education. Minor fields must be related to the teaching specialty including biological, physical, earth, or general science, mathematics, computer science, and integrated science. A minor of integrated science requires a minimum of 9 quarter credits from a specific minor area. Option C allows two additional minor fields: mathematics education and science education. Option B requires that one-third of the major be course work in the teaching field (in addition to the course work in the minor). The curriculum may be completed during the academic year or during the summer session. Students may elect a project option or thesis option.

The doctorate (Ph.D.) in science or mathematics education provides two options (A) preparation of secondary science and mathematics teacher educators, (B) preparation of community college/college science and mathematics teachers, and (C) preparation of elementary science and mathematics teacher educators.

**Option** A requires a major that includes 40 credits of professional courses in science/mathematics education (including the doctoral research core), and 8 credits meeting the research competency; this option requires a 28-credit minor.

**Option B** requires a major that includes 30 credits of professional courses in science/mathematics education (including the doctoral research core), 6 credits of college teaching practicum and 8 credits meeting the research competency; this option contains a 36 credit minor.

**Option** C requires a major that includes 40 credits of professional courses in science/mathematics education (including the doctoral research core), and 8 credits meeting the research competency; this option requires a 28-credit minor. Special minors are available for this option: mathematics/science education (elementary mathematics, elementary science, middle school mathematics or middle school science)

A dissertation is required for all three options.

## COURSES

### Upper Division Courses

### Upper Division Courses

**SED 309. FIELD PRACTICUM: SCIENCE/MATHEMATICS (3).** Placement in elementary or middle school (grades 3-8) to assist students in developing competencies with children and early adolescents in science/mathematic classes.

**SED 401. RESEARCH (1-16).**

**SED 405. READING AND CONFERENCE (1-16).**

**SED 406. SED 406. PROJECTS (1-16). (1-16).**

**SED 407. SEMINAR (1-16).**

**SED 409. FIELD PRACTICUM: SCIENCE/MATHEMATICS (3).** Placement in middle or high school (grades 7-12) to assist students developing competencies with adolescents in science/mathematics classes.

**SED 412/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 twenty-first century.

**SED 413/SED 513. SCIENCE MATERIALS AND LABORATORIES (3).** Development of instructional materials, laboratories, and demonstrations in science for the elementary, middle and high schools using modern learning theory as the basis.

**SED 414/SED 514. MATHEMATICS MATERIALS AND LABORATORIES (3).** Development of instructional materials, laboratories, and demonstrations in mathematics for the elementary, middle and high schools using modern learning theory as the basis.

**SED 416/SED 516. METHODS FOUNDATIONS FOR TEACHING MATH/SCIENCE (3).** Historical, philosophical, social, political and legal factors influencing education with analysis of prominent views of learning on the development and organization of schools and curricula.

### Graduate Courses

**SED 501. RESEARCH (1-16).**

**SED 503. THESIS (1-16).**

**SED 505. READING AND CONFERENCE (1-16).**

**SED 506. SED 506. PROJECTS (1-16). (1-16).**

**SED 507. SEMINAR (1-16).**

**SED 508. WORKSHOP (1-16).**

**SED 510. PROFESSIONAL INTERNSHIP: SCIENCE AND MATHEMATICS EDUCATION (1-12).** Supervised teaching experience at the elementary, middle or high school level; students experience general classroom and professional responsibilities common to the regular science and mathematics teacher.

**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 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 518. ANALYSIS OF CLASSROOMS III (3).** Analysis and support of students as learners in the science/math classroom (grades 3-12): cultural, psychological, sociological, economic, and instructional concerns.

**SED 521. MULTIDISCIPLINARY TEACHING IN THE SELF-CONTAINED CLASSROOM (3).** Reading and writing in the content areas, integration of subject matter, thematic/interdisciplinary instruction, teaming, and technology integration in the self-contained classroom.

**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 II (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. PREREQ: Admission to MAT Program.

**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 learning situations with videotape feedback and critique by self, peers, and supervisor. For mathematics preservice teachers.

**SED 563. SCIENCE MICROTEACHING LABORATORY (3).** Develop, practice, and improve specific instructional skills, strategies, and modes in small-group teaching learning situations with videotape feedback and critique by self, peers, and supervisor. For science preservice teachers.

**SED 571. TECHNOLOGY AND PEDAGOGY: SECOND SUBJECT (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 572. TECHNOLOGY AND PEDAGOGY: FIRST SUBJECT (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: SECOND SUBJECT (2).** Development of pedagogical content knowledge in grades 3-12 science instruction: learning theory, nature of science, and reform recommendations.

**SED 574. MATHEMATICS PEDAGOGY: SECOND SUBJECT (2).** Development of pedagogical content knowledge in grades 3-12 mathematics instruction: learning theory, nature of mathematics, and reform recommendations.

**SED 575. MULTIMEDIA PEDAGOGY: SECOND SUBJECT (2).** Development of pedagogical content knowledge in grades 3-12 multimedia and information technology instruction: learning theory, nature of technology, and reform recommendations.

**SED 576. MATHEMATICS PEDAGOGY: FIRST SUBJECT (2).** Development of additional pedagogical content knowledge; stress on dominant themes of the school of mathematics curriculum including problem solving, reasoning, communication, and connection.

**SED 577. SCIENCE PEDAGOGY: FIRST SUBJECT (2).** Development of additional pedagogical content knowledge; stress on dominant themes identified in national reforms for school science curriculum including inquiry and the nature of science.

**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 and education and education in general, including portfolio and other forms of alternative assessment.

**SED 581. PROFESSIONAL DEVELOPMENT AND PRACTICUM IN MATHEMATICS (3).** Supervised field practicum in mathematics teaching which leads to the development of state required work sample/portfolio. This course is required for Standard Licensure.

**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.

**SED 592. PROFESSIONAL DEVELOPMENT AND PRACTICUM IN SCIENCE (3).** Supervised field practicum in science teaching which leads to the development of state required work sample/ portfolio. This course is required for Standard Licensure.

**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. CLINICAL SUPERVISION IN MATHEMATICS AND SCIENCE (3).** Provides for the development of a variety of classroom observation techniques and clinical supervision skills. This course fulfills state requirements for becoming a supervisor of student interns.

**SED 598. SCIENCE CURRICULUM (3).** Current trends, history of these trends, and rationale for 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.

**SED 601. RESEARCH (1-16).**

**SED 603. DISSERTATION (1-16).**

**SED 605. READING AND CONFERENCE (1-16).**

**SED 606. SED 606. PROJECTS (1-16). (1-16).**

**SED 607. SEMINAR (1-16).**

**SED 608. WORKSHOP (1-16).**

**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.

**SED 612. QUANTITATIVE RESEARCH DESIGN AND CRITICAL ANALYSIS (3).** A study of quantitative research designs and analytical procedures with specific applications in science/mathematics education.

**SED 613. RESEARCH PRACTICUM I (3).** In-depth analysis of current and emerging lines of significant quantitative research in science/mathematics education.

**SED 615. PRACTICUM IN MATHEMATICS/SCIENCE IN COLLEGE TEACHING (3).** Supervised field practicum in college mathematics/science teaching. PREREQ: SED 596 and SED 594. May be repeated for up to 6 credits.

**SED 621. SURVEY OF RESEARCH ON LEARNING (3).** Critical analysis of perspectives on student thinking and learning in science/math education.

**SED 622. QUALITATIVE RESEARCH TECHNIQUES (3).** Critical analysis of perspectives on student thinking and learning in science/math education.

**SED 623. RESEARCH PRACTICUM II (3).** In-depth analysis of current and emerging lines of significant qualitative research in science and mathematics education.

## STATISTICS

Dan Schafer, Interim Chair
44 Kidder Hall
Oregon State University
Corvallis, OR 97331-4606
(541) 737-3366

**Faculty**

*Professors* Butler, Ramsey, Seely, Urquhart, Waymire; *Associate Professors* Arthur, Birkes, Peters, Schafer; *Assistant Professors* Lesser, Murtaugh

### Graduate Major

**Operations Research (M.A., M.S.)**
**Statistics (M.A., M.S., Ph.D.)**
*Graduate Areas of Concentration*
Applied Statistics
Biostatistics
Environmental Statistics
Mathematical Statistics
Operations Research
Statistics

The Department of Statistics offers undergraduate service courses and an undergraduate minor, as well as graduate courses and programs leading to the M.A., M.S., and Ph.D. 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 and an upper division sequence in mathematical statistics.

### COURSES

#### Lower Division Courses

**ST 201, ST 202. PRINCIPLES OF STATISTICS (3,3).** ST 201: Design of experiments, descriptive statistics, the normal curve, probability, chance variability, sampling, confidence intervals for averages and percentages. ST 202: Tests of significance for averages and percentages for one and two samples, Students t curve, chi-square tests, nonparametric tests, correlation and regression. Must be taken in order.

**ST 209. PRINCIPLES OF HYPOTHESIS TESTING (1).** Tests of significance for averages and percentages for one and two samples, Student's t curve, limitations of significance testing. PREREQ: ST 201. Self-paced. May be taken concurrently with a self-paced section of ST 201.

**ST 211. INTRODUCTION TO HYPOTHESIS TESTING (1).** Hypothesis testing for means and proportions using one and two samples. This course serves as a transition between ST 201 and ST 352. PREREQ: ST 201. Self-paced. May be taken concurrently with a self-paced section of ST 201.

#### Upper Division Courses

**ST 314. INTRODUCTION TO STATISTICS FOR ENGINEERS (3).** Probability, expectation, common probability distributions, sampling distributions, statistical inference, one- and two-sample problems, regression analysis. PREREQ: MTH 253.

**ST 351, ST 352. INTRODUCTION TO STATISTICAL METHODS (4,4).** ST 351: Descriptive statistics, random variables, normal distribution, sampling distributions, confidence intervals and hypothesis tests for means using one and two samples. ST 352: Simple and multiple linear regression, correlation, analysis of variance, analysis of categorical data. ST 352 PREREQ: ST 211 or ST 314 or ST 351. Lec/lab.

**ST 406/ST 506. PROJECTS (1-16).** Section 1: Projects, graded P/N. Section 2: Teaching Experience, graded P/N. Section 3: Directed Work, graded P/N.

**ST 407. SEMINAR (1).** Section 1: Attendance at consulting seminar. Graded P/N.

**ST 410/ST 510. INTERNSHIP (1-16).**

**ST 411/ST 511, ST 412/ST 512, ST 413/ST 513. METHODS OF DATA ANALYSIS (4,4,4).** ST 411/ST 511: Graphical, parametric and nonparametric methods for comparing two samples; one-way and two-way analysis of variance; simple linear regression. ST 412/ST 512: Multiple linear regression, including model checking, dummy variables, using regression to fit analysis of variance models, analysis of covariance, variable selection methods; nonlinear regression; logistic regression; multivariate regression. ST 413/ST 513: 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 models, interpretation of log-linear models. PREREQ: ST 209 or ST 351 or the equivalent. Must be taken in order. Lec/lab.

**ST 415/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. PREREQ: ST 352 or ST 411/ST 511.

**ST 421/ST 521, ST 422/ST 522. INTRODUCTION TO MATHEMATICAL STATISTICS (4,4).** ST 421/ST 521: Probability, random variables, expectation, discrete and continuous distributions, multivariate distributions, sampling distributions, central limit theorem. ST 422/ST 522: Maximum likelihood estimation, unbiased estimation, confidence intervals, hypothesis testing. PREREQ: MTH 253. Must be taken in order.

**ST 431/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. PREREQ: ST 411/ST 511.

**ST 435/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. PREREQ: ST 412/ST 512. Not offered every year.

**ST 439/ST 539. SURVEY METHODS (3).** Survey design, sampling, data collection and analysis, general methodology. PREREQ: ST 201 or ST 351. Not offered every year.

**ST 441/ST 541. PROBABILITY, COMPUTING, AND SIMULATION IN STATISTICS (4).** Review of probability, including univariate distributions, discrete-event simulation, and limit theorems. Random-number generation, simulation of statistical distributions, bootstrap, variance reduction techniques. Emphasis on the use of computation in statistics, using the MATLAB programming language. PREREQ: ST 422/ST 522. Lec/lab.

**ST 443/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, using the MATLAB programming language. PREREQ: ST 421/ST 521, experience with a high-level programming language, statistical package or mathematical computation package.

**ST 448/ST 548. OPERATIONS RESEARCH METHODS (3).** Survey of operations research methods and applications, including linear programming, dynamic programming, Markov chains, queueing theory, and other topics such as network analysis, integer programming, nonlinear programming, inventory theory, decision analysis and reliability. PREREQ: MTH 245.

**ST 473/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. PREREQ: ST 412/ST 512, ST 421/ST 521. Not offered every year.

**ST 481/ST 581. LINEAR PROGRAMMING (3).** Formulation and solution of linear programming models; development of the simplex method and related pivot algorithms; duality, postoptimality analysis, extensions and applications of linear programming; special classes of linear programming. PREREQ: MTH 341 or MTH 367 or ST 448.

**ST 483/ST 583. NONLINEAR OPTIMIZATION (3).** Fundamentals of nonlinear optimization. Convex sets and convex functions; gradients, Hessians; necessary and sufficient conditions for optimality; nonlinear duality; algorithms for unconstrained and constrained optimization. PREREQ: MTH 254, MTH 341.

**ST 491/ST 591. SPECIAL TOPICS I (1).** May be repeated for credit. Not offered every year.

**ST 492/ST 592. SPECIAL TOPICS II (2).** May be repeated for credit. Not offered every year.

**ST 493/ST 593. SPECIAL TOPICS III (3).** May be repeated for credit. Not offered every year.

**ST 494/ST 594. SPECIAL TOPICS IV (4).** May be repeated for credit. Not offered every year.

### Graduate Courses

**ST 501. RESEARCH (1-16).** Department consent required.

**ST 503. THESIS (1-16).** Consent required.

**ST 505. READING AND CONFERENCE (1-16).** Consent required.

**ST 507. SEMINAR (1).** Section 1: Attendance at consulting seminar, 1 credit, graded P/N. Section 3: Research Seminar, 1 credit, graded P/N. Section 4: Computing Facilities, 1 credit graded P/N.

**ST 509. CONSULTING PRACTICUM (2).** The student provides statistical advice under faculty guidance, on university-related research projects. Graded P/N. PREREQ: ST 507, Section 1, and ST 553, or consent of instructor. May be repeated for credit.

**ST 514. ENGINEERING STATISTICS (3).** Descriptive statistics, probability, discrete and continuous random variables, sampling distributions, confidence intervals and hypothesis testing for one- and two-sample problems. PREREQ: MTH 253, graduate standing in engineering.

**ST 551, ST 552, ST 553. STATISTICAL METHODS (4,4,4).** ST 551: 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. ST 552: Simple and multiple linear regression including polynomial regression, indicator variables, weighted regression, and influence statistics; nonlinear regression and linear models for binary data. ST 553: Principles and analysis of designed experiments, including factorial experiments, analysis of covariance, random and mixed effect models, and split plot designs; introduction to multivariate analysis and repeated measures designs. PREREQ: ST 422/ST 522. COREQ: MTH 341. Must be taken in order.

**ST 555. ADVANCED EXPERIMENTAL DESIGN (3).** Incomplete block designs, confounding and fractionalization, split plots, response surfaces, change-over designs, repeated measures, analysis of unbalanced data. PREREQ: 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. PREREQ: ST 412/ST 512; MTH 252 or MTH 245. Not offered every year.

**ST 561, ST 562, ST 563. THEORY OF STATISTICS (3,3,3).** ST 561: Distributions of functions of random variables, joint and conditional distributions, sampling distributions, convergence concepts, order statistics. ST 562: Sufficiency, exponential families, location and scale families; point estimation: maximum likelihood, Bayes, invariant, and unbiased estimators; asymptotic distributions of maximum likelihood estimators; Taylor series approximations. ST 563: Hypothesis testing: likelihood ratio, invariant, Bayesian, and uniformly most powerful tests; similar tests in exponential families; asymptotic distributions of likelihood ratio test statistics; confidence intervals. PREREQ: ST 422/ST 522. Must be taken in order.

**ST 565. TIME SERIES MODELS (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. PREREQ: ST 412/ST 512, ST 422/ST 522. Offered alternate years.

**ST 571. ENVIRONMENTAL SAMPLING (3).** Evaluation and design of environmental surveys with special reference to the statistical aspects of indicator development, cost effective response designs, and spatially distributed sampling. Involves group project work. PREREQ: ST 422/ST 522 or consent of instructor. Not offered every year.

**ST 585. TOPICS IN OPERATIONS RESEARCH (1-3).** A two-part course consisting of a reading component and a research component. In the reading component, students select and work on topics from a designated list. The research component provides an opportunity for further exploration in a topic of their choosing. PREREQ: ST 443/ST 543 or ST 481/ST 581. May be repeated for credit.

**ST 601. RESEARCH (1-16).** Consent required.

**ST 603. THESIS (1-16).** Consent required.

**ST 606. PROJECTS (1-16).** Section 1: Projects; Section 2: Teaching Experience, graded P/N; Section 3: Directed Work, graded P/N.

**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. PREREQ: ST 553, ST 563.

**ST 625. GENERALIZED REGRESSION MODELS II (3).** Multiparameter analysis using large-sample likelihood methods, primarily applied to response-time data; multiparameter models, reparameterization, and regression- type models; likelihood functions, including censored data; testing based on maximum likelihood estimators, likelihood ratios, and score tests; computational methods including the EM algorithm; partial likelihood methods for proportional hazards models; analysis of grouped data. PREREQ: ST 553, ST 563.

**ST 632. SAMPLING THEORY (3).** The basic sampling model for probability selection, basic sampling methods, generalization of the basic model, common applications of the general theory. PREREQ: ST 422/ST 522.

**ST 651, ST 652, ST 653. LINEAR MODEL THEORY (3,3,3).** ST 651: Least squares estimation, best linear unbiased estimation, parameterizations, multivariate normal distributions, distributions of quadratic forms, testing linear hypotheses, simultaneous confidence intervals. ST 652, ST 653: Advanced topics including classification models, mixed-effects models and multivariate models. PREREQ: ST 553, ST 563. Must be taken in order. Offered alternate years.

**ST 661, ST 662, ST 663. ADVANCED THEORY OF STATISTICS (3,3,3).** ST 661: Exponential families, sufficient statistics; unbiased, equivariant, Bayes, and admissible estimation. ST 662: Uniformly most powerful, unbiased, similar, and invariant tests. ST 663: First-order and higher-order asymptotics; likelihood ratio, score, and Wald tests; Edgeworth and saddlepoint approximations. PREREQ: ST 553, ST 563. Must be taken in order. Offered alternate years.

### Upper Division Courses

**ST LDT. (1-16).**

**ST UDT. (1-16).**

## ZOOLOGY

Stevan J. Arnold, Chair
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### Faculty

*Professors* Arnold, Bayne, Blaustein, Boucot, Brownell, Farber, Hixon, King, Lubchenco, Menge, Mix, Moore, Morris, Roberts, Ruben; *Associate Professors* Houck, Mason, Taylor; *Assistant Professors* Blouin, Weis, Zhang; *Senior Instructor* Beatty; *Instructor:* Yamada; *Adjunct Faculty* Anderson, Baer, Kiester, Somero

### Undergraduate Major

**Zoology (B.S.)**

### Minor

Zoology

### Graduate Major

**Zoology (M.A., M.S., Ph.D.)**

*Graduate Areas of Concentration*

Behavioral Ecology
Behavioral Endocrinology
Cell Biology
Comparative Immunology
Conservation Biology
Developmental Biology
Evolutionary Biology
Genetics
Marine Ecology
Neurobiology
Parasitology
Physiology
Population Biology

A major in zoology can prepare students for those vocations which 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.

The department offers B.S., M.A., M.S., and Ph.D. 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 advisers, students can plan programs to meet their particular needs.

## GRADUATE STUDY

The Department of Zoology has strong programs of graduate study in behavioral ecology, marine biology and ecology, evolutionary biology, physiology, behavioral endocrinology, population biology, genetics, neurobiology, cell and developmental biology and comparative immunology. Detailed information on the graduate faculty and program is available from the Department of Zoology.

## B.S. CURRICULUM

All students majoring in zoology are required to take a common core of courses. The following list of requirements organizes courses into freshman through senior years, as a model program; but, according to individual needs, students may make adjustments in the order in which courses are taken in consultation with their adviser.

## CURRICULUM

### Freshman Year

BI 211, BI 212, BI 213. Introductory Biology (12)
CH 221, CH 222, CH 223. General Chemistry (15)[14]
MTH 251. Differential Calculus (4)
WR 121. English Composition (3)
HHP 231. Health and Human Fitness (3)
Z 110. Zoology Tutorial (1)
Additional required courses/electives (7)

### Sophomore Year

Z 371, Z 372. Vertebrate Biology and Lab (5)
BI 214. Cell and Molecular Biology (3)
PH 201, PH 202. General Physics (10)
BI 370. General Ecology (3)
CH 331, CH 332. Organic Chemistry (8)
MTH 252. Integral Calculus (4)
Math, Statistics, or Computer Science (4)
Additional required courses/electives (14)[13]

### Junior Year

BB 450, BB 451. Biochemistry (4,3)
BI 311. Genetics (4)
BI 445. Evolution (3)
Z 361, Z 362. Invertebrate Biology and Lab (5)[12]
Additional required courses/electives (20)[13]

### Senior Year

BI 460, BI 461. Cell Biology (3,2)
Z 414. Scientific Communication for Biologists (WIC) (2)
Z 425. Embryology and Development (5)
Z 430. Principles of Physiology (4)
Z 436. Animal Physiology Laboratory (2)
Required courses and/or electives (27)[13]

## MINOR

The zoology minor is designed for students from other majors who have an additional interest in zoology. Students are strongly encouraged to identify a minor adviser in the Department of Zoology. Completion of the minor is certified on the student's academic transcript.

### Core Requirements

BI 211, BI 212, BI 213. Intro Biology (12)
Z 361, Z 362. Invertebrate Biology (5).
Z 371, Z 372. Vertebrate Biology (5)
Add two or more courses from the following list:
BI 350, Z 438, BI 460, Z 422, BI 370, Z 425, Z 423, BI 311, Z 473, Z 461, Z 351, Z 427, Z 456, Z 430, BI 445.

## COURSES

### Lower Division Courses

**Z 110. ZOOLOGY TUTORIAL (1).** New student orientation. Weekly discussion of material students have read and other topics relating to the zoology major.

### Upper Division 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. PREREQ: Sophomore standing. Lec.

**Z 331, Z 332, Z 333. HUMAN ANATOMY AND PHYSIOLOGY (3,3,3).** Lecture course on structure and functions of the human body. Tissues, organ systems, homeostatic mechanisms, patho-physiology and pathomorphology. Z 331 is a prerequisite for Z 332, Z 333.

**Z 341, Z 342, Z 343. HUMAN ANATOMY AND PHYSIOLOGY LABORATORY (2,2,2).** Dissection of preserved specimens and study of prepared human prosection materials. Physiology demonstrations illustrate functions of organ systems. F-skeleto muscular; W-neural; S-gastric, vascular, renal. Lab fee of $10.00. COREQ: Z 331, Z 332, 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.

**Z 346. *SOCIOBIOLOGY AND POWER (0-3).** Human evolution under natural selection and implications for the understanding and amelioration of current struggles over social, economic, and gender equality. 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.

**Z 350. ANIMAL BEHAVIOR (3).** Concepts of behavior; sensory receptors, internal mechanisms governing responses; learning and habituation; social organization and communication. Lec. PREREQ: One year of biological science. CROSSLISTED as BI 350.

**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. PREREQ: One year of biology. May be taken alone or concurrently with Z 352. Lec.

**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. PREREQ: Z 351 or concurrent enrollment. Field trip fee. Lab.

**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. May be taken alone or concurrently with Z 362. PREREQ: One year of biology. Lec.

**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. PREREQ: Z 361 or concurrent enrollment. Lab.

**Z 371. VERTEBRATE BIOLOGY (3).** Overview of vertebrate origins and phylogeny, structural and functional adaptations, behavior, and ecology. PREREQ: One year of biology. May be taken alone or concurrently with Z 372. Lec.

**Z 372. VERTEBRATE BIOLOGY LABORATORY (2).** Classification, identification, and natural history of vertebrates. Includes laboratory examination of specimens and field trips (fee charged) emphasizing Oregon fauna. PREREQ: Z 371 or concurrent enrollment. Lab.

**Z 401. RESEARCH (1-16).** Undergraduate research, completed under faculty supervision. Departmental approval required.

**Z 403. THESIS (1-16).** Undergraduate thesis, completed under faculty supervision. Required of honors students. 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. Departmental approval required.

**Z 407. SEMINAR (1).** Undergraduate enrichment seminars, as offered by faculty. Graded P/N.

**Z 410. OCCUPATIONAL INTERNSHIP (1-16).** Practical experience working with professionals. Graded P/N.

**Z 414. ^SCIENTIFIC COMMUNICATION FOR BIOLOGISTS (2).** For zoology majors of junior or senior standing, biological research done locally is explored. Emphasis is on communication of biological information (Writing Intensive Course)

**Z 422/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. PREREQ: One year of biology. Lec/lab.

**Z 423/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. PREREQ: One year of biology. Lec/rec.

**Z 425/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. PREREQ: Three years of biology. Lec/lab.

**Z 427/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. PREREQ: One year of biology. Lec.

**Z 430/Z 530. PRINCIPLES OF PHYSIOLOGY (4).** Concepts and mechanisms of physiology, especially neural integration, sensory perception, muscle function, with specific examples from circulation, respiration, osmoregulation, kidney function and digestion. PREREQ: BI 213 and CH 332 or equivalent. Lec.

**Z 431/Z 531, Z 432/Z 532. VERTEBRATE PHYSIOLOGY (4,4).** Physiology of organ systems in vertebrates with emphasis on mammals. Systems to be considered include the nervous, excretory (renal), endocrine, reproductive, respiratory, and circulatory. Courses may be taken in any order. PREREQ: Z 430/Z 530. Lec/rec.

**Z 436/Z 536. ANIMAL PHYSIOLOGY LABORATORY (2).** Laboratory experience with concepts and procedures of modern animal physiology. Lab fee of $10. PREREQ: Z 430.

**Z 438/Z 538. BEHAVIORAL NEUROBIOLOGY (3).** Advanced study of neural and endocrine systems as regulators of behavior. Cellular mechanisms, neural circuitry and chemical messengers of simple and complex behaviors. Offered alternate years. PREREQ: Two years of biology, including physiology. Lec.

**Z 441, Z 442, Z 443. ADVANCED HUMAN ANATOMY AND PHYSIOLOGY LABORATORY (2,2,2).** 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 of $10.00. COREQ: Z 430, Z 431, Z 432.

**Z 451. FUNCTIONAL ANATOMY OF THE HUMAN MUSCULAR SYSTEM (4).** Overview of the orientation, innervation, and functional significance of muscles and muscle groups. Topics will include techniques of dissection, muscle identification, and variation on muscular anatomy. The laboratory component will consist of the dissection of the muscular anatomy of a human cadaver. Lab fee. PREREQ: Z 331, Z 332, Z 333, or Z 341, Z 342, Z 343 or Z 441, Z 442, Z 443 or equivalent. Lec/lab.

**Z 456/Z 556. PARASITOLOGY (4).** Morphology, life cycles, physiological adaptations, evolution, and distribution of parasitic animals. Offered alternate years. PREREQ: Two years of biology. Lec/lab.

**Z 461/Z 561. TISSUE STRUCTURE AND FUNCTION (5).** Microscopic study of tissues and organs, emphasizing functional adaptations. Offered alternate years. PREREQ: Two years of biology. Lec/lab.

**Z 465/Z 565. SELECTED TOPICS IN ZOOLOGY (1-16).** Topics and credits vary. May be repeated for credit. Grading mode TBA.

**Z 471/Z 571. ORNITHOLOGY (4).** Systematics, evolution, ecology, behavior, physiology, and distribution of birds, with emphasis on field studies. Field trip fee. PREREQ: Z 371 or equivalent course in vertebrate biology. Not offered every year, TBA.

**Z 473/Z 573. HERPETOLOGY (4).** World families and distribution of amphibians and reptiles; population biology, life histories, current literature. Field trip fee. PREREQ: Z 371 or equivalent course in vertebrate biology. Lec/lab.

**Z 481/Z 581. BIOGEOGRAPHY (3).** Covers the principles on which biogeography is based, past and present, plus an 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. PREREQ: Consent of instructor required.

### Graduate Courses

**Z 501. RESEARCH (1-16).** Graduate-level research, completed under faculty supervision. Departmental approval required. Graded P/N.

**Z 503. THESIS (1-16).** Masters thesis, completed under faculty supervision.

**Z 505. READING AND CONFERENCE (1-16).** For graduate students working towards Masters degree. After arrangements with individual faculty, readings and discussions on topics of mutual interest. Departmental approval required.

**Z 507. SEMINAR (1).** Graded P/N.

**Z 510. INTERNSHIP (1-16).**

**Z 537. ENDOCRINOLOGY (4).** Influence of endocrine glands on the physiology of the animal body, with emphasis on mammals. PREREQ: Graduate status or consent of instructor. Offered alternate years.

**Z 541. NEUROBIOLOGY (3).** Structure and function of vertebrate and invertebrate nervous systems: properties of excitable membranes and synaptic transmission; receptor physiology and sensory integration; cellular mechanisms of behavior and simple learning. Offered alternate years. PREREQ: Advanced course work in physiology.

**Z 551. FUNCTIONAL ANATOMY OF THE HUMAN MUSCULAR SYSTEM (4).** (See Z 451 for description)

**Z 591. POPULATION BIOLOGY (5).** Population Biology from an evolutionary perspective; emphasis on both theoretical and empirical approaches. Offered alternate years. PREREQ: courses in genetics and ecology equivalent to BI 311 and BI 370 or consent of instructor.

**Z 593. BEHAVIORAL ECOLOGY (5).** Behavioral Ecology with emphasis on both theoretical and empirical approaches. Offered alternate years. PREREQ: Graduate status or consent of instructor.

**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. PREREQ: Courses in ecology, statistics, and math equivalent to BI 370, ST 452, and MTH 113 or consent of instructor.

**Z 601. RESEARCH (1-16).** Doctoral-level research under faculty supervision. Graded P/N.

**Z 603. THESIS (1-16).** Doctorate thesis, completed under faculty supervision.

**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.

### FOOTNOTES

*Baccalaureate Core Course

^Writing Intensive Course (WIC)

[1]A list of approved courses is available at the College of Science office. Fifteen of these credits can also fulfill part of the Baccalaureate Core requirements.

[2]At least one course with significant computer science content approved by the major department; credits are not shown since the course may be part of one already included.

[3]At least one term in biological science and one term in physical and earth science. Must include a two-term sequence in one of these sciences.

[4]For courses listed in the required curricula, equivalent courses taken at other institutions may be substituted. All substitutions must be approved by the student's academic adviser.

[5]Electives must include enough upper division courses (400 or 500-level) to meet University graduation requirements of 60 upper division credits.

[6]Including at least one term of calculus (MTH 241 or 251), and computer science (CS 101 or higher). See also Individualized (Elementary Education) which has a different requirement.

[7]Courses may be taken from departments outside of the College of Science; however, students must take a total of 24 credits of upper division science from departments in the College of Science.

[8]Students take the courses required by the BSN program selected for future transfer.

[9]Credits of applied art (ceramics, woodworking, etc.) and 18 credits of humanities are required.

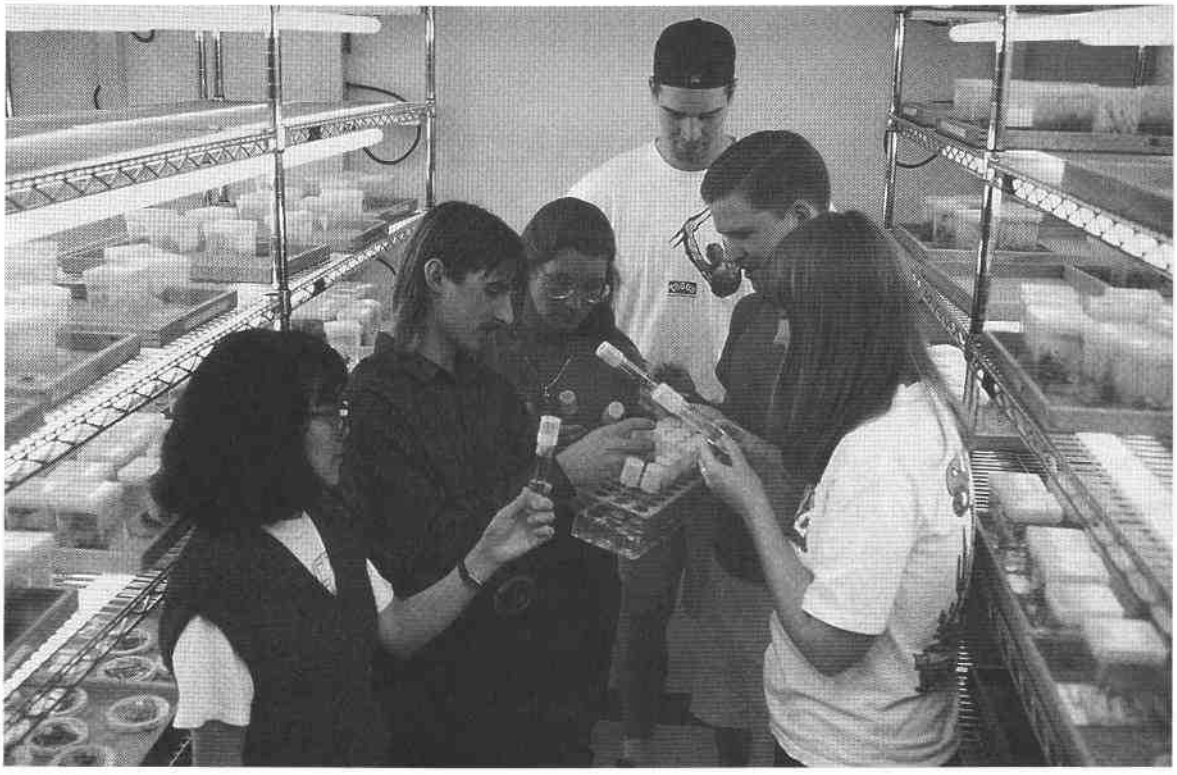
[10]Work experience with an occupational therapist is strongly recommended.

[11]Required courses include the Baccalaureate Core requirements and the College of Science requirements. A pretherapy program with somewhat less emphasis on science is offered through the College of Health and Human Performance.

[12]Marine biology (BI 450, BI 451) is an acceptable alternative to invertebrate biology (Z 361, Z 362) animal physiology laboratory (Z 436), and ecology (BI 370).

[13]At least 9 of these credits must be from a list of approved courses in the biological sciences. The list is obtainable from your Zoology academic adviser

[14] Students with weaker chemistry background should take CH 121, CH 122, CH 123.



*The College of Agricultural Sciences performs four vital services—instruction, research, extension, and international agriculture—which are closely tied to the human and natural resources of the state of Oregon and which support the economic development of the state and of the Pacific Northwest.*

The Student Advancement Office administers educational programs to serve the needs of individuals interested in pursuing careers in environmental and resource management; animal, plant and food systems; agribusiness and economics; agriculture; international education; and research. The college offers a B.S. degree at the undergraduate level. 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.

Students choose their majors from among the curricula of the Departments of Agricultural Education and General Agriculture, Agricultural and Resource Economics, Animal Sciences, Crop and Soil Science, Fisheries and Wildlife, Food Science and Technology, Horticulture, and Rangeland Resources, as well as the program areas of Bioresource Research and Pre-Veterinary Medicine .

In cooperation with the College of Science, degrees are offered in the Departments of Botany and Plant Pathology, Entomology, Microbiology, and Statistics. The M.S. and Ph.D. degrees in Bioresource Engineering are offered through the College of Engineering but are administered by the Department of Bioresource Engineering in the College of Agricultural Sciences.

Most departments offer the Master of Agriculture (M.Agr.), Master of Science (M.S.) and the Ph.D. degrees and participate in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) degree program.

## International Degree

Undergraduates with majors in the College of Agricultural Science can earn a second degree in International Studies. (See the Interdisciplinary Studies section of this catalog for more information.)

## High School Preparation

Advances in technology and sciences in agriculture make the study of physical, biological, and social sciences and communications a vital necessity. High School Agricultural Science and Technology (AST) courses also help prepare students for college. The following preparation in high school is strongly recommended for students who plan to major in agriculture: English, 4 units; mathematics, 3 units; physics, chemistry, and biology, 1 unit each; social studies, 3 units; and other college preparation, 2 units (including AST).

## Individual Advising

Each student is considered an important individual. His or her study program is developed in personal consultation with a faculty adviser in the department in which the student has expressed a major interest. As early as possible, students select a subject area and become associated with instructors and other students having similar interests. Initial or early advising is based upon the student's high school record and placement test scores. When 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.

## 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 adviser in the area of interest and meet the following requirements.

1. The minor must consist of a minimum of 27 designated credits of related course work, including 12 in upper division courses.
2. Courses required for the student's major may not count toward a minor.
3. An individual course may not count toward more than one minor.

## Internships

The College of Agricultural Sciences in cooperation with the Cooperative Education Coordinator offers academic credit for supervised work experience. Internships are available in all facets of agriculture, through individual departmental offerings. Applications for internships must be approved prior to placement. Details are available from advisers or from the College of Agricultural Sciences Student Advancement Office.

## Job Opportunities

The diverse professional and occupational areas in agriculture include agricultural managers, marketers and merchandisers; natural resource managers particularly in rangelands, fisheries, and wildlife; scientists and engineers specializing in the fields of agriculture, food, and natural resources; communications and education specialists; and agricultural production specialists. A listing of current job opportunities can be found at www.orst.edu/dept/agric/jobs.

## Graduation Requirements

To be eligible for a Bachelor of Science (B.S.) degree, a student must complete a minimum of 180 credits including:

1. University requirements (see Baccalaureate Core Requirements)
2. Courses in agriculture: 36 credits including 24 credits at the upper division level. Some majors require up to 192 credits.

## Scholarships

The College of Agricultural Sciences offers a variety of scholarships to deserving students. Several are reserved for incoming high school or transfer students. Additional information and application forms are available from the Student Advancement Office. For more information see the Scholarship section in the front of this catalog.

Footnotes for this section on page 205.

*Oregon State University*
*Corvallis, OR*
*97331-2202*
*(541) 737-2211*
*www.orst.edu/dept/agric*

### ADMINISTRATION

**THAYNE R. DUTSON**
*Dean*

**MICHAEL J. BURKE**
*Associate Dean*

**L.-J. KOONG**
*Associate Dean*

**LAVERN J. WEBER**
*Associate Dean*

**KARRIE GEORGE**
*Head Advisor*

## AGRICULTURAL AND RESOURCE ECONOMICS

William G. Boggess, Head
213 Ballard Extension Hall
Oregon State University
Corvallis, OR 97331-3601
(541) 737-2942

**Faculty**
*Professors* Adams, Boggess, Buccola, Castle, Cornelius, Eisgruber, Hanna, Johnston, Miller, Obermiller, Perry, Rettig, Stevens, Weber; *Associate Professors* Burt, Eleveld, Greer, Hinman, Lev, Polasky, Schmisseur, Seavert, Sylvia, Tanaka; *Assistant Professors* Diebel, Durham, Emami, Munisamy, Wu

### Undergraduate Majors

**Agricultural and Resource Economics (B.S.)**
*Options*
**Agricultural Economics**
**Resource & Environmental Economics**
**Agricultural Business Management (B.S.)**

### Minors

Agricultural Business Management
Agricultural Economics
Resource Economics

### Graduate Majors

**Agricultural and Resource Economics (M.S., Ph.D.)**
**Economics (M.A., M.S., Ph.D.)**
*Graduate Areas of Concentration*
Production Economics
Economics of Development
Food Markets and Trade
Resource and Environmental Economics

The Department of Agricultural and Resource Economics offers two baccalaureate (Bachelor of Science) degrees. They open doors to exciting careers in traditional areas of commercial agriculture, agricultural business management, agricultural policy, and in new career opportunities in natural resource and environmental management, marine resources, international trade and development, and rural growth and change.

The **Agricultural and Resource Economics (AREC)** degree contains options in agricultural economics as well as resource and environmental economics. The degree emphasizes training in the social and physical sciences, providing students with the skills they need to address production, marketing, and resource management issues. The option in resource and environmental economics was recently created to reflect the growing demand for economists in this area. Flexibility is provided to match program focus with student interest. The degree prepares students for a wide range of careers including public service with federal, state, and local agencies, international groups, and private businesses plus graduate study.

The **Agricultural Business Management (ABM)** degree prepares students for the unique challenges and opportunities in agricultural business careers. The degree 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 technical minor from one of eight fields offered within the College of Agricultural Sciences.

### CAREERS

Following graduation, majors may pursue a number of attractive career opportunities. Many move directly into professional jobs with agribusiness firms, financial and insurance institutions, agricultural or natural resource management agencies of state and federal government, planning institutions in both the private and public sectors, and the like. Others complete graduate programs, generally with M.S. or M.B.A. degrees.

### CURRICULUM

#### AGRICULTURAL AND RESOURCE ECONOMICS

The curriculum leading to the B.S. degree in agricultural and resource economics is designed to develop the skills of students in agricultural economics, resource economics, economic development, marine economics, international agricultural trade, and in related fields. Along with the baccalaureate core of required courses in the sciences and humanities, students may select a broad range of electives with the help of a faculty adviser. This program provides flexibility to meet a wide variety of educational and career goals.

**B.S. Degree Requirements (180)**

**Baccalaureate Core (48)**
**Agricultural & Resource Economics**
AREC 101. Orientation to Ag and Resource Econ (1)
AREC 300. Applied Economics Analysis (3)
AREC 311. Intermediate Microeconomic Theory I (4)
AREC 312. Intermediate Microeconomic Theory II (4)
AREC 461. Ag and Food Policy Issues (4)

**Business Administration**
BA 271. Information Technology in Business (3)

**Social Science and Liberal Arts**
ECON 201. Introduction to Microeconomics (4)
ECON 202. Introduction to Macroeconomics (4)
ECON 315. Intermedicate Macroeconomic Theory (4)

**Communication**
COMM 111 or 114
WR 323 or WR 327 (3)

**Mathematics**
MTH 111. College Algebra (4)
MTH 241. Calculus for Management & Social Science (4)

**Statistics**
ST 351. Introduction to Statistical Methods (4)
ST 352. Introduction to Statistical Methods (4)
or
ECON 325. Introduction to Econometric Methods (4)

**Science**
Two terms Chemistry or Physics
Two terms Biology

**AGRICULTURAL ECONOMICS OPTION:**
BA 215. Fundamentals of Accounting (4)
AREC 211. Management in Agriculture (4)
AREC 221. Marketing in Agriculture (3)
AREC 351. Natural Resource Management (4)
or
AREC 352. Environmental Economics & Policy (3)
AREC 370. Agricultural Marketing (3)
AREC 447. Ag Price and Market Analysis (4)
**Two classes from the following list:**
CSS 300. Introduction to Crop Production (4)
CSS 305. Principles of Soil Science (4)
ANS 121. Introduction to Animal Sciences (4)
RNG 341. Rangeland Resources (3)
**Eighteen additional upper division hours from approved list.**

**RESOURCE AND ENVIRONMENTAL ECONOMICS OPTION:**
AREC 250. Introduction to Environmental Economics and Policy (3)
AREC 410. Internship (6) or
AREC 406. Research Project (6)
AREC 434X. Environmental & Natural Resource Economics (3)
AREC 477. Economics, Politics & Government (3)
PS 475. Politics of Environmental Problems (4) OR
PS 474. Bureaucratic Politics & Policy (4)
**Two of the following courses:**
AREC 351. Natural Resource Management (4)
AREC 352. Environmental Economics & Policy (3)
AREC 353. Public Land Policy (3)
**One of the following courses:**
AREC 452. Marine and Fishery Economics (3)
FOR 432. Economics of Recreation Resources (3)
AREC 432. Economics of Rural Development (3)
**Two courses from the following list:**
BI 370. General Ecology (3)
CSS 305. Principles of Soil Science (4)
CSS 355. Water Resource Science
GEO 265. GIS Practicum
OC 331. Introduction to Oceanography
**Eleven additional upper division hours from approved list**

#### AGRICULTURAL BUSINESS MANAGEMENT

The B.S. curriculum in agricultural business management 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. Skills are developed in agribusiness finance, agribusiness management, and agribusiness marketing and export trade. Students select a minor within the College of Agricultural Sciences. An internship or project is required to integrate course work with business-oriented experiences.

**B.S. Degree Requirements (180)**

**Baccalaureate Core (48)**

**Agricultural Core Courses**
AREC 101. Orientation to Ag and Resource Econ (1)
AREC 211. Management in Agriculture (4)
AREC 221. Marketing in Agriculture (3)
AREC 300. Applied Economics Analysis (3)
AREC 370. Agricultural Marketing (3)
AREC 447. Ag Price and Market Analysis (4)
AREC 406/410. Projects/Internship (6)
AREC 441. Ag Financial Management (4)
AREC 442. Ag Business Management (4)
AREC 461. Ag and Food Policy Issues (4)

**Business Administration**
BA 215. Fundamentals of Accounting (4)
BA 230. Business Law (4)
BA 271. Info Technology in Business (3)
BA 340. Finance (4)
BA 352. Organizational Behavior (4)

**Liberal Arts and Social Sciences**
ECON 201. Intro to Microeconomics (4)
ECON 202. Intro to Macroeconomics (4)

**Communication**
COMM 111 or 114 (3)
WR 323 or 327 (3)

**Physical Sciences**
One Chemistry course (3-5)
MTH 111. College Algebra (4)
MTH 241. Calculus for Mgmt & Social Sci (4)
ST 351. Intro to Statistical Methods (4)
ST 352. Intro to Statistical Methods (4) OR ECON 325. Intro to Econometric Methods (4)

**Minors**
Technical minor within the College of Agricultural Sciences unless specifically approved by the Department.

## MINOR PROGRAMS

Minors in Agricultural Economics, Resource Economics, and Agricultural Business Management are available to any undergraduate student except AREC and ABM majors.

### AGRICULTURAL ECONOMICS (27)

**Requirements**
ECON 201. Intro to Microeconomics (4)
ECON 202. Intro to Macroeconomics (4)
AREC 211. Management in Agriculture (4)
AREC 221. Marketing in Agriculture (3)
AREC 311. Intermediate Microeconomic Theory I (4)
AREC 461. Agricul and Food Policy Issues (4)

**Electives**
Select additional upper division AREC courses to make 27 total credits.

### RESOURCE ECONOMICS (27)

**Requirements**
ECON 201. Intro to Microeconomics (4)
AREC 300. Applied Economic Analysis (3)
AREC 311. Intermediate Microeconomic Theory I (4)
Select 3-4 of the following courses:
AREC 351. Natural Resource Management (4)
AREC 352. Environmental Econ & Policy (3)
AREC 353. Public Land Policy (3)
AREC 461. Ag and Food Policy Issues (4)

**Electives**
*Select additional credits from the following list to make a total of 27 credits:*
AREC 250. Intro to Environmental Econ & Policy (3)
AREC 432. Econ of Rural Development (3)
AREC 434X. Natural Resource Economics (3)
AREC 452. Marine & Fishery Economics (3)
AREC 477. Eonomics, Politics, & Govt. (3)
ECON 202. Intro to Macroeconomics (4)
ECON 315. Intermediate Macroecon Theory (4)
ECON 435. The Public Economy (4)
ECON 439. Public Policy Analysis (4)
FOR 430. Forest Resource Economics I (4)
FOR 431. Econ of Recreation Resources (3)
FOR 432. Econ of Recreation Resources (3)
NR 455. Natural Resource Decision Making (3)
PS 474. Bureaucratic Politics & Policy (4) or PS 475. Politics of Environmental Problems (4)

### AGRICULTURAL BUSINESS MANAGEMENT (27)

**Requirements**
ECON 201. Intro to Microeconomics (4)
BA 215. Fundamentals of Accounting (4)
AREC 211. Management in Agriculture (4)
AREC 221. Marketing in Agriculture (3)
AREC 300. Applied Economics Analysis (3)

To complete the minor in Agricultural Business Management, you must complete a minimum of 10 credits from either the Ag Business Option or the Farm Management Option.

**Agricultural Business Option (11)**
For an emphasis in Agricultural Business Management, complete the minor with the following coursework:
BA 340. Finance (4)
AREC 370. Agricultural Marketing (3) or AREC 441. Agricultural Finance (4)

**Farm Management Option (10)**
For an emphasis in Farm Management, select credits from the following list to total 2-
AREC 385. Advanced Farm Management (3
AREC 407. Ag Cooperatives Seminar (1
BA 463. Family Business Management (4
*One of the following*
AREC 351. Natural Recource Mangement (4
AREC 352. Environmental Econ & Policy (3
AREC 353. Public Land Policy (3
Other AREC upper division classes tha complement a Farm Management emphasis

## GRADUATE STUDIE

The department offers graduate wor leading to the M.S. and Ph.D. degrees i Agricultural and Resource Economics an offers courses supporting the M.Agr. an M.A.I.S. graduate degree programs. Th Department also participates in th University Graduate Faculty of Economic to offer the M.A., M.S., and Ph.D. degrees i Economics. Through these programs, th Department strives to develop applie economists who are well trained in economic theory and quantitative method with specialized research experience in th fields of (a) Production Economics; (b Resource and Environmental Economics; (c Economics of Development; and (d) Foo Markets and Trade. Opportunities for polic analysis exist in each of these fields o study. The University graduate faculty o economics coordinates the core course wor in economic theory and quantitativ methods. Detailed information on graduate programs offered by the Department and the University Graduate Faculty of Economics is available on request.

Many students who receive the M.S. degree continue their studies towards the Ph.D. degree. Others enter a wide range of occupations, such as positions with the Cooperative Extension Service, U.S. Department of Agriculture, international organizations (such as F.A.S. and U.S.A.I.D.), consulting firms, and state government. Ph.D. recipients take professorial (teaching/research/extension) positions in universities around the world. Others are employed in federal and state agencies.

More detailed information on the M.S. and Ph.D. degree programs may be obtained by contacting the department's graduate program coordinator. Further information on the M.Agr. and M.A.I.S. degree programs may be obtained from the Academic Program Offices of the Colleges of Agricultural Sciences and Liberal Arts, respectively.

## COURSES

**Lower Division Courses**

**AREC 101. ORIENTATION TO AGRICULTURAL AND RESOURCE ECONOMICS (1).** Introduction to department, college, and university programs and to the fields of study in agricultural and resource economics; academic guidance and career planning. PREREQ: Freshman, new major, or minor.

**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. PREREQ: ECON 201.

**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. PREREQ: ECON 201.

**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 tradeoffs 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)

**Upper Division Courses**

**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. PREREQ: ECON 201, MTH 241.

**AREC 311. INTERMEDIATE MICROECONOMIC THEORY I (4).** An examination of the theories of consumer behavior and demand, production cost, the firm, supply, and competitive and monopoly market structures. PREREQ: ECON 201, ECON 202, and MTH 241 or MTH 251. CROSSLISTED AS ECON 311

**AREC 312. INTERMEDIATE MICROECONOMIC THEORY II (4).** Examination of the theories of imperfect competition, input markets, general equilibrium and welfare economics. PREREQ: AREC 311. CROSSLISTED AS ECON 312.

**AREC 351. *NATURAL RESOURCE MANAGEMENT (4).** Application of principles of economics to problems of natural resource use, particularly to current and historical conflicts among water uses in Oregon and other western states: these uses include irrigation, hydropower, municipal and industrial, navigation, and fisheries habitat. PREREQ: ECON 201, MTH 111. (Bacc Core Course)

**AREC 352. *ENVIRONMENTAL ECONOMICS AND POLICY (3).** Analysis of the interrelationships among economic activity, government policies, and the environment; benefits and costs of economic growth; economics of environmental quality and the social costs of pollution. Three to five case studies, selected by the instructor, introduce students to the way economists analyze environmental policies. PREREQ: ECON 201. CROSSLISTED AS ECON 352. (Bacc Core Course)

**AREC 353. PUBLIC LAND POLICY (3).** Policies guiding the homesteading and economic development of the western states; laws and policies guiding the regulation and use of grazing, timber, and mineral resources. PREREQ: ECON 201.

**AREC 370. AGRICULTURAL MARKETING (3).** Marketing functions; economics of agricultural markets; marketing firms and their services; price determining forces; marketing problems; cooperatives; futures markets. PREREQ: AREC 221 and AREC 311.

**AREC 382. FARM AND RANCH APPRAISAL (3).** 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. PREREQ: ECON 201.

**AREC 385. ADVANCED FARM MANAGEMENT (3).** An applied course in farm/ranch business decision making. Analysis of current farm/ranch financial position and performance; use of budgeting techniques to project impacts of future management changes. Case study problems will be analyzed using decision support software. Simulation game used to practice business decision making. PREREQ: AREC 211, ECON 201, BA 215.

**AREC 388. LEGAL ASPECTS OF AGRICULTURE (3).** 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.

**AREC 401. RESEARCH (1-16).**

**AREC 402. INDEPENDENT STUDY (1-16).**

**AREC 403. THESIS (1-16).** PREREQ: Senior standing.

**AREC 405. READING AND CONFERENCE (1-16).**

**AREC 406. PROJECTS (1-16).**

**AREC 407. SEMINAR (1-16).**

**AREC 408. WORKSHOP (1-16).**

**AREC 410. INTERNSHIP (1-6).** Practical on-the-job training in agricultural business, marketing, commercial agricultural production, or related private or public organizations. PREREQ: Junior or senior standing. Submission and approval of pre-internship work plans. PREREQ: Consent of Internship Program Coordinator. Graded P/N.

**AREC 432/AREC 532. ECONOMICS OF RURAL DEVELOPMENT (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. PREREQ: AREC 311. Offered alternate years. Offered 1998-99.

**AREC 433/AREC 533. *INTERNATIONAL AGRICULTURAL DEVELOPMENT (3).** Role of agriculture in economic development; theoretical and policy issues in agricultural development; supply of and demand for agricultural resources and products; population pressure on land; value and use of resources; agricultural development policy. PREREQ: AREC 311. Senior or graduate standing. (Bacc Core Course)

**AREC 441/AREC 541. 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. PREREQ: AREC 211; AREC 311, BA 215, and BA 340.

**AREC 442/AREC 542. AGRICULTURAL BUSINESS MANAGEMENT (4).** Application of economic principles to agricultural businesses; use of regression and linear programming as management tools; risk management; marketing; forecasting; production management; competitive strategies. PREREQ: AREC 441/541.

**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. PREREQ: AREC 311; AREC 370; ST 351; ECON 325 or ST 352. Lec/lab.

**AREC 452/AREC 552. MARINE AND FISHERY ECONOMICS (3).** Economic aspects of marine resource utilization and management; the resources; conflict and allocation of marine resources; marine resource markets. Includes marine recreation, pollution, and aquaculture, with special emphasis on commercial fisheries. PREREQ: AREC 351 or AREC 311. Offered alternate years. Not offered 1998-99.

**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. PREREQ: AREC/ECON 311. (Writing Intensive Course)

**AREC 477. ECONOMICS, POLITICS, AND GOVERNMENT (3).** Why and how governments tax, spend, subsidize, regulate, and deregulate; applications of economic and public choice theory. PREREQ: ECON 201, ECON 202. CROSSLISTED as ECON 477, PS 477.

### Graduate Courses

**AREC 501. RESEARCH (1-16).**

**AREC 503. THESIS (1-16).**

**AREC 505. READING AND CONFERENCE (0-16).**

**AREC 507. SEMINAR (1-16).**

**AREC 508. WORKSHOP (1-16).**

**AREC 512. MICROECONOMIC THEORY I (4).** Economic theories of consumer behavior and demand. Proficiency will be gained in production, cost, supply, and duality. PREREQ: AREC 312, ECON 312, or equivalent. CROSSLISTED as ECON 512.

**AREC 513. MICROECONOMIC THEORY II (4).** Economic theories of imperfect competition, input markets, general equilibrium and welfare economics. PREREQ: AREC 512. CROSSLISTED as ECON 513.

**AREC 525. ECONOMETRIC METHODS (4).** The use of multiple regression under generalized assumptions, specification problems, introduction to simultaneous equation estimation, the classical linear model using matrices. Emphasis on the analysis of data and communication of findings. PREREQ: ECON 325 and AREC 512/ECON 512. CROSSLISTED as ECON 525.

**AREC 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. PREREQ: AREC 525 CROSSLISTED as ECON 526.

**AREC 543. MARKETS AND TRADE (3).** Topics covered include consumer demand, price analysis, market structure, pricing strategies and the relationships between trade policy and natural resource use. Applications will be to the agricultural sector, fisheries, and forestry. PREREQ: AREC 513/ECON 513, AREC 526/ECON 526 AND ECON 440/ECON 540.

**AREC 550. ENVIRONMENTAL ECONOMICS (3).** Historical development of environmental management and environmental economics; economics of environmental pollution, including the concept of economic efficiency, the optimal level of pollution, and alternative pollution control approaches; measuring environmental values and damages, including the contingent valuation methods, revealed preference models, and the transfer of such values; the time, discount rates, uncertainty and sustainable development. PREREQ: AREC/ECON 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. PREREQ: AREC/ECON 512.

**AREC 561. RESEARCH IN AGRICULTURAL AND RESOURCE ECONOMICS (4).** Identification and conceptualization of research issues in agricultural and resource economics; selection of procedure and methods for resolution of research problems; organization and communication of findings.

**AREC 581. SPECIAL TOPICS (1-3).** Various topics in agricultural and resource economics of special and current interest not covered in other courses. May be repeated for credit. Graded P/N.

**AREC 592. AGRICULTURAL CREDIT ANALYSIS (4).** Current situation and outlook for development of agricultural lending policies; financial statements and cash flow analysis; tax management; risk management; bankruptcy; forms of business and estate planning; investment analysis, leasing, and marketing strategies. REQ: Consent of instructor. Must be taken in order.

**AREC 593. AGRICULTURAL CREDIT ANALYSIS (4).** Current situation and outlook for development of agricultural lending policies; financial statements and cash flow analysis; tax management; risk management; bankruptcy; forms of business and estate planning; investment analysis, leasing, and marketing strategies. REQ: Consent of instructor. Must be taken in order.

**AREC 601. RESEARCH (1-16).**

**AREC 603. THESIS (1-16).**

**AREC 605. READING AND CONFERENCE (1-16).**

**AREC 607. SEMINAR (1-16).**

**AREC 608. WORKSHOP (1-16).**

**AREC 611. ADVANCED MICROECONOMIC THEORY: PRODUCTION AND CONSUMPTION (3).** A rigorous development of the theory of production and consumption behavior, with emphasis on duality. PREREQ: AREC 513, MTH 254. CROSSLISTED AS ECON 611.

**AREC 612. ADVANCED MICROECONOMIC THEORY: OUTPUT & INPUT MARKETS (3).** Competitive, monopoly, and imperfectly competitive input and output market structures; game theory. PREREQ: AREC 611. CROSSLISTED AS ECON 612.

**AREC 613. ADVANCED MICROECONOMIC THEORY: GENERAL EQUILIBRIUM & WELFARE (3).** A rigorous treatment of general equilibrium and welfare theory; risk, uncertainty, and imperfect information; social choice theory. PREREQ: ECON 612. CROSSLISTED as ECON 613.

**AREC 617. RESEARCH METHODOLOGY (3).** An examination of what constitutes reliable knowledge in economics; philosophy of science and economic research; fundamental economic concepts affecting economic research; quantitative techniques and empirical investigation. PREREQ: Completion of one academic year of graduate work in economics or related field. CROSSLISTED AS ECON 617.

**AREC 625. ADVANCED ECONOMETRICS I (3).** Statistical foundations of econometrics; the general linear statistical model with autocorrelation and heteroscedasticity; maximum likelihood estimation; hypothesis testing; multicollinearity; errors in variables; asymptotic distribution theory. PREREQ: AREC 526, ST 521. CROSSLISTED AS ECON 625.

**AREC 626. ADVANCED ECONOMETRICS II (3).** Systems of equations; seemingly unrelated regression models; identification and estimation of simultaneous equation models; time series analysis; distributed lag models; forecasting and model evaluation. PREREQ: AREC 625. CROSSLISTED AS ECON 626.

**AREC 643. APPLIED INTERNATIONAL TRADE ANALYSIS (3).** Theoretical and empirical approaches to the analysis of international trade in food and fiber products and of related trade, macroeconomic and agricultural policies; interdependencies between international trade and natural resource use. PREREQ: AREC 513, AREC 526, ECON 540. Offered alternate years.

**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. PREREQ: AREC 513, AREC 526. Offered alternate years.

**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. PREREQ: AREC 513, AREC 526. Offered alternate years. Offered 1998-99.

**AREC 681. SPECIAL TOPICS (1-3).** Various topics in agricultural and resource economics

## AGRICULTURAL CHEMISTRY

Ian Tinsley, Head
1007 Agricultural and Life Sciences
Oregon State University
Corvallis, OR 97331-7301
(541) 737-3791

**Faculty**

*Professors* Bailey, Baird, Buhler, Deinzer, Hays, Hendricks, Kerkvliet, Miller, Mosbaugh, Tinsley, Wagner, Whanger, Williams; *Associate Professors* Jenkins; *Assistant Professors* Field, Miranda; *Senior Research Assistants* Arbogast, Butler, Hoffman, Inman, Johnson, Loveland, Oughton, Steppan, Thomson

**Majors**

**Agricultural Chemistry (no degree offered)**
**Toxicology (M.S., Ph.D.)**

The Department of Agricultural Chemistry offers both upper division and graduate courses as well as research opportunities in applied chemistry and molecular biology; particular emphasis is given to environmental problems.

The definition and solution of problems associated with the impact of chemical and biological technology on the environment require the application of fundamental concepts in chemistry, toxicology, and molecular biology. Course and laboratory work in these areas provide valuable perspectives for students in the physical, engineering, and biological sciences who have interests in environmental science, resource management, or biotechnology.

Toxicology is an interdisciplinary graduate program administered by the Graduate School. The Toxicology Program offers courses leading to the M.S. or Ph.D. degree in Toxicology and prepares students for careers in toxicology in industry, government, and academic institutions. Biochemical, chemical, and pathological research approaches are emphasized, focusing on the following areas: analyical, aquatic, biochemical, comparative, environmental, food, immuno- and neurotoxicology. The close interactions between the faculty and the National Institute of Environmental Health Sciences (NIEHS) supported Environmental Health Sciences Center and Marine/Freshwater Biomedical Sciences Center at OSU contribute additional research and training opportunities for students. Three scientists from the Oregon Health Sciences University are also faculty members and provide students with new opportunities directly related to issues in human health. Most students in the program receive financial support through graduate research assistantships or from an NIEHS environmental health predoctoral training program.

The Toxicology Program has an interdisciplinary focus with faculty from the Colleges of Science, Agricultural Sciences, Pharmacy, Veterinary Medicine, Engineering, the staff of OSU's Hatfield Marine Sciences Center, and from the Center for Research on Occupational and Environmental Toxicology, and the Department of Pharmacology at the Oregon Health Sciences University in Portland.

Students who wish to enter the program should have a B.S. degree (or equivalent) in a science related field and are expected to develop a M.S. or Ph.D. curriculum related to their own area of specialization. Students will take a core set of courses and they will attend and participate in the Toxicology Seminar class. Courses in toxicology also may be taken by students in engineering or the basic sciences.

### COURSES

#### ■ AGRICULTURAL CHEMISTRY

**Upper Division Courses**

**AC 401/AC 501. RESEARCH (1-16).**

**AC 405/AC 505. READING AND CONFERENCE (1-16).**

**AC 420/AC 520. COMPARATIVE METABOLISM OF FOREIGN COMPOUNDS (3).** Metabolism of exogenous chemicals by animals and relation to environmental problems; comparative aspects of metabolic processes; interacting effects of other chemicals, nutritional and environmental variables; metabolic aspects of selective toxicity. PREREQ: BB 450, BB 451. Offered alternate years, fall term. CROSSLISTED as TOX 420/520.

**AC 428/AC 528. CHEMICAL ANALYSIS OF ENVIRONMENTAL RESIDUES (3).** Separation and analysis of chemical pollutants in the environment; considerations in sampling, separation techniques, instrumentation and methods used for chemical analysis and confirmation of trace levels of organic chemicals and heavy metals. PREREQ: CH 331 and CH 332 or equivalent. CROSSLISTED as TOX 428/528.

**AC 430/AC 530. CHEMICAL BEHAVIOR IN THE ENVIRONMENT (3).** Application 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. PREREQ: CH 106, CH 331; senior standing. CROSSLISTED as TOX 430/530.

**AC 445/AC 545. ON-LINE TOXICOLOGY DATA SYSTEMS (3).** Use of on-line systems (Toxline, CAS-Online, etc.) to obtain bibliographic and other data relating to toxicology and application of PROPHET system for toxicological data analysis. PREREQ: BB 450, BB 451. CROSSLISTED as TOX 445/545.

**AC 450/AC 550. ENVIRONMENTAL TOXICOLOGY (3).** Principles of environmental toxicology including exposure, uptake, and distribution of environmental chemicals; quantitative assessment of toxicity; nature of toxic effects; epidemiological studies; and risk assessment. PREREQ: Organic chemistry and introductory biology.

**AC 460/AC 560. BIOTECHNOLOGY: PERSPECTIVES AND CASE STUDIES (3).** Theory and application of biotechnology in research, agriculture and medicine. PREREQ: One year of biology, chemistry, and physics; GEN 311 or BB 331/332; BB 350 or BB 351/352 or BB 450/451. Offered alternate years, spring term.

**Graduate Courses**

**AC 601. RESEARCH (1-16).**

**AC 603. THESIS (1-16).**

**AC 605. READING AND CONFERENCE (1-16).**

**AC 606. PROJECTS (1-16).**

**AC 607. SEMINAR (1-16).**

**AC 637. MASS SPECTROMETRY OF ORGANIC COMPOUNDS (3).** Physical principles of mass spectrometric instrumentation and interpretation of the mass spectra of organic compounds. PREREQ: CH 336, CH 442, CROSSLISTED as CH 537.

#### ■ TOXICOLOGY

**Upper Division Courses**

**TOX 420/TOX 520. COMPARATIVE METABOLISM OF FOREIGN COMPOUNDS (3).** Metabolism of exogenous chemicals by plants and animals and relation to environmental problems; comparative aspects of metabolic processes; interacting effects of other chemicals, nutritional and environmental variables; metabolic aspects of selective toxicity. PREREREQ: BB 450, BB 451 for TOX 520. CROSSLISTED as AC 420/AC 520. Offered alternate years, fall term.

**TOX 428/TOX 528. CHEMICAL ANALYSIS OF ENVIRONMENTAL RESIDUES (3).** Separation and analysis of chemical pollutants in the environment; considerations in sampling, separation techniques, methods of chemical analysis used for analysis and confirmation of trace levels of organic chemicals and heavy metals. PREREQ: CH 428. CROSSLISTED as AC 428/AC 528.

**TOX 430/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. PREREQ: CH 106, CH 331, senior standing. CROSSLISTED as AC 430/530.

**TOX 445/TOX 545. ON-LINE TOXICOLOGY DATA SYSTEMS (3).** Use of on-line systems (Toxline, CASOnline, etc.) to obtain bibliographic and other data relating to toxicology and application of PROPHET system for toxicological data analysis. PREREQ: BB 450 or BB 451 CROSSLISTED as AC 445/ /AC 545, TOX 445/TOX 545

**Graduate Courses**

**TOX 501. RESEARCH (1-16).**

**TOX 503. THESIS (1-16).**

**TOX 505. READING AND CONFERENCE (1-16).**

**TOX 507. SEMINAR (1-16).**

**TOX 601. RESEARCH (1-16).**

**TOX 603. THESIS (1-16).**

**TOX 605. READING AND CONFERENCE (1-16).**

**TOX 607. SEMINAR (1-16).**

## AGRICULTURAL EDUCATION AND GENERAL AGRICULTURE

R. L. Cole, Head
112 Strand Agriculture Hall
Oregon State University
Corvallis, OR 97331-2204
(541) 737-2661

**Faculty**

*Professor* Cole; *Assistant Professor* Thompson, Fanno; *Student Advancement Coordinator* Balschweid, Nelson

### Undergraduate Major

**General Agriculture (B.S.)**

### Minors

Agricultural Sciences
International Agricultural Development

### Graduate Major

**Agricultural Education (M.S., M.Ag., M.A.T.)**

*Graduate Areas of Concentration*
Agricultural Education
International Agriculture

The Department of Agricultural Education and General Agriculture combines two programs. The General Agriculture program is an undergraduate studies program which provides maximum flexibility in designing and structuring a course of study to meet the students' individual needs. General Agriculture 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 in animal science, crops, and agricultural business management); students preparing for leadership positions in agriculture which require excellent communication and leadership skills as well as breadth of agricultural background (such as teachers of agriculture, lobbyists, commodity liaison persons, and 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 General Agriculture 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.

Agricultural Education offers course work that serves teachers and leaders in agriculture. The M.S., M.Agr., M.A.T., and M.A.I.S. degrees may be pursued with an emphasis in leadership, communication, pedagogy, extension and/or technical agriculture. Candidates work with an adviser to develop programs that meet their specific needs as indicated by their occupational objectives.

Two minors are available in the Agricultural Education and General Agriculture Department. 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.

The second minor, Agricultural Science, is available for undergraduate students who have majored in an area that requires the addition of breadth in agriculture to their major program. The Agricultural Science minor will provide appropriate technical agriculture background for a person interested in agricultural management, communication, environmental studies, etc.

### UNDERGRADUATE STUDIES

High school and college transfer students who are admitted to Oregon State University as an undergraduate are eligible to participate in the General Agriculture program. General Agriculture majors, in consultation with their departmental academic adviser, may plan elective course work to emphasize personal interests, abilities and career objectives.

A leadership and communication area of emphasis is available and was 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 General Agriculture major is to prepare agriculture's future leaders in education, extension, government, and business.

Career opportunities for General Agriculture majors are unlimited because of the unlimiting nature of the program structure. Students can return to home farms or ranches, move into agricultural middle management, become extension staff, move into political positions, work in marketing or international agriculture, complete the Teacher Preparation program and become high school teachers of agriculture, teach agriculture in community colleges or what ever they decide to plan a program to accomplish. Salaries vary depending on the position a student may strive to achieve.

#### GENERAL AGRICULTURE

**Baccalaureate Core (48)**

**Agricultural Core**
AG 111. Computer Apps in Agriculture (3)
AG 199. Special Studies (1)
AREC 211. Management in Agriculture (4)
AG 407. Senior Seminar (1)
AG 421. Leadership Development (WIC) (3)
Agricultural Electives (a minimum of 36 credits of technical agriculture, 24 credits of which must be upper division is required) (36)

**Business**
BA 215. Fundamentals of Accounting (4)
BA 230. Business Law (4) or Environmental Law (4)

**Communication**
Communications elective (3)

**Humanities, Arts and Social Sciences**
ECON 201. Principles of Economics (4)

**Sciences—Physical and Biological**
Physical science—chem (10-15)
Biological sciences—one-year series (12)

**Math**
Math 105. (3)

**Electives (48-52)**

**Total (180)**

**LEADERSHIP AND COMMUNICATION CURRICULUM**

The General Agriculture Curriculum plus the following:
COMM 111. Public Speaking (3)
COMM 114. Argumentation and Critical Discourse (3)
COMM 218. Interpersonal Communication (3)
Communication elective (6)

## MINORS

**AGRICULTURAL SCIENCES MINOR (27)**

**Lower Division Core**
AG 111. Computers in Agriculture (3)
One Agricultural Resource Mgmt. Course (3-4)
One Production Agriculture Course (3-4)

**Upper Division Core**
Two courses from selected department 1 (6-8)
Two Courses from selected department 2 (6-8)
**Electives (0-9)**

**INTERNATIONAL AGRICULTURAL DEVELOPMENT MINOR (27)**

**Undergraduate Curriculum**
AREC 433. Intl Agricul Development (3)
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.

**GRADUATE CURRICULUM**

AREC 533. International Ag Development (3)
AG 521. Leadership Development (3)
Language competency
Technical electives in agriculture (5 masters, 9 doctorate)
Social, cultural and economic electives (5)
Minimum of 21 credits for masters, 25 for doctorate.
*Note:* A graduate international agricultural development minor is not available to a student who took an undergraduate international agricultural development minor at Oregon State University.

## GRADUATE STUDIES

Students who have earned a baccalaureate degree and meet Graduate School entrance requirements may apply for participation in the Agricultural Education master degree programs.

Careers available to people who complete graduate work in Agricultural Education include teaching agriculture at the high school and community college level, extension staff, agricultural industry personnel, agricultural government personnel, and agricultural lobbyists. A student can complete a graduate program in Agricultural Education without being involved in the Teacher Certification program.

## COURSES

### ■ AGRICULTURE EDUCATION

**Upper Division Courses**

**AED 313. THEORY AND PRACTICUM III: FIELD (4).** Field based experience for students preparing to be agricultural teachers. Focus on teaching models. PREREQ: Sophomore standing.

**Graduate Courses**

**AED 501. RESEARCH (1-16).**

**AED 503. THESIS (1-16).**

**AED 505. READING AND CONFERENCE (1-16).**

**AED 507. SEMINAR (1-16).**

**AED 508. WORKSHOP (1-16).**

**AED 509. PRACTICUM (1-16).**

**AED 510. PROFESSIONAL INTERNSHIP: AGRICULTURE EDUCATION (1-16).** 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.

**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.

**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.

**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.

**AED 556. LINK RESEARCH, TEACHING, AND PRACTICE (3).** This course links research to teaching. Students will work with cooperating teachers and 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 Agricultrual Education at the secondary level.

**AED 558. IMPROVING VOCATIONAL EDUCATION PROGAMS (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.

### ■ GENERAL AGRICULTURE

**Lower Division 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).**

**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.

**Upper Division Courses**

**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. (Bac 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 overhaul. Engine efficiency theories and measurement are presented.

**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).**

**AG 405. READING AND CONFERENCE (1-16).**

**AG 407. SEMINAR (1-16).**

**AG 410. INTERNSHIP (1-15).** A work-internship to give students practical on-the-job preparation in any of the many facets of agriculture or related industries. PREREQ: College and instructor approval.

**AG 421/AG 521. ^LEADERSHIP DEVELOPMENT (3).** Principles of leadership development, leadership analysis and style, record keeping procedures, youth organizations, and activities in leadership for youth. PREREQ: Senior standing. (Writing Intensive Course)

**AG 425/AG 525. DEVELOPMENTS IN AGRICULTURAL MECHANICS (3).** Emphasis on the development of instructional units for agricultural instruction programs. Wide applications to agricultural mechanization. PREREQ: Senior standing.

**AG 492/AG 592. *TECHNOLOGY TRANSFER IN AGRICULTURE (3).** Examination of processes by which formal and informal agricultural instructional 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. PREREQ: Senior standing. (Bacc Core Course)

**Graduate Courses**

**AG 507. SEMINAR (1-16).**

**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.

**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. PREREQ: Teaching or Extension experience.

## ANIMAL SCIENCES

L. Swanson, Interim Head
112 Withycombe Hall
Oregon State University
Corvallis, OR 97331-6702
(541) 737-3431

**Faculty**
*Professors* Carr, Cheeke, Davis, Forsberg, Gamroth, Hathaway, Howell, Hu, Koong, Meyer, Savage, Stormshak, Swanson, Weber; *Associate Professors* Carroll, DelCurto, Farnsworth, Froman, Gangwer, Hermes, Holtan, Menino, Mills, Pirelli, Thompson, Zollinger; *Assistant Professors* Brodie, Knutson; *Senior Instructor* Hill; *Instructor* Dickson, Girdis, Jacobs, Pawelek, Struble; *Research Assistants* Beilstein, Cross, Feltmann, Keller, Paxton, Taylor; *Professional* Busse; *Adjunct Faculty* Chamberlain, Mobley, Vavra

### Undergraduate Major

**Animal Sciences (B.S.)**
*Options*
Preveterinary Medicine
Beef Emphasis
Dairy Emphasis
Equine Emphasis
Poultry Emphasis
Sheep Emphasis

### Minor

Animal Sciences
Equine Science

### Graduate Major

**Poultry Science (M.S., Ph.D.)**
**Animal Sciences (M.S., Ph.D.)**
*Graduate Areas of Concentration*
Dairy Production
Endocrinology
Genetics
Growth and Development
Livestock Management
Nutrition
Nutritional Biochemistry
Reproductive Physiology

Programs in animal sciences provide up-to-date information on methods of rearing domestic livestock and poultry, equine, and producing meat, milk, eggs, wool, and other animal products. Essential to this information is knowledge generated in 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 B.S. degree in agriculture can be developed. To allow students flexibility in course arrangement, six 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 offices in banks and credit agencies; government agency positions at local, state and federal levels; and the Peace Corps.

Graduate students may pursue research projects through the Agricultural Experiment Station as part of their programs for M.S. or Ph.D. degrees. Graduate majors are offered in animal genetics, animal nutrition, and animal physiology.

### CURRICULUM[1]

**Baccalaureate Core (48)**

**Animal Sciences Core**
ANS 100. Orientation to Animal Sciences (2)
ANS 121. Introduction to Animal Sciences (4)
ANS 207. Sophomore Seminar (1)
ANS 210. Applied Animal Nutrition: Feeds and Feed Processing (3)
Two Animal Industries courses from ANS 215, ANS 216, ANS 217, ANS 220, ANS 231, ANS 280 (6)
ANS 251. Principles of Animal Foods Technology (3)
ANS 311. Principles of Animal Nutrition (3)
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)
Two production courses (from ANS 430, ANS 433, ANS 434, ANS 436, ANS 439, ANS 443, ANS 444) (6)
ANS 420. Ethical Issues in Animal Agriculture (3)

**Physical and Biological Sciences**
CH 121, CH 122, CH 123. Gen Chem (15) or CH 221, CH 222, CH 223. Gen Chem (15)
BI 211, BI 212, BI 213. Introductory Biology (12)
MTH 111. College Algebra (4)
A microbiology course (3)

**Statistics**
ST 201, ST 202. Prin. of Stats (6) or St 351. Intro. to Stat Meth (4)

**Business**
BA 215. Fundamentals of Accounting (4), or BA 230. Business Law (4) or, AREC 211. Management in Agriculture (4) or, AREC 221. Marketing in Agriculture (3)

### OPTIONS

#### PREVETERINARY MEDICINE

This 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 B.S. degree in Animal Sciences.

Students not admitted to veterinary school after completing the three-year program may complete additional requirements to qualify for the B.S. degree in Animal Sciences. Those with training in poultry who also earn a D.V.M. degree have an additional advantage; only a very small percentage of veterinary school graduates have the appropriate academic background to qualify for poultry veterinary positions.

The 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: Core curriculum and additional credits as required by the College of Veterinary Medicine.

#### ANIMAL PRODUCTION

Provides background for making decisions in the production and management of poultry, dairy cattle and meat animal enterprises which include beef cattle, sheep and swine; includes basic sciences and animal sciences with less intense training in crops, soils and business. With this option, there are five areas of emphasis. Requirements: Core curriculum and additional credits in consultation with the adviser.

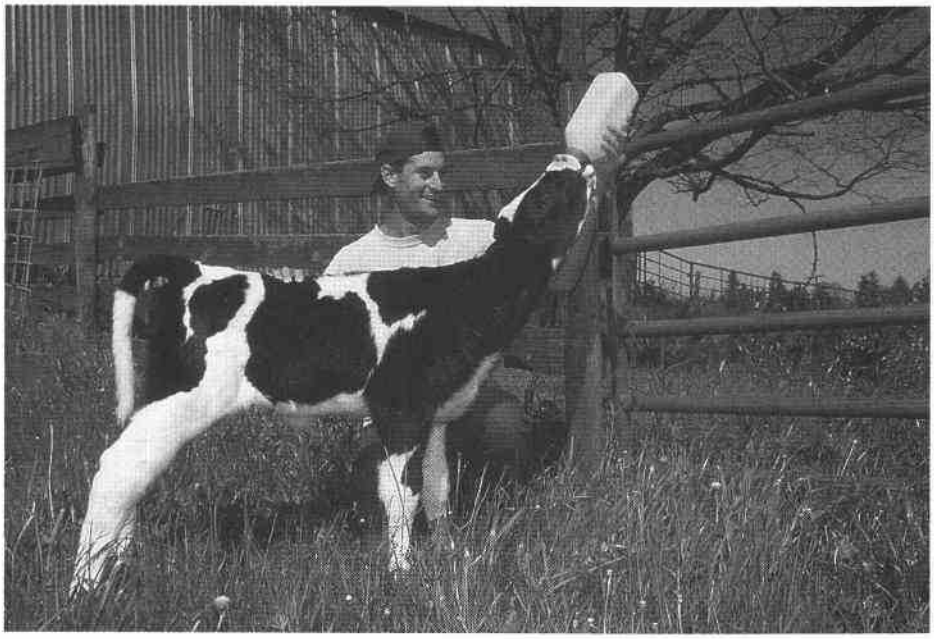
**Beef Emphasis:** Designed for students whose major interest is in commercial or purebred cow-calf production or feedlot operations. The Department of Animal Sciences owns a small herd of purebred beef cattle which is used as an instructional resource for those interested in the purebred beef cattle industry.

**Dairy Emphasis:** Designed specifically for students whose primary interest is in dairy management and production. Requirements include courses relevant to dairy operations.

#### EQUINE EMPHASIS

The equine science option emphasizes a well-rounded education in equine production, management, training and marketing. Students have an opportunity for extensive hands-on practical experience in all areas. In addition, the program offers a unique equestrian coaching program and a diverse recreational riding program with credit courses in both English and Western disciplines. Requirements: Core curriculum and additional credits in consultation with the adviser.

**Poultry Emphasis:** Designed for students whose primary interest is in the poultry industry. Poultry science involves the study of domestic birds and how they are used to serve people. During the twentieth century, poultry science has helped transform poultry production from a simple small-scale enterprise into a complex multibillion dollar agribusiness. The complexity and continuing growth of the poultry industry is reflected in a wide variety of jobs for graduates with an interest in poultry. Oregon State Univer-



sity offers the only poultry program in the Pacific Northwest.

**Sheep Emphasis:** Designed especially for students who have an interest in the sheep industry. Courses are similar to the other animal production emphases except for courses relevant to sheep production.

## COOPERATIVE PROGRAMS

Residents of Washington and Idaho, who are interested in poultry science, may begin their undergraduate training within the Department of Animal Sciences at Washington State University or the University of Idaho. Following their sophomore year, these students may transfer to the OSU Department of Animal Sciences without paying out-of-state tuition. Students transferring after one or two years at a community college should also be able to complete the requirements for a B.S. after three or two years, respectively.

Undergraduate and graduate students of the participating Western Undergraduate Exchange (WUE) or Western Interstate Commission for Higher Education (WICHE) states (Alaska, Arizona, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, Utah, Washington, and Wyoming), who are interested in studying poultry science can matriculate at Oregon State University as in-state students. Arrangements for admittance to these programs must be made with the respective state coordinators.

## MINORS

### ANIMAL SCIENCES MINOR (27-28)

The following *four* courses:
ANS 121. Introduction to Animal Sciences (4)
ANS 211. Applied Animal Nutrition: Ration Formulation (3)
ANS 316. Reproduction in Domestic Animals (4)
ANS 378. Animal Genetics (4)

Select *one* of the following courses:
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)
*NOTE:* The 200 level course listed above is a prerequisite for the corresponding 400 level Production Systems course.
Select *one* course from the following:
ANS 210. Applied Animal Nuturition: Feeds and Feed Processing (3)
ANS 311. Animal Nutrition (3)
ANS 314. Animal Physiology (4)
ANS 321. Avian Embryology (4)
ANS 351. Principles of Animal Foods Technology (3)
Select *one* course from the following:
ANS 430. Horse Production Systems (3)
ANS 433. Poultry Meat Production Systems (3)
ANS 434. Egg Production Systems (3)
ANS 436. Sheep Production Systems (3)
ANS 439. Dairy Production Systems (3)
ANS 443. Beef Production Systems (3)
NOTE: complete the second course in the sequence of the systems course taken.
All courses must be taken on a graded basis only.

### EQUINE SCIENCE MINOR (27-29)

ANS 121. Introduction to Animal Sciences (4)
ANS 210. Applied Animal Nutrition: Feeds and Feed Processing (3)
ANS 220. Introductory Horse Science (3)
ANS 316. Reproduction in Domestic Animals (4)
ANS 430. Horse Production Systems (3)
*Select 10-12 credits from the following:*
ANS 191, ANS 192, ANS 193, ANS 194 or PAC 191, PAC 192, PAC 193, PAC 194. Horsemanship (1,1,1,1)
ANS 221. Equine Industries (2)
ANS 222. Young Horse Training (2)
ANS 223. Equine Marketing (2)
ANS 322. Equestrian Coaching (2)
ANS 431. Horse Production Systems (3)
PSY 422. Selected topics in Psychology (3)
*Note:* 12 credits must be upper division level.

## COURSES

### Lower Division 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. Case study approach to decision making will be introduced.

**ANS 121. INTRODUCTION TO ANIMAL SCIENCES (4).** Principles of breeding, physiology, nutrition, and management as they apply to modern livestock and poultry production.

**ANS 191. BEGINNER RIDING I (1).** This course is designed for beginning riders or those wishing to improve their basic skills. It offers an introduction to the basic Western or English (seperate 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. CROSSLISTED as PAC 191.

**ANS 192. BEGINNER RIDING II (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 riders position and control at the trot and canter, either English or Western (seperate 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. PREREQ: ANS 191 or PAC 191 or equivalent. May be repeated. CROSSLISTED as PAC 192.

**ANS 193. INTRODUCTORY DRESSAGE (1).** This course is 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 2nd 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. PREREQ: ANS 192 or equivalent. CROSSLISTED as PAC 193.

**ANS 194. INTRODUCTORY JUMPING (1).** This course is designed for riders who have taken ANS/PAC 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. PREREQ: ANS/PAC 193 or equivalent. May be repeated. CROSSLISTED as PAC 194.

**ANS 199. SPECIAL STUDIES (1-16).** Graded P/N.

**ANS 207. SOPHOMORE SEMINAR (1).** Examination of career opportunities in animal science. PREREQ: Sophomore standing.

**ANS 210. APPLIED ANIMAL NUTRITION: FEEDS AND FEED PROCESSING (3).** Characteristics of feedstuffs and forages for livestock. Feed processing techniques and their effects on nutrient bioavailability and toxins in feeds. PREREQ: ANS 121.

**ANS 211. APPLIED ANIMAL NUTRITION: RATION FORMULATION (3).** Nutrient requirements of domestic animals, ration formulation and feeding recommendations. PREREQ: MTH 111 and AG 111 or experience with spreadsheet programs. No freshmen.

**ANS 215. BEEF/DAIRY INDUSTRIES (3).** Introduction to beef and dairy industries; history, current industry status, and demonstration and practice of basic husbandry skills. PRERQ: 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. PREREQ: 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.

**ANS 221. EQUINE INDUSTRIES (2).** Instruction and practice of management skills involved in the feeding, handling and health care of horses. Course to provide valuable industry contacts through guest speakers and field trips. PREREQ: ANS 121 and ANS 220.

**ANS 222. YOUNG HORSE TRAINING (2).** Practical training the young horse, including: weaning, haltering, grooming, leading, use of obstacle course and round corral, tying techniques, clipping, trailering, fitting and conditioning, bitting, rigging, ground-driving and longeing. Course work to advance through the third year if applicable. PREREQ: ANS 192 and ANS 220 or instructor consent.

**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. PREREQ: ANS 121 and ANS 220; also ANS 192 or instructor consent.

**ANS 224. PUREBRED BEEF CATTLE MANAGEMENT (1-2).** Practical hands-on and decision making experience in the management of purebred beef cattle. Field trips are required for which an extra fee may be charged. PREREQ: ANS 121. Course may be repeated.

**ANS 231. LIVESTOCK EVALUATION (2).** Visual appraisal of market and breeding classes of beef cattle, sheep, and swine. Live animal and carcass comparisons. PREREQ: 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.

### Upper Division Courses

**ANS 311. PRINCIPLES OF ANIMAL NUTRITION (3).** Classification, digestion, absorption, and metabolism of nutrients in animals; consequences of nutritional deficiencies and toxicities. PREREQ: ANS 210 or ANS 211.

**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. PREREQ: General Biology. No freshmen.

**ANS 315. *ANIMAL PRODUCTION ISSUES OF CONCERN TO SOCIETY (3).** Discussion of contemporary issues relating to interrelations between humans and domestic animals. Topics include animal products and human health; animal rights/welfare; biotechnology, hormones, genetic engineering; and ecological implications of livestock production. (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. PREREQ: ANS 121, BI 211, CH 121, or CH 221. No freshman.

**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. PREREQ: ANS 316 or concurrent enrollment in ANS 316.

**ANS 321. AVIAN EMBRYO (4).** Discussion and experimentation involving the development and the environmental requirements for the artificial incubation of avian embryos. PREREQ: ANS 121, BI 221. Offered even-numbered years.

**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. PREREQ: PAC 193 or ANS 193, ANS 194; ANS 221.

**ANS 327. APPLIED PHYSIOLOGY OF REPRODUCTION (4).** Principles, techniques and recent development in semen collection, evaluation, extension and preservation; artificial insemination, estrus detection and synchronization; pregnancy diagnosis and embryo transfer. PREREQ: ANS 316 and ANS 317.

**ANS 331. ADVANCED LIVESTOCK EVALUATION (4).** Aspects of an individual animals 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. PREREQ: ANS 23l. No Freshmen.

**ANS 351. PRINCIPLES OF ANIMAL FOODS TECHNOLOGY (3).** Processing of meat, milk and eggs into human food products. Topics include humane slaughter of animals, packaging, animal food chemistry, muscle physiology, nutrient values, functional properties, sausage making, fermentation, curing, smoking, milk and egg pasteurization, inspection, grading, quality control. PREREQ: BI 211 or ANS 121. No Freshmen, Sophomores.

**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.

**ANS 401. RESEARCH (1-16).** Graded P/N.

**ANS 405. READING AND CONFERENCE (1-16).** Graded P/N.

**ANS 407. READING AND CONFERENCE (1-16).**

**ANS 410. ANIMAL SCIENCE INTERNSHIP (1-12).** On or off-campus, occupational work experience supervised by the department. Graded P/N.

**ANS 411/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. PREREQ: ANS 211 or ANS 311.

**ANS 412/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. PREREQ: ANS 211 and 311.

**ANS 415. LIVESTOCK JUDGING TEAM (3).** Designed to train students for participation in the intercollegiate livestock judging team. PREREQ: ANS 331.

**ANS 430/ANS 530. HORSE PRODUCTION SYSTEMS (3).** Fundamentals of nutrition, reproductive physiology and health programs and their applications in the care and management or horses and horse production. PRERQ: ANS 211, ANS 220, ANS 316, ANS 378.

**ANS 431/ANS 531. ^HORSE PRODUCTION SYSTEMS (3).** Practical application of production techniques in a laboratory and by study of management decision analysis. PREREQ: ANS 430/ANS 530.

**ANS 433/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. PREREQ: ANS 211, ANS 217, ANS 316, ANS 378 or Instructor's Approval. (Writing Intensive Course)

**ANS 434/ANS 534. ^EGG PRODUCTION SYSTEMS (3).** Applications and analyses of egg production systems as brooding, rearing, feeding and housing egg producing chickens. Decision case studies and practical management problems are incorporated into the course. Offered even-numbered years. PREREQ: ANS 211, 217, ANS 316 or instructor's approval. (Writing Intensive Course)

**ANS 436/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. PREREQ: ANS 216, ANS 311, ANS 316, ANS 378.

**ANS 437/ANS 537. ^ADVANCED SHEEP PRODUCTION SYSTEMS (3).** Examination and analysis of resource utilization and decision-making in different sheep production systems; course will include visits to operating sheep ranches for data collection and a return visit to present findings and recommendations to managers. PREREQ: 436. (Writing Intensive Course).

**ANS 439/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. PREREQ: ANS 211, ANS 215, ANS 316, ANS 378.

**ANS 440/ANS 540. ^DAIRY PRODUCTION SYSTEMS (0-3).** Decision case analysis or special topics in application of dairy management principles. PREREQ: ANS 211, ANS 215, ANS 316, ANS 378. (Writing Intensive Course)

**ANS 443/ANS 543. BEEF PRODUCTION SYSTEMS (3).** Fundamentals of nutrition, reproductive physiology and health programs and their applications in the care and management of beef cattle. PREREQ: ANS 211, ANS 215, ANS 316, ANS 378.

**ANS 444/ANS 544. ^BEEF PRODUCTION SYSTEMS (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. PREREQ: ANS 443/ANS 543. (Writing Intensive Course).

**ANS 445/ANS 545. BEEF PRODUCTION SYSTEMS (3).** Discussion of the feedlot industry including the types of operations, nutrition, management, diseases, parasites and marketing. Practical feedlot management decisions are made by the students through the

**ANS 451/ANS 551. AVIAN DISEASES (3).** The pathologies of viral, bacterial, genetic, nutritional, and mycotic avian diseases; programs for control. PREREQ: Consent of instructor. Offered odd numbered years. CROSSLISTED as VM 451/551.

**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 478/ANS 578. ANIMAL BREEDING & GENETICS (3).** Application of genetic principles to selection and improvement of livestock. Topics include breeding value and heritability estimation, mating systems and selection strategies. Emphasis on quantitative traits of importance in domestic livestock. PREREQ: ANS 378.

**ANS 480/ANS 580. ANIMAL GROWTH (3).** A discussion and analysis of growth and development of skeletal, muscle and adipose tissue in the domestic meat animal. Topics include synthesis and degradation (turnover) of skeletal muscle, adipose tissue, and factors regulating these processes. In addition, biotechnological applications to modulate growth will be discussed. PREREQ: ANS 311, or ANS 411 and ANS 314. No freshmen or sophomores.

**ANS 485. *CONSENSUS AND NATURAL RESOURCE ISSUES (3).** Students will use a working group approach to find solutions to disagreements over natural resource issues. 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 issues. CROSSLISTED as HORT 485/HORT 585, PS 485/PS 585, SOC 485/SOC 585. (Bacc Core Course)

**ANS 490/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. PREREQ: ANS 311.

### Graduate Courses

**ANS 501. RESEARCH (1-16).** Graded P.

**ANS 503. THESIS (1-12).** Graded P.

**ANS 505. READING AND CONFERENCE (1-16).** Graded P.

**ANS 507. GRADUATE SEMINAR (1).** Section 1: Seminar/General for all graduate students. Preparation of effective visual aids. Practice explaining the validity of significance of experimental results to an informed audience. Section 2: Seminar/Endocrinology, for graduate students interested in physiology.

**ANS 532. BIOLOGY OF LACTATION (3).** Physiological and environmental factors affecting mammary gland development and function. PREREQ: Z 431/Z 531. Offered alternate years. Offered 1998-99. CROSSLISTED as BI 532.

**ANS 550. TOPICS IN ANIMAL NUTRITION (3).** Recent advances. Different topic each term. PREREQ: ANS 411/ANS 511, ANS 412/ANS 512.

**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 eicosacoids. PREREQ: BB 452, BB 492 or equivalent. Offered alternate years. CROSSLISTED as NFM 560.

**ANS 585. CONSENSUS AND NATURAL RESOURCES (3).** (See ANS 485 for Description).

**ANS 601. RESEARCH (1-16).** Graded P/N.

**ANS 603. THESIS (1-16).**

**ANS 605. READING AND CONFERENCE (1-16).**

**ANS 606. PROJECTS (1-16).**

**ANS 607. GRADUATE SEMINAR (1).**

**ANS 662. HORMONE ACTION (3).** Recent advances in the biochemistry and molecular biology of hormone action at the cellular level. Offered alternate years. PREREQ: Z 537; BB 451. CROSSLISTED as BB 662.

**ANS 673. BIOLOGY OF MAMMALIAN REPRODUCTION (4).** Physiological, neuroendocrine, endocrine and environmental factors that regulate reproduction of mammals. PREREQ: ANS 316 or equivalent; BB 350. Offered alternate years. Offered 1999-2000..

## BIORESOURCE ENGINEERING

Degrees in bioresource engineering are granted through the College of Engineering; see College of Engineering for curricula and course descriptions.

## BIORESOURCE RESEARCH

Bioresource Research students acquire research experience and broadly-based knowledge in interdisciplinary fields of agricultural, environmental, food, and forest sciences. Students determine their fields of study by choosing among ten different option areas. After two years of research in the program of a faculty mentor, each student writes a senior thesis. In addition to research expertise, students graduate with strong basic science backgrounds and problem-solving and communication skills. Many will become industrial or academic research professionals, in areas of science where there will be a shortage of qualified individuals for the foreseeable future. Others will enter graduate and professional schools in the life sciences, or become highly effective secondary school science teachers. There are over one hundred Bioresource Research faculty mentors, from fifteen departments in the colleges of Agricultural Science, Forestry, and Science: Agricultural Chemistry, Animal Science, Bioresource Engineering, Botany and Plant Pathology, Chemistry, Crop and Soil Science, Entomology, Fisheries and Wildlife, Food Science and Technology, Forest Resources, Forest Science, Horticulture, Microbiology, Rangeland Resources, and Zoology. The faculty are organized into ten interdepartmental option groups according to their research interests. See complete description under Interdisciplinary Studies.

## BOTANY AND PLANT PATHOLOGY

See College of Science.

## CROP AND SOIL SCIENCE

Sheldon Ladd, Head
109B Crop Science
3017 Ag and Life Sciences
Oregon State University
Corvallis, OR 97331
(541) 737-2821 and (541) 737-2441

### Faculty

*Professors* Bottomley, Christensen, Cook, Dick, Hannaway, Hart, Hayes, Huddleston, Jensen, Jolliff, Karow, Knapp, Kronstad, Ladd, Myrold, Rogers, Rykbost, Shock, Simko, Smiley, Stoltz; *Associate Professors* Aldrich-Markham, Baham, Ball, Bohle, Bolte, Butler, Chastain, Dovel, Gingrich, Huber, Kiemnec, Kling, Locke, Macnab, Mellbye, Mosley, Roseberg, Schrumph, Todd, Wysocki, Young; *Assistant Professors* Gutbrod, Henderson, Lundin, Mallory-Smith, McMorran, Motazedian, Payne, Shenk, Slabaugh, Sullivan; *Senior Instructors* Brewster, Scott; *Instructors* Caputo, Shafabakhsh, Verhoeven

### Courtesy Faculty

*Professors* Barker, Elliott, Haunold, Jarrell, Metzger, Olszyk, Rickman, Trione, Young; *Associate Professors* Douglas, Mueller-Warrant, Rasmussen, Steiner; *Assistant Professors* Bethlenfalvay, Griffith, Henning, Johnson

### Undergraduate Major

**Crop and Soil Science (B.S.)**

*Options*
Crop Science
Soil Science

### Minor

Crop Science
Soil Science

### Graduate Majors

**Crop Science (M.S., Ph.D.)**

*Graduate Areas of Concentration*
Cereal Breeding and Genetics
Crop Modeling
Crop Physiology
Crop Production
Forage and Pasture Management
Grass Breeding & Genetics
New Crops
Oilseed Crop Breeding and Genetics
Potato Production
Seed Production and Technology

**Soil Science (M.S., Ph.D.)**

*Graduate Areas of Concentration*
Forest Soils
Soil and Clay Mineralogy
Soil Chemistry
Soil Fertility and Plant Nutrition
Soil Genesis and Classification
Soil Microbiology
Soil Physics
Soils and Land Use

Crop Science instruction is involved primarily in the production and improvement of field crop species—in growing, protecting, developing, and improving plants which supply the world population's food, livestock feed, seed industrial raw materials, soil and watershed protection, lawns, turf, and wildlife crops. Courses integrate the scientific principles of soil science, physics, chemistry, botany, and genetics as the student deals with theories and practices of crop management and improvement.

Soils are one of our most diverse and fascinating natural resources. We use them daily to grow our food and fiber, dispose of our wastes, build our houses and roads, landscape our lawns and gardens, and exercise on in the outdoors. But we rarely see it because it is hidden beneath our feet. There is a whole new world down there, a world of complex chemical, physical, and biological interactions waiting to be explored.

Soil Science is an applied science that builds upon a strong foundation in biology, geology, chemistry, and physics. Students who like science, and the challenge of solving scientific problems can do it all in soil science. They study chemical processes that affect plant nutrition and toxic metal mobility, biological processes involved in nutrient cycling and waste disposal, physical process of water movement into and within the soil, and geological processes related to soil development and soil mapping. Soil scientists help solve problems related to forest management, groundwater contamination, erosion and sedimentation, land reclamation, crop production, land use planning, and many others.

## CAREERS

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 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 USDA Forest Service and Natural Resource Conservation Service often employ soil scientists, as do private consulting firms in environmental engineering or 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 interest 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. Advisers and faculty provide curricular guidance and aid in professional extracurricular activities, career decisions, and job placement.

## SCHOLARSHIPS

The Department of Crop and Soil Science administers a number of scholarships that are available only to undergraduates majoring in the department. The department also supports a Crop and Soil Science Club that provides valuable co-curricular professional development, and a collegiate soil judging team that participates in both regional and national competition. See the Scholarships section in the front of this catalog.

## CURRICULA

### CROP SCIENCE OPTION

**Baccalaureate Core Requirements (48)**

**Crop Science Core**

CSS 100. Orientation/Career Plan (1)
CSS 300. Intro to Crop Prod. (4)
CSS 320. Prin of Oil & Fiber Crop Prod (1)
CSS 321. Prin of Cereal Crop Prod (1)
CSS 322. Prin of Potato Prod (1)
CSS 407. Sem/Senior (1)
CSS 410. Internship (1-6)
CSS 430. Plant Genetics (3)
CSS 440. Weed Control (4)
CSS 450. Plant Breeding (4)
CSS 475. Ag. Mngt. Ore. Soil Res. (2)
CSS 480. Crop. Systems/Dec. Making (4)
Electives to total 27 credits in CSS : (Crops)

**Other Agriculture**

AG 111. Computer App/Agric. (3)
AREC 211. Mgt. in Agriculture (4)
CSS 305. Prin. of Soil Sci. (5)
CSS 315. Nutrient Mgt. & Cycling (4)
ANS 210. Feed Prcessing (3)

**Biological Sciences**

BI 101/BI 211. Introductory Biology (4)
BI 102/BI 212. Introductory Biology (4)
BI 103/BI 213. Introductory Biology (4)
BOT 221. Systematic Botany (4)
BOT 331. Plant Physiology (5)
BOT 350. Intro. Plant Path. (4)
ENT 311. Intro. Insect Pest Mgt (5)

**Physical Sciences**

CHEM 121. General Chemistry (5-3)
CHEM 122. General Chemistry (5-3)
CHEM 123/CHEM 130. General Chemistry (5-3)
CHEM 331. Organic Chemistry (3) & CHEM 332 (3)
ST 351. Intro. Stat. Methods (4)
MTH 105. Intro to Contemporary Math (3)

### SOIL SCIENCE OPTION

**Baccalaureate Core Requirements (51)**

**Soil Science Core**

CSS 100. Orientation/Career Plan. (1)
CSS 305. Prin. Soil Science (5)
CSS 315. Nutrient Mgt and Cycling (4)
CSS 407. Sem/Senior (1)
CSS 410. Internship (1-6)
CSS 435. Soil Ecosystem Properties (4)
CSS 445. Geochemistry of Soil Ecosystems (4)
CSS 455. Biology of Soil Ecosystems (4)
CSS 466. Soil Morphology & Classification (4)
CSS 475. Ag. Mngt. Ore. Soil Res. (2)
Electives to total 27 credits in CSS: (Soils)

**Other Agriculture**

AG 111. Computer App/Agric. (3)
CSS 300. Intro. to Crop Prod. (4)
RNG 341. Rangeland Resources (3)
CSS 480. Crop Systems/Dec. Making (4)

**Biological Sciences**

BI 101/BI 211. Introductory Biology (4)
BI 102/BI 212. Introductory Biology (4)
BI 103/BI 213. Introductory Biology (4)
BOT 331. Plant Physiology (5)
MB 302. General Microbiology (3)
MB 303. General Microbiology Lab (2)

**Physical Sciences**

CHEM 121. General Chemistry (5-3)
CHEM 122. General Chemistry (5-3)
CHEM 123/CHEM 130. General Chemistry (5-3)
CHEM 331. Organic Chemistry (3)
CHEM 332. Organic chemistry (3)
PH 201/PH 211. General Physics (5-4)
PH 202/PH 212. General Physics (5-4)
STAT 351. Intro. Stat. Methods (4)
MTH 241. Calc for Mgt and Social Sci (4)
MTH 245. Math for Mgt, Life, & Social Sci (4)
GEO 201. Geology of Interior Earth (4)
GEO 202. Geology Surface Earth (4)
GEO 203. Geologic Evolution North America (4)

## MINORS

### CROP SCIENCE MINOR (27)

**Requirements**

CSS 300. Intro to Crop Prod (4)
CSS 305. Principles of Soil Science (5)
CSS 407. Seminar (1)

**Electives**

*Select two or more of the following*
- CSS 320,321,322. (Sequence) (3)
- CSS 310. Forage Production (4)
- CSS 460. Seed Production (3)

*Select any of the following to bring total to a minimum of 27 credits*
- CSS 420. Seed Science and Technology (5)
- CSS 430. Plant Genetics (3)
- CSS 450. Plant Breeding (4)
- CSS 440. Weed Control (4)
- CSS 480. Cropping Systems and Decision Making (4)
- CSS 475. Agricultural Management of Oregon Soil Resources (2)

### SOIL SCIENCE MINOR (27)

**Requirements**

CSS 305. Principles of Soil Science (5)
CSS 315. Nutrient Management and Cycling (4)
Physical science elective (5)
Biological science elective (4)
*Select a minimum of 9 credits from*
- CSS 401. Research (1-3)
- CSS 405. Reading and Conference (1-3)
- CSS 407. Seminar (1)
- CSS 408. Workshop (1)
- CSS 415. Soil Fertility Management (3)
- CSS 425. Sustaining Soil Productivity (3)
- CSS 435. Soil Ecosystem Properties (4)
- CSS 445. Geochemistry of Soil Ecosystem (4)
- CSS 455. Biology of Soil Ecosystems (4)
- CSS 466. Soil Morphology & Classification (4)
- CSS 475. Agr Mgmt of Oregon Soil Resources (2)
- CSS 485. Environmental Applications of Soil Science (4)
- CSS 495. Topics in Soil Management (3)

## COURSES

### Lower Division Courses

**CSS 100. ORIENTATION/CAREER PLANNING (1).** Introduction to departments, college and university programs. Individual and group counseling and baccalaureate program planning. Exposure to career opportunities in crop and soil science. PREREQ: Major and minor students only.

**CSS 105. SOILS AND MAN (3).** Soil resources in relation to environmental planning and sound ecological principles of land use. Examples and case studies involving soil problems and limitations in land use, pollution control and ecological aspects of production. One field trip.

**CSS 199. SPECIAL STUDIES (1-16).**

### Upper Division Courses

**CSS 300. INTRODUCTION TO CROP PRODUCTION (4).** Principles, practices and issues relating to production, marketing and improvement of horticultural and agronomic crops. Comparison of crop production systems; geopgraphy of crop production; cropping calendars. PREREQ: Year of General Biology or equivalent. CROSSLISTED as HORT 300.

**CSS 305. PRINCIPLES OF SOIL SCIENCE (5).** Origin, formation, classification, physical, chemical, and biological characteristics; effects of soil management or agricultural and forest crop production. Field trips. PREREQ: CH 122.

**CSS 310. FORAGE PRODUCTION (4).** Importance of and current production practices for forage crops. PREREQ: CSS 300 or equivalent; CSS 305.

**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. PREREQ: CSS 305, CH 122. REC: Courses in computers. (Writing Intensive Course)

**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. PREREQ: CSS 300 or equivalent; CSS 305.

**CSS 321. PRINCIPLES OF CEREAL CROP PRODUCTION (1).** An overview of the principles underlying small grain production practices in the Pacific Northwest. PREREQ: CSS 300 or equivalent; CSS 305.

**CSS 322. PRINCIPLES OF POTATO PRODUCTION (1).** Principles and practices governing all aspects of potato production, storage and use. PREREQ: CSS 300 or equivalent; CSS 305.

**CSS 335. *WATER RESOURCE SCIENCE (3).** An introduction to water science and water uses, including the components of the hydrologic cycle, water as a biological habitat, different uses of water, and water quality for beneficial uses. PREREQ: Basic Chemistry and Physics. (Bac Core Course)

**CSS 395. *WORLD SOIL RESOURCES (3).** The properties, global distribution, and agricultural productivities 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. PREREQ: CH 121.

**CSS 401. RESEARCH (1-16).**

**CSS 403. THESIS (1-16).** Independent, original study and preparation of a senior thesis. PREREQ: Senior standing.

**CSS 405. READING AND CONFERENCE (1-16).**

**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.

**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.

**CSS 410. INTERNSHIP (1-6).** Professional work experience previously approved and supervised by the department, written report required. PREREQ: Junior standing.

**CSS 415/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. PREREQ: CSS 315. REQ: Courses in statistics, chemistry and plant physiology. Offered alternate years.

**CSS 420/CSS 520. SEED SCIENCE AND TECHNOLOGY (5).** Seed certification; seed testing; labeling and labeling laws; marketing; industry organizations; seed identification; seed biology (including: seed development, physiology of germination, dormancy, longevity, and deterioration). PREREQ: CSS 300 or equivalent.

**CSS 425/CSS 525. SUSTAINING SOIL PRODUCTIVITY (3).** Explores long-term impact of agriculture on soil physical, chemical and biological parameters; potential and limitations on management systems that emphasize cover crops and polycultures in relation to nutrient cycling and plant nutrition; management practices that maximize nutrient efficiency from inorganic sources, organic wastes, and plant residues. PREREQ: CSS 305. Offered alternate years.

**CSS 430/CSS 530. PLANT GENETICS (3).** Theories and principles; polyploidy; qualitative and quantitative inheritance. PREREQ: CSS 300, HORT 201, BI 203. CROSSLISTED as HORT 430/530.

**CSS 435/CSS 535. SOIL ECOSYSTEM PROPERTIES AND PROCESSES (4).** An advanced treatment of soils, stressing the prominent physical, chemical, and biological soil properties. Develops the basis for an integrated view of soil processes in terrestrial ecosystems. Weekly laboratory emphasizing the measurement of soil properties. PREREQ: CSS 305, REQ: MTH 242, CH 123. PH 201.

**CSS 440/CSS 540. WEED CONTROL (4).** Principles of weed control by cultural, biological, and chemical means; weed identification; introduction to herbicides and factors influencing their use. Field trip. PREREQ: One year of biological science, one course in organic chemistry; BOT 331 strongly recommended. Lec/lab.

**CSS 445/CSS 545. GEOCHEMISTRY OF SOIL ECOSYSTEMS (4).** Structural chemistry of clay minerals and organic matter cation and anion exchange, soil solution equilibria, solubility, redox reactions, biogeochemical, weathering, acidity, soil salinity and chemical reactions affecting the transport of reactive solutes through soils. PREREQ: CH 123, PH 201 & CSS 305 recommended.

**CSS 446/CSS 645. SOIL GEOCHEMISTRY LABORATORY (1).** Measurement of soil properties and processes which influence the transport of nutrients and organic compounds through the soil environment. PREREQ: CH 123, PH 201 or equivalent.

**CSS 450/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. PREREQ: BI 311 or CSS 430/CSS 530. CROSSLISTED as HORT 450/HORT 550.

**CSS 455/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 organism, taxonomy and biology of soil organisms, fundamentals of nutrient cycles, special topics in soil biology, review basis of soil microbial and ecological principles. PREREQ: CSS 305. REC: Courses in chemistry, physics, and microbiology.

**CSS 460/CSS 560. SEED PRODUCTION (3).** Examination of principles and management systems required to produce high quality seed. Fundamentals of seed crop biology and production methods are stressed. Concepts are illustated using Pacific Northwest seed crops. PREREQ: CSS 300 or equivalent.

**CSS 466/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. PREREQ: CSS 305.

**CSS 475/CSS 575. AGRICULTURAL MANAGEMENT OF OREGON SOIL RESOURCES (2).** Field trips to study soil and crop management for agriculture and forestry through the experiences of Oregon farmers, ranchers, and foresters. Trips visit both dryland and irrigated enterprises in eastern Oregon. Irrigated and nonirrigated operations in western Oregon, and managed forests and rangelands throughout Oregon. Field trip fee may be charged. PREREQ: Senior standing. CROSSLISTED as HORT 475/HORT 575.

**CSS 480/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. PREREQ: HORT/CSS 300, Senior standing in Agriculture. CROSSLISTED as HORT 480/580. (Writing Intensive Course).

**CSS 485/CSS 585. ENVIRONMENTAL APPLICATIONS OF SOIL SCIENCE (4).** Applications of the principles of soil science to the understanding of and solutions to environmental problems. Topics covered include use of soil surveys, development of soil survey interpretations, use of soils as a medium for disposal and treatment of municipal and industrial wastes, groundwater contamination related to soil management, effects and control of erosion and sedimentation, soil evaluation models used in land use planning. PREREQ: CSS 305, CSS 435 recommended. Offered alternate years.

**CSS 499/CSS 599. SPECIAL TOPICS IN CROP SCIENCE AND SOIL SCIENCE (1-16).**

### Graduate Courses

**CSS 501. RESEARCH (1-16).**

**CSS 503. THESIS (1-16).**

**CSS 505. READING AND CONFERENCE (1-16).**

**CSS 507. SEMINAR (1).**

**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.

**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.

**CSS 590. FIELD-PLOT TECHNIQUE (3).** Field experiments and field plots, optimum plot size and shape; basic experimental designs; agronomy trials; factorial experiments; contrasts among means and totals; yield trials; separation of means; augmented designs; lattice designs; stability analysis. PREREQ: ST 351.

**CSS 595. TOPICS IN SOIL SCIENCE (3).** Recent issues & developments in Soil Science. Course can be repeated for credit.

**CSS 601. RESEARCH (1-16).**

**CSS 603. THESIS (1-16).**

**CSS 605. READING AND CONFERENCE (1-16).**

**CSS 606. PROJECTS (1-16).**

**CSS 607. SEMINAR (1).**

**CSS 608. WORKSHOP (1-16).**

**CSS 615. PLANT NUTRIENT AVAILABILITY (3).** Chemical physical, and biological processes influencing nutrient availability and uptake by plants; development and verification of a mechanistic model describing nutrient uptake; application of basic principles to soil fertility and plant nutrition research. PREREQ: CSS 315 Offered alternate years.

**CSS 630. ADVANCED PLANT BREEDING I (3).** Theory and practice of plant breeding in population, inbred, hybrid, and clone improvement; manipulation of male sterility, self-incompability, and polyploidy; molecular marker-assisted selection and application of tissue culture techniques to plant breeding. PREREQ: CSS 430/CSS 530 or equivalent. Offered alternate years.

**CSS 635. CHEMICAL PROCESSES IN SOIL SYSTEMS (3).** Application of equilibrium thermodynamics and chemical kinetics to reactions in soil systems; solubilities, complexation, cation exchange equilibria, surface chemistry, chemical modeling, and chemical transport as applied to weathering, genesis, nutrient availability, and the nature of soil acidity. PREREQ: CSS 445; CH 442 or equivalent. Offered alternate years.

**CSS 645. SOIL BIOLOGY AND BIOCHEMISTRY (3).** Biogeochemical cycling of N, P, and S; soil microbial biomass; soil enzymes; rhizosphere biology; applications of stable isotopes in soil science; biodegradation of organic wastes; applications of molecular biology to soil microbiology; models of microbial activity in soil. PREREQ: CSS 445, MB 448; biochemistry. Offered alternate years.

**CSS 650. ADVANCED PLANT BREEDING II (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. PREREQ: GEN 311 or CSS 430/CSS 530, CSS 450/CSS 550, ST 411/ST 511, ST 412/ST 512, and ST 413/ST 513. Offered alternate years.

**CSS 655. PLANT-WATER RELATIONS (3).** Quantitatie aspects of the distribution, movement, and function of water in the soil/plant/atmosphere continuum. PREREQ: CSS 445, CH 442. Offered alternate years.

**CSS 660. HERBICIDE SCIENCE (4).** Absorption, movement, and mechanism of action of herbicides in plants; behavior of herbicides in soil. PREREQ: CSS 440/CSS 540, BOT 331. Offered alternate years.

**CSS 665. SOIL GENESIS AND CLASSIFICATION (3).** Soil development; soil forming factors and processes as related to soil landscape formation and soil classificaton; interpretation of X-ray data for soil genesis. Offered alternate years.

**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. PREREQ: BOT 441 or equivalent. Offered alternate years.

## FISHERIES AND WILDLIFE

Erik K. Fritzell, Head
104 Nash Hall
Oregon State University
Corvallis, OR 97331-3803
(541) 737-4531

**Faculty**

*Professors* Coblentz, Crawford, Gregory, Jarvis, Langdon, Malouf, Markle, Mate, Olson, Osis, Weber; *Associate Professors* Bergeron, Edge, Ford, Heikkila, Kauffman, Kaufmann, Liss, Sampson, Wolff; *Assistant Professors* Faudskar, Fitzpatrick, Herlihy, J. Li, Robinson, Shields; *Senior Instructor* Goblirsch, Hanschumaker

**Courtesy Faculty**

*Professors* Anthony, Aron, Collopy, Fisher, Henny, Lackey, H. Li, Meslow, Schoning, Schreck, Sedell, Thomas; *Associate Professors* Bennett, Bisson, Ewing, Haig, Hughes, Landers, Larson, Noss, Roby, Starkey, Stoddard; *Assistant Professors* Allen-Gil, Amandi, Bury, Carey, Forsman, Gresswell, Jackson, Koprowski, Lamberti, Leonard, Linder, Maule, Reeves, Ryer; *Instructors* Ball, Berkman, Brodziak, Conser, Crone, Jean, Jon, Martin, Paul, Ramon, Rogers, Staley

**Adjunct Faculty**

*Professors* Buhler (Agricultural Chemistry), Smith (Anthropology); *Associate Professors* Hayes (Forest Science), Reno (Microbiology)

### Undergraduate Majors

**Fisheries Science (B.S.)**
**Wildlife Science (B.S.)**
*Options*
Fisheries/Business
Fishery Science
Marine Resources
Public Education/Extension
Wildlife Science
Individual Studies

### Minor

Fisheries and Wildlife

### Graduate Majors

**Fisheries Science (M.S., Ph.D.)**
*Graduate Areas of Concentration*
Aquaculture
Conservation Biology
Fish Genetics
Fisheries
Ichthyology
Invertebrate Fisheries
Limnology
Parasites and Diseases
Physiology and Ecology of Marine and Freshwater Fishes
Steam Ecology
Water Pollution Biology

**Wildlife Science (M.S., Ph.D.)**
*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 Environmental Contaminants
Food Habits and Nutrition
Parasites and Diseases
Population Dynamics
Reproductive Biology
Riparian/Wetland Ecology
Wildlife Ecology
Wildlife-Forestry Interactions
Wildlife Science

This department prepares students for professional careers in fisheries and wildlife as biologists, managers, consultants, and administrators. Course work leading to the B.S., M.Agr., M.S., M.A.I.S., and Ph.D. degrees is offered.

The undergraduate curriculum is based upon the belief that students in fisheries and wildlife should be provided with a good education in biology and ecology as the basis for careers in resource science and management. But fisheries and wildlife are not simply biological disciplines. Educated professionals must be aware of the inherent social, as well as biological, considerations and must operate with a perspective that is integrative. Toward this end, biological, social, economic, and political knowledge is integrated within the curriculum to provide students with a broad framework for understanding and resolving resource problems.

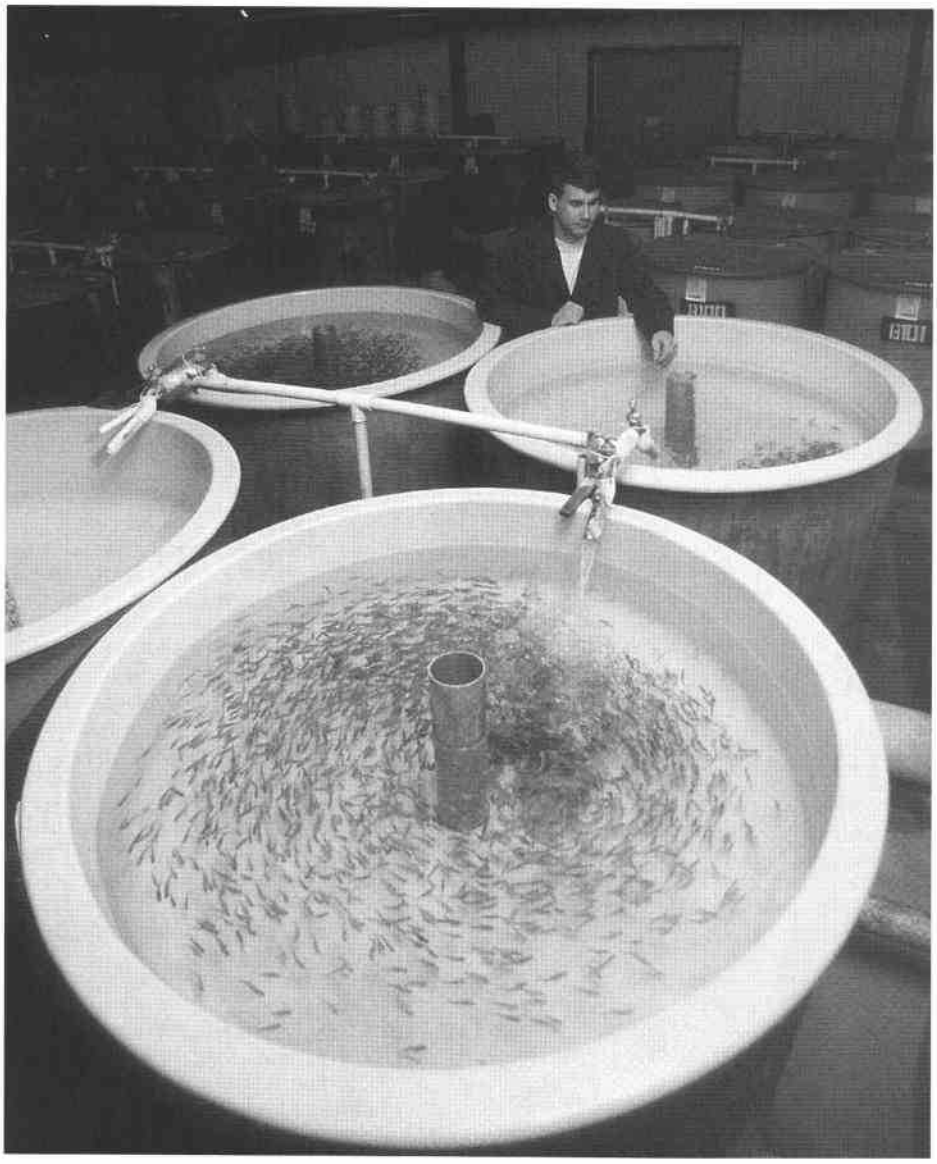
The undergraduate curriculum is composed of a core and several educational options or areas of concentration. Students may elect either a fishery science or wildlife science major. The core is composed of course work required in both majors. The concentrations reflect the diversity of educational and career opportunities within fisheries and wildlife.

The fisheries science major is intended to provide students with perspectives and approaches for understanding and managing fisheries and aquatic systems. Options within the fisheries science major include fishery science, marine resources, fisheries/business, public education/extension, and individual studies. Education in the fisheries science major prepares students for graduate study or professional employment in research or management of fisheries and aquatic systems. One term of full-time enrollment at a marine field station (normally the Hatfield Marine Science Center in Newport) is required for the B.S. degree in fisheries science.

The wildlife science major is intended to provide students with the biological expertise and social perspectives to understand and manage wildlife resources and the terrestrial and aquatic systems they depend upon. Options within the wildlife science major include wildlife science, public education/extension and individual studies. Education in the wildlife science major prepares students for professional employment in management or research, and for graduate study.

Students planning to transfer to this department should focus on courses in general biology, general chemistry, physics, and mathematics during their freshman and sophomore years.

Strategically located for the study of fisheries and wildlife, Oregon State University has, within easy access, state fish hatcheries; lakes, streams and public lands; refuges; experimental streams and ponds; and the Hatfield Marine Science Center at



Newport. Research by the Oregon Department of Fish and Wildlife, several federal research centers, and the Cooperative Wildlife and Fishery Research Units is of basic value to the instructional program.

Graduate programs leading to the M.Agr., M.S., M.A.I.S., or Ph.D. permit intensive study in special areas of interest under the guidance of nationally known scientists. Advanced study in fisheries science may be pursued in water pollution biology, stream ecology, aquaculture, ecology of marine and freshwater fishes, taxonomy and systematics, genetics, toxicology, and parasites and diseases of fish. Advanced study in wildlife science is oriented toward resource management and can involve almost any bird or mammal species, biotic community or habitat. Research emphasis may be placed on population dynamics and utilization, life history and ecology, habitats, food habits and nutrition, behavior, and organization of animal communities. Opportunities exist for work in terrestrial and aquatic systems.

The core courses required of all students seeking the B.S. degree are listed below. The student must choose one area of concentration by the beginning of the junior year.

## CURRICULUM

**B.S. Degree Requirements (180)**
**Baccalaureate Core (48)**
**Fisheries and Wildlife Core (116-122)**
FW 107. Orientation to Fisheries & Wildlife (1)
FW 251. Principles of Wildlife Conservation (3)
FW 255. Field Sampling of Fish & Wildlife (2)
**Five courses from the following:**
FW 311. Biology of Birds (3)
FW 312. Systematics of Birds (2)
FW 315. Biology of Fishes (3)
FW 316. Systematics of Fishes (2)
FW 317. Biology of Mammals (3)
FW 318. Systematics of Mammals (2)
Z 473. Biology of Reptiles & Amphibians (3)
Z 474. Systematics of Reptiles & Amphibians (3)
FW 320. Introductory Population Dynamics (4)
FW 321. Fisheries & Wildlife Resource Ecol (3)
FW 407. Senior Seminar (2)

**Science**
BI 211, BI 212, BI 213. Intro Biology (12)
BI 370. Ecology or BI 371. Ecological Methods (3)
CH 221, CH 222, CH 223 or CH 121, CH 122, CH 123 General Chemistry (9-15)
MTH 241 or MTH 251. Calculus (4)
ST 351. Introduction to Statistical Methods (4)
PH 201. General Physics (5) or
PH 331 and 332. Sound, Hearing & Music (3) Light, Vision & Color (3)

**Communications**
COMM 111. Public Speaking (3)
WR 121. English Composition (3)
WR 222. English Composition (3) or
PHL 121. Reasoning and Writing (3)

**Other Required Courses**
ECON 201. Microeconomics (3)
PS 474. Bureaucratic Politics and the Policy Process (4) or PS 476, Science and Politics
*Select two of the following:*
ANTH 481. Natural Resources & Community Values (3)
BA 432. Environmental Law (4)
FOR 351. Recreation Behavior & Mgt (4)
HSTS 415. Theory of Evolution & Foundation of Modern Biology (3)
PHL 440. Environmental Ethics (3)
PHL 443. Values & Human Ecology (3)
PS 475. Politics of Environmental Problems (4)

## OPTIONS

### FISHERY SCIENCE OPTION

Intended for students interested in a career in the science and management of fishery resources.

**Fisheries and Wildlife Core courses plus:**
CH 331. Organic Chemistry (4)
FW 454. Fishery Biology (5)
FW 456. Limnology (5)
BI 311. Genetics or ANS 378, Animal Gen (4)
ST 352. Introduction to Statistical Methods (4)
*Select one of the following: (4)*
ANS 314. Animal Physiology
FW 476. Fish Physiology
Z 423. Environmental Physiology
Z 430. Principles of Physiology
*Select one of the following: (4)*
BOT 221. Systematic Botany
BOT 341. Plant Ecology
BOT 416. Aquatic Botany
*Select one of the following: (4-5)*
ENT 433. Aquatic Entomology
Z 361. Invertebrate Biology and Z 362. Invertebrate Biology Lab
*Select one of the following: (3-4)*
FOR 460. Forest Policy
FOR 365. Issues in Natural Resources Conservation
RNG 341. Rangeland Resources
*Select one of the following: (3-4)*
FE 430. Watershed Processes
GEO 482. Forest Geomorphology
RNG 355. Desert Watershed Management
FW 479. Wetlands and Riparian Ecology
*Select one of the following: (4)*
AREC 351. Natural Resources Management
AREC 352. Natural Resources and Environmental Economics
FOR 430. Forest Resource Economics I
FOR 432. Economics of Recreation Resources
*Twelve credits of the following at the Hatfield Marine Science Center:*
FW 407. Seminar (1)
FW 431. Dynamics of Marine Biological Resources (4)

FW 465. Marine Fisheries (4)
FW 470. Aquatic Toxicol & Pollution Biol (3)
FW 494. Parasites and Diseases of Marine Fishes and Invertebrates (5)
FW 495. Principles of Aquaculture (4)
FW 496. Culture of Aquatic Organisms (4)
FW 497. Aquaculture (3) (Writing Intensive Course)
FW 498. Aquaculture Lab (3)
Electives (0-8)

**WILDLIFE SCIENCE OPTION**

Intended for students interested in careers in wildlife science and management.

**Fisheries and Wildlife Core courses plus:**
BOT 221. Systematic Botany (4)
CH 331. Organic Chemistry (4)
FW 481. Wildlife Ecology (3) (Writing Intensive Course)
FW 482. Senior Project (2) (Writing Intensive Course)
BI 311. Genetics or ANS 378. Animal Gen (4)
ST 352. Introduction to Statistical Methods (4)
*Select one of the following: (3-5)*
BOT 341. Plant Ecology
BOT 416. Aquatic Botany
RNG 347. Arid Land Biomes and RNG 348. Arid Land Plants
RNG 350. Grassland Ecosystems
*Select one of the following: (4)*
AREC 351. Natural Resources Management
AREC 352. Natural Resources and Environmental Economics
FOR 430. Forest Resource Economics I
FOR 432. Economics of Recreation Resources
*Select one of the following: (3-5)*
CSS 305. Principles of Soil Science
FE 430. Watershed Processes
RNG 355. Desert Watershed Management
FW 479. Wetlands and Riparian Ecology
*Select one of the following: (4-5)*
FW 451. Biology of Game Birds
FW 453. Managed Forest and Wildlife Interactions
FW 458. Management of Big Game Animals
FW 485. Wildlife Behavior
*Select one of the following: (4-5)*
FW 454. Fishery Biology
FW 456. Limnology
Electives (9-21)

**MARINE RESOURCES OPTION**

For students interested in a career in research and management of marine fisheries and marine systems.

**Fisheries and Wildlife Core courses plus:**
CH 331. Organic Chemistry (4)
FW 454. Fishery Biology (5)
FW 456. Limnology (5)
BI 311. Genetics or ANS 378. Animal Genetics (4)
MRM 414. Ocean Resources Management or MRM 415. Coastal Resources Mgmt (3)
OC 331. Introduction to Oceanography (3)
OC 332. Coastal Oceanography (3)
OC 440. Introduction to Biol Oceanography (3)
ST 352. Introduction to Statistical Methods (4)
*Select one of the following: (4)*
ANS 314. Animal Physiology
FW 476. Fish Physiology
Z 423. Environmental Physiology
Z 430. Principles of Physiology
*Select one of the following: (4)*
AREC 351. Natural Resources Management
AREC 352. Natural Resources and Environmental Economics
FOR 430. Forest Resource Economics I
FOR 432. Economics of Recreation Resources
*Twelve credits of the following at the Hatfield Marine Science Center:*
FW 407. Seminar (1)
FW 431. Dynamics of Marine Biological Resources (4)
FW 465. Marine Fisheries (4)
FW 470. Aquatic Toxicol & Pollution Biol (3)
FW 494. Parasites and Diseases of Marine Fishes and Invertebrates (5)
FW 495. Principles of Aquaculture (4)
FW 496. Culture of Aquatic Organisms (4)
FW 497. Aquaculture (3) (Writing Intensive Course)
FW 498. Aquaculture Lab (3)
Electives (4-12)

**FISHERIES/BUSINESS OPTION**

**Fisheries and Wildlife Core courses plus:**
AREC 221. Marketing in Agriculture or BA 390. Marketing (3-4)
AREC 441. Agricultural Financial Management or BA 340. Finance (4)
AREC 452. Marine and Fishery Economics (4)
AREC or BA Upper Division Electives (8)
BA 215. Fundamentals of Accounting (4)
BA 350. Managing Organizations (4)
FW 454. Fishery Biology (5)
FW 456. Limnology (5)
*Twelve credits of the following at the Hatfield Marine Science Center:*
FW 407. Seminar (1)
FW 431. Dynamics of Marine Biological Resources (4)
FW 465. Marine Fisheries (4)
FW 470. Aquatic Toxicol & Pollution Biol (3)
FW 494. Parasites and Diseases of Marine Fishes and Invertebrates (5)
FW 497. Aquaculture (3) (Writing Intensive Course)
FW 496. Culture of Aquatic Organisms (4)
FW 498. Aquaculture Lab (3)
Electives (9-16)

**PUBLIC EDUCATION/EXTENSION OPTION**

For students interested in careers involving communication of agency or institution policies, research findings, and management decisions to specific user groups and the general public. This would include careers in extension, in public relations, and as information and education specialist with federal and state agencies, private industry or public organizations.

**Fisheries and Wildlife Core courses plus:**
FW 405. Reading and Conference/Extension (9)
FW 454. Fishery Biology (fisheries majors) or FW 481. Wildlife Ecology (Writing Intensive Course) and FW 482. Senior Project (5) (Writing Intensive Course( (wildlife majors)
*Select one of the following: (4)*
AREC 351. Natural Resources Management
AREC 352. Natural Resources & Environmental Economics
FOR 430. Forest Resources Economics I
FOR 432. Economics of Recreation Resources
*15 credits from:* COMM, WR, or other appropriate courses. Selection to be made by student in consultation with adviser
*Wildlife Majors Only*
FW 454. Fishery Biology or FW 456. Limnology (5)

Fisheries majors are required to spend one term at the Hatfield Marine Science Center. Twelve credits of the following courses are required:
FW 407. Seminar (1)
FW 431. Dynam of Marine Biol Res (4)
FW 465. Marine Fisheries (4)
FW 470. Aquatic Toxicol & Pollution Biol (3)
FW 494. Parasites and Diseases of Marine Fishes and Invertebrates (5)
FW 497. Aquaculture (3) (Writing Intensive Course)
FW 498. Aquaculture Lab (3)
Electives (fisheries major 3-10; wildlife major 10-17)

**INDIVIDUAL STUDIES**

Intended for students interested in preparing an individual study program with a specific emphasis or focus. Examples that would be considered appropriate: fisheries/forestry; wildlife/forestry; environmental toxicology; wildlife/geography/land use planning; environmental law.

The student prepares an individual study program with a specific emphasis or focus. The program will be developed based on discussion with faculty advisers and other professionals.

The program must include (in addition to the core):
1) a course on the economics of natural resources
2) supporting courses to total about 55-70 credits
3) one term at a Marine Field Station is recommended

The Fisheries program must also include:
1) fW 454, fisheries Biology
2) 9 additional hours in Fisheries & Wildlife

The Wildlife program must also include:
1) fW 481, Wildlife Ecology
2) 5 additional hours in Fisheries & Wildlife

The program will be reviewed by the Resident Instruction Committee and will become a contract upon approval by the committee and the department head.

**Qualification**

The individual study concentration could be proposed at any time to be effective after achieving junior standing.

## MINOR (27)

A sequence in general zoology or general biology is prerequisite.

BI 370. General Ecology (3)
FW 251. Principles of Wildlife Conservation (3)
*Five courses from the following:*
FW 311. Biology of Birds (3)
FW 312. Systemtics of Birds (2)
FW 315. Biology of Fishes (3)
FW 316. Systematics of Fishes (2)
FW 317. Biology of Mammals (3)
FW 318. Systematics of Mammals (2)

Z 473. Biology of Repties and Amphibions (3)
Z 474. Systematics of Reptiles and Amphibions (2)
Electives (must be approved by head adviser)

*Select 13 credits from the following:*

FW 255. Field Sampling of Fish & Wildlife (2)
Any FW 3xx or FW 4xx courses, except blanket numbered courses

## COURSES

### Lower Division Courses

**FW 107. ORIENTATION TO FISHERIES & WILDLIFE (1).** Information relevant to academic pathways and career planning in the fields of fisheries and wildlife. Graded P/N.

**FW 199. SPECIAL STUDIES (1-16).** Graded P/N.

**FW 240. *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.

**FW 251. PRINCIPLES OF 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.

**FW 255. FIELD SAMPLING OF FISH AND WILDLIFE (2).** 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. PREREQ: WR 121; familiarity with personal computers.

### Upper Division Courses

**FW 311. BIOLOGY OF BIRDS (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. PREREQ: One year introductory biology.

**FW 312. SYSTEMATICS OF BIRDS (2).** Classification of birds of the world, anatomical features taxonomically important, and identification of birds by sight and song. Field trips required. PREREQ: One year introductory biology.

**FW 315. BIOLOGY OF FISHES (3).** A survey of the diversity of biological adaptations of fishes. Topics include physiological and zoogeographic adaptations, reproduction, evolution, cladogenesis, morphology, behavior, and genetics. PREREQ: One year introductory biology.

**FW 316. SYSTEMATICS OF FISHES (2).** Phylogenetic diversity of fishes, especially Oregon fishes. Includes identification, anatomy, use of keys, taxonomy, and field collections. PREREQ: One year introductory biology.

**FW 317. BIOLOGY OF MAMMALS (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. PREREQ: One year introductory biology.

**FW 318. SYSTEMATICS OF MAMMALS (2).** A survey of the phylogentic diversity of the mammals in Oregon from a habitat/community perspective. Identifying, using keys, and measuring specimens will be stressed. PREREQ: 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 and mortality; models for population and yield analysis. PREREQ: BI 370 or BI 371.

**FW 321. FISHERIES AND WILDLIFE RESOURCE ECOLOGY (3).** Perspectives in community and ecosystem ecology, including ecosystem classification, and their use in management of fisheries and wildlife resource systems. PREREQ: FW 320.

**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 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 401. RESEARCH (1-16).**

**FW 405. READING AND CONFERENCE (1-16).**

**FW 407. SEMINAR (1-16).**

**FW 408/FW 508. WORKSHOP (1-16).**

**FW 410. INTERNSHIP (1-6).**

**FW 431/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. PREREQ: BI 370 or BI 371. Offered alternate years.

**FW 436/FW 536. WILDLAND FIRE SCIENCE (3).** Principles and applications of fire as a natural resource management tool, the role of fire in conservation management, restoration, and preservation of ecosystems. Focus will center on ecological relationships of fire and natural communities, wildlife habitats, fire influences on air quality, and climate change. The course will cover techniques used to describe fire behavior, fuels, and fire effects on the biota (Offered 1996-97).

**FW 451/FW 551. BIOLOGY OF GAME BIRDS (5).** Identification, classification, life history strategies, ecology and management of upland and migratory gamebirds. PREREQ: FW 311.

**FW 453/FW 553. MANAGED FOREST AND WILDLIFE INTERACTIONS (3).** Management of stands and landscapes to achieve wildlife habitat objectives. PREREQ: FOR 341 or equivalent course in ecology. CROSSLISTED as FS 453.

**FW 454/FW 554. FISHERY BIOLOGY (5).** Principles and methods used in studying the biology of fishes; ecological requirements of freshwater and anadromous fishes; principles and practices in sport fishery management. PREREQ: FW 315, FW 320.

**FW 456/FW 556. LIMNOLOGY (5).** Physical, chemical, and biological concepts in limnology and techniques related to aquatic resources and their management. PREREQ: Senior standing.

**FW 458/FW 558. MANAGEMENT OF BIG GAME ANIMALS (4).** A thorough understanding of ecology of herbivorous big game mammals. Techniques used to determine their abundance, diets, reproduction, and the cultural and political variables that contribute to formulation of management programs. PREREQ: 9 credits of upper division biological sciences.

**FW 465/FW 565. MARINE FISHERIES (4).** A global perspective on commercial fish and shellfish harvesting with emphasis on fishing technology and policy issues. PREREQ: FW 315. Offered alternate years.

**FW 470/FW 570. AQUATIC TOXICOLOGY AND POLLUTION BIOLOGY (3).** Principles of toxicology applied to aquatic systems; application of biological principles to the solution of water pollution problems. PREREQ: Junior standing.

**FW 471/FW 571. ENVIRONMENTAL PHYSIOLOGY OF FISHES (4).** Principles of the functional biology of fishes with emphasis on environmental interactions and management implications. PREREQ: FW 315, BI 370 or BI 371.

**FW 472/FW 572. ADVANCED ICHTHYOLOGY (3).** Evolution of fishes with emphasis on the role of ontogeny; cladistic methodology and classification contrasted with traditional taxonomic approaches. PREREQ: Two years upper division fisheries or zoology.

**FW 473/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. PREREQ: BI 370; FW 315.

**FW 474/FW 574. EARLY LIFE HISTORY OF FISHES (3).** Overview of diversity of development patterns in fishes; emphasis on morphology, life history, and evolution. PREREQ: FW 315 or equivalent. Offered alternate years.

**FW 476/FW 576. FISH PHYSIOLOGY (4).** Physiological specializations and adaptations of major groups of fishes. PREREQ: FW 315; CH 123, or CH 223.

**FW 479/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. PREREQ: BI 370 or BI 371.

**FW 481/FW 581. ^WILDLIFE ECOLOGY (3).** Interrelationships of wildlife, environment and humans. Evaluation of properties and habitats of wildlife populations. PREREQ: BI 370 or BI 371; FW 310, FW 311, FW 320; ST 351. (Writing Intensive Course)

**FW 482/FW 582. ^SENIOR PROJECT (2).** Independent research project designed and conducted by student. PREREQ: Senior standing, ST 351. (Writing Intensive Course)

**FW 485/FW 585. WILDLIFE BEHAVIOR (4).** Adaptive significance of egocentric and social behavior of wildlife species. Implications of behavior in sound management practice. PREREQ: 9 credits of upper division biology.

**FW 494/FW 594. DISEASES AND PARASITES OF MARINE FISHES AND INVERTEBRATES (5).** Emphasis on interactions between marine organisms and potential disease-causing agents and on ecological conditions under which disease agents may serve as limiting factors in the marine environment. PREREQ: 6 credits of upper division biology.

**FW 497/FW 597. ^AQUACULTURE (3).** Principles and practices for the aquaculture of fish, shellfish, and algae. PREREQ: 9 credits of upper division biology. (Writing Intensive Course.)

**FW 498/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. PREREQ: 9 credits of upper division biology.

**FW 499. SPECIAL TOPICS IN FISHERIES AND WILDLIFE (0-3).** Various topics in fisheries science and wildlife science. May be repeated for up to six credits.

### Graduate Courses

**FW 501. RESEARCH (1-16).**

**FW 503. THESIS (1-16).**

**FW 505. READING AND CONFERENCE (1-16).**

**FW 507. SEMINAR (1-16).** Section 1: Selected Topics. Graded P/N.

**FW 520. RESEARCH DESIGN IN FISHERIES AND WILDLIFE (2).** Critical examination associated with the identification and solution of problems in science, hypothesis testing, and use of the scientific method in designing scientific research. Course emphasizes objective thinking, application of sound ecological principles, and a critical evaluation of research design and published literature, and distinguishing science from nonscience. PREREQ: One course in ecology and one course in statistics or equivalents.

**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. PREREQ: 9 credits of upper division science.

**FW 599. SPECIAL TOPICS IN FISHERIES AND WILDLIFE (0-3).** (See FW 499 for description.)

**FW 601. RESEARCH (1-16).**

**FW 603. THESIS (1-16).**

**FW 605. READING AND CONFERENCE (1-16).**

**FW 606. PROJECTS (1-16).**

**FW 607. SEMINAR (1-16).**

**FW 661. ANALYSIS OF ANIMAL POPULATIONS (4).** Quantitative methods for estimating the vital parameters (density, survival, population stability, home range size) of animal populations. Emphasis is on vertebrate animals and statistical approaches to estimation parameters, hypothesis testing, and modeling population processes. PREREQ: ST 511, ST 512 or equivalent. Offered alternate years. Offered 1996-97.

**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. PREREQ: 9 credits of upper division science, philosophy or natural resources.

**FW 668. FIRE ECOLOGY (3).** Examination of the variable response of ecosystems to natural and anthropogenic fire. Mechanisms by which the physical, biotic, and climatic components interact with fire to shape ecosystem structure and ecological processes. Study focuses on the effects of fire on vegetation, wildlife habitats, nutrient cycles, and management of natural resources. Offered 1995-96.

**FW 699. SPECIAL TOPICS IN FISHERIES AND WILDLIFE (1-3).** Various topics in fisheries science and wildlife science. May be repeated for up to 6 credits.

## FOOD SCIENCE AND TECHNOLOGY

Daniel F. Farkas, Head
100 Wiegand Hall
Oregon State University
Corvallis, OR 97331-6602
(541) 737-3131
http://osu.orst.edu/dept/foodsci

**Faculty**

*Professors* Arnold, Bodyfelt, Daeschel, Dutson, Farkas, McDaniel, McGuire, Morrissey, Scanlan, Selivonchick, Wells, Wrolstad; *Associate Professors* An, Bakalinsky, Lundahl, Park, Penner, Torres; *Senior Instructor* Watson; *Instructor* D. Smith

### Undergraduate Major

**Food Science and Technology (B.S.)**

*Options*

**Food Science**

**Fermentation Science**

### Minors

**Food Science**

**Food Technology**

### Graduate Major

**Food Science and Technology (M.S., Ph.D.)**

*Graduate Areas of Concentration*

Enology and Beverage Technology
Food Chemistry/Biochemistry
Food Engineering Technology
Food Microbiology
Food Processing
Food Toxicology
Seafood Processing
Sensory Evaluation

Food Science and Technology is concerned with scientific and technological aspects of foods and related products. The academic program integrates principles and concepts acquired in the physical, biological, and engineering sciences, and applies them to the scientific and technological aspects of food processing. The role of the food scientist is to successfully integrate these disciplines to assure the nation of an abundant, high quality food supply that is nutritious, safe, and convenient.

The core curriculum is approved by the Education Committee of the Institute of Food Technologists, the professional society of international food scientists. This curriculum allows students to select elective credits to gain added expertise in special areas such as business, nutrition, industrial engineering, or a science-related field. Faculty advisers provide one-on-one guidance, undergraduate research projects, and assistance in career decisions, summer job selection, scholarship opportunities, and job placement.

Graduate programs leading to the M.S. or Ph.D. 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, and microbiology; sensory analysis; and food engineering. Research in food processing operations covers a diversity of food commodities such as dairy products, fruits, vegetables, meats, and seafoods.

Departmental facilities include well-equipped laboratories, pilot plant, a winery, and a micro-brewery for instruction and research. Research facilities also are available at the Coastal Oregon Marine Experiment Station Seafood Laboratory at Astoria.

### Work Experience and Internships

Because of the educational value of professional work experience, the department assists students in finding summer employment opportunities. A student may work six months (mid-June to mid-December) in the food industry and then return in January for two terms. This program is not a requirement, but some students have participated as many as three times. Students may earn internship credit with prior approval of the department and of the employer. OSU students may also participate in Alaska and international internship programs.

### Cooperative Programs

A cooperative agreement exists with the University of Idaho for training Food Science and Technology students from Idaho at the undergraduate level at in-state tuition rates.

Alaska students can attend the University of Alaska-Fairbanks for two years and then transfer to OSU and earn a food science and technology degree in two additional years through the Western Undergraduate Exchange (WUE) Program. These students pay tuition at a rate of 1.5 times the in-state tuition, rather than full out-of-state tuition. See Student Exchanges in this catalog.

### Scholarships

The College of Agricultural Sciences, the department, the food industry, and the Institute of Food Technologists offer both merit and financial need scholarships to encourage students preparing for careers in the food industry. Contact the department for more specific information. Also see the Scholarship section in the front of this catalog and on the World Wide Web.

### Career Opportunities

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. Food Science and Technology graduates hold teaching, research and extension positions with colleges and universities. Governmental agencies employ food scientists for work in regulatory control, research, and the development of food standards. The department has graduated over 1,000 students in the past 76 years.

### Curriculum

**BACCALAUREATE CORE (48)**

(*courses below are included in the 48)

**Food Science and Technology Courses**

FST 310. Food Processing Calculations (3)
FST 311. Food Processing Calculations Lab (1)
FST 411. Food Chemistry (4)
FST 412. Food Chemistry (4)
FST 421. Food Law (3)
FST 423. Food Analysis^ (5)
BRE 452. Food Engineering (4)
BRE 453. Food Engineering (4)
MB 440. Food Microbiology (3)
MB 441. Food Microbiology (2)
NFM 225. Human Nutrition (4)

**Chemistry/Biochemistry Courses**

CH 221. General Chemistry* (5)
CH 222. General Chemistry* (5)
CH 223. General Chemistry* (5)
CH 331. Organic Chemistry (4)
CH 332. Organic Chemistry (4)
CH 337. Organic Chemistry Lab (2)
CH 324. Quantitative Analysis (4)
BB 350. Elementary Biochemistry (4)

**Physics/Mathematics Courses**

PH 201. General Physics* (5)
PH 202. General Physics (5)
MTH 251. Differential Calculus* (4)
MTH 252. Integral Calculus* (4)

**Biological Science Courses**

BI 212. General Biology* (4)
MB 302. General Microbiology (3)
MB 303. General Microbiology Lab (2)

**OPTION COURSES**

(Students will choose one of the following two options):

**Food Science Option Courses**

FST 103. Food Quality Evaluation (1)
FST 210. Food Processing (2) *or*
FST 212. Dairy Processing (3) and
FST 213. Dairy Processing Lab (1)
FST 414. Toxic Agents in Foods (2)
FST 420. Sensory Evaluation of Food (3)
FST 450. Advanced Food Processing (4)
FST 407. Seminar (1)
ST 351. Intro. to Statistical Methods (4)
ST 352. Intro. to Statistical Methods (4)

**Fermentation Science Option Courses**

FST 251. Introduction to Wines, Beers, and Spirits (3)
FST 335. Sensory Properties of Wine and Beer (3)
FST 450. Advanced Food Processing (4)
FST 460. Brewing Science and Analysis (4)
FST 465. Wine Science and Analysis (4)
FST 479. Food Biotechnology (3) *or*
BRE 456. Bioprocess Engineering I (3)
FST 480. Topics in Fermentation (to be taken twice) (2)
ST 351. Intro. to Statistical Methods (4)

Food Science and Technology majors must earn an overall GPA of 2.00 in the required food science and technology courses. With adviser approval, students may elect S/U grading in any course that is *not* a required food science and technology course. Required courses include Food Scioence and Technology Core courses and Options (Food Science *or* Fermentation Science) Courses. See Academic REgulations for more on S/U grading.

## MINORS

**FOOD SCIENCE MINOR (27)**

**Required Courses (13)**

FST 411. Food Chemistry (4)
FST 412. Food Chemistry (4)
MB 440. Food Microbiology (3)
MB 441. Food Microbiology Lab (2)

**Elective Courses**

(Select 14 credits from the following courses)
FST 102. Maraschino Cherry (1)
FST 103. Food Quality Evaluation (1)
FST 251. Intro. to Wines, Beers, and Spirits (3)
FST 335. Sensory Properties of Wine and Beer (3)
FST 414. Toxic Agents in Foods (2)
FST 420. Sensory Evaluation of Food (3)
FST 421. Food Law* (3)
FST 423. Food Analysis^ (5)
FST 460. Brewing Science & Analysis (3)
FST 465. Wine Science & Analysis (3)
FST 479. Food Biotechnology (3)
FST 480. Topics in Fermentation (1)

**FOOD TECHNOLOGY MINOR (27/28)**

**Required Courses (15/16)**

FST 102. Maraschino Cherry (1)
FST 103. Food Quality Evaluation (1)
FST 210. Food Processing (2)
FST 212. Dairy Processing (3) and
FST 213. Dairy Processing Lab (1) or
FST 251. Intro. to Wines, Beers, and Spirits (3)
MB 230. Introductory Microbiology (4)
NFM 235. Science of Foods (4)

**Elective Courses**

(Select 12 credits from the following courses)
FST 335. Sensory Properties of Wine and Beer (3)
FST 420. Sensory Evaluation of Food (3)
FST 421. Food Law (3)
FST 480. Topics in Fermentation (1)
ANS 351. Principles of Animal Foods Technology (3)
NFM 310. Science and Management of Foods (4)
NFM 314. Beverage Management (3)
NFM 433. Food Product Development and Promotion (3)

## COURSES

**Lower Division Courses**

**FST 101. FOOD SCIENCE ORIENTATION (1).** For food science majors. Orientation and academic guidance toward career planning in food science and technology. Graded P/N.

**FST 102. MARASCHINO CHERRY (1).** The interdisciplinary nature of Food Science and Technology is demonstrated by examining historical, technological, and scientific aspects of maraschino cherry production.

**FST 103. FOOD QUALITY EVALUATION (1).** Standards and quality grading; detection, extraction, and identification of extraneous materials in foods.

**FST 199. SPECIAL STUDIES (1-16).** Graded P/N.

**FST 210. FOOD PROCESSING (2).** Lectures, pilot plant projects and plant tours to help majors and nonmajors understand food manufacturing technology. PREREQ: CH 123 or CH 223.

**FST 212. DAIRY PROCESSING (3).** Methods of processing and preserving milk and milk products and related unit operations. PREREQ: CH 123 or CH 223.

**FST 213. DAIRY PROCESSING LABORATORY (1).** Laboratory and field work to accompany FST 212. Field trip required. COREQ: FST 212.

**FST 251. INTRODUCTION TO WINES, BEERS, AND SPIRITS (3).** A descriptive introduction to the history, science, technology, regulations, and economics of fermented and distilled beverage production including an examination of health and societal issues. PREREQ: High School biology and chemistry. Open to any major.

**Upper Division Courses**

**FST 310. FOOD PROCESSING CALCULATIONS (3).** Application of physics and chemistry to the quantification of food processing parameters; retort processing calculations. Schematic representation of food processing unit operations; material and energy balance calculations. PREREQ: PH 202, CH 123 or CH 223, MTH 251.

**FST 311. FOOD PROCESSING LABORATORY (1).** Laboratory to accompany FST 310. Material and energy balance calculations; moisture control technology including the determination of packaging requirements. COREQ: FST 310. PREREQ: MB 303.

**FST 335. SENSORY PROPERTIES OF WINE AND BEER (3).** Introduction to the sensory properties of wine and beer. Description of and sensitivity to appearance, aroma, taste, and textural characteristics of wine and beer, whether desired characteristics or defects. PREREQ: FST 251; must be 21 years of age.

**FST 401. RESEARCH (1-16).** Departmental approval required.

**FST 403. THESIS (1-16).**

**FST 405. READING AND CONFERENCE (1-16).** Departmental approval required.

**FST 407. SEMINAR (1).**

**FST 410. INTERNSHIP (3-6).** A work-internship to give students practical on-the-job training in the food processing or related industries. REQ: Departmental approval, submission of employer and employee evaluation forms, and written reports. PREREQ: Junior standing.

**FST 411/FST 511. FOOD CHEMISTRY (4).** Chemistry and biochemistry of foods. Water, colloids, enzymes, lipids, flavors. PREREQ: CH 332, BB 350.

**FST 412/FST 512. FOOD CHEMISTRY (4).** Chemistry and biochemistry of foods. Carbohydrates, colors and pigments, post-harvest changes in fruits and vegetables. PREREQ: CH 332, BB 350.

**FST 414/FST 514. TOXIC AGENTS IN FOODS (2).** Occurrence and effects of toxic chemicals in foods. PREREQ: CH 337, BB 350.

**FST 420/FST 520. SENSORY EVALUATION OF FOOD (3).** For FST majors and for nonmajors. Procedures and test methods used to evaluate the sensory properties of foods. PREREQ: ST 352 or ST 412.

**FST 421/FST 521. *FOOD LAW (3).** Concepts, statutes, regulations, and agencies controlling the production, processing, and distribution of food. PREREQ: Senior standing. (Bacc Core Course)

**FST 423/FST 523. ^FOOD ANALYSIS (5).** Systematic analysis of the chemical composition of foods and related biological materials. PREREQ: CH 324, CH 337; BB 350. (Writing Intensive Course)

**FST 450/FST 550. ADVANCED FOOD PROCESSING (4).** Applications of food engineering, food microbiology and food chemistry to practical food processing problems. Emphasis on computer supported calculations for heat transfer and chemical reactions. PREREQ: AG 111, BRE 453, FST 411, MB 440.

**FST 451/FST 551. CURRENT TOPICS IN FOOD SCIENCE (3).** Recent advances in food science and technology and their application to special fields of study. Consult department for topics, which vary from year to year. PREREQ: FST 412; MB 303; BB 350.

**FST 460/FST 560. BREWING SCIENCE AND ANALYSIS (4).** Chemistry, microbiology and engineering of brewing operations. Compositional analysis of barley, malt, hops, water, and beer. Laboratory techniques for detection and monitoring microorganisms of importance to brewing. PREREQ: MB 302

**FST 465/FST 565. WINE SCIENCE AND ANALYSIS (4).** Principles and practices of wine production from grape harvest through bottling covering the microbiology and chemistry of fermentation and aging and production practices for red and white wines, sparkling wines, dessert wines, and brandy. PREREQ: MB 302.

**FST 479/FST 579. FOOD BIOTECHNOLOGY (3).** Principles and applications of genetic engineering for food and beverage production. PREREQ: BB 450, MB 302, or by consent of instructor. CROSSLISTED as MB 479/ MB 579.

**FST 480. TOPICS IN FERMENTATION (1).** Selected topics in fermentation science will be presented by department faculty and invited outside experts. Topics and format will change each quarter. May be completed for 2 credits.

**Graduate Courses**

**FST 501. RESEARCH (1-16).** Departmental approval required.

**FST 503. THESIS (1-16).**

**FST 505. READING AND CONFERENCE (1-16).** Departmental approval required.

**FST 507. SEMINAR (1).**

**FST 510. INTERNSHIP (3-6).**

**FST 531. CARBOHYDRATES IN FOODS (3).** Chemical, physical, and functional properties of carbohydrates and their changes during processing and storage. PREREQ: CH 332; BB 451 or BB 491. Offered alternate years.

**FST 533. LIPIDS IN FOODS (3).** Function, composition, preservation, deterioration, and analysis. PREREQ: CH 332; BB 451 or BB 491. Offered alternate years.

**FST 541. FOOD TOXICOLOGY (3).** Principles, design, and interpretation of toxicological studies; evaluation of techniques used to assess the safety of food and additions made to foods, epidemiological approaches to food toxicology. PREREQ: CH 332; BB 451 or BB 491. Offered alternate years.

**FST 561. PIGMENTS AND COLOR EVALUATION (3).** The chemical and physical properties of food pigments and the changes they undergo during processing and storage; color perception and evaluation. PREREQ: BB 451 or BB 491. Offered alternate years.

**FST 563. ENZYMES OF FOODS (3).** Characterization and evaluation of enzyme behavior in complex, heterogeneous, reaction systems. Examples will focus on the use of enzymes in industrial food processing and the effect of processing parameters on enzyme activity. PREREQ: BB 451 or BB 491.

**FST 601. RESEARCH (1-16).** Departmental approval required.

**FST 603. THESIS (1-16).**

**FST 605. READING AND CONFERENCE (1-16).** Departmental approval required.

**FST 607. SEMINAR (1).**

## GENETICS

Warren Kronstad, Walt Ream, Co-Directors
231 Crop Science Building
Oregon State University
Corvallis, OR 97331-3002
(541) 737-3728

**Faculty**

*Professors* Kronstad and Ream; other faculty members are listed under the agricultural and biological science departments.

### Graduate Major

**Genetics (M.A., M.S., Ph.D.)**

*Graduate Areas of Concentration*

Animal Genetics and Improvement
Biochemical and Molecular Genetics
Cytology and Cytogenetics
Evolution and Speciation
Forest Genetics
Fungus Genetics
Genetics
Microbial Genetics
Plant Genetics and Improvement
Quantitative Genetics
Viral Genetics

Administered by the College of Agricultural Sciences, the University program in genetics provides an integrated course of study. Faculty for the program, drawn from throughout the University, are qualified geneticists working in the major biological subdisciplines. Students in the program participate in research designed to prepare them for careers in the forefront of the science of genetics. Requirements and procedures for admission may be obtained from the director of the program.

Genetics may also be used as an area of emphasis in the degree programs of various College of Science, College of Agricultural Sciences, and professional school departments.

Although there is no undergraduate degree in genetics, prebaccalaureate students may select the genetics option in the biology degree program. The core courses in genetics (GEN 430/GEN 530, GEN 454/GEN 554, GEN 455/GEN 555, GEN 456/GEN 556) will prepare a student for graduate study.

To supplement the courses listed below, many departments offer courses in specialized or applied aspects of genetics.

### COURSES

**Upper Division Courses**

**GEN 401. RESEARCH (1-16).** Graded A,B,C,D,F,I.

**GEN 405. READING AND CONFERENCE (1-16).**

**GEN 430/GEN 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.

**GEN 454, MICROBIAL GENETICS (4).** Principles of microbial genetics. Topics include prokaryotic genetics, DNA replication, transcription, translation, plasmids and transposons, DNA repair, and gene regulation. PREREQ: Two terms of biochemistry or consent of instructor. CROSSLISTED as MB 454 and MCB 454.

**GEN 455. EUKARYOTIC MOLECULAR GENETICS (4).** Current concepts of eukaryotic molecular genetics with an emphasis on gene structure and expression. Topics will include recombinant DNA techniques, eukaryotic gene structure, and transcription, translation, posttranslational modifications, genome evolution and genetic engineering. PREREQ: Two terms of biochemistry and genetics, or consent of instructor. MCB 453 and MCB 454 recommended. CROSSLISTED as MCB 455.

**GEN 456. CELL SIGNALING AND DEVELOPMENT (3).** Current concepts of integrated cellular function in multicellular organisms, presented in an integrated manner. Topics such as development, differentiation, immunology, neurobiology and tumorigenesis in both animals and plants will be covered. PREREQ: Two terms of biochemistry and genetics or consent of instructor. MCB 453/MCB 454/MCB 455 recommended. CROSSLISTED as MCB 556.

**Graduate Courses**

**GEN 501. RESEARCH (1-16).** Graded A,B,C,D,F,I.

**GEN 503. THESIS (1-16).**

**GEN 505. READING AND CONFERENCE (1-16).**

**GEN 507. SEMINAR (1-16).** One-credit sections.

**GEN 536. MOLECULAR VIROLOGY (4).** A survey of representative viruses with an emphasis on the molecular mechanisms involved in replication, transcription, and pathogenesis. CROSSLISTED BB 536, MB 536, MCB 536. Offered alternate years.

**GEN 554, MICROBIAL GENETICS (4).** Principles of microbial genetics. Topics include prokaryotic genetics, DNA replication, transcription, translation, plasmids and transposons, DNA repair, and gene regulation. PREREQ: Two terms of biochemistry or consent of instructor. CROSSLISTED as MB 554 and MCB 554.

**GEN 555. EUKARYOTIC MOLECULAR GENETICS (4).** Current concepts of eukaryotic molecular genetics with an emphasis on gene structure and expression. Topics will include recombinant DNA techniques, eukaryotic gene structure, and transcription, translation, posttranslational modifications, genome evolution and genetic engineering. PREREQ: Two terms of biochemistry and genetics, or consent of instructor. MCB 553 and MCB 554 recommended. CROSSLISTED as MCB 555.

**GEN 556. CELL SIGNALING AND DEVELOPMENT (3).** Current concepts of integrated cellular function in multicellular organisms, presented in an integrated manner. Topics such as development, differentiation, immunology, neurobiology and tumorigenesis in both animals and plants will be covered. PREREQ: Two terms of biochemistry and genetics or consent of instructor. MCB 553/MCB 554/MCB 555 recommended. CROSSLISTED as MCB 556.

**GEN 573. CYTOGENETICS (4).** Effects of variations in chromosome structure and number. PREREQ: GEN 430/530 or consent of instructor. Offered alternate years. CROSSLISTED AS HORT 573, and MCB 573.

**GEN 591. SELECTED TOPICS IN GENETICS (3).** Advanced treatment of topics of special interest in one or more areas of genetics. May be repeated for credit. Not offered every year.

**GEN 601. RESEARCH (1-16).**

**GEN 603. THESIS (1-16).**

**GEN 605. READING AND CONFERENCE (1-16).**

**GEN 625. PLANT MOLECULAR GENETICS (3).** Structure, expression, and interactions of the plant nuclear, chloroplast and mitochondrial genomes. Critical examination of the current literature on gene regulation, mobile genetic elements and biotechnology in higher plants. PREREQ: GEN 555 or MCB 555 or equivalent, GEN 554 or MCB 554 and GEN 556 or MCB 556 recommended. Offered alternate years. CROSSLISTED as BOT 625 and MCB 625.

**GEN 664. HOST PARASITE INTERACTIONS; GENETICS AND PHYSIOLOGY (3).** Mendelian and molecular analysis of host-pathogen genetics. Biochemical and physiological basis of plant disease. Topics include gene organization and function, chromosome mapping, parasexuality, and genetic models for plant disease resistance. Host-parasite recognition, pathogenicity, and host responses to infection. PREREQ: BB 451/BB 551 and GEN 555 or MCB 555 or consent of instructor. Offered alternate years. CROSSLISTED as BOT 664, MCB 664.

## HORTICULTURE

C. D. Boyer, Head
4017 Ag and Life Sciences Building
Oregon State University
Corvallis, OR 97331-7304
(541) 737-3695

**Faculty**

*Professors* Azarenko, Boyer, Breen, P. Chen, T. Chen, Daley, Darnell, Facteau, Fuchigami, J. Green, Hemphill, Mansour, Mehlenbacher, Mielke, Mobley, D. Mok, M. Mok, Poole, Proebsting, Richardson, Righetti, Strik, William; *Associate Professors* VanBuskirk, Braunworth, Bubl, Clough, Cook, Hellman, Kaufman, Long, McGrath, McReynolds, Olsen, Penhallegon, Potter, Regan, Stang, Sugar; *Assistant Professor* Bauer, Candolfi, Luna, Maul, Morgan, Niederholzer, Rosetta, Svenson, Tiger, VanDerZanden; *Instructors* Fick, Gredler, A. Green, Hay

**Courtesy Faculty**

Banowetz, Doss, Finn, Gabert, Hummer, Hutton, McFarlane, Miller, Potter, Reed, Watson

**Adjunct Faculty**

Bondi, Fitch, R. Fletcher, Jensen, Landgren, Long, Rogers

## Undergraduate Major

**Horticulture (B.S.)**
*Options*
Horticultural Science
Turf and Landscape Management

## Minor

**Horticulture**

## Graduate Major

**Horticulture (M.S., Ph.D.)**
*Graduate Areas of Concentration*
Culture and Management of Horticultural Crop Production
Genetics and Breeding of Horticultural Crop Production
Physiology and Biochemistry

Horticulture involves the production, genetic improvement, storage, and marketing of fruits, nuts, vegetables, flowers, and nursery crops; and the design, construction, and management of landscape plantings. 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 two options: horticultural science, and turf and landscape management. The horticultural science option prepares students for careers dealing directly or indirectly with the production, breeding, post-harvest handling, marketing, and scientific study of horticultural crops. The turf and landscape management option prepares students for careers involving the design, construction, and maintenance of turf and landscape plantings. Both 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 thesis.

A high school student preparing for the program should follow a well-balanced college prep 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 vocational-technical courses from community colleges may be equivalent to lower division horticulture courses. Equivalent credit can be given for such courses. Contact a departmental adviser for further information.

For additional information about the program, contact one of the undergraduate advisers: Anita L. Green (Head Adviser, Horticultural Science and Turf and Landscape Management); Jack Stang (Horticultural Science); Tom Cook (Turf and Landscape Management).

## CURRICULA

**Baccalaureate Core Requirements (48)**
**Horticulture Core**
HORT 111. Intro to Horticultural Crops or HORT 112. Intro to Turf & Lndscpe Mgmt (2)
HORT 300. Introduction to Crop Production (4)
HORT 301. Principles of Horticulture Technology (4)
HORT 407. Seminar (1)
HORT 410. Internship or HORT 403. Thesis (6-12)
Completion of requirements of either Horticultural Science or Turf and Landscape Management Option (55-64)

**General Science**
CH 121, CH 122, CH 123. Gen Chem (or equiv) (15)
BI 211, BI 212, BI 213. Gen Biol (or equiv) (12)
MTH 112, MTH 245, or MTH 251/MTH 252 or ST 201/ST 351. Mathematics or Statistics (4)

**Agricultural Sciences**
CSS 305. Principles of Soil Science (5)
ENT 311. Introduction to Integrated Pest Management (5)
BOT 350. Intro to Plant Pathology (4)
CSS 440. Weed Control (4)

**Other Agriculture**
AG 111. Computers in Agriculture (3)

**HORTICULTURAL SCIENCE OPTION**
ECON. Economics (3)
AREC/BA. Business elective (3-4)
CH 331 CH 332. Organic Chemistry (4,4)
BOT 331. Plant Physiology (5)
CSS 430/BI 311. Genetics (3-4)
HORT 311. Plant Propagation (4)
Ecology Elective (3-4)

**Horticultural Plant Materials**
Select *2* of the following:
HORT 433. Systematics/Adapt of Veg (4) or HORT 226, HORT 227, HORT 228. Landscape Plant Material (3,3,3)
HORT 251. Temperate Tree Fruits. Berries, Grapes & Nuts *or* HORT 255. Herbaceous Plant Materials

**Horticultural Technology**
*Select 12 credits from the following:*
HORT 315. Principles & Practices of Landscape Maint (4)
HORT 316. Plant Nutrition (4)
HORT 351. Greenhouses & Controlled Environments (4)
HORT 414.Geographics Information Systems in Hort (4)
HORT 441. Tissue Culture (4)
HORT 445. Post-Harvest Physiology (4)
HORT 450. Plant Breeding (4)

**Integration-Horticultural Production**
*Select 8 credits from the following:*
HORT 451. Tree Fruit Production & Physiology (4)
HORT 452. Berry & Grape Production & Physiology (4)
HORT 461. Nursery Management (3)
HORT 475. Ag Mngment of Oregon's Soil

Resources *and*
HORT 480. *Case Studies in Cropping Systems (2,4)
HORT 477. Agroecology (4)

**TURF AND LANDSCAPE MANAGEMENT OPTION**

Ag 312. Engine Theory and Operation (3)
BA 215. Fundamentals of Accounting (4)
BA 315. Accounting for Decision Making (4)
HORT 226, HORT 227, HORT 228. Landscape Plant Materials (3,3,3)
HORT 255. Herbaceous Plant Materials (3)
HORT 280. Landscape Design Theory (2)
HORT 281. Applied Landscape Design Theory (3)
HORT 314. Principles/Practices of Turf Maint (4)
HORT 315. Principles/Practices Landscape Maintenance (4)
HORT 316. Plant Nutrition (4)
HORT 358. Landscape Construction Techniques (4)
HORT 360. Irrigation and Drainage (4)
HORT 380. Garden Composition (4)
*Select one of the following:*
AIHM 319. CADD Drafting (3)
HORT 418. *Golf Course Maintenance (4)
*Select one of the following:*
BI 301. *Human Impacts on Ecosystems (3)
BI 333. Environmental Problem solving (3)
BOT 341. Plant Ecology (4)
RNG 350. Grassland Ecosystems (3)
*Satisfies University Baccalaureate Core Requirements

**GENERAL HORTICULTURE MINOR (27)**

HORT 111. Intro to Horticultural Crops
HORT 300. Introduction to Crop Production (4)
HORT 301. Principles of Horticulture Technology (4)
HORT 407. Seminar (1)
At least 16 additional credits in horticulture including at least six upper division credits

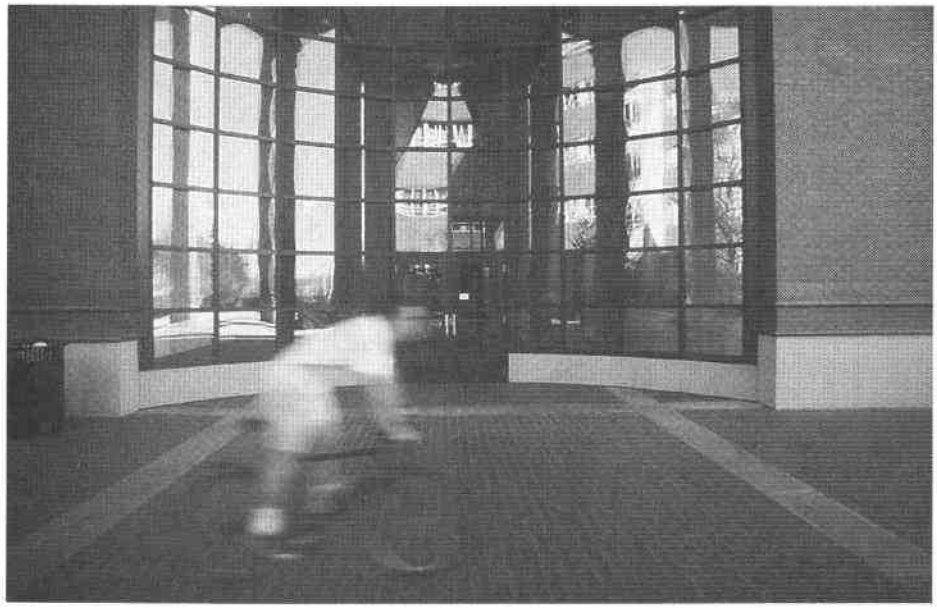
**TURF AND LANDSCAPE MANAGEMENT MINOR (27)**

HORT 112. Intro to Turf and Landscape (2)
BI 103. General Biology or equivalent (4)
HORT 301. Principles of Horticulture Technology (4)
CSS 305. Soil Science (5)
HORT 314. Principles of Turf Maintenance (4)
HORT 315. Principles & Practices of Landscape Maintenance (4)
HORT 418. Golf Course Maintenance (4)

## GRADUATE STUDIES

The Department of Horticulture offers Master of Agriculture, Master of Science, and Doctor of Philosophy degree programs. Students in the latter two programs select thesis topics, in consultation with a graduate adviser, which are complementary to an ongoing research program. Thesis research topics are in the field of physiology, biochemistry, genetics, breeding, or culture and management of fruit, vegetable, or ornamental crops.

Since Oregon is a major horticultural area, departmental research and graduate programs are oriented to basic and applied mission-oriented investigations with clearly defined objectives.



Research assistantships are available as resources permit, as is graduate student office space. Graduate degree students are not required to show proficiency in a foreign language, but are required to participate in graduate seminar presentations. A 4-credit teaching experience is required of doctoral students. Most Department of Horticulture faculty members are graduate faculty members; some also serve as faculty in the Genetics Program/Plant Physiology Program.

For more information or application, contact any member of the graduate faculty or Dr. M. Mok, Department of Horticulture, OSU, Corvallis, Oregon 97331. Provision of Graduate Record Examination scores and letters of reference with application materials will expedite consideration of admission applications.

## COURSES

### Lower Division Courses

**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 TURF AND LANDSCAPE MANAGEMENT (2).** Survey of turf and landscape management industry with emphasis on the Pacific Northwest; career opportunities. Required field trips.

**HORT 226,HORT 227,HORT 228. LANDSCAPE PLANT MATERIALS (3,3,3).** Identification of trees, shrubs, vines, and ground covers used in landscape horticulture; their use in plant composition.

**HORT 251. TEMPERATE TREE FRUIT, BERRIES, GRAPES, AND NUTS (2).** This course will acquaint students with 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.

**HORT 280. LANDSCAPE DESIGN THEORY (2).** Functional and aesthetic aspects of landscape planning as a basis for design decisions affecting the built environment; the site planning process; history of landscape planning; case studies.

**HORT 281. LANDSCAPE DESIGN STUDIO (3).** Application of landscape design theory. Project work in studio. PREREQ: HORT 280.

**HORT 291. LANDSCAPE DESIGN AND MANAGEMENT (3).** Technical aspects of site development including use of architectural and plant materials; case studies. PREREQ: HORT 281.

### Upper Division Courses

**HORT 300. INTRODUCTION TO CROP PRODUCTION (4).** Principles, practices and issues relating to the production, marketing and improvement of horticultural and agronomic crops. Comparison of crop production systems; geography of crop production; cropping calendars. PREREQ: Year of General Biology or equivalent. CROSSLISTED as CSS 300.

**HORT 301. PRINCIPLES OF HORTICULTURAL TECHNOLOGY (4).** Principles and practices relating to control of plant growth and development; manipulation of growth rate, plant form, flowering, fruiting, and dormancy by means of environment, chemicals and pruning and training. PREREQ: General biology or botany sequence.

**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. PREREQ: HORT 301. (Writing Intensive Course).

**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. PREREQ: HORT 301 or CSS 302;CSS 305.

**HORT 315. PRINCIPLES AND PRACTICES OF LANDSCAPE MAINTENANCE (4).** Maintenance practices related to non-turf landscape areas. Emphasis on pruning, planting, fertilization, and pest control. Plant responses to stress, particularly those encountered in the urban environment. Field trips required. PREREQ: HORT 301.

**HORT 316. PLANT NUTRITION (4).** Factors influencing nutrient absorption and composition; criteria of essentiallty and roles of elements; nutritional status and nutrient balance with emphasis on interpreting soil and tissue analysis. Basic concepts of mineral nutrition and soil management for woody plants and turf emphasized. PREREQ: BOT 331, CSS 305.

**HORT 351. ^GREENHOUSES AND CONTROLLED ENVIRONMENTS FOR CROPS (4).** Integrated systems for management of aerial and root environments in greenhouses and other highly controlled crop production facilities. PREREQ: HORT 301, CSS 305 or equivalent courses. (Writing Intensive Course).

**HORT 358. LANDSCAPE CONSTRUCTION: SITE MEASUREMENT AND PROJECT LAYOUT (3).** Site survey; layout and dimensioning of site development projects; plan and profile layout of project work.

**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. PREREQ: HORT 358, CSS 305.

**HORT 401/HORT 501. RESEARCH (1-16).**

**HORT 403/HORT 503. THESIS (1-16).** PREREQ: Junior Standing

**HORT 405/HORT 505. READING AND CONFERENCE (1-16).**

**HORT 407. SEMINAR (1).** Grade P/N.

**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. PREREQ: Junior standing.

**HORT 418. ^GOLF COURSE MAINTENANCE (4).** Basic aspects of golf course maintenance under temperate zone conditions. Offered alternate years. PREREQ: HORT 314. (Writing Intensive Course).

**HORT 433/HORT 533. SYSTEMATICS AND ADAPTATION OF VEGETABLE CROPS (4).** Classification of vegetable crops based on phylogenetic and horticultural characteristics; environmental and cultural requirements.

**HORT 441. PLANT TISSUE CULTURE (4).** Principles, methods, and applications of plant organ, tissue, cell, and protoplast culture. Laboratory is important part of course. Topics include callus culture, regeneration, micropropagation, anther culture, mutant selection, somatic hybridization, and transformation. PREREQ: BOT 331, BI 311, or CSS 430.

**HORT 445/HORT 545. POST-HARVEST PHYSIOLOGY (4).** Storage physiology and biochemistry of fruits, vegetables, and ornamental crops. Influence of preharvest, grading, storage, packaging, transportation and marketing. Effects of storage temperature $CO_2$, $O_2$, ethylene on ripening. Involves lecture, recitation, and lab demonstration. Offered alternate years. PREREQ: BOT 331.

**HORT 450/HORT 550. PLANT BREEDING (4).** An introduction to the genetic improvement of self-pollinated, cross-pollinated, and vegetatively 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. PREREQ: BI 311 or CSS 430/CSS 530. CROSSLISTED as CSS 450/CSS 550.

**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 and dormancy and cold acclimation. Field trips required. PREREQ: HORT 301, BOT 331 or concurrent enrollment. Offered alternate years.

**HORT 452/HORT 552. SMALL FRUIT AND GRAPE PHYSIOLOGY AND CULTURE (4).** Plant growth and development in relation to production of wine grapes, caneberries, strawberries, blueberries, and cranberries. Field trips required. PREREQ: HORT 301, 302; BOT 331. Offered alternate years.

**HORT 461. NURSERY MANAGEMENT (3).** Nursery and ornamental crop production management; nature of the industry; presentations by nursery industry leaders, locating and planning organizations and layouts for efficient production, handling, and distribution; programming production; nursery practices; field and container growing of woody ornamentals; mechanization; quality control; record keeping; application of technology and management principles to solving production problems. Field trips required.

**HORT 475/HORT 575. AGRICULTURAL MANAGEMENT OF OREGON SOIL RESOURCES (2).** Field trips to study soil and crop management for agriculture and forestry through the experiences of Oregon farmers, ranchers, and foresters. Trips to both dryland and irrigated enterprises in eastern Oregon, irrigated and nonirrigated operations in western Oregon, and managed forests and rangelands throughout Oregon. A field trip fee may be charged. PREREQ: Senior standing. CROSSLISTED as CSS 475/CSS 575.

**HORT 480/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. PREREQ: HORT 300, Senior standing in Agriculture. CROSSLISTED as CSS 480/CSS 580. (Writing Intensive Course)

**HORT 485/HORT 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 PS 485/PS 585, ANS 485/ANS 585, SOC 485/SOC 585. (Bacc Core Course)

**Graduate Courses**

**HORT 507. SEMINAR (1-16).**

**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.

**HORT 513. PLANT GENETIC ENGINEERING (3).** Principles, methods and recent developments in the genetic engineering of higher plants. PREREQ: BOT 331, BI 311 or CSS 430/CSS 530. Offered alternate years.

**HORT 520. TOPICS IN HORTICULTURE RESEARCH (1-3).**

**HORT 521. RESEARCH TECHNIQUES (1-3).** Separate sections dealing with the theory and practice of various laboratory and field techniques used in horticultural research.

**HORT 541. PLANT TISSUE CULTURE (4).** Principles, methods, and applications of plant organ, tissue, cell, and protoplast culture. Laboratory is important part of course. Topics include callus culture, regeneration, micropropagation, anther culture, mutant selection, somatic hybridization, and transformation. PREREQ: BOT 331, BI 311, or CSS 430/530. CROSSLISTED as MCB 541.

**HORT 573. CYTOGENETICS (4).** Effects of variation in chromosome structure and number. Offered alternate years. PREREQ: GEN 430/GEN 530 or consent of instructor. CROSSLISTED as GEN 573, MCB 573.

**HORT 601. RESEARCH (1-16).**

**HORT 603. DISSERTATION (1-16).**

**HORT 605. READING AND CONFERENCE (1-16).**

**HORT 606. PROJECTS (1-16).**

**HORT 607. SEMINAR (1-16).**

**HORT 611. PLANT GENETICS (3).** Specific topics in genetics of higher plants. PREREQ: GEN 311. REC: HORT 573. Offered alternate years.

**HORT 623. PHLOEM TRANSPORT (3).** Structure, pathways and mechanisms involved in the translocation of substances in the phloem. Offered alternate years.

**HORT 629. PLANT DORMANCY AND STRESS PHYSIOLOGY (3).** Physiology of dormancy, cold hardiness and other stresses in plants; ecology and molecular biology of plant hardiness; viability tests and freezing processes and cryopreservation of plants. Offered alternate years.

**HORT 691. PLANT GENETIC ENGINEERING (1-5).** Discussion in current literature in gene identification, expression, and transfer of relevance to improving plants' agronomic, horticultural and silvicultural characteristics. Alternate years. PREREQ: BOT 625 or equivalent.

## MICROBIOLOGY

See College of Science.

## NATURAL RESOURCES

The College of Agricultural Sciences, in cooperation with the Colleges of Forestry, Liberal Arts, and Science, participates in offering a broad-based B.S. degree in Natural Resources. A student enrolls in the department most related to the specialty area he or she selects under the Natural Resources Program. See the Interdisciplinary Studies section of this catalog for curriculum details.

## RANGELAND RESOURCES

William Krueger, Head
202 Strand Agriculture Hall
Oregon State University
Corvallis, OR 97331-6704
(541) 737-3341

**Faculty**

*Professors* Buckhouse, Doescher, Eddleman, Johnson, Krueger, Larson, R. Miller, Sharrow, Vavra; *Associate Professors* Borman, McInnis

**Courtesy Faculty**

*Associate Professor* Pyke; *Assistant Professors* Angell, Barker, Ganskopp, P. Miller, Riegel, Svejcar

**Adjunct Faculty**

*Professor* Obermiller; *Associate Professors* Chamberlain, Deboodt, Jacks, Williams; *Assistant Professors* Delaney, Peters, Sheehy; *Instructors* Rambo, White

### Undergraduate Major

**Rangeland Resources (B.S.)**

*Options*

General Rangeland Resources
Range/Forestry
Range Management
Range Science
Range/Soils
Range/Wildlife
Wildland Ecology

### Minor

**Rangeland Resources**

### Graduate Major

**Rangeland Resources (M.S., Ph.D.)**

*Graduate Areas of Concentration*

Agroforestry
Ecology of Rangelands
Physiological Ecology
Range Improvement
Range Nutrition
Riparian Zone Management
Watershed 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 good 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 B.S. degree and provides emphasis either in science, management, ecology, or allied disciplines. The B.S. degree is also offered on the campus of Eastern Oregon State College at La Grande through an extension of the OSU Rangeland Resources Department. Facilities for study include classroom and field-oriented educational environments both on-campus and at locations through Oregon. Field trips are taken in conjunction with specific courses.

Graduate work leading to M.Agr., M.A.I.S., M.S., or Ph.D. degrees may involve research on domestic or wild animals, range nutrition, community ecology, physiology of range plants, range improvement, range watershed and riparian zone management, rangeland restoration, utilization and management, agroforestry, landscape ecology, and range economics. Research locations occur in both western and eastern Oregon.

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 Rangeland Resources is accredited by the Society for Range Management. It is recognized throughout the country as one of the leading institutions of rangeland management.

## Curriculum

Each student must take core courses plus additional courses in one of the seven options.

**Baccalaureate Core (48)[6]**

**Rangeland Resources Core (110)[6]**

MTH 241. Calculus for Mgmt and Soc Sci (4)[7]
CH 121. Gen Chem (5)
CH 122. Gen Chem (5)
CH 130. Gen Chem/Living Systems (4)
BI 211, BI 212. General Biology (8)[7]
CSS 305. Principles of Soil Sci (5)
CSS 465. Soil Morphology & Survey (4)
ECON 201. Principles of Econ (3)[7]
AREC 351. Nat Res Management (4)[7] or
AREC 352. Environ Econ & Policy (3)
ST 351. Intro to Stat Methods (4)
ANS 211. Nutrition (3)
ANS 436 or ANS 443. Beef (Sheep) Product (3)
BOT 221. Systematics (4)
BOT 331. Physiology (5) or
BOT 488. Environ Physiology fo Plants (3)
BOT 414. Agrostology (4)
BI 370. Gen Ecol or BOT 341. Plant Ecol (3)
GEO 202. Geology of the surface of the Earth (4)
WR 327. Tech Rept Writing (3)[7]

**Natural Resources (11)**

FOR 111. Intro to For (4)
FOR 251. Rec Res Mgt (4)
FW 251. Principles of Wldlf (3)
CSS 310. Forage Prod and Mgt (4)

**Rangeland Resources (30)**

RNG 341. Rangeland Res (3)
RNG 301. Career Orientation (1)
RNG 347. Arid Land Biomes (3)
RNG 348. Arid Land Plants (2)
RNG 350. Grassland Ecosystems (3)
RNG 355. Desert Watershed Mgt (3)
RNG 403. ^Senior Thesis (3)
RNG 421. Rnglnd Impr & Restoration Eco (4)
RNG 441. Rnglnd Analysis (4)
RNG 442. Rnglnd-Animal Rel (4)
RNG 490. Rnglnd Mgt Planning (4)

**Free electives (3-13)**

## Options

Option course work must include a minimum of 15 upper division credits. Students must choose one option.

**RANGE SCIENCE OPTION (27)**

ANS 378. Animal Breeding (4)
Physics (8)
Biology and range (13)
Electives (2)

**RANGE/FORESTRY OPTION (27)**

*Select 27 credits from:*
FOR 220. Aerial Photos Interpretation and Forest Measurements (3)
FOR 241. Dendrology (5)
FOR 341. For Ecol (5)[8]
ENT 415. Forest Insects & Disease Mgmt (5)
FOR 321. Mensuration (5)
FOR 441. Silviculture Principles (3)
FOR 420. Advanced Aerial Photos and Remote Sensing
FOR 407. Seminar (1)

**RANGE/SOILS OPTION (27)**

CSS 315. Nutrient Mgt & Cycling (4)
CSS 435. Soil Ecosystem Properties (4)
CSS 445. Soil Ecosystem Processes (4)
CSS 485. Env App (4)
CSS 425. Sustaining Soil Productivity (3)
Other soils and range classes (8)

**RANGE MANAGEMENT OPTION (27)**

FOR 220. Aerial Photo Interpretation and Forest Measurements (3) or GEO 415. Photo Intepretation (3)
ANS 378. Animal Breeding (5)
Additional Agribusiness Mgt (8)
Additional Plant Science (8)
Additional ANS and RNG (4)

**RANGE/WILDLIFE OPTION (27)**

Zoology (6)
GEN 311. Principles of Genetics (4)
FW Credits: 17 credits from FW 310 (or Z 472), FW 311 (or Z 471), FW 320, FW 321, FW 458, FW 481, FW 485 (or Z 348), Z 473, ENT 350

**WILDLAND ECOLOGY OPTION (27)**

*Select two courses from:*
FW 311. Birds or FW 310. Mammals (4)
FW 321. FW Ecol (3)
FW 458. Big Game (4)
RNG 455. Riparian Mgt (3)
CSS 435. Soil Ecosystems Properties (4)
*Select three courses from:*
BOT 441. Autecology (3)
BOT 442. Pl Ecol (3)
FOR 341. For Ecol (4)
BI 371. Ecol Meth (3)
GEO 422. Biotic Resource Geography (3)
Electives (6)

**GENERAL RANGELAND RESOURCES**

27 credits of electives chosen in consultation with adviser and department head

## Minor Program (27)

*Note:* Completion of the Rangeland Resources Minor alone does not qualify students for Rangeland Conservationist positions with the U.S. Office of Personnel Management (OPM).

**Requirements**

RNG 341. Rangeland Resources (3)
RNG 347. Arid Land Biomes or RNG 350. Grasslnd Ecosystems (3)
RNG 421. Rnglnd Imp & Restoration Ecol. (4)
RNG 442. Rnglnd-Animal Rel (4)
RNG 490. Rnglnd Mgmt & Plan (4)
*Select 9 additional credits from:*
Any other RNG course
BOT 341. Plant Ecology (4)
ANS 436. Sheep Production (3)
ANS 443. Beef Production (3)

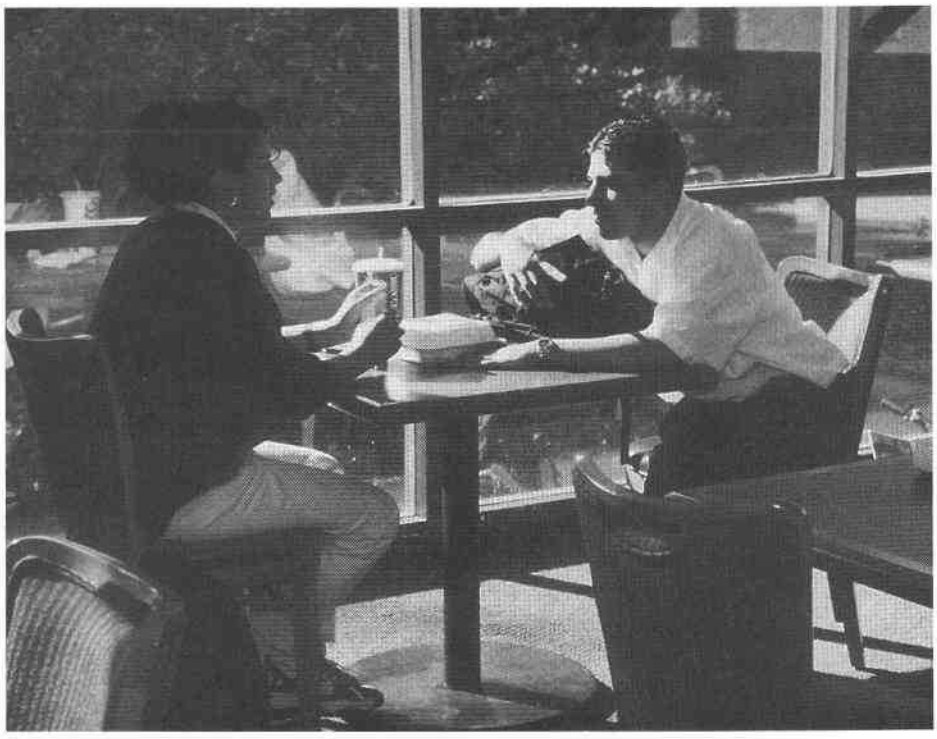
## Courses

**Upper Division Courses**

**RNG 301. CAREER ORIENTATION (1).** Opportunity to explore rangeland careers in an informal, seminar-like setting.

**RNG 341. RANGELAND RESOURCES (3).** Nature and management of rangelands. Integrated land use with emphasis on plant-animal-soil interactions.

**RNG 347. ARID LAND BIOMES (3).** Designed to acquaint students with the physical, climatic, and vegetational characteristics of arid rangelands in the U.S. and their world counterparts. An emphasis will be placed upon community level descriptions of arid biomes.



**RNG 348. ARID LAND PLANTS (2).** Emphasis is placed on identification of important plant species occurring in arid land biomes of the U.S. Students are required to learn both scientific and common names, ecological requirements and tolerances, reaction to grazing and their value as forage and cover.

**RNG 350. GRASSLAND ECOSYSTEMS (3).** Designed to acquaint students with grassland systems with emphasis on North American grasslands and comparison with grasslands of other continents. Emphasis of the course is on system structure, process and function. Major consideration will be placed on phytoedaphic and zootic relationships.

**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 403. ^SENIOR THESIS (1-16).** (Writing Intensive Course)

**RNG 405/RNG 505. READINGS AND CONFERENCE (1-16).**

**RNG 406/RNG 506. PROJECTS (1-16).** Graded P/N.

**RNG 411. ADVANCED PLANT ID (2).** Advanced rangeland plant taxonomy. Consent of instructor. Departmental approval required.

**RNG 415/RNG 515. RANGELAND FIELD TRIP (2).** Trip will occur during quarter break. Students will be required to register winter term and attend organizational meetings. Students are expected to cover individual and transportation costs incurred during the trip. It is advised that students take RNG 347 (Arid Land Biomes) and RNG 348 (Arid Land Plants) before the field trip. Departmental approval required.

**RNG 421/RNG 521. RANGELAND IMPROVEMENTS AND RESTORATION ECOLOGY (4).** Practices for rehabilitating degraded rangelands are studied. This involves knowledge of manipulating plants, animals, and microenvironments of rangelands for optimal sustained yield of rangeland resources, for maintenance and improvement of basic natural resources, and for improved ecosystem functions. REC: RNG 348 or BOT 341.

**RNG 441/RNG 541. RANGELAND ANALYSIS (4).** Techniques used to describe vegetation in shrublands, grasslands, and forests. Use of measurements in resource management. Course is field-oriented, emphasizing both theory and practice of wildland inventory methods. PREREQ: ST 351.

**RNG 442/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. REC: RNG 341.

**RNG 450/RNG 550. LANDSCAPE ECOLOGY AND ANALYSIS (3).** Course will introduce students to the principles and terminology of landscape ecology in a rangeland context. We will examine the pattern and distribution of elements across the landscape and seek relationships between element location and environmental parameters. Landscape dynamics through time will be quantified, analyzed, and mapped. PREREQ: RNG 341 or equivalent.

**RNG 455/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). PREREQ: RNG 355.

**RNG 468/RNG 568. *INTERNATIONAL RANGELAND RESOURCE MANAGEMENT (3).** Discussion of the problems and potentials of range management techniques as they are applied in developing countries. This is accomplished by examining traditional development actions in light of social, economic, ecological, and technical constraints. Qualifies as Baccalaureate Core synthesis (Contemporary Global Issues) course.

**RNG 477/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 which underlie the application of agroforestry technology. PREREQ: Course in basic ecology. Qualifies as Baccalaureate Core synthesis (Science, Technology and Society) course. REQ: Any ecology course.

**RNG 490/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.

### Graduate Courses

**RNG 501. RESEARCH (1-16).**

**RNG 503. MASTERS THESIS (1-16).**

**RNG 507. SEMINAR (1-2).**

**RNG 601. RESEARCH (1-16).**

**RNG 603. DOCTORAL THESIS (1-16).**

**RNG 605. READING AND CONFERENCE (1-16).**

**RNG 606. PROJECTS (1-16).**

**RNG 607. SEMINAR (1-2).**

**RNG 643. ARID LAND PLANT PHYSIOLOGY (4).** Basic physiological characteristics and growth strategies of arid land plants are studied. Alternate years. Offered 1998-99.

**RNG 661. AGRICULTURAL RESEARCH PERSPECTIVES (3).** Planning and managing agricultural research projects, publishing research results, professional ethics, interactions of science, scientists, and society. Alternate years. Offered 1995-96.

**RNG 662. RANGELAND ECOLOGY (3).** Studies ecological theory in rangeland and related resource management. Population ecology, succession and classification are discussed and evaluated. Alternate years. Offered 1997-98.

## STATISTICS

See College of Science.

### FOOTNOTES

*Baccalaureate Core Course

^Writing Intensive Course (WIC)

[1]Required courses are not to be taken S/U.

[2]Fisheries Science majors take two of these three courses. Wildlife Science majors take all of these.

[3]Requirement may also be met, with approval of the head adviser, by attending another marine field station.

[4]Offered at Hatfield Marine Science Center.

[5]A minimum of 12 credits must be taken from the following food processing courses: FST 210, FST 211, FST 212, FST 213, FST 310, FST 311, FST 450.

[6]Certain classes may be used to satisfy both the Baccalaureate Core and the Rangeland Resources core.

[7]Satisfies requirements of the Baccalaureate Core.

[8]Offered during Forestry's Spring Intensive Term.

# College of Business

*The primary mission of the College of Business is to educate. Our goal is to prepare students for lifelong learning, and to enable them to participate in society and in the work force as educated individuals who can succeed in a chosen career and contribute in a positive way to a changing global economic system. The undergraduate and graduate programs in business and the undergraduate program in accounting are all accredited by the American Assembly of Collegiate Schools of Business.*

The College of Business offers two undergraduate degree programs and one graduate degree program. Curricula lead to Bachelor of Arts (B.A.), Bachelor of Science (B.S.), and Master of Business Administration (M.B.A.) degrees. The College participates in the M.A.I.S program, but College faculty do not serve as the major professor for M.A.I.S degrees. For advanced degrees see the Graduate School section of this catalog.

Business Administration offers options in accounting, international business, finance, management, management information systems, marketing management, and general business. A minor in a non-business area is required of all business students.

College of Business undergraduate students have the opportunity to participate in student exchange programs around the world.

### Undergraduate Majors

**Business Administration (B.A., B.S.)**
*Options*
Accounting
Finance
General Business
International Business
Management
Management Information Systems
Marketing Management

### Minor

Business Administration

### Certificate Program

Post-Baccalaureate Certificate in Accounting

### Graduate Major

**Business Administration (M.B.A.)**

## INTERNATIONAL DEGREE

Undergraduate majors in Business can earn a second degree in International Studies. See the Interdisciplinary Studies section of this catalog for more information.

#### POST-BACCALAUREATE CERTIFICATE IN ACCOUNTING

A post-baccalaureate certificate in accounting is intended for those who wish to prepare for careers in professional accounting. The certificate is available to those holding a baccalaureate degree that did not involve specialized accounting education. The required accounting course work is identical to that required for the B.S. in Business Administration with an option in accounting. In addition, certain business and related elective courses are recommended.

#### MINOR PROGRAM

The College of Business offers a transcript-visible minor for students majoring in other disciplines. The minor allows students to tailor a program of study to enhance their skills in areas such as marketing, management, and finance. More information may be obtained in the Office of Student Services, 214 Bexell Hall, or call (541) 737-3716.

## GRADUATE PROGRAM

#### Master of Business Administration

The M.B.A. degree program is designed primarily for students whose undergraduate degrees are in disciplines other than business administration or those having an undergraduate business degree and significant subsequent work experience. The program stresses breadth of knowledge in all areas of business and administration. It provides a working knowledge of those skills necessary for the graduate to develop into a competent and responsible executive in both private and public organizations.

#### Graduate International Exchange Program

The College of Business has a student exchange program for M.B.A. students with the Copenhagen School of Economics and Business Administration, Copenhagen, Denmark.

#### 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; keyboarding, one year; 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 the business adviser at the community college to determine the most appropriate courses to complete prior to transfer. The head adviser of the College of Business may also be contacted for advice.

#### ADVISING AND PLACEMENT

The College of Business has experienced advisers available to assist students in all academic matters as well as in the areas of career choice and job placement. The resources at Career Services are available to all students seeking information concerning placement opportunities and interviews with visiting firms.

#### ACADEMIC REQUIREMENTS

The standards set forth below apply to all students enrolled in the College of Business and are in addition to those standards applicable to all students in the University. Students are responsible for satisfying these requirements and should seek clarification in the Office of Student Services, 214 Bexell Hall. Students are expected to make satisfactory progress toward a degree. Satisfactory progress includes (but is not limited to) the completion of all review group courses listed below by the time the designated number of credits has been completed within a specified number of terms. At a minimum, the record of every student in the college will be reviewed at the completion of 45, 90, and 135 credits. Students will be required to transfer from the College of Business if:

(a) a minimum of 2.50 grade-point average

200 Bexell Hall
Oregon State University
Corvallis, OR
97331-2603
(541) 737-3716

#### ADMINISTRATION

**DONALD F. PARKER**
*Sara Hart Kimball Dean*

**CLARA HORNE**
*Head Adviser*

(OSU grades only) is not achieved in each set of review group courses listed below, OR

(b) two or more review group courses have not been completed in the designated year. (Exception: transfer students who are following a schedule approved during their first term at OSU.

**Review Group Courses**

Only grades earned in courses completed at OSU are used in the 2.50 grade-point average computation.

(a) At the end of the freshman year (45 credits or three terms): WR 121, MTH 111, MTH 241, MTH 245, and COMM 111 or COMM 114;

(b) At the end of the sophomore year (90 credits or six terms): BA 211, BA 213, BA 230, BA 271, BA 275, BA 278, ECON 201, ECON 202;

(c) At the end of the junior year (135 credits or nine terms): BA 340, BA 347, BA 350, BA 352, BA 357, and BA 390;

(d) During the senior year (135-180 credits or 12 terms): BA 469, BA 471, and all specified 400-level course work.

To graduate, a student must also have a 2.50 grade-point average in all course work taken in the College of Business and in all 400-level course work taken in the College.

Review group courses for which a W or grades A-F are received may be repeated no more than once.

## CONCURRENT DEGREES

Students who wish to earn an undergraduate degree in business administration combined with another OSU degree may enroll in the concurrent degree program. The requirements for earning two degrees are listed under Requirements for Baccalaureate Degrees. Students who intend to obtain one of their degrees in business administration should see the head adviser of the College of Business as soon as possible.

### 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. In the junior or senior year, students select one of several options that include specialized course work in an area of interest. (See Options.)

The study of business administration is combined with a minor in a non-business area. Minors are designed to augment the education of the business executive by providing tools or understanding related to the increasingly complex demands business professionals encounter during a business career.

### PROGRAM REQUIREMENTS (180)

**Business Administration Core Curriculum (50-53)**

The business administration core curriculum provides students with basic skills in accounting, data processing 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; and the opportunity to integrate course work and further develop decision-making skills through the analysis of business cases.

**Option (23-36)**

Options are designed to allow students to extend their professional preparation beyond the introductory level in one or more areas. Most options (except accounting and management information systems) may be completed within one academic year and are designed for the senior year. Students electing accounting or management information systems begin their option course work in the junior year.

**Minor (27 or more)**

Each business administration student is required to complete a minor area of study or an approved alternative in course work outside the College of Business. Students typically begin course work for their minors in their sophomore year.

**Mathematics (12)**

The basic mathematics requirements are MTH 111, College Algebra; MTH 241, Calculus for Management and Social Science; and MTH 245, Mathematics for the Management, Life and Social Sciences, preceded, if needed, by prerequisite mathematics courses.

**Economics (6)**

Micro- and macroeconomics are covered in ECON 201 and ECON 202. Students transferring from another institution who have completed a one-year course in Principles of Economics have completed this requirement.

**Written and Oral Communication (6)**

Business students also must take WR 121, English Composition; and COMM 111, Public Speaking, or COMM 114, Argument and Critical Discourse.

**University General Requirements**

MTH 111, WR 121, and COMM 111 or COMM 114 meet the University's baccalaureate core requirements for Mathematics, Writing I, and Writing III/Speech, respectively. All students must meet the other baccalaureate core requirements and the other requirements for baccalaureate degrees. (See Requirements for Baccalaureate Degrees.)

## CORE CURRICULUM

**Freshman Year**

MTH 111, MTH 241, MTH 245. Math (12)
COMM 114 or COMM 111. Speech (3)
WR 121. English Composition (3)
Baccalaureate core, unrestricted electives (27)

**Sophomore Year**

BA 211, BA 213. Accounting Principles (8)
BA 230. Business Law (4)
BA 271. Information Technology in Business (3)
BA 275. Quantitative Business Methods (4)
ECON 201, ECON 202. Introduction to Micro-, Macroeconomics (8)
Baccalaureate core, minor courses, or unrestricted electives (18)

**Junior Year**

BA 340. Finance (4)
BA 347. International Business (4)
BA 350. Organizational Systems (4)
BA 352. Organizational Behavior (4)
BA 357. Operations Management (4)
BA 390. Marketing (4)
Baccalaureate core, minor courses, or unrestricted electives (21)

**Senior Year**

BA 469. Strategic Management & Business Policy (4)
BA 471. Management Information Systems (3)*
Business Administration Option (24-36)
Baccalaureate core, minor courses, or unrestricted electives (5-17)

Students majoring in business administration must choose an option no later than the last term of their junior year. Students in accounting and management information systems begin their option in the junior year, reducing their elective credits as needed.

*Students with an option in accounting or management information systems do not take BA 471.

### OPTIONS

Students who complete all requirements will receive the B.A. or B.S. degree in Business Administration. All students in business administration must complete 23-36 credits of business administration or related courses in one of the options described below.

## ACCOUNTING, FINANCE, AND INFORMATION MANAGEMENT

**Faculty**

*Professors* Bailes, Frishkoff, Harrison, Neyhart, J. Nielsen; *Associate Professors* C. Brown, Coakley, Graham, Kleinsorge, Seville, Sullivan; *Assistant Professors* Gammill, Herrmann, Mishra, Moulton, Tyran; *Instructor* Bandhauer, Sebastin

**ACCOUNTING OPTION (36)**

The primary goal of the Accounting Option at Oregon State University is to provide a professionally oriented program to prepare students for successful careers in the major fields of accounting. Accounting students take the courses shown below (beyond the introductory accounting courses that are taken by all business students).

**Junior Year**

BA 317, BA 318, BA 319. Intermediate Accounting (12)
BA 321, BA 322. Cost Accounting (8)
BA 325. Tax Accounting I (4)

**Senior Year**

BA 417. Advanced Accounting (4)
BA 420. Accounting Information Systems (4)
BA 427. Auditing (4)

Students in accounting will begin their 36-credit option in the junior year, reducing their elective credits as needed. All accounting option course work must be taken on a graded (A-F) basis. Courses that are beyond introductory accounting and that are completed at another institution or through correspondence study are not transferable. Students should consult the departmental office for enrollment requirements. Accounting students are required to take 135 credits of non-accounting classes.

**FINANCE OPTION (23-24)**
Financial managers engage in many activities designed to ensure the efficient utilization of an individual's or organization's capital resources. Oregon State University's emphasis is on institutional finance.

Finance careers include bank loan officer, bank operations officer, insurance claims, underwriting, insurance sales, stock broker, security analyst, portfolio manager, credit manager, cash manager, and risk manager.

**Senior Year**
BA 436. Risk Management (4)
BA 440. Corporate Finance (4)
BA 441. Financial Institutions (4)
BA 442. Investments (4)
BA 445. International Financial Management (4)
*Select one from the following:*
BA 317. Intermediate Accounting (4)
BA 325. Tax Accounting I (4)
BA 437. Employee Benefits & Estate Planning (4)
ECON 330. Money & Banking I (4)

**MANAGEMENT INFORMATION SYSTEMS OPTION (24)**
The mission of the Management Information Systems Option is to help prepare students for entry level positions and successful careers within the field of information management. The program builds on the business and computer skills classes required of all business students, and prepares students specifically to apply the information technologies to business tasks. Students complete a programming course (CS 151) and three information management courses during the junior year:

**Junior Year**
BA 370. Business Data Processing (4)
BA 371. Business Systems Analysis & Design (4)
BA 372. Business Software Development (4)
Satisfactory completion of these courses puts the student in a good position to work as an intern during the summer between the junior and senior years.

**Senior Year**
BA 479. Current Topics in Information Management (4)
BA 483. Management of Information Technologies (4)
BA 462. Project Management (4)

**Recommended Elective**
BA 477. Business Internet Applications (4)
Students should consult the departmental office for current information relative to the above requirements.

## MANAGEMENT, MARKETING, AND INTERNATIONAL BUSINESS

**Faculty**
*Professors* Becker, Bloomfield, Gobeli, Larson, Miller, Parker; *Associate Professors* D. Brown, Drexler, King, Koenig, Lawton, McAlexander, Mukatis, Shane, *Assistant Professors* Camacho, Chandraschekar, Down, Hseih, Kim

**GENERAL BUSINESS OPTION (24)**
All students in the option must take 24 credits of 400-level College of Business courses in addition to the undergraduate business core curriculum. A request for approval must be submitted to the Office of Student Services, 214 Bexell Hall.

**INTERNATIONAL BUSINESS OPTION (24)**
The International Business Option prepares students for management positions in organizations engaged in international trade. Graduates of this program are typically employed with firms involved in exporting, importing, or service organizations that facilitate international trade. Students study the economic, political, geographical, and socio-cultural factors which impact business across national boundaries.

**Senior Year**
BA 445. Internat'l Financial Management (4)
BA 447. Topics in International Business (4)
BA 497. Global Marketing (4)
ECON 440. International Trade (4)
Area Study Courses (9)

Area Study courses must be approved by an adviser in the Office of Student Services, 214 Bexell Hall. Students must also demonstrate second-year foreign language proficiency consistent with the area identified above.

**MANAGEMENT OPTION (24)**
The Management Option helps prepare students for careers as managers and supervisors in goods-producing and service enterprises. Students obtain a solid grounding in the management of systems, personnel, and quality. The integrative focus of the Management Option also provides excellent preparation for graduate-level studies in law, urban and regional planning, public services administration, and health care administration.

**Senior Year**
*Select six (6) of the following:*
BA 451. Quality Improvement (4)
BA 453. Human Resources Management (4)
BA 455. Management and Union Relations (4)
BA 458. Technology Systems Management (4)
BA 459. Competitive Analysis (4)
BA 460. Venture Management (4)
BA 462. Project Management (4)
BA 463. Family business Management (4)

**MARKETING MANAGEMENT OPTION (24)**
The Marketing Option provides students with both technical marketing skills and leadership training. Students may enter marketing careers in business, not-for-profit organizations, and the public sector. International and domestic markets are studied.

**Senior Year**
BA 492. Consumer Behavior (4)
*Select one from the following:*
BA 498. Services Marketing (4)
BA 499. Marketing Policy (4)
*Select at least four from the following:*
BA 493. Advertising Management (4)
BA 494. Marketing Technology (4)
BA 495. Retail Management (4)
BA 496. Marketing Research (4)
BA 497. Global Marketing (4)

## BUSINESS ADMINISTRATION MINOR (28)

The business administration minor is developed for students with majors outside of the College of Business. The minor assumes familiarity with computerized word processing, spreadsheets, and database management. Students without such preparation should take BA 131 or a similar course. MTH 111 and ECON 201 are prerequisites to the minor.

**MINOR REQUIREMENTS:**
BA 215. Fundamentals of Accounting (4)
*Select at least one of the following:*
BA 230. Business Law (4)
BA 347. International Business (4)
*Select at least three of the following:*
BA 340. Finance (4)
BA 350. Organizational Systems (4)
BA 352. Organizational Behavior (4)
BA 357. Operations Management (4)
BA 390. Marketing (4)

Select a minimum of two 400-level business courses (8 credits), or additional business courses from the list above (prerequisites must be satisfied).
TOTAL: 28 credits minimum
All courses must be taken on a graded (A-F) basis. A minimum overall 2.50 grade-point-average in all courses is required for certification.

## NON-BUSINESS MINORS (27)

A non-business University-approved minor or an approved alternative is required of all business undergraduate majors. Minors and alternatives must consist 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. Approved alternatives will not be noted on transcripts.

A list of approved alternatives is available from the head adviser of the College of Business. In addition to the approved alternatives, students may also propose a coherent set of non-business courses to fulfill this requirement. Students must demonstrate how the proposal supports their career goals. Proposals must be submitted to the Office of Student Services no later than the beginning of the junior year. Proposals will not be approved that represent a deviation from a University-approved minor or an approved alternative.

Candidates for the B.A. degree must complete a minor offered by the Department of Foreign Languages and Literature or complete 27 pre-approved credits of foreign language and culture studies, 12 credits of which must be at the upper division level. Students who choose the latter must also demonstrate a foreign language proficiency equivalent to that attained at the end of a second year language sequence.

## COURSES

### Lower Division Courses

**BA 101. INTRODUCTION TO BUSINESS (3).** Explores the relationships between competetive markets and business organizations; examines the roles played by business in society; introduces the functions and operations that must exist if businesses are to create goods and services; highlights major problems faced by managers in planning, organizing, directing, and controlling enterprises; and identifies career opportunities in private and public enterprises.

**BA 131. BUSINESS PRODUCTIVITY SOFTWARE (2).** Use of application programs as communication tools; primarily e-mail, word processing, and spreadsheet modeling.

**BA 199. SPECIAL STUDIES (1-4).** Graded P/N.

**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. PREREQ: MTH 111 and 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. PREREQ: BA 211 and sophomore standing.

**BA 215. FUNDAMENTALS OF ACCOUNTING (4).** A survey of basic accounting principles and procedures that is designed for non-business students. Encompasses both financial and managerial accounting from a user perspective. Not open to business students. PREREQ: Sophomore standing.

**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. PREREQ: Sophomore standing.

**BA 271. INFORMATION TECHNOLOGY IN BUSINESS (3).** Application of information technology as a personal productivity tool within a business environment. Integrative use of application programs such as database management systems, spreadsheets, presentation graphics, and Internet usage. PREREQ: BA 131 or equivalent demonstrated proficiency; sophomore standing.

**BA 275. QUANTITATIVE BUSINESS METHODS (4).** Management decision processes utilizing statistical methods, use and application of probability concepts, sampling procedures, statistical estimation, and regression to the analysis and solution of such business problems as income and cost estimation, sales forecasting, performance evaluation, inventory analysis, and quality control. PREREQ: MTH 241, MTH 245 and sophomore standing.

**BA 278. INTRODUCTION TO MANAGEMENT SCIENCE (4).** Management decision processes utilizing mathematical models, use and application of modeling techniques, mathematical programming, decision theory, and other methods to the analysis and solution of business problems. PREREQ: BA 275, MTH 241, and sophomore standing.

### Upper Division Courses

**BA 315. ACCOUNTING FOR DECISION MAKING (4).** Cost accounting concepts in product costing, standard costing, profit planning, and budgeting, taught with a management emphasis. Topics to be covered from the perspective of understanding the content and how to use cost accounting information in decision making. PREREQ: BA 215. Not open to business students.

**BA 317. INTERMEDIATE ACCOUNTING (4).** Financial accounting theory and practice; financial statement overview; income determination; and valuation, measurement, and recognition of current assets. PREREQ: BA 213, BA 271, junior standing, and departmental approval.

**BA 318. INTERMEDIATE ACCOUNTING (4).** Continuation of philosophy established in BA 317. In-depth coverage of non-current assets and liabilities, including pensions, leases, and income tax allocation. PREREQ: BA 317, junior standing, and departmental approval.

**BA 319. INTERMEDIATE ACCOUNTING (4).** Concepts and valuation of owners' equity, contributed and earned capital, earnings per share, disclosure requirements, introduction to accounting for government and not-for-profit organizations, and cash flow analysis. PREREQ: BA 318, junior standing, and departmental approval.

**BA 321. COST ACCOUNTING (4).** Cost behavior profit planning and budgeting, motivation and control, cost accounting systems and standard costs .PREREQ: BA 213, BA 271, BA 340, junior standing, and departmental approval.

**BA 322. COST ACCOUNTING (4).** Relevant costs, cost accumulation and allocation for specific decisions, segment performance measurement and control, quantitative techniques in cost and managerial accounting. PREREQ: BA 321, BA 357, junior standing, and departmental approval.

**BA 325. TAX ACCOUNTING I (4).** Principles and philosophy of the federal tax system as it applies to individuals. PREREQ: BA 213 and junior standing.

**BA 340. FINANCE (4).** Role and functions of financial manager in 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. PREREQ: ECON 201; BA 213 or BA 215; junior standing.

**BA 347. INTERNATIONAL BUSINESS (4).** Integrated view of international business including: current patterns of international business, socioeconomic and geo-political 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 interface between nation states and the firms conducting foreign business activities. PREREQ: ECON 202 and junior standing.

**BA 350. ORGANIZATIONAL SYSTEMS (4).** A system perspective for managing organizations is applied to processes and structures. Emphasis is placed on total quality management. Topics include changing environments, systems analysis, planning, organizing, directing, and evaluating. PREREQ: Junior standing.

**BA 352. ORGANIZATIONAL BEHAVIOR (4).** Diagnose behavior at the individual and small group level and develop skills in improving individual and small group performance. An emphasis is placed on the practical application of theory and research. Concepts of total quality and diversity are integrated into course topics. PREREQ: Junior standing.

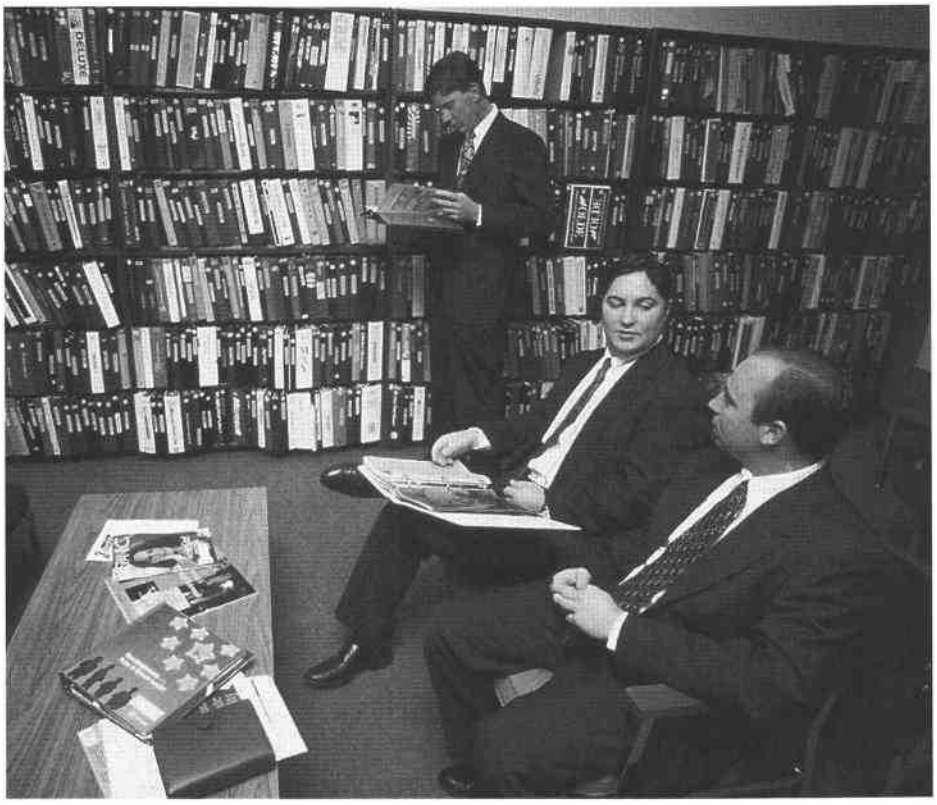
**BA 357. OPERATIONS MANAGEMENT (4).** Decision making in managing the production of goods and services: product planning, process planning, facility planning, control of quantity, cost and quality. Special emphasis on exponential forecasting, inventory management, work methods, project management, productivity improvement, and international comparisons. PREREQ: BA 275; and junior standing.

**BA 370. BUSINESS DATA PROCESSING (4).** Introduce business students to the Information Management career field. Emphasis placed on understanding how information technology can be applied to enhance decision making and further competitive strategies within a business environment, and on the characteristics and roles of business information systems. Students will be required to use state-of-the art computer applications programs to solve business problems. PREREQ: BA 213, BA 271, BA 275; and junior standing.

**BA 371. BUSINESS SYSTEMS ANALYSIS AND DESIGN (4).** Systems analysis, design, control, documentation, and implementation techniques for business information system applications. Covers documentation methods used in all phases of the development life cycle. PREREQ: BA 370 and junior standing.

**BA 372. BUSINESS SOFTWARE DEVELOPMENT (4).** Software development environment and tools used for creating business computer applications. Emphasis on program development with COBOL. Covers database management systems, report generators, and documentation requirements. PREREQ: BA 371, CS 151 and junior standing.

**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. PREREQ: ECON 201 and junior standing.



**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. PREREQ: Senior standing and departmental approval required.

**BA 406. PROJECTS (1-16).** Departmental approval required.

**BA 407. SEMINAR (1-16).**

**BA 410. BUSINESS INTERNSHIP (1-6).** Planned and supervised work experience at selected cooperating business firms. Supplementary training, conference, reports, and appraisals. PREREQ: Upper-division standing and departmental approval required. Graded P/N.

**BA 415,BA 416. NEW PRODUCT DEVELOPMENT (4,4).** The integrated development of a product and its associated business and manufacturing processes is studied. Built around a team based project leading to a manufacturable product, and a financially realizable business plan.Teams are composed of engineering and business students in their last year in major. Both terms must be taken consecutively. A grade is only given after the second term. CROSSLISTED as ENGR 415.

**BA 417. ADVANCED ACCOUNTING (4).** An advanced course in financial accounting dealing with corporate investments, foreign operations and partnerships. Material is presented in the context of contemporary issues in financial accounting and accounting theory. PREREQ: BA 319, BA 322, senior standing and departmental approval.

**BA 420. ACCOUNTING INFORMATION SYSTEMS (4).** Accounting information systems and organizations, basic business processes, information technology, and developing business solutions with an emphasis on problem analysis and critical thinking skills. PREREQ: BA 271, BA 319, BA 322, senior standing and departmental approval. This course is not open to students who have taken BA 471.

**BA 424. ADVANCED SELECTED TOPICS IN ACCOUNTING (1-4).** Conceptual and applied examination of advanced contemporary issues and changes in accounting. Topics will vary from term to term. PREREQ: BA 319, BA 322, senior standing, and departmental approval.

**BA 425. TAX ACCOUNTING II (3).** Principles and procedures of the federal tax system with an emphasis on partnerships, corporations, and estates and trusts. Some complex topics apply to individuals. PREREQ: BA 325, senior standing, and departmental approval.

**BA 427. AUDITING (4).** Types of audits and auditors. Theory, practice, environment, and ethics of auditing types of audit reports. The nature of a professional audit: planning, evidence gathering and evaluation, and reporting of results. PREREQ: BA 319, BA 322, senior standing, and departmental approval.

**BA 430. TOPICS IN BUSINESS LAW (4).** Legal aspects of property rights including intellectual property, terms of business, labor and employee considerations, antitrust, insurance, debtor-creditor law including bankruptcy and alternatives to litigation. PREREQ: BA 230.

**BA 432/BA 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. BA 432; PREREQ: Junior standing. BA 532; Graduate standing.

**BA 435/BA 535. INSURANCE PLANNING FOR INDIVIDUALS (4).** Identification and management of insurable business risks; loss forecasting; loss reduction; financing alternatives including retention, insurance, and captives. Focuses on worker's compensation, liability, and property exposures. PREREQ: BA 340 and senior standing or BA 530 and graduate standing.

**BA 436/BA 536. RISK MANAGEMENT (4).** Identification and management of insurable business risks; loss forecasting; loss reduction; financing alternatives including retention, insurance, and captives. Focuses on worker's compensation, liability, and property exposures. PREREQ: BA 340 or BA 530 and graduate standing.

**BA 437/BA 537. EMPLOYEE BENEFITS AND ESTATE PLANNING (4).** Employer and employee objectives for benefit plans; employee life, medical, disability, and retirement plans; gift and estate taxes; estate planning problems and tools, including property ownership, wills, trusts, and strategies for closely held business interests. PREREQ: BA 340 or BA 530 and graduate standing.

**BA 440/BA 540. CORPORATE FINANCE (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. PREREQ: BA 340 or BA 530 and graduate standing.

**BA 441/BA 541. FINANCIAL INSTITUTIONS (4).** Operation of commercial banks and other financial institutions; management of financial services; analysis of loan and investment policies, operating and pricing policies, and current developments in financial services. PREREQ: BA 340 or BA 530 and graduate standing.

**BA 442/BA 542. 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. PREREQ: BA 340 or BA 530 and graduate standing.

**BA 445/BA 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. PREREQ: BA 347, BA 340, or BA 540 and BA 547 and graduate standing.

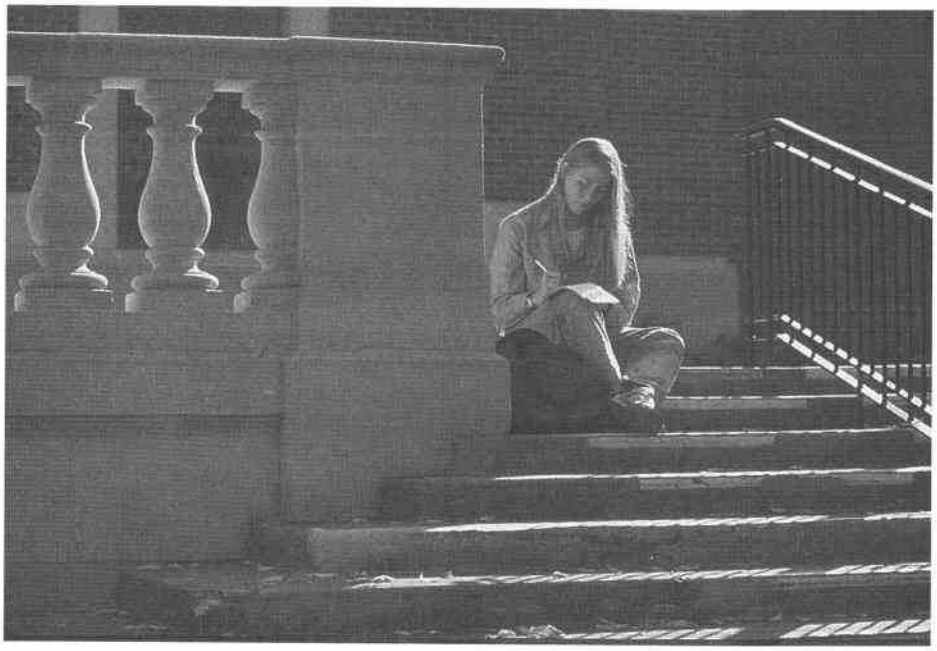
**BA 446. MANAGEMENT OF THE MULTINATIONAL ENTERPRISE (4).** Advanced integrative course in international business with an emphasis on the multinational enterprise. Focus on the unique problems, characteristics, and demands that face firms engaged in international business. Reviews the evolving patterns, management practices, and the strategic and operational decisions of multinational enterprises. PREREQ: BA 347, BA 340, BA 350, BA 352, BA 390, and senior standing; or BA 530,BA 547, BA 550, and BA 590.

**BA 447. TOPICS IN INTERNATIONAL BUSINESS (1-4).** Analysis of current topics in international business. Topics will vary from term to term. PREREQ: Senior standing.

**BA 450. TOPICS IN MANAGEMENT (1-4).** Analysis of current topics in management theory and/or applications. PREREQ: senior standing.

**BA 451/BA 551. QUALITY IMPROVEMENT (4).** Theory, principles, procedures, and tools of quality management, with application exercises and an integrative process improvement project. PREREQ: BA 357 or instructor approval. Not open to students who have taken BA 554.

**BA 452. LEADERSHIP AND TEAM BUILDING (4).** In-depth practice and development of three skills: leadership, team building, and negotiations. Provides opportunities for learning to increase effectiveness as a group member or leader. PREREQ: BA 350, BA 352, and senior standing.



**BA 453/BA 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. PREREQ: BA 350, BA 352, and senior standing; or BA 550.

**BA 455. MANAGEMENT AND UNION RELATIONS (4).** Union organizing and recognition, contract negotiation, strikes, and grievance administration including collective bargaining policies and practices, unions as organizations, labor movement history, and labor law. PREREQ: BA 350, BA 352, and senior standing.

**BA 458/BA 558. TECHNOLOGY SYSTEMS MANAGEMENT (4).** Theory, principles, procedures and tools of technology management, with focus on the innovation process from a systems perspective. Application experience through integrative technology development project that involves project management skills. PREREQ: BA 357 or instructor approval.

**BA 459/BA 559. COMPETITIVE ANALYSIS (4).** Strategic planning, macro and industry driver variables and scenario construction. Projects involve analysis of industry competition and examination of behaviors in segmented competitive groupings. Examination of competitive strategies in different industries. PREREQ: BA 340, BA 350, BA 390 and senior standing; or BA 530, BA 550, BA 590; or instructor approval.

**BA 460/BA 560. 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. PREREQ: 340, BA 350, BA 390 and senior standing; or BA 530, BA 590; or instructor approval.

**BA 462/BA 562. 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. PREREQ: BA 350, BA 352, BA 357, and senior standing; or BA 550.

**BA 463/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 advisers. PREREQ: Senior standing/and instructor approval.

**BA 466. BUSINESS ETHICS (4).** Analysis and critique of conventional conceptions of business ethics. Evaluation of ethical issues involving businesses at firm, national, and international levels. PREREQ: Senior standing.

**BA 468/BA 568. INTERNATIONAL COMPARATIVE MANAGEMENT (4).** Managerial practice throughout the world, market versus centrally directed economies, political regimes and business organizations, careers and values of managers in different countries, and forms of worker participation and management union relations. Variety of national systems of management as a challenge to American managers. PREREQ: BA 347, BA 350, BA 352 and senior standing; or BA 547 and BA 550.

**BA 469. ^STRATEGIC MANAGEMENT AND BUSINESS POLICY (4).** Advanced integrative course on the role of top management; focus on the tasks of the general manager, including analysis of external environment, setting corporate goals and objectives, and implementing plans through policymaking. A variety of techniques are used, including a business simulation game and case studies of companies, to provide the basis for this integrative experience. PREREQ: BA 340, BA 350, BA 352, BA 357, BA 390, and senior standing. (Writing Intensive Course)

**BA 471. MANAGEMENT INFORMATION SYSTEMS (3).** Application of computers to solve business problems, with an emphasis on the development and use of business information systems. The course assumes each student is already a competent user of various computer-based application programs such as word processing, database management systems, spreadsheets, and presentation graphics. PREREQ: BA 271, BA 275, BA 340, BA 319, BA 357, BA 390, and senior standing. This course is not open to students who have taken or are taking BA 420 or BA 370.

**BA 477/BA 577. BUSINESS INTERNET APPLICATIONS (4).** Design, construction, and evaluation of mutimedia documents with an emphasis on building commercial World Wide Web applications, application of simulation techniques to the solution of business problems, and construction of pages with forms and database access. PREREQ: BA 271 or equivalent database experience, CS 151 or equivalent programming experience, senior standing.

**BA 478. TOPICS IN MANAGEMENT SCIENCE (4).** The techniques of management science are applied to the analysis of various managerial problems. The case method is utilized, with each case drawn from an existing organization. The emphasis is on problem formulation, solution procedures, and the steps necessary to gain management acceptance for implementation of the recommended solution. PREREQ: BA 275 and senior standing.

**BA 479. CURRENT TOPICS IN INFORMATION MANAGEMENT (4).** Study of current research and state-of-the-art issues in the use of computers to assist in the management process, including such topics as end-user computing, new generation computer languages, telecommunications, networking, application development, and other current topics. PREREQ: BA 372 and senior standing.

**BA 483. MANAGEMENT OF INFORMATION TECHNOLOGIES (4).** Integration and management of the various information resources in a business organization, including management information systems, decision support systems, telecommunication data management, and office automation. Analysis of the user/manager's role in information system design and the management of information system departments. PREREQ: BA 372 and senior standing.

**BA 492/BA 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. PREREQ: BA 390 and senior standing; or BA 590.

**BA 493/BA 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. PREREQ: BA 390 and senior standing; or BA 590.

**BA 494/BA 594. MARKETING AND TECHNOLOGY (4).** Management of marketing in a technological environment. New product development, sales force management, and business-to-business marketing, with special reference to high technology markets. PREREQ: BA 390 and senior standing; or BA 590.

**BA 495/BA 595. RETAIL MANAGEMENT (4).** Management of retail business with emphasis on strategic planning, analysis, and control, focused on middle and upper-management decision. PREREQ: BA 390 and senior standing; or BA 590.

**BA 496/BA 596. MARKETING RESEARCH (4).** Problem identification, problem definition, alternative identification; research design, methodology, questionnaire design; data collection and analysis related to the marketing research process. PREREQ: BA 390 and senior standing; or BA 590.

**BA 497/BA 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. PREREQ: BA 347, BA 390 and senior standing; or BA 590.

**BA 498/BA 598. 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. PREREQ: BA 390 and senior marketing option students; BA 590.

**BA 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. PREREQ: BA 390 and last term senior marketing option students.

### Graduate Courses

**BA 501. RESEARCH (1-16).**

**BA 505. READING AND CONFERENCE (1-16).**

**BA 506. PROJECTS (1-16).** Departmental approval required.

**BA 507. SEMINAR (1-16).**

**BA 510. BUSINESS INTERNSHIP (1-6).** Planned and supervised work experience at selected cooperating business firms. Supplementary training, conferences, reports, and appraisals. PREREQ: Graduate standing. Departmental approval required.

**BA 511. BUSINESS FUNDAMENTALS (2).** A two-week intensive study and skill development course involving team work, managing diversity, financial reporting, and business simulation. PREREQ: MBA students only. Graded P/N.

**BA 513. NEGOTIATION SKILLS (1).** Theory and practice of principled negotiations in business situations. Requires intensive work with experiential exercises, feedback, and simulations. PREREQ: Graduate standing.

**BA 521. ACCOUNTING FUNDAMENTALS (4).** Fundamentals of financial accounting from the perspective of the non-accounting decision maker or manager. Includes financial statement analysis and the impact of economic decisions on financial reports. Introduction to managerial accounting topics. PREREQ: BA 511 and graduate standing.

**BA 522. MANAGERIAL ACCOUNTING AND CONTROL (4).** Understanding and using managerial accounting information for business decision-making and strategic cost management. Emphasis on the interpretation and use of internal accounting data rather than the preparation of these data. PREREQ: BA 521 or equivalent and graduate standing.

**BA 524. SELECTED TOPICS IN ACCOUNTING (1-4).** Examination of the impact of recent advances in accounting on the management of contemporary business. Topic will vary from term to term. PREREQ: Graduate standing.

**BA 530. FINANCIAL MANAGEMENT (4).** Overview of the theory of financial management of a business enterprise, maximizing the firms's value, and application of analytical techniques to financial decision making. PREREQ: BA 521 and graduate standing.

**BA 531. LEGAL ENVIRONMENT OF BUSINESS (4).** Nature and function of law in our business society. Obligations and liabilities associated with breach of contract and warranty and the commission of torts, crimes, and regulatory civil violations. Ethical considerations are highlighted. PREREQ: BA 511 and graduate standing.

**BA 544. INVESTMENTS (4).** Economic, technical, and tax aspects of alternative investments including equity securities, bonds, real property, investment companies, options and forward contracts. Special emphasis on option valuation models and portfolio management. PREREQ: BA 340 or BA 530; graduate standing.

**BA 547. INTERNATIONAL BUSINESS (4).** Integrative course on the international business environment. Focus on the unique problems, characteristics, and demands that face firms engaged in international business. Reviews current patterns and trends, management practices, and strategic and operational decisions with international business. PREREQ: graduate standing.

**BA 548. INTERNATIONAL FINANCIAL MANAGEMENT (3).** Foreign exchange risk management, the foreign investment decision, political risk management, international financial markets, cost of capital, international banking, import/export financing, working capital management, planning and control, and taxation. PREREQ: BA 530 and graduate standing.

**BA 549. SELECTED TOPICS IN FINANCE (1-4).** Recent advances in selected finance fields. Topics will vary from term to term. PREREQ: BA 511; graduate standing.

**BA 550. ORGANIZATIONAL THEORY AND BEHAVIOR (4).** Management theory including organization structure and organizational behavior with special emphasis on how managers respond to a rapidly changing environment. PREREQ: graduate standing.

**BA 554. QUALITY MANAGEMENT (4).** Contemporary development of total quality management theory, procedures and techniques including Hoshin planning, process improvement, and innovation through quality function deployment. First course in a three-course quality management sequence. PREREQ: BA 511 and graduate standing.

**BA 555. DATA ANALYSIS FOR MANAGEMENT (4).** Application of statistical methods to assist in the planning and control of business operations. Second course in a three-course quality management sequence. PREREQ: graduate standing.

**BA 556. MANAGING OPERATIONS (4).** Conceptual framework for studying the managerial decisions involved in converting inputs into goods and services. Third course in a three-course quality management sequence. PREREQ: BA 555 and graduate standing.

**BA 557. BUSINESS CONDITIONS ANALYSIS (4).** Methods of economics and mathematics applied to analysis and forecasting of general business conditions accounting systems (national income, international payments, flow of funds) models in aggregate income analysis, business fluctuations and growth, and such forecasting techniques as input-output analysis, the and statistical and econometric methods. PREREQ: 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. PREREQ: Graduate standing.

**BA 569. BUSINESS POLICY FORMULATION AND IMPLEMENTATION (4).** Examination of the general manager's functions, including establishing corporate direction, and formulating and implementing policies. Related concepts such as the values of the general manager, social responsibility, innovation, and competition are reviewed in terms of their impact on the general manager's integrative function. Case studies provide the basis for analyzing concepts and interrelated aspects of company operations. PREREQ: BA 521, BA 530, BA 556, BA 590 and graduate standing.

**BA 571. INFORMATION MANAGEMENT (4).** Role of information, computers, and computer information systems in an organization, including management information systems, decision support systems, databases, and information centers; and systems design, security and privacy of data, disaster planning, and hardware and software selection. Courses are discussed from the viewpoint of the user and manager. Computer projects are assigned to illustrate topics. PREREQ: Graduate standing.

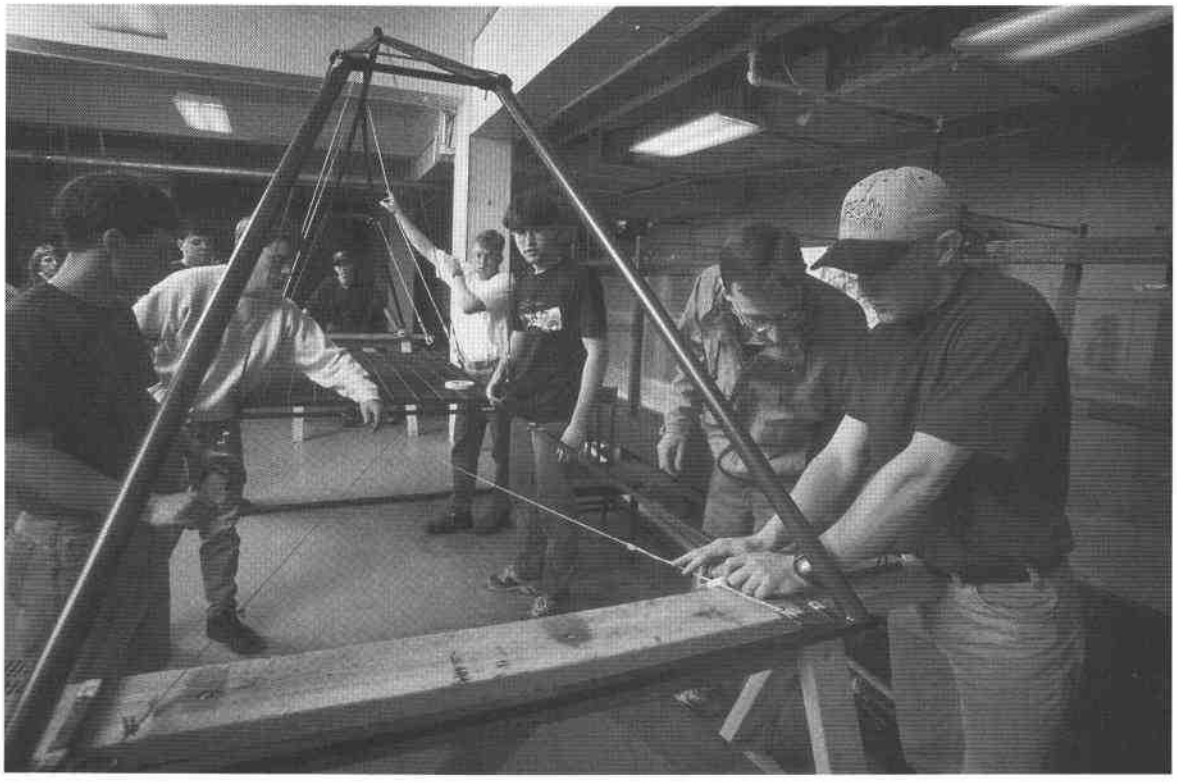
**BA 581. TOPICS IN COMPUTER INFORMATION MANAGEMENT (1-4).** Recent advances in the use of computers to assist in the management process. Study of the relationship between information needs and the organizational structure, objectives and decision centers. PREREQ: graduate standing.

**BA 584. TOPICS IN DECISION SCIENCES (1-4).** Application of management science techniques to selected problem areas within business. Topics will vary from term to term. PREREQ: graduate standing.

**BA 590. MARKETING MANAGEMENT (4).** Intensive analysis of consumer and industrial markets, the institutions involved in marketing and distributing products, and major managerial decisions. Emphasis on identifying structure of decisions, understanding buyer behavior, and application of marketing concepts. PREREQ: graduate standing.

**BA 591. STRATEGIC MARKETING (3).** Evaluation of internal and external environments in the development of strategic marketing plans. Projects or cases provide a comprehensive and realistic planning experience. PREREQ: BA 590 and graduate standing.

**BA 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. PREREQ: graduate standing.



*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 24,000 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 offers degrees in engineering, computer science, construction engineering management, engineering physics and radiation health physics. Students may choose engineering majors from Biological, chemical, civil, computer, electrical and electronics, environmental, industrial and manufacturing, mechanical, and nuclear engineering. Educational preparation for land surveying, a licensed profession in all states, is offered through civil engineering.

## The Engineering Profession

Engineering is the profession in which a knowledge of the mathematical and natural sciences gained through education, experience, 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 U.S.A., and educational programs must meet high professional standards. Engineers are not only responsible for planning, design, construction, and management, but also for the safety and welfare of the public which relies on their work.

## Engineering Program Objective

The primary objective of the College of Engineering is to provide a quality education for students entering the engineering profession. A graduate of the college will have the engineering knowledge to serve the profession, the academic background for continuing educational growth, and an appreciation of societal roles and values.

## Preparing for an Engineering Career

To prepare for the professional practice of engineering, students must complete an accredited program of study leading to a Bachelor of Science degree in an established engineering field. Each engineering curriculum requires 192 credits and includes a balance of courses in mathematics, science, liberal arts, engineering science, and engineering design

Engineering topics include both engineering science and design. Engineering science begins at the sophomore level, where students take a number of courses common to all programs, and extends through the professional engineering program. At the junior and senior levels, engineering science topics constitute a significant portion of each curriculum through a combination of required and technical elective courses.

The academic programs of each department within the college incorporate a strong design component. Many aspects of design theory and practice are introduced early in the academic experience. These concepts are developed in specific first-year courses and continue to be taught in selected courses in the pre-engineering program. Much of the student's design expertise is developed during the junior and senior years following the attainment of proficiency in basic engineering concepts and an understanding of the ethical, social, economic, and safety considerations of engineering practice. This work culminates with a major upper-division design activity representative of that experienced in a professional engineering environment.

Upon graduation, students who complete an engineering degree 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 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.

## Pre-Professional Program

Courses included in the freshman 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. (See the pre-professional curricula which follow.) 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 a (✥). These courses must be completed before the student is eligible to apply for admission to the professional program. The other courses listed are important and may constitute prerequisites for junior-level courses.

All engineering programs have the same required pre-professional courses. This allows the flexibility of selecting a major after one or two years of study. Other majors offered by the college have different required pre-professional courses appropriate to that major.

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**ADMINISTRATION**

**Thomas M. West**
*Interim Dean*

**Chris A. Bell**
*Associate Dean, Research and Graduate Studies*

**Roy C. Rathja**
*Assistant Dean, Undergraduate Programs and Head Adviser*

Footnotes for this section on page 241.

## Professional Program

The professional program consists of various curricula offered at the junior and senior levels which 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.

## Admissions 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 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. To be eligible to apply, students must complete 80 credits, including all required courses, by the end of summer term for fall admission and by the end of fall term for winter admission. Grades of C or better and a minimum of 2.25 cumulative GPA must be earned in required courses.

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 forms and information on policies and programs are available from the College of Engineering.

## 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 freshman year are essentially equivalent. This flexibility allows students to change majors during the freshman year without loss of progress. Engineering students who are unsure about their choice for a major are advised to register in pre-general engineering until they make a decision.

The final selection of a major is a significant milestone in a student's life, since this choice has a lifetime effect on his or her professional career. Students are advised to study the options carefully and to take full advantage of the counseling available.

## Accreditation

Professional standards are assured by periodic inspection of the college by off-campus teams operating under the Accreditation Board for Engineering and Technology, Inc. (A.B.E.T.). The engineering curricula at Oregon State University are accredited by the Engineering Accreditation Commission of A.B.E.T. Civil, electrical, and mechanical engineering were first accredited in 1936; chemical engineering in 1942; industrial engineering in 1950; nuclear engineering in 1973; and computer engineering and industrial engineering (manufacturing) in 1985. The construction engineering management program was accredited in 1980 by the American Council for Construction Education (A.C.C.E.).

## Minors

The College of Engineering offers minors in: Environmental Engineering, Computer Science, Nuclear Engineering, Radiation Health Physics, and Earth Information Science and Technology. See the listings in the departmental areas in this section of the catalog.

## Cooperative Programs

The College of Engineering has cooperative programs of two types. In each case, agreements exist to make available to students degree opportunities not normally available through Oregon State University alone.

### University of Idaho Degrees

The University of Idaho has a cooperative agreement with Oregon State University which allows Oregon resident engineering students to earn geological, metallurgical, or mining engineering degrees at the University of Idaho. Students must attend the University of Idaho for at least the last year of the degree program.

### Three-Two Program Degrees

By cooperative arrangement, students may pursue dual degree programs in engineering and science, usually physics. Other degree-granting institutions provide the first three years of a science program and required pre-professional courses. Oregon State University provides the last two years in professional studies plus the remaining part of the science degree requirements. Students graduate with two baccalaureate degrees, one in engineering from Oregon State University and one in a science area from the cooperating institution.

## International Degree

Undergraduates with majors in the College of Engineering can earn a second degree in international studies. See the Interdisciplinary Studies section of this catalog for more information.

## 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 (M.S.) degree normally requires one or two years. The Doctor of Philosophy (Ph.D.) degree requires three to four additional years.

# BIORESOURCE ENGINEERING

James A. Moore, Head
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(541) 737-2041

**Faculty**

*Professors* Cuenca☆, English☆, Hashimoto, Kolbe☆, McGuire☆, Miner☆, Moore☆; *Associate Professors* Bolte, Hellickson☆, Selker; *Assistant Professors* Bachelet, Bothwell, Chaplen, Godwin (Adjunct), Velayudhan, Wykes (Adjunct)

**Undergraduate Major (B.S.)**

Biological Engineering

**Undergraduate Minors**

Irrigation Engineering

**Graduate Major**

Bioresource Engineering (M.S., Ph.D.)

***Graduate Areas of Concentration***

Bioconversion Processes
Biointerfacial Phenomena
Cell Culture Engineering
Downstream Processing in Biotechnology
Food and Postharvest Engineering
Groundwater Resource Analysis
Irrigation System Analysis
Non-point Source Water Pollution
Regional Hydrologic Modeling

Bioresource engineering is the application of life science principles and engineering analysis to optimize the use and sustainability of biological resources. Our undergraduate program leading to a degree in *biological engineering* was developed to serve at the interface between life sciences and engineering. It provides a solid background in biology, chemistry, physics and mathematics, in addition to the engineering sciences. Upper-level coursework in biological engineering includes analysis and design of bioprocesses involving genetically engineered cells and plant and animal cell cultures, and the recovery of products from bioreactors. Similarly, our graduate curriculum is engineering-based with strong emphasis on

the life sciences. Research and extended education efforts of the department are concentrated in two major areas: *bioprocess engineering*, and *water resources engineering*. The bioprocess engineering curriculum provides quantitative training required to address topics ranging from sub-molecular issues relevant to enzyme structure and function to value-added processing of food and pharmaceuticals. The water resources engineering curriculum provides a rigorous understanding of the physical processes and mathematical methods to address issues of non-point source pollution, groundwater resource analysis, regional hydrologic modeling and analysis of irrigated agricultural water systems.

The graduate curriculum is flexible and diversified and helps students prepare for employment in positions of responsibility in food, pharmaceutical and biomedical technology, environmental and natural resource management, educational institutions or government. In addition to providing a strong foundation in engineering and physical and biological sciences, it allows students to expand their interests in emerging technologies relevant to modern biotechnology, biomedicine, or water resources engineering.

The graduate program leading to Master of Science and Doctor of Philosophy degrees emphasizes courses in bioprocess engineering and water resources engineering. Supplemental courses include nonlinear and advanced biological modeling, interfacial processes and nonlinear adsorption and chromatography.

## CURRICULUM

### IRRIGATION ENGINEERING MINOR (30)

A minor in Irrigation Engineering is available to any undergraduate student accepted into the professional engineering program. This minor enables engineering students to be exposed to the agricultural, biological, and engineering sciences needed to specialize in agricultural and food related industries.

#### ENGINEERING (17)

**Required**

CE 311, CE 312. Fluid Mechanics (6)
CE 313. Hydraulic Engineering (3)
BRE 434. Irrigation Water Quality and Drain (4)
BRE 433. Irrigation System Design (4)

**Elective**

BRE 471. Biosystems Modeling Techniques (3)
CE 412. Hydrology (3)
CE 417. Hydraulic Engineering (3)
CE 413. Water Resources Design (3)
STAT 314. Intro to Stat for Engineers (13)

#### SCIENCE (13)

**Required**

CSS 200. Principles of Crop Science (4)
CSS 305. Principles of Soil Science (5)

**Elective**

MB 230. Introductory Microbiology (4)
BI 212. Biology (5)
BOT 331. Plant Physiology (5)

## COURSES

### Upper Division Courses

Courses numbered 500 and above may be taken for graduate credit.

### Lower Division Courses

**BRE 111. BIOLOGICAL ENGINEERING ORIENTATION (3).** Introduction to the engineering profession in general and biological engineering in particular; careers in biological engineering; problem solving strategies.

**BRE 112. INTRODUCTION TO DESIGN (2).** Team approach to design and construction of a selected bioprocess; report writing and oral presentation. PREREQ: BRE 111.

**BRE 199. SPECIAL TOPICS (1-16).**

**BRE 221. BIOLOGICAL ENGINEERING (3).** Overview of the biological engineering discipline. Use of chemistry and biological fundamentals and simple engineering principles to quantitatively describe systems that involve biomolecules, cells, or tissues. PREREQ: MTH 252.

**BRE 299. SPECIAL TOPICS (1-16).**

### Upper Division Courses

**BRE 399. SPECIAL TOPICS (1-16).**

**BRE 401. RESEARCH (1-16).**

**BRE 405. READING AND CONFERENCE (1-16).**

**BRE 406. PROJECTS (1-16).**

**BRE 407. SEMINAR (1-16).**

**BRE 432/BRE 532. LIVESTOCK HOUSING AND WASTE MANAGEMENT (3).** Basics in where, how, and why one would build, insulate, and ventilate livestock buildings. Manure and waste water collection, treatment, storage, and utilization. Offered alternate years.

**BRE 433/BRE 533. 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. PREREQ: ENGR 332. Lec/lab. Offered alternate years.

**BRE 434/BRE 534. DRAINAGE SYSTEM DESIGN (4).** Principles of application of drainage systems, water balance calculations and governing equations for saturated and unsaturated soils. Development of drainage system design specifications for field installation, collection of drainage water, pumping and disposal. Applications to irrigation salinity control, drainage of landfills, land application of wastewater and construction site dewatering. PREREQ: ENGR 322. Lec/lab. Offered alternate years.

**BRE 439. IRRIGATION PRINCIPLES AND PRACTICE (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 COREQ: Pre-calculus.

**BRE 448/BRE 548. NON-POINT SOURCE POLLUTION ASSESSMENT AND CONTROL (3).** Quantitative description of the processes whereby pollutants of natural and manmade origin enter and adversely impact the quality of surface and groundwater resources. Integrates hydrologic understandings with those of water quality dynamics. Utilizes alternate analytical techniques to design abatement and evaluation strategies as well as tools for interaction with the regulatory process.

**BRE 452/BRE 552. FOOD ENGINEERING I (4).** Service course for non-engineering majors. Conservation of mass and energy and fundamentals of fluid dynamics with application to food processing. PREREQ: MTH 251, PH 201.

**BRE 453/BRE 553. FOOD ENGINEERING II (4).** Service course for non-engineering majors. Thermodynamics and heat transfer applied to the food processing of food. Field trips may be required. PREREQ: BRE 452.

**BRE 456/BRE 556. BIOPROCESS ENGINEERING I: BIOLOGICAL FUNDAMENTALS (3).** Biological principles that influence the analysis and design of bioprocesses. Emphasis is on cell metabolism; recombinant DNA technology; bioethics; enzyme and cell growth kinetics; and metabolic stoichiometry. PREREQ: MTH 252, BB 350 or equivalent.

**BRE 457/BRE 557. BIOPROCESS ENGINEERING II: BIOLOGICAL REACTORS (3).** Analysis and design of bioprocesses using microbial cell cultures. Emphasis is placed on scale-up and scale-down, and the use of mixed cultures. PREREQ: BRE 456/556 and BB 451.

**BRE 458/BRE 558. BIOPROCESS ENGINEERING III: EUKARYOTIC CELL CULTURE (3).** Characterization of production processes for biologically- derived products from eukaryotic organisms. Emphasis is on process kinetics and the design of bioreactor systems. PREREQ: BRE 457/BRE 557 or consent of instructor.

**BRE 459/BRE 559. FERMENTATION ENGINEERING LABORATORY (2).** Development of laboratory techniques utilized in fermentation and cell culture engineering. Major design parameters of bioreactor systems are investigated. Critical evaluation of experimental data is stressed. PREREQ: BRE 458/558.

**BRE 462/BRE 562. BIOPRODUCT RECOVERY (4).** Application of basic mass transfer, reaction kinetics and thermodynamic principles to understanding, selection, and development of strategies for the recovery of products from bioreactors. PREREQ: BRE 456/BRE 556.

**BRE 471/BRE 571. BIOSYSTEMS MODELING TECHNIQUES (3).** Development of mathematic models of biological and ecological systems; linear and nonlinear systems analysis; simulation of random processes; model solution and analysis techniques. PREREQ: BRE 470/570 or equivalent.

**BRE 490. BIOPROCESS DESIGN I (3).** Design of bioprocess systems, from upstream-processing steps through bioreactors to downstream-processing steps. PREREQ: BRE 456, BRE 457, BRE 458, and BRE 462.

**BRE 491. BIOPROCESS DESIGN II (3).** Design of bioprocess systems, from upstream-processing steps through bioreactors to downstream-processing steps. PREREQ: BRE 490.

**BRE 499. SPECIAL TOPICS (1-16).**

### Graduate Courses

**BRE 501. RESEARCH (1-16).**

**BRE 503. THESIS (1-16).**

**BRE 505. READING AND CONFERENCE (1-16).** Graded P/N.

**BRE 506. PROJECTS (1-16).**

**BRE 507. SEMINAR (1).** Section 1: Graduate Student Orientation Seminar to acquaint new graduate students about Graduate school and department 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.

**BRE 514. GROUNDWATER HYDRAULICS (3).** Analytical and numerical modeling of groundwater flow systems. Steady and unsteady flow in confined and unconfined aquifers. Finite difference modeling of aquifers and well fields. Analysis of well tests for hydraulic properties of aquifers. PREREQ: MTH 252. CROSSLISTED AS CE 514 and GEO 514.

**BRE 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. CROSSLISTED as CE 525. Offered alternate years.

**BRE 536. OPTIMUM IRRIGATION MANAGEMENT (3).** Management of irrigation systems for economic optimization. Management to control salinity, alkalinity, and toxic residuals. Algorithms for optimum irrigation management. Offered alternate years.

**BRE 540. FIELD AND LABORATORY TECHNIQUES IN SUBSURFACE HYDROLOGY (1-3).** Tools and methods employed to characterize hydrologic properties of subsurface systems. Use of GPR, TDR, resistivity, and methods of determining hydraulic conductivity, sorptivity, bulk density, and other fundamental hydrologic properties. Must be taken in conjunction with BRE 542.

**BRE 542. VADOSE ZONE TRANSPORT (3).** 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. PREREQ: MTH 254.

**BRE 544. HYDRAULICS OF OPEN CHANNELS (4).** Steady, uniform, and nonuniform flow in natural and artificial open channels; unsteady flow; interaction of flow with river structures; computational methods. PREREQ: CE 313. CROSSLISTED as CE 544. Offered alternative years.

**BRE 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. PREREQ: MTH 256. Offered alternate years.

**BRE 561. BIOCONVERSION PROCESSES (4).** Biologically mediated processes to convert biomass into food, feed, fuel, and other useful products. Discuss properties of biomass that make them amendable to bioconversion, the major microbial and enzymatic processes that occur during bioconversion and the design and economic considerations that influence the feasibility of bioconversion systems. PREREQ: Basic principles of microbiology and biochemistry. Lec/lab.

**BRE 580. BIOSYSTEMS INSTRUMENTATION (3).** Introduction to sensors and techniques important to bioresources production, including temperature, radiation, strain, psychrometry, displacement, flow rate, and pressure. Projects emphasize signal conditioning, data acquisition and storage using microcomputers to analyze and control agricultural and food processes.

**BRE 583. ADVANCED DIGITAL IMAGE ANALYSIS (3).** Advanced digital image/signal analysis for image enhancement, restoration, and preprocessing, statistical pattern recognition, syntactic pattern recognition. Provide fundamental understanding of advanced image processing techniques with case studies in natural resource management, environmental monitoring, land surface processes, and machine vision using remotely sensed satellite image, scanned image, and video/still frame image.

**BRE 599. SPECIAL TOPICS (1-16).**

**BRE 601. RESEARCH (1-16).**

**BRE 603. THESIS (1-16).**

**BRE 605. READING AND CONFERENCE (1-16).**

**BRE 606. PROJECTS (1-16).**

**BRE 607. SEMINAR (1-16).**

**BRE 662. INTERFACIAL PROCESSES (3).** Fundamentals of colloid and surface chemistry with emphasis on biomolecular behavior at interfaces, and application to biofilm development and biomolecular separation processes. Offered alternate years.

**BRE 664. PREPARATIVE ADSORPTION AND CHROMATOGRAPHY (3).** Use of adsorptive and chromatographic separation methods at high loadings to isolate or purify compounds, with emphasis on biological mixtures. Role of multicomponent adsorption isotherms stressed. Outline of continuous separation methods.

**BRE 672. ADVANCED BIOLOGICAL MODELING (3).** Construction and analysis of realistic mathematical models describing a variety of biological and engineering processes. Use of a computer algebra system, especially for perturbatin methods; introduction to optimization. PREREQ: BRE 471/BRE 571 or consent of instructor. Offered alternate years.

**BRE 699. SPECIAL TOPICS (1-16).**

## CHEMICAL ENGINEERING

E.A.C./A.B.E.T. Accredited

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**Faculty**

*Professor* Kimura; *Associate Professors* Jovanovic, Levien☆, Rochefort, Rorrer; *Assistant Professors* Koretsky

### Undergraduate Major

**Chemical Engineering (B.S.)**

### Graduate Major

**Chemical Engineering (M.S., Ph.D.)**

*Graduate Areas of Concentration*

Biochemical Reactors
Biotechnology
Ceramics Materials Synthesis and Processing
Chemical Engineering
Chemical Recovery Technology (Pulp and Paper)
Combustion
Fluidization Engineering
Polymer Rheology and Processing
Process Control/Optimization
Reactor Design
Supercritical Fluid Technology
Thin Film Materials Processing

Chemical engineers design, operate, and manage safe and economical processes and industrial facilities for converting basic raw materials into products that are useful to people. Typical products from these processes include microelectronic devices, pharmaceuticals, polymers, synthetic fibers, advanced composite materials, pulp/paper and other consumer products ranging from detergents to processed foods. Chemical engineers find employment in such traditional areas as industrial chemicals and petroleum refining, but many are also working in production or waste treatment and minimization in industries new to Oregon and the Pacific Northwest.

The chemical engineering curriculum provides students with a background of fundamental knowledge which prepares them for responsible positions in research and development, design, technical service, plant operation, technical sales, and management in a wide variety of industries. It places major emphasis on mathematics, chemistry, and engineering sciences in addition to courses in design and analysis.

Chemical engineering students who plan to work in industrial research laboratories or to pursue an academic career should continue with graduate work toward the M.S. or Ph.D. degree.

### CURRICULUM

#### PRE-PROFESSIONAL

**Freshman Year**

CH 221✥, CH 222, CH 223. General Chem (15)
MTH 251, MTH 252. Diff and Integral Calc (8)✥
MTH 253. Infinite Series and Sequences (4)✥
WR 121. English Composition (3)✥
CHE 101. Chemical Engr Orientation (3)
CHE 102. Intro Chem Engr Comp (3)✥
PH 211. General Physics (4)✥
HHP 231. Lifetime Fitness for Health (3)[1]
Perspectives (3)[1]
Free Electives (3)

**Sophomore Year**

CH 334, CH 335, CH 336. Organic Chem (9)
MTH 254. Vector Calculus I (4)✥
MTH 256. Applied Diff. Equations (4)✥
ENGR 211. Statics (3)✥
ENGR 212. Dynamics (3)✥
CHE 211. Material Balances (4)
CHE 212. Energy Balances (4)
PH 212. General Physics (4)✥
ENGR 201. Electrical Fundamentals (3)✥
COMM 111. Inform and Persuasive Communication (3) or COMM 114✥
WR 327. Technical Report Writing (3)
Perspectives (6)[1]

#### PROFESSIONAL CHEMICAL ENGINEERING

**Junior Year**

CH 440, CH 441, CH 442. Physical Chemistry (9)
ENGR 331, ENGR 332, ENGR 333. Momentum, Energy and Mass Transfer (11)
CHE 312. Chemical Engineering Thermodynamics (4)
CHE 323. Applied Momentum and Energy Transfer (3)
CHE 361. Data Acquisition and Process Cntrl (3)
CHE 461. Process Control (3)
Engineering Topics Elective (3)[2]
Science/Math Elective (5)[3]
Perspectives (6)[1]

**Senior Year**

CHE 411, CHE 412. Mass Transfer Operations (6)
CHE 414, CHE 415. Chem Engr Laboratory (6)
CHE 431, CHE 432. Chem Engr Plant Design (6)
CHE 443. Chemical Reactor Engineering (4)
ENGR 390. Engineering Economy (3)
Engineering Topics Elective (3)[2]
Perspectives (3)[1]
Synthesis (6)[1]
Free Electives (3)
Adv Chemistry Elective (6)

## COURSES

### Lower Division Courses

**CHE 101. CHEMICAL ENGINEERING ORIENTATION (3).** Department engineering orientation. Lec/rec.

**CHE 102. INTRODUCTORY CHEMICAL ENGINEERING COMPUTATION (3).** Application of FORTRAN programming to various topics in chemical engineering. Lec/rec.

**CHE 211. MATERIAL BALANCES AND STOICHIOMETRY (4).** Material balances, energy balances, and thermophysical and thermochemical calculations. PREREQ: General chemistry; sophomore standing in engineering. COREQ: MTH 252. Must be taken in order. Lec/rec/lab.

**CHE 212. ENERGY BALANCES (4).** Material balances, energy balances, and thermophysical and thermochemical calculations. PREREQ: CHE 211, General chemistry; sophomore standing in engineering. Must be taken in order. Lec/rec/lab.

### Upper Division Courses

**CHE 312. CHEMICAL ENGINEERING THERMODYNAMICS (4).** Equations of state, thermodynamic property relationships, phase, equilibrium, and chemical equilibrium. PREREQ: MTH 256, CHE 212, CH 440.

**CHE 323. APPLIED MOMENTUM AND ENERGY TRANSFER (3).** Application of momentum and energy transfer phenomena to designing industrial equipment. PREREQ: ENGR 332, CHE 212.

**CHE 361. DATA ACQUISITION AND PROCESS DYNAMICS (3).** Fundamental principles of process dynamics and instrumentation used in the control of process variables such as pressure, temperature and flow rate. PREREQ: MTH 256; ENGR 201; ENGR 332.

**CHE 401. RESEARCH (1-16).**

**CHE 405. READING AND CONFERENCE (1-16).**

**CHE 406. PROJECTS (1-16).**

**CHE 410. INTERNSHIP (1-16).**

**CHE 411/CHE 511. MASS TRANSFER OPERATIONS (3).** Mass transfer operations; design of separation processes. Must be taken in order. PREREQ: CHE 212, CHE 312, ENGR 333, CH 442. Must be taken in order. Lec/rec.

**CHE 412/CHE 512. MASS TRANSFER OPERATIONS (3).** Mass Transfer operations; design of separation processes. PREREQ: CHE 212; CHE 312, ENGR 333; CH 442. Must be taken in order. Lec/rec.

**CHE 414. ^CHEMICAL ENGINEERING LABORATORY (3).** Unit operations and unit processes; preparation of technical reports. Must be taken in order. PREREQ: CHE 411, CHE 443.

**CHE 415. CHEMICAL ENGINEERING LABORATORY (3).** Unit operations and unit processes; preparation of technical reports. Must be taken in order. PREREQ: CHE 411, CHE 443.

**CHE 431/CHE 531. CHEMICAL PLANT DESIGN (3).** Design of chemical plants and chemical engineering equipment. PREREQ: CHE 212, CHE 411, CHE 443, ENGR 390.

**CHE 432/CHE 532. CHEMICAL PLANT DESIGN (3).** Design of chemical plants and chemical engineering equipment. PREREQ: CHE 212, CHE 411, CHE 443, ENGR 390.

**CHE 443/CHE 543. CHEMICAL REACTION ENGINEERING (4).** The design of chemical reactors, for economical processes and waste minimization. Contacting patterns, kinetics and transport rate effects in single phase and catalytic systems. PREREQ: MTH 256, CH 442, CHE 312, ENGR 333.

**CHE 444/CHE 544. THIN FILM MATERIALS PROCESSING (3).** Chemical vapor deposition, physical vapor deposition, plasma etching, and thin film characterization. COREQ: CHE 443 PREREQ: Consent of instructor.

**CHE 445/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. PREREQ: CH 334, CH 335, CH 336 or equivalent, MTH 256 and/or junior standing in engineering or science. Lec/lab.

**CHE 461/CHE 561. PROCESS CONTROL (3).** Analog and digital control methods and control strategies in the chemical process industries. PREREQ: MTH 256, CHE 361.

### Graduate Courses

**CHE 501. RESEARCH (1-16).**

**CHE 503. THESIS (1-16).**

**CHE 505. READING AND CONFERENCE (1-16).**

**CHE 506. PROJECTS (1-16).**

**CHE 507. SEMINAR (1-16).** One credit seminar graded P/N.

**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 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 combined heat and mass transfer. Must be taken in order.

**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).** I: 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).** Design, performance and scale up. Reactors involving solids: packed, fluidized, trickle and slurry reactors.

**CHE 550. ADVANCED PROCESS CONTROL (4).** Modern control theory applied to chemical systems. Identification, analysis, and control of processes using state-space and input-output methods in continuous and discrete time. PREREQ: CHE 461 or equivalent.

**CHE 552. ANALYSIS OF CHEMICAL ENGINEERING MODELS (3).** Critical evaluation of models and solutions for problems in process flow sheeting, transport phenomena, reaction engineering, separations, and process dynamics. Reading and critique of pertinent research literature. PREREQ: CHE 525 or equivalent.

**CHE 571. ELECTRONIC MATERIALS PROCESSING (3).** Technology, theory, and analysis of processing methods used in integrated circuit fabrication. PREREQ: Graduate standing or consent of instructor. Offered alternate years.

**CHE 572. PROCESS INTEGRATION (3).** Process integration, simulation, and statistical quality control issues related to integrated circuit fabrication. PREREQ: ECE 511. Offered alternate years.

**CHE 573. ELECTRONIC MATERIALS AND CHARACTERIZATION (3).** Physics and chemistry of electronic materials and methods of materials characterization. PREREQ: Graduate standing or consent of instructor. Offered alternate years.

**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.

**CHE 603. THESIS (1-16).**

**CHE 605. READING AND CONFERENCE (1-16).**

**CHE 606. PROJECTS (1-16).**

## CIVIL, CONSTRUCTION, AND ENVIRONMENTAL ENGINEERING

Wayne C. Huber, Head
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Oregon State University
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http://www.orst.edu/dept/ccee/index.html

**Faculty**
*Professors* Bell☆, Bella☆, Hicks☆, Huber☆, Hudspeth☆, Istok☆, Klingeman☆, Layton☆, McDougal☆, Pritchett☆, Schroeder☆, Schultz☆, Vinson☆, Williamson☆; *Associate Professors* Eldin, Leahy☆, Lundy, Miller☆, Nelson, Rogge☆, Semprini☆, Sollitt, Woods, Yim☆; *Assistant Professors* Dickenson, Hunter-Zaworski☆

### Undergraduate Majors

**Civil Engineering (B.A., B.S.)**
**Civil Engineering-Forest Engineering (B.S.)**
**Environmental Engineering (B.A., B.S.)**
**Construction Engineering Management (B.A., B.S.)**
*Options*
Environmental Engineering
Earth Information Science and Technology (EIST)-See Interdisciplinary Studies

### Minor

Environmental Engineering
Earth Information Science and Technology (EIST)-See Interdisciplinary Studies

### Graduate Majors

**Civil Engineering (M.S., Ph.D.)**
*Graduate Areas of Concentration*
Civil Engineering
Construction Engineering Management
Environmental Engineering
Geotechnical Engineering
Ocean Engineering
Structural Engineering
Transportation Engineering
Water Resources Engineering
**Ocean Engineering (M.Oc.E.)**
*Graduate Area of Concentration*
Ocean Engineering

## CIVIL ENGINEERING

E.A.C./A.B.E.T. Accredited

Within the Department of Civil, Construction, and Environmental Engineering (CCEE), the civil engineering curriculum is designed to prepare students for professional and responsible engineering positions with business, industry, consulting firms, or government. The curriculum includes basic sciences, social sciences, humanities, communication skills, engineering sciences, and engineering design.

Training in the basic sciences occurs primarily in the freshman and sophomore years; engineering science is introduced at the sophomore year and continues to graduation in a combination of required and technical elective courses. Completion of the OSU Baccalaureate Core provides experience in the humanities and social sciences as well as in other non-technical areas, as additional preparation for a student's profession and life.

Design is the essence of civil engineering, and training draws upon the basic and engineering sciences plus non-technical and societal factors to provide an integrated approach to solutions of a practical nature. The concept of design is introduced during the freshman orientation course, with most of the capability developed at the junior and senior level, culminating in a team approach to solution of open-ended, realistic problems drawn from the professional experience of the faculty. Courses with design content include those with "design" in their titles, as well as others. A more detailed explanation of the design experience and design course sequences is contained in the "Undergraduate Advising Guide for the Civil Engineering Program," which may be obtained form the department or viewed on the department's Web site.

Civil engineering is a diverse professional field with discipline specialties in structures, transportation, water supply and water pollution control, environmental engineering, geotechnical engineering, hydrology, hydraulics and water resources, surveying, ocean engineering, and engineering planning and economics. All students receive basic instruction in all disciplines, with the option for additional elective courses in desired areas.

The CCEE Department offers an undergraduate minor and option in Environmental Engineering. (See Environmental Engineering.) The Environmental Engineering option and minor provide education in water pollution, air pollution, solid wastes and hazardous wastes.

Surveying and Mapping course work is offered as a part of the Earth Information Science and Technology (EIST) option and minor in Interdisciplinary Studies.

The growing complexity of modern engineering practice has required further specialization in one or more engineering disciplines. This is generally attained through postgraduate study. The CCEE Department offers Master of Science degree programs in construction engineering management, environmental engineering, geotechnical engineering, ocean engineering, structural engineering, transportation engineering, and water resources engineering. A unique Master of Ocean Engineering program is also available. Doctoral programs leading to the Ph.D. degree are available in environmental engineering, geotechnical engineering, ocean engineering, structural engineering, transportation engineering, and water resources engineering. Areas of concentration can be combined to form an integrated civil engineering M.S. program or M.S. and Ph.D. minors.

## EARTH INFORMATION SCIENCE AND TECHNOLOGY

For more information about the Earth Information Science and Technology option and minor, see the Interdisciplinary Studies section of this catalog.

## CURRICULUM

### PRE-CIVIL ENGINEERING

**Freshman Year**
CE 101,[5] CE 102 (or FE 215)✥. Civil and Construction Engineering Orientation (6)
MTH 251, MTH 252, MTH 253. Calculus (12)✥
CH 201✥, CH 202.[5] Chemistry for Engineering Majors (6)
PH 211. General Physics with Calculus (4)✥
Approved biological science (4)[1, 5]
WR 121. Writing (3)[1]✥
COMM 111 or COMM 114. Speech (3)[1]✥
HHP 231. Fitness (3)[1]
Perspectives (6)[1]
Free elective (1)

**Sophomore Year**
MTH 254. Vector Calculus (4)✥
MTH 256. Differential Equations (4)✥
ENGR 211✥, ENGR 212✥, ENGR 213.[5] Mechanics (Statics, Dynamics), Strength of Materials (9)
ENGR 201. Electrical Fundamentals (3)✥
ST 314. Intro to Statistics for Engineers (3)[5]
ENGR 245 Engr Graphics and Design (3)[5]
PH 212, PH 213. General Physics with Calc (8)✥
WR 327. Tech Writing (3)[1]
Science elective (3)
Free electives (2)
Perspectives (6)[1]
TOTAL (96)

### PROFESSIONAL CIVIL ENGINEERING

**Junior Year**
CE 311, CE 312. Fluid Mechanics (8)
CE 313. Hydraulic Engineering (4)
CE 321. Civil Engineering Materials (4)
ENVE 321. Environmental Engr Fund (4)
CE 361. Surveying Theory (4)
CE 372. Soils Engineering (4)
CE 373. Soil Mechanics (4)
CE 381, CE 382. Structural Theory I, II (8)
CE 383. Design of Steel Structures (4)
CE 392. Intro to Transportation Engr (4)

**Senior Year**
ENGR 311. Thermodynamics (3)
ENGR 390. Engineering Economy (3)
CE 412. Hydrology (3)
CE 481. Reinforced Concrete I (4)
CE 491. Highway Engineering (4)
Technical electives (18)
Free elective (1)
Perspectives (6)[1]
Synthesis (6)[1]
TOTAL (96)

### ENVIRONMENTAL ENGINEERING OPTION AND MINOR

See Environmental Engineering.

### SURVEYING AND MAPPING

See Earth Information Science and Technology (EIST) under the Interdisciplinary Studies section of this catalog.

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.

**Civil Engineering** students require CE 361 (Surveying Theory) and three courses from the following list.

**Construction Engineering Management** students require CEM 263 (Plane Surveying), CE 365 (Highway Location and Design) and three courses from the following list.

CE 365. Highway Location and Design (3)
CE 461/CE 561. Photogrammetry (3)
CE 463/CE563. Control Surveying (4)
CE 465/CE 565. Oregon Land Survey Law (3)
CE 469/CE 569. Property Surveys (3)

## COURSES

### Lower Division Courses

**CE 101. CIVIL AND CONSTRUCTION ENGINEERING ORIENTATION (3).** Description of civil and environmental engineering and construction management professions; problem solving; communication skills. PREREQ: Enrollment in pre-engineering.

**CE 102. COMPUTERS IN CIVIL AND CONSTRUCTION ENGINEERING (3).** Use of microcomputers in engineering problem solving. PREREQ: CE 101 or equivalent.

### Upper Division Courses

**CE 311/CE 312. FLUID MECHANICS I (4).** 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 channels and hydraulic structures. PREREQ: CE 312.

**CE 321. CIVIL ENGINEERING MATERIALS (4).** Highway materials; aggregate, concrete and asphalt. Standard test methods. PREREQ: ENGR 213.

**CE 322. CIVIL ENGINEERING MATERIALS (3).** Engineering properties of metals, plastics, composites, and wood. ASTM Standards for these materials and standards for testing. PREREQ: ENGR 213.

**CE 356. *TECHNOLOGY AND ENVIRONMENTAL SYSTEMS (3).** Limitations of the analytical approach to environmental and technological problems. Methods to address the crucial role of complex human systems. Application to environmental assessments and global environmental change. (Bacc Core Course)

**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. (GIS) PREREQ: ST 314.

**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. PREREQ: CE 361 or CEM 263.

**CE 372. SOILS ENGINEERING (4).** Uses of soils in engineering and construction. Identification and classification. Compaction principles and methods. Basic soil mechanics and introductions to foundations and excavations. PREREQ: ENGR 213; CE 311 or CEM 311.

**CE 373. SOIL MECHANICS (4).** Soil strength and soil mechanics theories applied to analyses of slope stability, retaining structures, and foundations. PREREQ: CE 372.

**CE 382. STRUCTURAL THEORY I,II (4).** Analysis of statically determinate and indeterminate structures (beams, frames, trusses, arches, and cables). Approximate analysis, influence lines, deflections. Must be taken in order. PREREQ: ENGR 213.

**CE 383. DESIGN OF STEEL STRUCTURES (4).** Introduction to LRFD (load and resistance factor design) of steel members, connections and structural systems. PREREQ: CE 382.

**CE 392. INTRODUCTION TO TRANSPORTATION ENGINEERING (4).** Transportation systems characteristics, traffic estimation, comprehensive transportation planning, highway economics, driver and vehicle characteristics, highway operations and capacity, signalization and control. Introduction to intelligent transportation.

**CE 401. RESEARCH (1-16).**

**CE 405. READING AND CONFERENCE (1-16).**

**CE 406. PROJECTS (1-16).**

**CE 407. SEMINAR (1-3).**

**CE 410. INTERNSHIP (1-12).**

**CE 411/CE 511. OCEAN ENGINEERING (3).** An introductory course applying civil engineering methods in the marine environment. Topics include wind waves and tides; nearshore currents and sediment transport; wave forces on seawalls and piles; and rubble structures. PREREQ: CE 313 or CEM 311.

**CE 412/CE 512. HYDROLOGY (3).** Fundamentals of hydrology, the hydrologic cycle, precipitation, streamflow, hydrograph analysis and hydrologic measurements. PREREQ: ST 314.

**CE 413/CE 513. WATER RESOURCES DESIGN (3).** Application of hydrologic and hydraulic engineering principles together with economic and environmental planning and analysis to the design of water resources projects. PREREQ: CE 412 and CE 417.

**CE 415/CE 515. PORTS AND HARBORS (3).** Planning and design criteria of near-shore and harbor facilities, including piers, platforms, jetties, sea walls, groins, moorings, docks, submerged pipelines, harbor design and use of hydraulic models. PREREQ: CE 411.

**CE 417/CE 517. HYDRAULIC ENGINEERING (3).** Theory and design of hydraulic structures. Application of the principles of fluid mechanics and hydraulics to the analysis, synthesis, and elementary design of hydraulic systems involving hydraulic structures and machinery. PREREQ: CE 313.

**CE 420/CE 520. ENGINEERING PLANNING (3).** 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; decision-making implementation.

**CE 422. MODERN CONSTRUCTION METHODS (3).** An in-depth study of the construction process and its many phases. Equipment and method alternatives; management styles. Several field trips to construction sites.

**CE 424/CE 524. CONTRACTS AND SPECIFICATIONS (3).** Quantity surveying; unit prices, subcontracts, overhead costs, profits; principles and laws of contracts applied to engineering.

**CE 456/CE 556. ENVIRONMENTAL ASSESSMENT (3).** Introduction to environmental modeling; risk analysis, principles of applied ecology, and environmental strategies.

**CE 461/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. PREREQ: CE 361 or CEM 263.

**CE 463/CE 563. CONTROL SURVEYING (4).** Control specifications, methods, and problems in obtaining large area angular measurement; precise leveling; triangulation and trilateration figure adjustments with introduction of least square techniques. Global positioning systems. PREREQ: CE 361 or CEM 263.

**CE 465/CE 565. OREGON LAND SURVEY LAW (3).** Oregon U.S. public land survey; 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. PREREQ: CE 361 or CEM 263 or FE 210.

**CE 466/CE 566. PHOTO INTERPRETATION (3).** Air photo interpretation and application to engineering problems; factors responsible for the formation and developments of artificial features and geological land forms. PREREQ: CE 361 or CEM 263.

**CE 469/CE 569. PROPERTY SURVEYS (3).** U.S. public land survey, restoration of corners, subdivision of sections; maps, subdivision plats, and resurvey plats; subdivision design; introduction to LIS/GIS; field astronomy. PREREQ: CE 361.

**CE 471/CE 571. FOUNDATIONS FOR STRUCTURES (3).** Criteria, theory, and practice of design and construction for foundations for structures. Use of in situ tests for geotechnical engineering. PREREQ: CE 373.

**CE 472/CE 572. SOIL TESTING FOR ENGINEERS (4).** Soil sampling; organization of soils laboratory; identification; permeability, consolidation and strength tests. PREREQ: CE 373.

**CE 473/CE 573. EARTH STRUCTURES (3).** Analysis of seepage and stability for earth dams. Design and construction considerations for embankments, earth dams and their foundations. PREREQ: CE 373.

**CE 476/CE 576. DESIGNING WITH GEOTEXTILES (3).** Classification of geotextiles and their applications, functions and mechanisms, and properties and tests. Design methods for drains, roads, embankments, walls and erosion control. PREREQ: CE 373 and CE 491; or FE 316.

**CE 480/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. PREREQ: CE 383 and CE 481 or equivalent.

**CE 481/CE 581. REINFORCED CONCRETE I (4).** Basic principles of reinforced concrete design; safety and economy; strength, stability and serviceability criteria; design of simple reinforced concrete members to resist compressive, bending, and shearing loads. PREREQ: CE 383.

**CE 482/CE 582. WOOD DESIGN (4).** Properties and behavior of lumber and panel products; structural design of columns, beams and diaphragms; design of connections: bolts, nails, timber connectors, and adhesives. PREREQ: CE 383.

**CE 483/CE 583. BRIDGE DESIGN (3).** AASHTO specifications for bridge design; for moving loads; design of concrete slab, T-beam, and composite steel-concrete bridges; simple and continuous spans. PREREQ: CE 481.

**CE 485/CE 585. APPLIED STRUCTURAL ANALYSIS (3).** Development of matrix stiffness method. Use of computer programs to analyze structures. Introduction to finite element method. PREREQ: CE 382.

**CE 486/CE 586. PRESTRESSED CONCRETE (3).** Prestressed concrete analysis and design; systems of prestressing; materials; economics. PREREQ: CE 481.

**CE 488/CE 588. PROBABILISTIC STRUCTURAL ENGINEERING (3).** Applications of probability theory and statistics in the analysis and design of civil engineering systems. Development of probabilistic models for loading and resistance. Introduction to probability-based design criteria including load and resistance factor design. PREREQ: ST 314.

**CE 489/CE 589. DESIGN FOR NATURAL HAZARDS (3).** Design of structures to resist the effects of earthquakes and wind loads. Seismic design philosophy, code requirements, and detailing for steel and reinforced concrete. PREREQ: CE 383, CE 481 or equivalent.

**CE 491. HIGHWAY ENGINEERING (4).** Highway standards, geometric design, cross section and roadside design, traffic control devices, channelization, highway surfaces, pavement design, highways and the environment, highway construction and maintenance. PREREQ: CE 392.

**CE 492/CE 592. PAVEMENT STRUCTURES (3).** Repeated load characteristics of pavement materials; design of pavement structures for streets, highways and airports; pavement management systems. PREREQ: CE 491.

**CE 495/CE 595. TRAFFIC OPERATIONS AND DESIGN (3).** Traffic operations and engineering; human and vehicular characteristics; traffic stream characteristics; highway capacity analysis; location and design of highway facilities; intersection operation, control and design. PREREQ: CE 491.

### Graduate Courses

**CE 501. RESEARCH (1-16).**

**CE 503. THESIS (1-16).**

**CE 505. READING AND CONFERENCE (1-16).**

**CE 506. PROJECTS (1-16).**

**CE 507. SEMINAR (1-16).**

**CE 510. INTERNSHIP (1-12).**

**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. PREREQ: MTH 252. CROSSLISTED as BRE 514 and GEO 514.

**CE 521. CONSTRUCTION ENGINEERING MANAGEMENT (3).** Principles of engineering and construction management for efficient delivery of constructed facilities; fundamentals of project management and project administration with emphasis on quality, time, cost, and project safety.

**CE 522. CONSTRUCTION ENGINEERING MANAGEMENT METHODS (3).** Capital budgeting and equipment policy, estimating and estimating systems, cost and reporting systems, employee motivation and construction market seasonality. PREREQ: ENGR 390.

**CE 523. ENGINEERING ECONOMIC PLANNING (3).** Planning of engineering facilities and economical land use. L.C.D.C. and zoning. Selection of alternatives and economic analysis and evaluation. Benefit cost analysis plus retirement and replacement analysis. PREREQ: ENGR 390.

**CE 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. CROSSLISTED as BRE 525.

**CE 526. ADVANCED CONCRETE TECHNOLOGY (3).** Cement and concrete characteristics and behavior; testing and quality control; mixture design; construction techniques; maintenance and rehabilitation techniques. PREREQ: CE 321.

**CE 527. ASPHALT TECHNOLOGY (3).** Advanced topics in bituminous materials, asphalt aggregate combinations, bituminous mixtures, materials characterization, and construction techniques. PREREQ: CE 321 or equivalent.

**CE 528. SOIL IMPROVEMENT (3).** Techniques to improve the performance of soils in engineering applications; compaction, blending, admixtures and geotextiles; properties, functions, applications, tests and design of geotextiles for embankments and roads. PREREQ: CE 372 and CE 321.

**CE 530. SELECTED TOPICS IN STRUCTURAL ANALYSIS AND MECHANICS (3).** A critical examination in depth of topics selected by the instructor from among topics not covered in other structural analysis and mechanics courses. May be repeated for a maximum of 9 credits on different topics. PREREQ: Graduate standing.

**CE 531. STRUCTURAL MECHANICS (3).** Theories of failure, multi-axial stress conditions, torsion, shear distortions, energy methods of analysis. Nonlinear and inelastic behavior. PREREQ: Graduate standing.

**CE 532. FINITE ELEMENT ANALYSIS (3).** Applications of the finite element method to structural analysis, fluid flow and elasticity problems. Use and development of large finite element computer programs.

**CE 533. STRUCTURAL STABILITY (3).** Stability theory and applications, with emphasis on design of steel structures. PREREQ: CE 383 or equivalent.

**CE 534. STRUCTURAL DYNAMICS (3).** Analytical and numerical solutions for single, multi-degree of freedom and continuous vibrating systems. Behavior of structures, dynamic forces and support motions. Seismic response spectrum analysis. PREREQ: Graduate standing.

**CE 535. INTRODUCTION TO RANDOM VIBRATIONS (3).** Introduction to probability theory and stochastic processes. Correlations and power spectral density functions. Response of linear systems to random excitations. First excursion and fatigue failures. Applications in structural and mechanical system analysis and design. PREREQ: CE 534 or ME 537.

**CE 536. NONLINEAR DYNAMICS (3).** Oscillations in nonlinear systems having few degrees of freedom. Qualitative and quantitative methods; phase plane analysis, averaging, perturbation, stability. Forced and self-excited oscillations, limit cycles, and domain of attraction. PREREQ: CE 534 or ME 537.

**CE 537. ADVANCED TOPICS IN DYNAMICS (3).** Advanced topics in linear and nonlinear dynamics, and random vibrations. Markov random processes and Fokker-Planck equation. Stationary and nonstationary excitations and responses. Approximate nonlinear analysis methods including perturbation, equivalent linearization, and closure techniques. Applications in structural and mechanical system analysis and design. PREREQ: CE 534.

**CE 540. FIELD AND LABORATORY TECHNIQUES IN SUBSURFACE HYDROLOGY (1-3).** Introduction to the tools and methods employed to characterize hydrologic properties of subsurface systems. Hands-on use of GPR, TDR, resistivity, and methods of determining hydraulic conductivity, sorptivity, bulk density, and other fundamental hydrologic properties. Must be taken in conjunction with BRE 542. CROSSLISTED as BRE 540.

**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. PREREQ: CE 412 or equivalent. Offered alternate years.

**CE 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. PREREQ: CH 313. Offered alternate years. Crosslisted as BRE 544.

**CE 545. SEDIMENT TRANSPORT (4).** Principles of sediment erosion, transportation and deposition in rivers, reservoirs, and estuaries; measurement, analysis, and computational techniques. PREREQ: CE 313. Rec. Offered alternate years.

**CE 546. RIVER ENGINEERING (4).** Multi-purpose river use; natural physical processes in alluvial rivers; channel modification practices; river structures; design practices; impact of river modification; problem analysis; and impact minimization. PREREQ: CE 313. Offered alternate years.

**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. PREREQ: CE 311 or equivalent.

**CE 549. CONTEMPORARY TECHNOLOGY (3).** Philosophy and sociology of contemporary technology; technological methods, strengths, and limitations; examination of contemporary issues and conflicts.

**CE 557. HAZARDOUS WASTE REMEDIATION (3).** Physical, chemical, and thermal processes for treatment of hazardous wastes and contaminated soils. Selection of treatment technologies for hazardous waste remediation. COREQ: CE 550.

**CE 570. GEOTECHNICAL ENGINEERING PRACTICE (3).** Development and management of actual projects through the examination of case histories; evaluation of geotechnical data; development of design recommendations and preparation of project reports. PREREQ: CE 471.

**CE 574. ENGINEERING PROPERTIES OF SOILS (4).** Geochemistry of soil formation, clay mineralogy, physical chemistry of clay water systems, permeability, consolidation, and shear strength. PREREQ: CE 373.

**CE 575. EARTH RETENTION AND SUPPORT (4).** Earth pressure theories. Earth supporting structures including walls, bulkheads, culverts, and shafts. PREREQ: CE 373.

**CE 577. GEOTECHNICAL ENGINEERING IN COLD REGIONS (3).** Characteristics of seasonally and permanently frozen ground; physical, thermal, and mechanical properties of frozen soils; frost heave phenomena; prediction of the ground thermal regime; thaw consolidation and stability of thawing slopes; foundation design for cold regions. PREREQ: CE 471. Offered alternate years.

**CE 578. GEOTECHNICAL EARTHQUAKE ENGINEERING (3).** Characteristics of ground motions during earthquakes; dynamic soil properties and site response analysis; soil liquefaction and settlement under cyclic loading; seismic earth pressures; seismic slope stability. PREREQ: CE 373. Offered alternate years.

**CE 579. DEEP FOUNDATIONS (4).** Installation of piles; construction and design of drilled piers; analyses of axially and laterally loaded piers, piles and pile groups; wave equation and dynamic monitoring for pile behavior. PREREQ: CE 471. Offered alternate years.

**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.

**CE 591. TRANSPORTATION SYSTEMS ANALYSIS AND PLANNING (4).** Transportation system analysis, planning, and characteristics; technological characteristics of highway, rail, air, and other transportation modes; transport analysis techniques; transportation network analysis and evaluation; planning studies, demand analysis and forecasting; evaluation of alternative plans. PREREQ: CE 392. Offered alternate years.

**CE 593. TRAFFIC FLOW ANALYSIS AND CONTROL (4).** Traffic operations and control systems; traffic flow theory and stream characteristics; street network capacity analysis; computerized traffic models; regulation; accident and safety improvement. PREREQ: CE 495. Offered alternate years.

**CE 594. TRANSPORTATION FACILITY DESIGN (4).** Location and design of highways, airports, and other surface transportation terminals; design for safety, energy efficiency, and environmental quality. PREREQ: CE 491. Offered alternate years.

**CE 596. PAVEMENT EVALUATION AND MANAGEMENT (3).** Advanced topics in pavement evaluation techniques and pavement management procedures. PREREQ: 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. PREREQ: CE 392. 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 and drainage. PREREQ: CE 392. Offered alternate years.

**CE 599. TRANSPORTATION PLANNING APPLICATIONS (3).** Techniques of transportation planning applied in urban areas and for resource transportation; calibration, testing and application of traffic estimation models; evaluation of alternate plans. PREREQ: CE 591. Offered alternate years.

**CE 601. RESEARCH (1-16).**

**CE 603. THESIS (1-16).**

**CE 605. READING AND CONFERENCE (1-16).**

**CE 606. PROJECTS (1-16).**

**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.

**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. May be repeated for a maximum of 9 credits on different topics. PREREQ: CE 641. Offered alternate years.

**CE 641. OCEAN ENGINEERING WAVE MECHANICS (3).** Linear wave theory; shoaling, refraction, diffraction, superposition; wave forces; wind wave hindcasting; practical applications in ocean science and engineering. PREREQ: CE 313.

**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. PREREQ: CE 641. Offered alternate years.

**CE 643. COASTAL ENGINEERING (3).** Coastal sediment transport including nearshore currents, longshore onshore-offshore transport, and shoreline configuration; functional planning of coastal facilities for shoreline stabilization, backshore protection, inlet stabilization, and harbor protection; coastal structure design including design criteria, design conditions, and structural stability. PREREQ: CE 641. Offered alternate years.

**CE 644. OCEAN INSTRUMENTATION AND CONTROL THEORY (3).** Electrical systems components; analog and digital filters/amplifiers; passive network analyses; instrument behavior for displacement, velocity, acceleration, force and flow measurements; simple feedback and control theory for linear electrical/mechanical/hydraulic systems; digital data acquisition. PREREQ: ENGR 201, MTH 256. Offered alternate years.

**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. PREREQ: CE 641.

**CE 647. OCEAN AND COASTAL ENGINEERING MEASUREMENTS (3).** Hands-on experience in the conduct of sea, shore, and laboratory experiments, including sampling and measurements of waves, currents, wind, tides, sediments, bathymetry, shore profiles, wave forces on structures, and structural response. PREREQ: CE 641. Offered alternate years.

**CE 648. FINITE AMPLITUDE WAVE MECHANICS (3).** Nonlinear wave theories, perturbation expansion of nonlinear boundary value problems, numerical solutions of integral equation methods for nonlinear waves. PREREQ: CE 641. Offered alternate years.

**CE 649. MARINE GEOTECHNICAL ENGINEERING (3).** Overview of marine geology, sedimentation processes; marine sediment properties, sampling, testing, anchorages; Biot consolidation theory; and wave-structure-foundation interaction for piles, pipelines, sea walls, and caissons. PREREQ: CE 373, CE 641. Offered alternate years.

## CIVIL ENGINEERING-FOREST ENGINEERING

A five-year dual-degree program in civil engineering and forest engineering is offered jointly by the Departments of Civil, Construction, and Environmental Engineering (in the College of Engineering) and Forest Engineering (in the College of Forestry). Advising is done through either department. See College of Forestry.

## ■ ENVIRONMENTAL ENGINEERING

Not accredited

Sandra L. Woods, Program Coordinator
202 Apperson Hall
Oregon State University
Corvallis, OR 97331-2302
(541) 737-4934
http://www.orst.edu/dept/ccee/enve/index.htm

### Undergraduate Major

**Environmental Engineering (B.A., B.S.)**

### Minor

**Environmental Engineering**

The Department of Civil, Construction, and Environmental Engineering (CCEE) offers a new baccalaureate degree program in Environmental Engineering (ENVE). The program was designed to meet accreditation requirements, but will not be evaluated for accreditation until 1998. The Department also offers an undergraduate environmental engineering option for civil engineering students and a minor in environmental engineering.

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 capability developed at the junior and senior level, culminating 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 department or viewed on the department's Web site.

## CURRICULUM

### PRE-ENVIRONMENTAL ENGINEERING

**Freshman Year**

CE 101[5], FE 215✣. Civil & Environmental Engr Orientation (6)
WR 121. English Composition (3)✣
COMM 111 or COMM 114. Speech (3)✣
MTH 251, MTH 252, MTH 253. Calculus (12)✣
CH 221✣, CH 222[5], CH 223[5]. Chemistry (15)
PH 211. Physics (4)✣
BI 101 or BI 213. Introductory Biology with Ecology Content (4)[1,5]

**Sophomore Year**

MTH 254. Vector Calculus (4)✣
MTH 256. Differential Equations (4)✣
ST 314. Statistics for Engineers (3)[5]
ENGR 211✣, ENGR 212✣, ENGR 213[5]. Mechanics (Statics, Dynamics), Strength of Materials (9)
ENGR 201. Electrical Engineering Fundamentals (3)✣
PH 212. Physics (4)✣
MB 230. Microbiology (4)[5]
HHP 231. Lifetime Fitness (3)[1]
WR 327. Technical Writing (3)[1]
Perspectives (12)[1]
TOTAL (96)

### PROFESSIONAL ENVIRONMENTAL ENGINEERING

**Junior Year**
ENVE 321. Environ Engr Fundamentals (4)
CE 311, CE 312. Fluid Mechanics (8)
CE 313. Hydraulic Engineering (4)
CE 372. Soils Engineering (4)
CHE 211. Mass Balances (4)
CHE 434. Air Pollution Control (3)
ENGR 332, ENGR 333. Heat and Mass Transfer (7)
ENGR 311. Thermodynamics (3)
BI 370. Ecology (3)
CH 324. Quantitative Analysis (4)
CH 331. Organic Chemistry (4)

**Senior Year**
ENVE 421. Water and Wastewater Characterization (4)
ENVE 422. Environmental Engineering Design (4)
ENVE 451. Air, Water and Hazardous Substance Management (4)
CE 412. Hydrology (3)
CH 440. Physical Chemistry (3)
ENGR 390. Engineering Economics (3)
H 441. Environmental Health (3)
Technical electives (18)
Perspectives (6)[1]
Synthesis (6)[1]
Free electives (4)
TOTAL (96)

### ENVIRONMENTAL ENGINEERING OPTION AND MINOR

CCEE students may elect a transcript-visible option in Environmental Engineering. A minimum of 21 credits is required. Students from other departments electing the minor are required to complete the 21 credits required for the option plus 6 additional credits of required and elective courses.

**Option and Minor Core Courses (21)**
ENVE 421. Water and Wastewater Characterization (4)
ENVE 422. Environmental Engineering Design (4)
ENVE 451. Air, Water and Hazardous Substances Management (4)
ENVE 431. Transport and Fate of Organic Chemicals in Environmental Systems (4)
CH 123, CH 130, or CH 223. Chemistry (3-5)
Approved electives (0-2)
(Contact the CCEE Department for a list of approved elective courses.)

**Additional Core Courses for Minor (6)**
ENVE 321. Environmental Engineering Fundamentals (4)
Approved electives (2)

## COURSES

**Upper Division Courses**

**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. PREREQ: CH 202, MTH 256, biological science elective. (Writing Intensive Course)

**ENVE 421/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. PREREQ: ENVE 321.

**ENVE 422/ENVE 522. ENVIRONMENTAL ENGINEERING DESIGN (4).** Design of water and wastewater treatment facilities including physical, chemical, and biological processes. PREREQ: ENVE 421.

**ENVE 431/ENVE 531. TRANSPORT/FATE OF ORGANIC CHEMICALS IN ENVIRONMENTAL SYSTEMS (1/4).** Fundamentals of organic chemistry and engineering principles applied to the movement and fate of xenobiotic compounds. PREREQ: CH 121, CH 130 or CH 223; CH 440 or ENGR 311. Also offered in four 1-credit modules covering: a) chemical partitioning, b) process engineering, c) natural systems, and d) engineered systems.

**ENVE 438/ENVE 538. TRANSPORT AND FATE OF ORGANIC CHEMICALS LABORATORY (1).** Investigation of the partitioning of organic chemicals in the environment and the factors affecting their fate and transport. COREQ: ENVE 431.

**ENVE 451/ENVE 551. AIR, WATER AND HAZARDOUS SUBSTANCE MANAGEMENT (4).** Legislation, risk assessment, and management related to the discharge of air and water pollutants and hazardous substances. PREREQ: ENVE 321.

**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.

**Graduate Courses**

**ENVE 532. AQUEOUS ENVIRONMENTAL CHEMISTRY (1/4).** Applied chemical concepts for environmental scientists and engineers, emphasizing mathematical solutions to problems of ionic equilibria in natural waters and treatment processes. PREREQ: ENVE 521 AND ENVE 531 or equivalent. Also offered in four 1-credit modules covering a) introduction to and overview of aquatic chemistry; b) acid/base chemistry; c) precipitation and complexation chemistry, and d) oxidation-reduction chemistry.

**ENVE 534, ENVE 535. PHYSICAL/CHEMICAL PROCESSES FOR WATER WASTEWATER, AND HAZARDOUS WASTE TREATMENT (4,4).** Principles and design of unit operations and processes for water, wastewater, and hazardous waste treatment. ENVE 534 will focus on water and wastewater treatment, and ENVE 535 will focus on treatment of hazardous wastes and contaminated soils. Need not be taken in order. PREREQ: or COREQ: ENVE 532.

**ENVE 536. AQUEOUS ENVIRONMENTAL CHEMISTRY LABORATORY (1).** Laboratory investigation of acid/base equilibria, coordination chemistry, and precipitation/dissolution chemistry. COREQ: ENVE 532.

**ENVE 537. PHYSICAL/CHEMICAL PROCESSES LABORATORY (1).** Investigation of physical and chemical processes for treatment of water supplies, groundwater, soils, and municipal, industrial, and hazardous wastes. COREQ: ENVE 534 or ENVE 553.

**ENVE 541. MICROBIAL PROCESSES IN ENVIRONMENTAL SYSTEMS (1/4).** Energetics kinetics and stoichiometry of microbial transformations of organic and inorganic compounds. Mathematical models of biodegradation. PREREQ: ENVE 531. Also offered in four 1-credit modules covering a) microbial ecology, b) energetics and bacterial growth c) kinetics and stoichiometry, and d) mathematical models of biodegradation.

**ENVE 542. MICROBIOLOGICAL PROCESSES FOR MUNICIPAL AND HAZARDOUS WASTE (1/4).** Principles and design of microbial processes for treatment of municipal and hazardous wastes. PREREQ: ENVE 541. Also offered in four 1-credit modules covering a) wastewater characterization, b) suspended growth processes, c) fixed-film systems, and d) fixed-file systems.

**ENVE 545. MICROBIAL PROCESSES LABORATORY (1).** Laboratory investigation of microbiological processes for treatment of municipal, industrial, and hazardous waste. COREQ: ENVE 542.

**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. PREREQ: CE 514 or equivalent.

**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. May be repeated for a maximum of 9 credits on different topics. PREREQ: Instructor approval required.

## ■ CONSTRUCTION ENGINEERING MANAGEMENT

A.C.C.E. Accredited

H.D. Pritchett, Program Coordinator
202 Apperson Hall
Oregon State University
Corvallis, OR 97331-2302
(541) 737-2006
http://www.orst.edu/dept/ccee/index.html

### Undergraduate Major

**Construction Engineering Management (B.A., B.S.)**

The Department of Civil, Construction, and Environmental Engineering offers a unique academic degree program in Construction Engineering Management (CEM). The 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 CEM program is built on a rigorous four-year curriculum that leads to the Bachelor of Science degree. The program emphasizes practical applications as well as basic principles. Students are given many hands-on experiences in the laboratory and are involved in numerous field trips as a supplement to their classroom activities.

Graduate study in Construction Engineering Management is listed under Civil Engineering.

## CURRICULUM

### PRE-CONSTRUCTION ENGINEERING MANAGEMENT

**Freshman Year**
CE 101, CE 102 (or FE 215). Civil & Const Engr Orien (6)✥
PH 201, PH 202, PH 203. Physics (15)✥
MTH 251, MTH 252. Calculus (8)✥
WR 121. English Composition (3)[1]✥
HHP 231. Lifetime Fitness (3)[1]
Perspectives (6)[1]
COMM 111 or COMM 114. Speech (3)[1]✥
Free elective (3)

**Sophomore Year**
BA 215. Fundamentals of Accounting (4)✥
BA 230. Business Law I (4)
BA 275. Quantitative Business Methods (4)✥
CEM 251, CEM 252. Statics and Dynamics for Construction (6)✥
CEM 263. Plane Surveying (3)✥
CEM 291. Fundamentals of Estimating (3)✥
CH 201. Chemistry for Engineering Majors (3)✥

EC 201, EC 202. Prin of Economics (8)[1]
ENGR 213. Strength of Materials (3)✥
ENGR 245. Engr Graphics & Design (3)[1]✥
WR 327. Technical Writing (3)[1]
Approved biological science (4)[1]✥
TOTAL (95)

### PROFESSIONAL CONSTRUCTION ENGINEERING MANAGEMENT

**Junior Year**

CEM 311. Fluid Mechanics and Hydraulics (4)
CEM 341, CEM 342. Construct Estimating (6)
CEM 343. Construct Project Management (3)
CE 321. Civil Engineering Materials (4)
CE 372. Soils Engineering (4)
CEM 381, CEM 383 Structural Fundamentals, Probs (8)
ENGR 390. Engineering Economy (3)
CE 365. Highway Location and Design (3)
BA 315. Accounting for Decision Making (4)
BA 357. Accounting for Decision Making (4)
Perspectives (3)[1]
Synthesis (3)[1]

**Senior Year**

CEM 441, CEM 442, CEM 443. Const Mgmt (9)
CEM 471, CEM 472. Elec & Mech Facilities (7)
CEM 407. Const Engr. Management Sem (3)
CE 424. Contracts and Specifications (3)
BA 340. Finance (4)
BA 352. Organizational Behavior (4)
BA 453. Human Resources Management (4)
Perspectives (3)[1]
Restricted electives (8)
Synthesis (3)[1]
TOTAL (97)

## COURSES

### Lower Division Courses

**CEM 251. STATICS FOR CONSTRUCTION (3).** Fundamental concepts of statics applied to elementary civil engineering problems. PREREQ/COREQ: MTH 251.

**CEM 252. DYNAMICS FOR CONSTRUCTION (3).** Kinematics, Newton's laws of motion, work energy and impulse-momentum relationships for particles and rigid bodies. PREREQ: ENGR 211 or CEM 251, MTH 252.

**CEM 263. PLANE SURVEYING (3).** Use and adjustment of surveying equipment; surveying methods applied to construction; geometry of highway location including circular and vertical curves; terrain analysis using aerial photographs; and earthwork quantities and distribution. PREREQ: sophomore standing in Engineering.

**CEM 291. FUNDAMENTALS OF ESTIMATING (3).** Interpretation of drawings and specifications for use in estimating, planning, and communication. Plan reading, visualization, sketching, and quantity take-off techniques. PREREQ: CE 101, sophomore standing in Engineering.

### Upper Division Courses

**CEM 311. FLUID MECHANICS AND HYDRAULICS (4).** Pressure and energy concepts of fluids, fluid measurements, flow in pipes and open channels. PREREQ: CEM 252 or ENGR 212.

**CEM 341,CEM 342. CONSTRUCTION ESTIMATING (3,3).** Fundamentals of estimating and bidding construction projects; types of estimates; estimating and methods of construction for sitework, concrete, and carpentry; estimating subcontracts, estimating job overhead and home office overhead; and estimating profit. Must be taken in order. PREREQ: CEM 291.

**CEM 343. CONSTRUCTION PROJECT MANAGEMENT (3).** Principles of project control and productivity management; planning and scheduling, cost control systems, quality management, project safety, procedures for analysis of construction activities for improvement. PREREQ: CEM 342.

**CEM 381. STRUCTURAL FUNDAMENTALS (4).** Introduction to statically determinant analysis and design of steel structures. PREREQ: ENGR 213. Lec/rec.

**CEM 383. STRUCTURAL PROBLEMS (4).** Analysis and design of building elements of concrete and timber; detailing and fabrication. PREREQ: CEM 381.

**CEM 405. READING AND CONFERENCE (1-16).**

**CEM 406. PROJECTS (1-16).**

**CEM 407. SEMINAR (1-3).** Professional practice of construction engineering management.

**CEM 441/CEM 541,CEM 442/CEM 542, CEM 443/CEM 543. CONSTRUCTION MANAGEMENT (3,3,3).** CEM 441: Heavy Construction Management Methods; CEM 442: Building Construction Management and Methods, including form design. CEM 443: Engineering Management of Construction. Study of construction projects and their improvement through the implementation of management techniques and operational procedures. PREREQ: ENGR 390, CE 321.

**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. Lec/lab.

# COMPUTER SCIENCE

Michael Quinn, Interim Head
303 Dearborn Hall
Oregon State University
Corvallis, OR 97331-3202
(541) 737-3273

**Faculty**

*Professors* Bose, Cook, Cull, Dietterich, Pancake, Quinn, Rudd; *Associate Professors* Budd, Burnett, D'Ambrosio, Minoura, Tadepalli; *Assistant Professor* Rothermel; *Senior Instructors* Beekman, Johnson; *Instructor* Clark

**Undergraduate Major**

**Computer Science (B.A., B.S.)**

**Minors**

**Computer Science**

**Graduate Major**

**Computer Science (M.A., M.A.I.S., M.S., Ph.D.)**

*Graduate Areas of Concentration*
Analysis of Algorithms
Artificial Intelligence
Computer Science
Information-Based Systems
Parallel Computing
Programming Languages
Software Engineering
Theory of Computation

Computer Science is the study of programs, data, computing machinery, and people, and how they interact. The Department of Computer Science offers programs leading to the B.A., B.S., M.A., M.A.I.S., M.S., and Ph.D. The undergraduate program courses and requirements are designed to provide a strong background in the fundamental areas in computer science including operating systems, compilers, and computer architecture, plus additional work in artificial intelligence, database management systems, or software engineering. The undergraduate program prepares students for careers in the computing industry or for graduate school. 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.

The graduate programs in computer science emphasize programming and computer languages, the theory of computation, analysis of algorithms, computer design, software systems, parallel processing, artificial intelligence, and information-based systems. The Master's program provides advanced instruction beyond the undergraduate degree to prepare students for careers in which a higher level of education and experience is required. The Ph.D. program prepares students for careers at universities or for work in research laboratories in government and industry.

## CURRICULUM

### PRE-COMPUTER SCIENCE

**Freshman Year**

CS 151. Intro to C Programming (4)
CS 160. Computer Science Orientation (3)
CS 161, CS 162. Intro to Computer Science (8)
MTH 231, MTH 232. Elements of Discrete Mathematics (8)
MTH 251, MTH 252. Calculus (8)
WR 121. Writing I (3)[1]
WR 222. Writing II (3)[1]
HHP 231. Fitness (3)[1]
Biological Science (4)
Perspectives (3)[1]
Electives (1)

**Sophomore Year**

MTH 253. Calculus (8)✥
MTH 254. Vector Calculus I (4)
CS 261. Data Structures (4)✥
ECE 271. Digital Logic Design (3)
PH 211, PH 212, PH 213. General Physics with Calculus (12)✥
PH 221, PH 222, PH 223. Recitation for Physics (3)
WR 327. Technical Writing (3)[4]
COMM 111 or Comm 114. Speech (3)
Perspectives (12)[1]

**Junior Year**

CS 311, CS 361, CS 381. Computer Science (12)
CS 321, CS 325. Computer Science (10), CS 391[1]
ECE 375. Computer Org and System Design (4)
MTH 351. Intro to Num Analysis (3)
ST 314. Statistics for Engineers (3)
Perspectives (12)[1]
Contemporary global issues (3)[1]
Electives (1)

**Senior Year**

CS 411, CS 470, CS 480. Computer Science (12)
Upper division computer science electives (12)
Electives (24)

**Upper division computer science electives (12)**
Electives (24)

NOTE: It is strongly recommended that all students include a substantial amount of course work in a computer-related area such as one of the physical or mathematical sciences, engineering, or business.

### COMPUTER SCIENCE MINOR (36)

The department offers an undergraduate minor in computer science for students enrolled in other departments. In addition to a broad introduction to computer science, the minor provides the flexibility to specialize in a computer science area related to the student's major.

**Required**
CS 151. Intro to C Programming
MTH 231. Elements of Discrete Math I (4)
CS 161. Programming Methodology (4)
CS 162. Introduction to Data Structures (4)
MTH 232. Elements of Discrete Math II (4)
CS 261. Adv Data Structures (4)

**Electives**
(12 credits from upper division computer science courses other than CS 391, CS 395, CS 401, CS 405, CS 406, CS 407, or CS 410, CS 495)

## COURSES

### Lower Division 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, including multimedia and Internet communication tools.

**CS 131. INTRODUCTION TO FORTRAN PROGRAMMING (4).** Thorough treatment of FORTRAN language elements and control and data structures. PREREQ: previous programming experience.

**CS 151. INTRODUCTION TO C PROGRAMMING (4).** Thorough treatment of the basic elements of C, bitwise operations, flow of control, Input/Output, functions, arrays, strings, and structures. PREREQ: Previous programming experience.

**CS 160. COMPUTER SCIENCE ORIENTATION (3).** Introduction to the computer science field and profession. Team problem solving. Social and ethical issues surrounding use of computers.

**CS 161. INTRODUCTION TO COMPUTER SCIENCE I (4).** Overview of fundamental concepts of computer science. Introduction to problem solving, software engineering and object-oriented algorithm development and programming. PREREQ: CS 151 or equivalent. COREQ: MTH 231.

**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. PREREQ: CS 161, MTH 231.

**CS 199. SELECTED TOPICS (3).**

**CS 261. DATA STRUCTURES (4).** Complexity analysis. approximation methods. Trees and graphs. File processing. Binary search trees. Hashing. Storage management. PREREQ: CS 162, MTH 232.

### Upper Division Courses

**CS 311. OPERATING SYSTEMS I (4).** Introduction to operating systems using UNIX as the case study. System calls and utilities, fundamentals of processes and interprocess communication. PREREQ: CS 261, ECE 271.

**CS 312. SYSTEM ADMINISTRATION (4).** Introduction to UNIX system administration. Network administration and routing. Internet services. Security issues. PREREQ: CS 311 or instructor approval.

**CS 321. INTRODUCTION TO THEORY OF COMPUTATION (3).** Survey of models of computation including finite automata, formal grammars, and Turing machines. PREREQ: CS 261.

**CS 325. ANALYSIS OF ALGORITHMS (4).** Recurrence relations, combinatorics, recursive algorithms, proofs of correctness. PREREQ: CS 261.

**CS 361. ^FUNDAMENTALS OF SOFTWARE ENGINEERING (4).** Introduction to software engineering and the software engineering lifecycle: requirements specification; design techniques; implementation; verification and validation; debugging techniques; project management. PREREQ: CS 261. (Writing Intensive Course)

**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. PREREQ: CS 261.

**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. PREREQ: CS 101. (Bacc Core Course)

**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. PREREQ: CS 101 REC COREQ: ART 115.

**CS 401. RESEARCH (1-16).**

**CS 405. READING AND CONFERENCE (1-16).**

**CS 406. PROJECTS (1-16).**

**CS 407. SEMINAR (1-16).**

**CS 410. OCCUPATIONAL INTERNSHIP (1-15).**

**CS 411/CS 511. OPERATING SYSTEMS II (4).** Principles of computer operating systems: concurrent processes, memory management, job scheduling, multiprocessing, file systems, performance evaluation, networking. PREREQ: CS 311, ECE 375.

**CS 419. SELECTED TOPICS IN COMPUTER SCIENCE (3-4).** Topics of special and current interest not covered in other courses. Can be repeated for credit. PREREQ: Senior standing in computer science.

**CS 420/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. PREREQ: CS 325.

**CS 430/CS 530. ARTIFICIAL INTELLIGENCE PROGRAMMING TECHNIQUES (4).** Symbols and symbolic programming. Lisp basics: eval, recursion, variable binding and scoping, macros. Representation and problem solving in Lisp, Advanced topics: alternative data representations, generators, data-driven control, agendas. AI programming paradigms. PREREQ: CS 325, CS 381.

**CS 440/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. PREREQ: CS 261 or graduate standing in computer science.

**CS 450/CS 550. INTRODUCTION TO COMPUTER GRAPHICS (4).** Display devices, graphics software, interactive graphics, three-dimensional graphics. PREREQ: CS 311, CS 325.

**CS 451/CS 551. PROGRAMMING GRAPHICAL USER INTERFACES (4).** Introduction to the design and implementation of GUIs, focusing on the X-Window system platform. Event-driven systems, X-Library and X-Toolkit support, widget sets, influence of OSF/Motif policy guidelines. PREREQ: CS 411 or CS 582.

**CS 460. APPLIED SOFTWARE ENGINEERING (4).** Application of software engineering methodology to real-world applications of computers. Course emphasizes implementation of a working software system in a team environment. PREREQ: CS 361.

**CS 470/CS 570. 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 tradeoffs involved in Reduced Instruction Set Computer (RISC) architectures. PREREQ: ECE 375. CROSSLISTED as ECE 470/ECE 570.

**CS 475/CS 575. 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. PREREQ: CS 325, CS 470 or ECE 472, CS 570 or ECE 570.

**CS 480/CS 580. TRANSLATORS (4).** An introduction to compilers; attribute grammars, syntax- directed translation, lex, yacc, LR(1) parsers, symbol tables, semantic analysis, and peep-hole optimization. PREREQ: CS 311, CS 321, CS 325.

**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. PREREQ: CS 395, ART 222, ART 242, COMM 362, COMM 486.

### Graduate Courses

**CS 501. RESEARCH (1-16).**

**CS 503. THESIS (1-16).**

**CS 505. READING AND CONFERENCE (1-16).**

**CS 506. PROJECTS (1-16).**

**CS 507. SEMINAR (1-16).** Introduction to the features available on the Computer Science Department computing facilities. Presentation of graduate student research. PREREQ: Graduate standing in computer science.

**CS 515. ALGORITHMS AND DATA STRUCTURES (4).** Introduction to computational complexity. Survey of data structures: linear lists, strings, trees, graphs. Representation and algorithms; analysis of searching and sorting algorithms; storage management. PREREQ: Graduate standing in computer science.

**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 unrestrictive grammars; characterization, closure properties, algorithms, and limitations. PREREQ: 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 be repeated for credit. May not be offered every year. PREREQ: CS 511, CS 515.

**CS 521. COMPUTABILITY (4).** Recursive functions. Turing Machines. Undecidability. Relativized computation. Complexity classes. PREREQ: CS 516.

**CS 523. ANALYSIS OF ALGORITHMS (4).** Design and analysis techniques. Divide and conquer algorithms. Difference equations. Graph problems, matrix problems, fast transforms, and arithmetic algorithms. PREREQ: 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. PREREQ: 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. PREREQ: CS 515, MTH 341.

**CS 529. SELECTED TOPICS IN THEORETICAL COMPUTER SCIENCE (1-5).** Topics of interest in theory of computation, formal languages, or analysis of algorithms. Topics include: theory of parsing, finite state machines, complexity of computing, combinatorial optimization, bilinear algorithms. May be repeated for credit. PREREQ: CS 521 or CS 523.

**CS 531. ARTIFICIAL INTELLIGENCE (4).** Goals and methods of AI. Knowledge representation: propositional logic, predicate logic, other notations, direct representations. Reasoning and problem solving: search methods, deduction as search, non-deductive methods. PREREQ: CS 530, CS 515.

**CS 532. ADVANCED ARTIFICIAL INTELLIGENCE (4).** Advanced topics in representation and reasoning. Model and proof theory, representation design. Problem domains in AI: planning, learning, natural language (parsing, understanding, generation), vision, diagnosis, design. PREREQ: CS 531.

**CS 533. EXPERT SYSTEMS (4).** Design and implementation of expert systems. Nature of expertise. Models of expert problem solving including heuristic classification, fault trees, model-based reasoning, and case-based reasoning. Techniques for knowledge acquisition, reasoning under uncertainty, truth maintenance systems. Approaches to providing explanation and performing evaluation of expert systems. PREREQ: CS 531.

**CS 534. MACHINE LEARNING (4).** Survey of practical techniques for constructing learning programs. Probably-approximately correct learning. Techniques for learning decision trees, neural networks, probability distributions, Boolean formulas. Incorporating knowledge into the learning process; explanation-based learning. Skill acquisition and speed-up learning. PREREQ: CS 515, basic probability theory.

**CS 535. CYBERNETICS (4).** Control and communication organisms and machines; neural nets, cellular autonata, L-systems, genetic algorithms. PREREQ: graduate standing.

**CS 539. SELECTED TOPICS IN ARTIFICIAL INTELLIGENCE (1-5).** Advanced topics of current interest. Typical topics include qualitative reasoning, reasoning under uncertainty, truth maintenance systems, automated deduction, neural networks, automatic programming, and research methods. May be repeated for credit. PREREQ: CS 531.

**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. May be repeated for credit. PREREQ: CS 541.

**CS 552. USER INTERFACE DESIGN (4).** Principles and practices governing the quality and acceptability of user interfaces. Includes color theory, conceptual models, screen layout assessment, and testing techniques. PREREQ: CS 551 or CS 561.

**CS 561. SOFTWARE ENGINEERING (4).** Survey of models of software lifecycle, user interface design, programming style, control of complexity, testing methods, and ease of maintenance. PREREQ: CS 361 and graduate standing or equivalent work experience.

**CS 562. APPLIED SOFTWARE ENGINEERING (4).** Application of software engineering methodology to the development of a complete software system. PREREQ: CS 561.

**CS 569. SELECTED TOPICS IN SOFTWARE ENGINEERING (1-5).** Topics include new programming methodologies, productivity, software development, software complexity metrics. May be repeated for credit. PREREQ: CS 561.

**CS 577. PARALLEL PROGRAMMING LANGUAGES (4).** In-depth study of languages used to program parallel computers, including low-level machine-dependent languages, high-level languages, and trade-offs between portability, programmability, and performance. PREREQ: CS 575.

**CS 578. PARALLEL ALGORITHMS AND THEORY (4).** Design and analysis of parallel algorithms. PRAM and its variants. Parallel computation thesis. Parallel complexity classes. Analysis of interconnection networks. PREREQ: CS 575.

**CS 579. TOPICS IN COMPUTER ARCHITECTURE AND PARALLEL PROCESSING (1-5).** Current topics in advanced computer architecture and parallel processing. May be repeated for credit. PREREQ: CS 575, CS 570 or ECE 572

**CS 581. PROGRAMMING LANGUAGES (4).** A study of the concepts of modern programming and paradigms. PREREQ: CS 381, CS 511.

**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 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. May be repeated for credit. PREREQ: CS 581.

**CS 601. RESEARCH (1-16).**

**CS 603. DISSERTATION (1-16).**

**CS 605. READING AND CONFERENCE (1-16).**

**CS 607. SEMINAR (1-16).**

**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. May be repeated for credit. PREREQ: CS 581.

**CS 601. RESEARCH (1-16).**

**CS 603. DISSERTATION (1-16).**

**CS 605. READING AND CONFERENCE (1-16).**

**CS 607. SEMINAR (1-16).**

## ELECTRICAL AND COMPUTER ENGINEERING

Alan K. Wallace, Head
220A Electrical Engineering
Oregon State University
Corvallis, OR 97331-3211
(541) 737-2995

**Faculty**

*Professors* Forbes, Kolodziej, Temes, Tripathi, Van Vechten, Wager, Wallace; *Associate Professors* Herzog, Koc, Lu, Plant, Rathja, Spee, V. Stonick; *Assistant Professors* Lee, Magana, Moon, Shor, J. Stonick, Subramanian, Tenca, Von Jouanne☆, Weisshaar; *Instructors* Gygax, Traylor

### Undergraduate Majors

**Computer Engineering (B.S.)**

**Electrical and Electronics Engineering (B.S.)**

### Graduate Major

**Electrical and Computer Engineering (M.S., Ph.D.)**

*Graduate Areas of Concentration*

Communication, Signal Processing and Control
Computer Engineering (Architecture, Microprocessors, Parallel Systems)
Electrical Engineering
Electromagnetics (Microwave Circuits, Optics, Propagation)
Electronics (Materials, Devices, Circuits)
Integrated Circuits (Analog, Digital, Mixed Mode, Rf)
Power Energy Systems (Systems, Machines, Power Electronics)

The Department of Electrical and Computer Engineering offers two baccalaureate degree programs; Bachelor of Science in Electrical and Electronics Engineering and Bachelor of Science in Computer Engineering. Both degrees are accredited by the Accreditation Board for Engineering and Technology (ABET).

Electrical and Electronics engineers are concerned with electrical circuits, electronic materials, power generation & utilization, communication, digital computers, electromagnetics, and control systems. Course work leading to the B.S. degree incorporates work in these topics as well as the supporting disciplines of mathematics, physical sciences, and engineering sciences. Graduates of this program are prepared to either enter employment or pursue advanced degrees through graduate studies.

Computer Engineers are involved in the design, construction, programming and application of digital computers, microprocessors and digital components. Course work leading to the B.S. degree incorporates work in electrical circuits, electronic materials, digital logic, computer architecture, microprocessors, programming languages and operation systems. Graduates of the program also receive a minor in computer science. Upon graduation, computer engineers are prepared to seek industrial employment or to pursue advanced graduate degrees.

Both programs are supported by well equipped laboratories providing direct experience with electronic circuits, digital logic, instrumentation, electronic materials, electric machines, IC design, optoelectronics, RF techniques, instrumentation, control systems and microprocessors. Students may specialize their programs by selection of technical courses in the Junior and Senior years. The Multiple Engineering Cooperative program (MECOP) offers industrial internships to selected students. Students in both

programs fulfill humanities and social science requirements as specified by the University's Baccalaureate Core program.

The department 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 year-long 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.

The graduate program in electrical and electronic engineering provides opportunities for both thesis and non-thesis programs in the areas of electronic materials and devices, microwaves, optoelectronics, communications, DSP, computer architecture, control systems, electric power and electronic integrated circuits including analog, digital, mixed mode and RF IC's. Graduate work is supported by the department's well-equipped laboratory facilities. Opportunities exist for graduate students to participate in many research projects sponsored by private industry and governmental agencies.

Additional information concerning courses, advising procedures, faculty, and many other aspects of the department may be found at the department's Web page. "http://www.ece.orst.edu".

## ELECTRICAL AND ELECTRONICS ENGINEERING

E.A.C./A.B.E.T. Accredited

The curriculum in electrical & electronics engineering provides a wide range of opportunities in undergraduate and graduate study in the areas of communications, computers, control systems, energy conversion, electro magnetics, and electronic materials, devices, and integrated circuits.

### PRE-ELECTRICAL AND ELECTRONICS ENGINEERING CURRICULUM

**Freshman Year**

ECE 111, ECE 112+. Orientation (4)
MTH 251, MTH 252, MTH 253. Calculus (12)✥
CH 201✥, CH 202. General Chemistry (6)
Biological Sciences (4)[1]
Writing I (3)[1✥]
PH 211. General Physics (4)✥
Lifetime Fitness (3)[1]
CS 151 or CS 161. C or Java (4)
Perspectives (6)[1]
TOTAL (46)

**Sophomore Year**

MTH 254✥, MTH 255, MTH 256✥. Vector Calc & Diff Equations (12)
PH 212, PH 213. General Physics (8)✥
ECE 271, ECE 272. Digital Logic Design & Lab (3,1)
ENGR 201✥, ENGR 202, ENGR 203. Electrical Fundamentals (9)
ENGR 211, ENGR 212. Stat & Dynam (6)✥
CS 161 Jave or CS 162. Intro to Data Structures (4)✥
Perspectives (3)[1]
COMM 111 or COMM 114 (3)[1✥]
TOTAL (49)

### PROFESSIONAL ELECTRICAL AND ELECTRONICS ENGINEERING CURRICULUM

**Junior Year**

ECE 317. Electronic Materials & Devices (3)
ECE 322. Electronic Circuits (4)
ECE 323. Digital Electronics (4)
ECE 331. Electromech Energy Convers (4)
ECE 351, ECE 352. Signals & Syst I & II (6)
ECE 375. Computer Struct & Assemb Lang (4)
ECE 390. Electric & Magnet Fields (4)
ECE 391. Electromagnet Fields & Trans Lines (4)
ST 314. Intro to Statistics for Engrs (3)
PH 314. Modern Physics (4)
ENGR 311. Thermodynamics (3)
ENGR 390. Engineering Economy (3)
Synthesis (3)[1]
TOTAL (49)

**Senior Year**

Senior departmental electives (20)
ECE 441, ECE 442, ECE 443 Senior Design Projects (6)
Restricted electives (4)
Synthesis (3)[1]
Electives (3)
Writing II, WR 327 (3)[1]
Perspectives (9)[1]
TOTAL (48)

## COMPUTER ENGINEERING

E.A.C./A.B.E.T. Accredited

Offered through the Department of Electrical and Computer Engineering. See information listed above under Electrical and Electronics Engineering.

### PRE-COMPUTER ENGINEERING CURRICULUM

**Freshman Year**

ECE 111, ECE 112. Orientation (4)✥
CS 161, CS 162. Intro to CS I & II (8)
MTH 231. Discrete MTH I (4)
MTH 251, MTH 252, MTH 253. Calculus (12)✥
CH 201✥, CH 202. General Chemistry (6)
Biological Sciences (4)[1]
Writing 121 (3)[1✥]
HHP 231. Lifetime Fitness (3)[1]
PH 211. General Physics (4)✥
TOTAL (48)

**Sophomore Year**

ECE 271, ECE 272. Digital Logic Design & Lab (3,1)
MTH 254✥, MTH 255, Mth 256✥. Vector Calc & Diff Equations (12)
ENGR 201✥, ENGR 202, ENGR 203. Electrical Fundamentals (9)
ENGR 211, ENGR 212. Statics & Dynamics (6)✥
PH 212, PH 213. General Physics (8)✥
COMM 111 or COMM 114. Speech (3)[1✥]
CS 261. Data Structures (4)
Perspectives (3)[1]
TOTAL (49)

### PROFESSIONAL COMPUTER ENGINEERING CURRICULUM

**Junior Year**

ECE 317. Electronic Materials & Devices (3)
ECE 322, ECE 323. Electronic & Digital Circuits (8)
ECE 351, ECE 352. Sign & Syst I and II (6)
ECE 375. Comp Structures & Assem Lang Prog (4)
CS 311. Operating Systems (4)
ECE/CS 300-level restrictive electives (3)
Synthesis (6)
Perspectives (9)[1]
ENGR 390. Engineering Economics (3)
Writing II, WR 327 (3)[1]
TOTAL (49)

**Senior Year**

ECE 441, ECE 442, ECE 443. Senior Design Project (6)
ECE 471. Design of Microprocess Systems s (4)
ECE 472. Computer System Architecture (4)
ECE 474. VLSI System Design (4)
ECE 478. Digital Communication &Computer Networks (4)
CS 411. Operating Systems (4)[11]
ECE/CS 400-level restrictive electives (4)
ST 314. Intro to Statistics for Engrs (3)
Electives (3)
Restrictive electives (4)
Perspectives (6)
TOTAL (46)

## COURSES

### Lower Division Courses

**ECE 111. ORIENTATION TO COMPUTER APPLICATIONS (2).** Orientation to Computer Applications. Usage of personal computers and software for word processing, graphics, spreadsheets, and data base in an engineering environment.

**ECE 199. SPECIAL STUDIES (1-16).** One-credit section graded P/N.

**ECE 271. DIGITAL LOGIC DESIGN (3).** A first course in digital logic design using small and medium scale integrated circuits. PREREQ: Soph standing in engineering.

**ECE 272. DIGITAL LOGIC DESIGN LABORATORY (1).** Laboratory to accompany ECE 271, Digital Logic Design. This course illustrates topics covered in the lectures of ECE 271 using computer-aided design and verification tools and breadboards. PREREQ: ENGR 201; COREQ: ECE 271.

### Upper Division Courses

**ECE 317. ELECTRONIC MATERIALS AND DEVICES (3).** Semiconductor fundamentals, mathematical models, PN junction operation and device characteristics. PREREQ: ENGR 202 or ENGR 203.

**ECE 322. ELECTRONIC CIRCUITS (4).** Transient and steady state behavior of linear electronic circuits. PREREQ: ECE 317. Lec/lab.

**ECE 323. DIGITAL ELECTRONICS (4).** Switching in electronic devices and circuits. Design and analysis of circuits in digital systems. Interconnections and noise problems. PREREQ: ECE 271 and ECE 322. Lec/lab.

**ECE 331. ELECTROMECHANICAL ENERGY CONVERSION (4).** Non-linear magnetic circuits. Saturable reactors and transformers. Voltage generation and energy conversion principles for electromechanical devices. Characteristics of electromechanical machines. PREREQ: ECE 390. Lec/lab.

**ECE 351. SIGNALS & SYSTEMS I (3).** Analytical techniques for signal, system, and circuit analysis. PREREQ: ENGR 203.

**ECE 352. SIGNALS & SYSTEMS II (3).** Analytical techniques for signal, system, and circuit analysis. PREREQ: ECE 351.

**ECE 375. COMPUTER STRUCTURES AND ASSEMBLY LANGUAGE PROGRAMMING (4).** An introduction to the Von Neuman computer architecture and assembly language programming. PREREQ: ECE 271. Lec/lab.

**ECE 390. ELECTRIC AND MAGNETIC FIELDS (4).** Static and quasi-static electric and magnetic fields. PREREQ: MTH 255, ENGR 203.

**ECE 391. ELECTROMAGNETIC FIELDS AND TRANSMISSION LINES (4).** Time varying fields with application to engineering problems and transmission lines theory. PREREQ: ECE 390. Lec/lab.

**ECE 401. RESEARCH (1-16).** Departmental approval required.

**ECE 405. READING AND CONFERENCE (1-16).** Departmental approval required.

**ECE 406. PROJECTS (1-16).** Departmental approval required.

**ECE 417/ECE 517. BASIC SEMICONDUCTOR DEVICES (3).** Theory of PN and Schottky junctions; MOSFET, MESFET, JFET, and bipolar transistors. PREREQ: ECE 317.

**ECE 418/ECE 518. SEMICONDUCTOR PROCESSING (2).** Theory and practice of basic semiconductor processing techniques. Introduction to process simulation. PREREQ: ECE 317 or equivalent. Lec/lab.

**ECE 422/ECE 522. ANALOG INTEGRATED CIRCUITS (4).** Theory and design of CMOS and bipolar analog integrated circuits such as operational amplifiers. PREREQ: ECE 322, ECE 323 recommended.

**ECE 423/ECE 523. DIGITAL INTEGRATED CIRCUITS (4).** Theory and design of digital integrated circuits including CMOS and bipolar logic. PREREQ: ECE 323. Lec/lab.

**ECE 428/ECE 528. DATA ACQUISITION (4).** Fundamentals of data acquisition systems. PREREQ: ECE 323, ECE 352. Lec/lab.

**ECE 431/ECE 531. POWER ELECTRONICS (4).** Fundamentals and applications of devices, circuits and controllers used in systems for electronic power processing. PREREQ: ECE 323, ECE 352. Lec/Lab.

**ECE 432/ECE 532. ELECTROMECHANICAL ENERGY CONVERSION (4).** Generalized machine theory. Steady state and dynamic characteristics and analysis of electromechanical machines: direct current, synchronous, and induction machines. PREREQ: ECE 331. Lec/Lab.

**ECE 433/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. PREREQ: ECE 323 and ECE 352. Lec/lab.

**ECE 441. ^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. PREREQ: Senior standing in electrical or computer engineering; must be taken in sequence. (Writing Intensive Courses)

**ECE 442. ^ENGINEERING DESIGN PROJECT (2).** (See ECE 441 for description.) (Writing Intensive Course)

**ECE 443. ^ENGINEERING DESIGN PROJECT (2).** (See ECE 441 for description.) (Writing Intensive Course)

**ECE 449/ECE 549. PROJECT-UNIX SYSTEM AND TOOLS (2).** The introduction to ECE's computer facilities. Matlab, UNIX utilities, circuit simulation, maple, mathematical, and mosaic.

**ECE 451/ECE 551. CONTROL ENGINEERING DESIGN I (4).** Mathematical modeling of physical dynamic systems for automatic control system applications. Control system performance evaluation. Controller design via complex frequency-domain methods. PREREQ: ECE 351 or equivalent. Lec/lab.

**ECE 452/ECE 552. CONTROL ENGINEERING DESIGN II (4).** Analysis of control-related sampling issues in mixed digital/analog dynamical systems. Design of digital controllers for dynamic systems. Practical issues in control system implementation. PREREQ: ECE 451, or ECE 352 and equivalent of ECE 451.

**ECE 454/ECE 554. CONTROL ENGINEERING III (5).** Design and compensation of control systems. Introduction to nonlinear systems and systems involving time delay. Prediction of limit cycles. PREREQ: ECE 453. Lec/lab.

**ECE 461/ECE 561. PROBABILISTIC METHODS IN ELECTRICAL ENGINEERING (4).** Design of circuits and systems with random internal or external parameters. Introduction to random processes and spectral analysis. PREREQ: ECE 351, ST 314 or ST 421.

**ECE 462/ECE 562. COMMUNICATIONS I (4).** Modulation and demodulation of information signals; properties of noise and its effect in communication systems. Analog and digital systems. PREREQ: ECE 352, ST 314 or ST 421.

**ECE 463/ECE 563. COMMUNICATION II (4).** Digital data communication systems, introductory information theory, and coding. PREREQ: ECE 461 and ECE 462.

**ECE 464/ECE 564. DIGITAL SIGNAL PROCESSING (4).** Discrete-time signals, the discrete Fourier transform; design and implementation of digital filters. PREREQ: ECE 352.

**ECE 471/ECE 571. ADVANCED DIGITAL DESIGN (4).** Theory of digital logic design, finite state machine design and analysis, digital system testing and design for testability, high-level hardware description languages. PREREQ: ECE 375. Lec/Lab.

**ECE 472/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 tradeoffs involved in Reduced Instruction Set Computer (RISC) architectures. PREREQ: ECE 375. Crosslisted as CS 472/572.

**ECE 473/ECE 573. MICROPROCESSOR SYSTEM DESIGN (4).** Introduction to the internal organization and application of microprocessors and microcontrollers. Topic include: architecture of microprocessors/microcontrollers, interfacing peripheral devices, and interrupts. Several current microprocessors and microcontrollers are compared. Hardware and software implementation of a complete system based on an 8-bit microcontroller is studied. PREREQ: ECE 375.

**ECE 474/ECE 574. VLSI SYSTEM DESIGN (4).** Fundamental principles of VLSI design from both a theoretical and practical perspective. PREREQ: ECE 323 and ECE 375.

**ECE 478/ECE 578. DIGITAL COMMUNICATION AND COMPUTER NETWORKS (4).** Principles of communication applied to the interchange of information in networks of digital systems. PREREQ: ECE 375.

**ECE 482/ECE 582. OPTICAL ELECTRONIC SYSTEMS (4).** Laser theory, laser systems, photodetectors, coherent optical detection. PREREQ: ECE 391 or PH 481/581 or equivalent. Lec/lab. CROSSLISTED as PH 482/PH 582.

**ECE 483/ECE 583. GUIDED WAVE OPTICS (4).** Optical fibers, fiber mode structure and polarization effects, fiber interferometry, fiber sensors, conventional and coherent fiber communications, coherent OTDR, integrated optoelectronic devices. PREREQ: ECE 391 or PH 481/PH 581 or equivalent. Lec/lab. CROSSLISTED as PH 483/PH 483.

**ECE 484/ECE 584. ANTENNAS AND PROPAGATION (4).** Electromagnetic wave propagation and radiation. PREREQ: ECE 391 and ECE 352. Offered alternative years.

**ECE 485/ECE 585. MICROWAVE TECHNIQUES (4).** Introduction to basic techniques required for the design of high frequency circuits and systems. PREREQ: Senior standing in ECE. Lec/lab. Offered alternate years.

### Graduate Courses

**ECE 501. RESEARCH (1-16).** Departmental approval required.

**ECE 503. THESIS (1-16).**

**ECE 505. READING AND CONFERENCE (1-16).** Departmental approval required.

**ECE 506. PROJECTS (1-16).** Departmental approval required.

**ECE 507. SEMINAR (1-16).**

**ECE 511. ELECTRONIC MATERIALS PROCESSING (3).** Technology, theory, and analysis of processing methods used in integration circuit fabrication. PREREQ: Graduate standing or consent of instructor. Offered alternate years.

**ECE 512. PROCESS INTEGRATION (3).** Process integration, simulation, and statistical quality control issues related to integrated circuit fabrication. PREREQ: ECE 511. Offered alternate years.

**ECE 514. SEMICONDUCTORS (3).** Essential aspects of semiconductor physics relevant for an advanced understanding of semiconductor materials and devices. PREREQ: Exposure to quantum mechanics and solid state physics. Offered alterante years.

**ECE 515. SEMICONDUCTOR DEVICES III (3).** Physics and analysis of semiconductor microwave and optical devices. PREREQ: ECE 516 and ECE 513.

**ECE 516. SEMICONDUCTORS (3).** Essential aspects of semiconductor physics relevant for an advanced understanding of semiconductor materials and devices. PREREQ: Exposure to quantum mechanics and solid state physics.

**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 526. DIGITAL INTEGRATED CIRCUITS (3).** Analysis and design of digital integrated circuits PREREQ: ECE 423/ECE 523.

**ECE 527. VLSI SYSTEM DESIGN (3).** Design, layout, and simulation of a complete VLSI chip using CAD tools. PREREQ: ECE 526.

**ECE 530. CONTEMPORARY ENERGY APPLICATIONS (4).** Power electronic devices and their operation. Power electronic applications to power supplies for electronic equipment, motion control, power distribution and transmission systems, and power electronic interfaces with equipment and power systems. PREREQ: Graduate standing in ECE.

**ECE 534. ADVANCED ELECTRICAL MACHINES (3).** Development of models for the dynamic performance of all classes of electrical machines; synchronous, induction, permanent magnet and reluctant motors. Dynamic motor simulation. PREREQ: ECE 530. Lec.

**ECE 535. ADJUSTABLE SPEED DRIVES AND MOTION CONTROL (3).** Adjustable speed drives, associated power electronic converters, simulation and control. PREREQ: ECE 530. Lec.

**ECE 536. ADVANCED POWER ELECTRONIC SYSTEMS (4).** DC-AC, AC-DC, DC-DC high power converters; devices, topologies and control strategies. PREREQ: ECE 530. Lec/Lab.

**ECE 537. UTILITY APPLICATIONS OF POWER ELECTRONICS (3).** High power electronics, power system applications, Flexible AC Transmission Systems, distribution applications, power quality, renewable energy. PREREQ: ECE 530. Lec.

**ECE 539. SPECIAL TOPICS IN ENERGY SYSTEMS (4).** Course work to meet students needs in advanced or specialized areas; design of high voltage transmission systems, power system analysis, machine analysis, instrumentation, and process control. PREREQ: Graduate standing in ECE. Lec.

**ECE 550. LINEAR SYSTEMS (4).** Linear dynamic systems theory and modeling. PREREQ: ECE 453/ECE 553.

**ECE 555. CONTROL OF LINEAR SYSTEMS (3).** Observers and controllers. Linear state feedback. Optimal control problem formulation. Solution methods from the calculus of variations; Pontryagin Maximum principle and Hamilton-Jacobi theory applied to a number of standard optimal control problems; computational solution methods. PREREQ: ECE 550.

**ECE 560. STOCHASTIC SIGNALS AND SYSTEMS (4).** Stochastic processes, correlation functions, spectral analysis applicable to communication and control systems. PREREQ: ECE 461/ECE 561.

**ECE 567. DIGITAL SIGNAL PROCESSING (3).** Advanced methods in signal processing, optimum filter design, decimation and interpolation methods, quantization error effects, spectral estimation. PREREQ: ECE 464/ECE 564 and ECE 560.

**ECE 568. DIGITAL IMAGE PROCESSING (3).** Image processing, enhancement and restoration, encoding and segmentation methods. PREREQ: ECE 461/ECE 561 and ECE 464/ECE 564.

**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. PREREQ: Graduate standing in ECE. CROSSLISTED AS CS 570.

**ECE 576. PARALLEL AND DISTRIBUTED ARCHITECTURES (4).** In-depth study of advanced concepts in parallel and distributed architectures analysis and modeling of vector supercomputers, SIMD and MIMD multiprocessor systems. Issues in interconnection networks, memory systems, and software support for parallelism. PREREQ: ECE 472/ECE 572 and ECE 570.

**ECE 577. COMPUTER ARITHMETIC (3).** Number systems; basic arithmetic operations; high-speed and area-efficient arithmetic algorithms and architectures; advanced topics in floating-point and residue arithmetic. PREREQ: Graduate standing. CROSSLISTED as CS 577.

**ECE 580. NETWORK THEORY (4).** Linear graphs, multiport networks, and other topics in advanced network theory. PREREQ: Graduate standing in ECE.

**ECE 590. ANALYTICAL TECHNIQUES IN ELECTROMAGNETIC FIELDS (4).** Basic analytical techniques required to solve meaningful field problems in engineering. PREREQ: Graduate standing in ECE.

**ECE 591. ADVANCED ELECTROMAGNETICS (3).** Advanced techniques for analyzing problems in electromagnetics, primarily numerical. PREREQ: ECE 590. Offered alternate years.

**ECE 592. ADVANCED OPTOELECTRONICS (3).** Principles of quantum exchange devices, field-material interaction and theory, and applications of optical circuits and devices. PREREQ: ECE 482/ECE 582 and ECE 590. Offered alternate years.

**ECE 593. MICROWAVE CIRCUITS AND MEASUREMENTS (3).** Theory and design of microwave circuits based on circuit models of active elements. PREREQ: ECE 590. Offered alternate years.

**ECE 601. RESEARCH (1-16).** Departmental approval required.

**ECE 603. THESIS (1-16).**

**ECE 605. READING AND CONFERENCE (1-16).** Departmental approval required.

**ECE 606. PROJECTS (1-16).** Departmental approval required.

**ECE 607. SEMINAR (1-16).**

**ECE 619. SELECTED TOPICS IN SOLID STATE (3).** Special courses taught on various topics in solid state as interests and demands vary.

**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 650. NONLINEAR SYSTEM THEORY (3).** Nonlinear dynamics and control, stability theory, limit cycles, Liapunov methods, Popov criterion and describing functions. PREREQ: ECE 550.

**ECE 651. SYSTEM IDENTIFICATION (3).** Statistical and deterministic methods for system identification for both parametric and nonparametric problems; solution methods derived as algorithms for computational use; practical applications. PREREQ: ECE 550 and ECE 560.

**ECE 652. ADAPTIVE AND LEARNING SYSTEMS (3).** Models for deterministic and stochastic systems. Parameter estimation, adaptive prediction and control of deterministic systems. Adaptive filtering, prediction, and control of stochastic systems. PREREQ: ECE 550.

**ECE 653. STOCHASTIC FILTERING AND CONTROL (3).** Discrete and continuous optimal filters developed for state estimation and prediction; introduction to stochastic control theory. Practical applications of separation principle. PREREQ: ECE 550 and ECE 560.

**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. PREREQ: Graduate standing in ECE.

**ECE 661. COMMUNICATION SYSTEMS—WAVE FORM COMMUNICATIONS (3).** Modern and transmitter models for discrete and continuous information; some implementations. PREREQ: ECE 560.

**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. PREREQ: ECE 462/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. PREREQ: Graduate standing in ECE.

**ECE 678. PARALLEL ALGORITHMS (3).** Parallel computers and models, parallel algorithms for arithmetic and matrix problems, communication aspects of parallel algorithms.

**ECE 679. SELECTED TOPICS IN COMPUTER ENGINEERING (3).** 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. PREREQ: Graduate standing in ECE.

**ECE 699. ADVANCED TOPICS IN ELECTROMAGNETICS (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. PREREQ: Graduate standing in ECE.

# ENGINEERING PHYSICS

Kenneth Krane, Director
301 Weniger Hall
Oregon State University
Corvallis, OR 97331-6507
(541) 737-4631

**Undergraduate Major**

**Engineering Physics (B.S.)**

The curriculum in engineering physics provides basic and advanced instruction in physics and mathematics and the techniques for applying this knowledge to engineering problems. It prepares students for engineering opportunities that have roots in fundamental results obtained from research in physics.

## UNDERGRADUATE DEGREE PROGRAM

Students in engineering physics must complete a core curriculum of engineering science courses in addition to a rigorous curriculum of advanced courses in physics and mathematics. Flexible options permit a variety of advanced engineering science and design courses to be selected in the engineering discipline that most closely matches the students career objectives. Many engineering physics students take their advanced work in electrical or mechanical engineering, for example. This flexibility is one of the principal advantages of the engineering physics degree program.

A joint degree program permits students to earn two simultaneous B.S. degrees—an engineering physics degree through the College of Engineering and a physics degree through the College of Science.

Students in the professional program may apply for internships offered in the Multiple-Engineering Co-op Program (MECOP). Students accepted into MECOP take six months paid internships with member companies in their junior and senior years, and then finish their degrees in a fifth year at OSU.

## CAREERS

Students with degrees in engineering physics find employment in a wide variety of technological fields—solid state devices and their applications, materials science, electronics, aerospace research and development, lasers and optical sciences, computers. Students with engineering physics degrees can qualify to enter graduate programs at major U.S. universities in basic and applied physics, computer science, and a variety of engineering disciplines.

## PREPARATION

Recommended high school preparation for students who plan to major in engineering 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) upon entering may be delayed in their progress toward a degree. Students intending to transfer to OSU are encouraged to contact the Department of Physics at the earliest possible time to discuss their placement in the course curricula.

## ADVISING

Students in engineering physics enroll in the College of Engineering through the Department of Physics. Each undergraduate is assigned an adviser, and an engineering co-adviser who help select the curriculum that will best prepare the student for his or her career goals. Minor variations in the degree requirements are often possible, but must be discussed with and approved by the adviser at the earliest possible stage of curriculum planning.

## CURRICULUM

### PRE-ENGINEERING PHYSICS

**Freshman Year**

MTH 251, MTH 252, MTH 254. Calculus (12)
CH 221, CH 222, CH 223 (15). General Chem (15)
PH 211. General Physics with Calculus (4)
PH 221. Physics Recitation (1)
Writing I (3)
COM 111/114. Writing II (3)
HHP 231. Fitness (3)
Perspectives (6)[1]

**Sophomore Year**

MTH 255, MTH 253, MTH 256.
PH 212, PH 213. General Physics with Calculus (8)
PH 222, PH 223. Physics Recitation (2)
PH 314. Introductory Modern Physics (4)
ENGR 201. Electrical Fundamentals (3)
ENGR 211. Statics (3)
ENGR 213. Strength of Materials (3)
Computer programming (4)
WR 327.Writing III (3)
Biology (4)
ST 314. Statistics for Engineers (3)

### PROFESSIONAL ENGINEERING PHYSICS

**Junior Year**

PH 321, PH 322, PH 323. Paradigms in Physics (6)
PH 424, PH 425, PH 426. Paradigms in Physics (6)
PH 427, PH 428. Paradigms in Physics (2)
Approved engineering electives (23)
Perspectives (9)[1]
Hum/Soc Sci elective (3)

**Senior Year**

PH 431. Electromagnetism (3)
PH 461. Mathematical Methods (3)
PH 481. Optics (4)
PH 401. Research (1)
PH 403. Senior Thesis (2)
Approved physics electives (6)
Approved engineering electives (18)
Synthesis (6)[1]

# ENGINEERING SCIENCE

Roy Rathja, Assistant Dean
151 Batcheller Hall
Oregon State University
Corvallis, OR 97331-2411
(541) 737-5236

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 solutions of problems that are fundamental in analysis, design, and synthesis.

## COURSES

"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.

### Lower Division 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. PREREQ: College algebra and trigonometry. Lec/lab.

**ENGR 112. ENGINEERING ORIENTATION II (3).** Systematic approaches to engineering problem solving using computers. Logical analysis, flow charting, input/output design, introductory computer programming and use of engineering software. PREREQ: ENGR 111. Lec/lab.

**ENGR 199. CAREERS IN ENGINEERING (1).** Industrial recruiters present engineering career options. Career specific job search techniques and industry-specific resume refinement are presented. Graded P/N

**ENGR 201. ELECTRICAL FUNDAMENTALS (3).** Electric theory laws. Circuit analysis of dc circuits. Natural, step, and sinusoidal responses of circuits. Operational amplifier characteristics and applications. PREREQ: Sophomore standing in Engineering. Lec/lab.

**ENGR 202. ELECTRICAL FUNDAMENTALS (3).** Steady-state ac circuits—single and three-phase. Resonance, mutual inductance, operational amplifier applications. PREREQ: ENGR 201. Lec/lab.

**ENGR 203. ELECTRICAL FUNDAMENTALS (3).** Two-port networks, transfer functions, transient analysis. PREREQ: ENGR 201. Lec/lab.

**ENGR 211. STATICS (3).** Analysis of forces induced in structures and machines by various types of loading. PREREQ: Sophomore standing in engineering. Lec/lab.

**ENGR 212. DYNAMICS (3).** Kinematics, Newtons laws of motion, and work-energy and impulse-momentum relationships applied to engineering systems. PREREQ: ENGR 211; PH 211; sophomore standing in engineering. Lec/lab.

**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. PREREQ: ENGR 211; sophomore standing in engineering. Lec/lab.

**ENGR 245. ENGINEERING GRAPHICS AND DESIGN (3).** Graphic communication, multiview and pictorial representation, conceptual design, spatial analysis, engineering designs; graphical analysis and solutions; industrial procedures; introduction to design theory, and computer-aided drafting. PREREQ: Sophomore standing in engineering. Lec/lab.

### Upper Division Courses

**ENGR 311. THERMODYNAMICS (3).** Laws of thermodynamics, closed and open (control volume) systems; thermodynamic properties cycles. Lec.

**ENGR 312. THERMODYNAMICS (4).** Applications: Machine and cycle processes, thermodynamic relations, non-reactive gas mixtures, reactive mixtures, thermodynamics of compressible fluid flow. Must be taken in order. PREREQ: MTH 256; CH 202 for ENGR 311. Lec/rec.

**ENGR 321. MATERIALS SCIENCE (3).** Structure and properties of metals, ceramics and organic materials; control of structure during processing and structural modification by service environment. PREREQ: CH 203. Lec.

**ENGR 322. MECHANICAL PROPERTIES OF MATERIALS (4).** Mechanical behavior of materials, relating laboratory test results to material structure, and elements of mechanical analysis. PREREQ: ENGR 213, ENGR 321. Lec/lab.

**ENGR 331. MOMENTUM, ENERGY, AND MASS TRANSFER (4).** A unified treatment using control volume and differential analysis of: fluid flow, momentum transfer, conductive, convective and radiative energy transfer, binary mass transfer and prediction of transport properties. PREREQ: MTH 256; ENGR 212. COREQ: ENGR 311. Must be taken in order. Credit for both ENGR 331 and CE 311 not permitted. Lec/rec.

**ENGR 332. MOMENTUM, ENERGY, AND MASS TRANSFER (4).** A unified treatment using control volume and differential analysis of: fluid flow, momentum transfer, conductive, convective and radiative energy transfer, binary mass transfer and prediction of transport properties. PREREQ: MTH 256; ENGR 212. COREQ: ENGR 311. Must be taken in order. Lec/rec.

**ENGR 333. MOMENTUM, ENERGY, AND MASS TRANSFER (3).** A unified treatment using control volume and differential analysis of: fluid flow, momentum transfer, conductive, convective and radiative energy transfer, binary mass transfer and prediction of transport properties. PREREQ: MTH 256; ENGR 212. COREQ: ENGR 311. Must be taken in order. Lec/rec.

**ENGR 390. ENGINEERING ECONOMY (3).** Time value of money; economic study techniques, depreciation, taxes, retirement, and replacement of engineering facilities. PREREQ: Sophomore standing in Engineering.

**ENGR 407. SEMINAR (1-16).** Graded P/N.

**ENGR 415. NEW PRODUCT DEVELOPMENT (4).** First course of a two-course sequence jointly offered by the Colleges of Business and Engineering. Multi-disciplinary offering provides opportunities to learn proven methods of quality product development and associated business ventures. CROSSLISTED AS BA 415.

**ENGR 416. NEW PRODUCT DEVELOPMENT (4).** Second course of a two-course sequence jointly offered by the Colleges of Business and Engineering. Multi-displinary offering provides opportunities to learn proven methods of quality product development and associated business ventures. CROSSLISTED AS BA 416.

**ENGR 485/ENGR 585. COMPREHENSIVE LITERATURE SEARCHING IN ENGINEERING (1).** AND SCIENCE An introduction to the use of engineering and science indexes and abstracts, including on-line database searching.

**ENGR 490/ENGR 590. ENGINEERING ECONOMIC ANALYSIS (3).** Advanced techniques in engineering economy featuring capital budgeting, cost estimating, tax considerations, evaluation of public activities, cost effectiveness, risk and uncertainty model and project comparison methods. PREREQ: ENGR 390 and introductory statistics.

## ENVIRONMENTAL ENGINEERING

See Department of Civil, Construction, and Environmental Engineering for information on the Environmental Engineering program.

## FOREST ENGINEERING

See College of Forestry. Also see College of Forestry for information on the Civil Engineering-Forest Engineering program.

## GENERAL ENGINEERING

The freshman year of the general engineering curriculum meets the requirements of all other engineering curricula except chemical engineering and engineering physics, 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. Advising will be through the Department of Industrial and Manufacturing Engineering.

### CURRICULUM

The pre-general engineering curriculum below will prepare students to enter many of the engineering departmental programs. Students may transfer into another program any time during the first year; they must transfer by the end of the year.

**PRE-GENERAL ENGINEERING (one-year program)**

**Freshman Year**

ENGR 111, ENGR 112✥. Engr Orientation I,II (6)
MTH 251, MTH 252. Diff and Integral Calc (8)✥
MTH 253. Infinite Series and Sequences (4)✥
CH 201✥, CH 202. General Chem (6)
WR 121. English Composition (3)✥
COMM 111 or COMM 114. Speech (3)✥
PH 211. General Physics (4)✥
Perspectives (9)[1]
HHP 231. Lifetime Fitness (3)[1]
Free Electives (2)

## GEOLOGICAL ENGINEERING

A cooperative program with the University of Idaho. See head adviser, College of Engineering, for information.

## INDUSTRIAL AND MANUFACTURING ENGINEERING

E.A.C./A.B.E.T. Accredited

Sabah U. Randhawa, Head
118 Covell Hall
Oregon State University
Corvallis, OR 97331-2407
(541) 737-2365

**Faculty**

*Professors* Randhawa, West☆; *Associate Professors* Fichter☆, Hacker, Logendran, McDowell, Olsen☆; *Assistant Professors* Dunn, Funk, Paul, Shea; *Instructors* Beck

### Undergraduate Major

**Industrial and Manufacturing Engineering (B.S.)**

*Options*
Industrial Engineering
Manufacturing Engineering

### Graduate Major

**Industrial Engineering (M.S., Ph.D.)**

*Graduate Areas of Concentration*
Computer-Integrated Enterprise
Quality Control and Reliability
Manufacturing Engineering
Human Factors
Management Systems Engineering
Operations Research

The industrial and manufacturing engineering curricula is designed to develop engineering ability and management skills which prepare students for challenging and responsible careers. This people-oriented and cost-conscious preparation is widely applicable in industrial, service, commercial, and government activities.

The department offers two A.B.E.T. accredited engineering programs. The four-year industrial engineering program provides courses in all of the traditional areas of industrial and manufacturing engineering: operations research, information systems, work design, human engineering, systems analysis, quality control, facilities planning, production control, manufacturing processes, and engineering management. In addition, students may utilize restricted electives to gain added expertise in special areas such as statistics, computer science, or business.

The five-year manufacturing engineering co-op program is directed toward careers in manufacturing. It includes two internships with cooperating industries in the Northwest and allows students to gain practical experience. The internships are coordinated with University classes and are a requirement for graduation. The co-op program is similar to the standard industrial engineering curriculum, but includes several manufacturing-oriented courses including course work in computer-integrated manufacturing.

### CURRICULUM

**PRE-INDUSTRIAL ENGINEERING**

**Freshman Year**

ENGR 111. Engineering Orientation I (3)
ENGR 112. Engineering Orientation II (3)✥
MTH 251, MTH 252. Differential Calculus (8)✥
MTH 253. Infinite Series (4)✥
CH 201✥, 202. Chemistry for Engineering Majors (6)
PH 211. General Physics (4)✥
Writing 121, English composition (3)[1]✥
COMM 111. Public Speaking (3)[1]✥ or COMM 114. Argument and Critical Discourse (3)[1]✥
Perspectives (9)[1]
HHP 231. (3)[1]
Biological science elective (4)[1]

**Sophomore Year**

IE 251. Industrial Statistical Modeling (3)
IE 341. Work Design, Measurement and Human Factors (4)
ENGR 201. Electrical Fundamentals (3)✥
ENGR 211✥, ENGR 212✥, ENGR 213. Mechanics of Materials (9)
ENGR 245. Engr Graphics and Design (3)
PH 212✥, PH 213✥. General Physics (8)
MTH 254. Vector Calculus I (4)✥
MTH 256. Applied Differential Equations (4)✥
BA 215. Fundamentals of Accounting (4)
WR 327. Technical Report Writing (3)
Free elective (3)
TOTAL (98)

**PROFESSIONAL INDUSTRIAL ENGINEERING**

**Junior Year**

IE 335. Materials and Processes in Mfg (3)
IE 336. Industrial Mfg Ops and Systems (3)
IE 351. Quality and Reliability Control (4)
IE 352. Industrial Process Analysis (3)
IE 362, IE 363. Production Plng & Control I, II (6)
IE 365. Materials Handling & Facility Design (3)
ENGR 311. Thermodynamics (3)
ENGR 390. Engineering Economy (3)
Restricted IME electives (4)
MTH 341. Linear Algebra (3)

**Senior Year**

IE 413. Comp Simulation for Indstrl Apps (3)
IE 414. Industrial Data Systems (3)
IE 421, IE 422. Industrial Systems Optimization I, II (6)
IE 497, IE 498. Indus Engr Analysis & Dsgn (6)
ENGR 321. Materials Science (3)
ENGR 331. Momtm, Energy & Mass Trans (4)
Restricted electives (8)
Engineering science electives (6)
Perspectives (9)[1]
Synthesis (6)[1]
Free Elective (2)
TOTAL (94)

**PROFESSIONAL INDUSTRIAL ENGINEERING (MANUFACTURING ENGINEERING)**

**Junior Year**

IE 335. Materials and Processes in Mfg (3)
IE 351. Quality and Reliability Control (4)
IE 352. Industrial Process Analysis (3)
IE 362, IE 363. Product Plng & Control I, II (6)
IE 365. Materials Handling & Fac Design (3)
ENGR 311. Thermodynamics (3)
ENGR 390. Engineering Economy (3)
Engineering science electives (3)
Perspectives (3)
Internship (0)

**First Senior Year**
IE 413. Comp Simulation for Indust Apps (3)
IE 414. Industrial Data Systems (3)
IE 431, IE 432 Comp Aided Mfg I, II (6)
IE 434. Mfg Tooling and Product Design (3)
ENGR 321. Materials Science (3)
MTH 341. Linear Algebra (3)
Restricted IME elective (6)
Perspectives (3)[1]
Internship (0)

**Second Senior Year**
IE 421, IE 422. Indust Sys Optimiz I, II (6)
IE 497, IE 498. Engr Analysis and Design (3)
or ENGR 415, ENGR 416
ENGR 331. Momentum, Energy, and Mass Transfer (4)
Restricted electives (4)
Engineering science elective (6)
Perspectives (3)[1]
Synthesis (6)[1]
TOTAL (94)

## COURSES

### Lower Division Courses

**IE 251. INDUSTRIAL STATISTICAL MODELING (3).** Probability and statistical models for engineering with applications to quality control, reliability, project management, and random processes. PREREQ: MTH 251.

### Upper Division Courses

**IE 335. MATERIALS AND PROCESSES IN MANUFACTURING (3).** Methods of processing various raw materials into finished products. Materials include metals, plastics, ceramics and composites. Processes include machining, casting, forming, joining and nontraditional methods. Emphasis is placed on the relationship of materials and process on the design and manufacture of finished products. PREREQ: ENGR 245.

**IE 336. INDUSTRIAL MANUFACTURING OPERATIONS AND SYSTEMS (3).** Analysis of industrial manufacturing operations and manufacturing systems. Design of multistage manufacturing systems, equipment selection, integration of manufacturing cells, automation and control. PREREQ: IE 335.

**IE 341. WORK DESIGN, MEASUREMENT AND HUMAN FACTORS (4).** Theory and application, work design and measurement, principles of motion economy, time standards. Human factors consideration in workplace design. PREREQ: IE 251.

**IE 351. QUALITY AND RELIABILITY 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. PREREQ: IE 251.

**IE 352. INDUSTRIAL PROCESS ANALYSIS (3).** Systematic analysis of industrial manufacturing processes through the use of statistical analysis, methods, procedures, and application of statistical techniques including use of classic process analysis techniques, evolutionary operation and response surface methodologies. PREREQ: IE 351.

**IE 362. PRODUCTION PLANNING AND CONTROL I (3).** Forecasting techniques; network and other scheduling methods; routing, dispatching, and inspecting; machine assignment and maintenance; material and process control. PREREQ: IE 251.

**IE 363. PRODUCTION PLANNING AND CONTROL II (3).** Line balancing, inventory analysis, production systems analysis, master production scheduling, materials requirement planning. PREREQ: IE 362.

**IE 365. MATERIAL HANDLING AND FACILITY DESIGN (3).** Selection of material handling equipment, its application, coordination, and effect on plant layout in industrial situations; location and arrangement of facilities; design of warehouse facilities. PREREQ: ENGR 245, IE 362, ENGR 390. Lec/lab.

**IE 405. READING AND CONFERENCE (1-16).**

**IE 406. PROJECTS (1-16).**

**IE 407. SEMINAR (1-16).**

**IE 413/IE 513. COMPUTER SIMULATION MODELS FOR INDUSTRIAL APPLICATIONS (3).** Principles of Monte Carlo simulation using digital computer models; discrete-event models, with applications to management and engineering. PREREQ: IE 251 or knowledge of descriptive statistics; ENGR 112 or computer experience.

**IE 414/IE 514. INDUSTRIAL DATA SYSTEMS (3).** Principles of microprocessors and data processing systems; microcomputer hardware, software, and application to management and engineering. PREREQ: ENGR 112 or programming experience.

**IE 416/IE 516. ARTIFICIAL INTELLIGENCE SYSTEMS FOR ENGINEERING (3,3).** Concepts of symbolic problem solving, knowledge representation, and inference applied to problems in engineering analysis and design. Artificial Intelligence programming. PREREQ: IE 414 and senior or graduate standing in engineering.

**IE 419/IE 519. SIMULATION IN CIM PLANNING AND DESIGN (3).** Analysis and design of integrated manufacturing systems through the application of discrete and continuous modeling techniques. Development of CIM decision support systems utilizing animated simulation. PREREQ: IE 413.

**IE 421/IE 521. INDUSTRIAL SYSTEMS OPTIMIZATION I (3).** Techniques of analysis and solution of problems in industrial and management systems. Emphasis on applications of linear, non-linear, and integer programming and extensions. PREREQ: IE 251, MTH 341. Lec/rec.

**IE 422/IE 522. INDUSTRIAL SYSTEMS OPTIMIZATION II (3).** Techniques of analysis and solution of problems in industrial and management systems. Emphasis on applications of dynamic programming. Markovian processes, and queueing as applied to industrial proglems. PREREQ: IE 421/IE 521. Lec/rec.

**IE 423/IE 523. INDUSTRIAL SYSTEMS OPTIMIZATION III (3).** Techniques for analysis and solution of problems in industrial and management systems. Emphasis on general nonlinear optimization and solution of complex systems using multiple objective techniques. PREREQ: IE 422/IE 522. Lec/rec.

**IE 431/IE 531. COMPUTER-AIDED MANUFACTURING I (3).** Computers as control devices in manufacturing. Topics include programming languages, interfaces, sensors, actuators, and control theory. Emphasis on applications to design of manufacturing control systems. PREREQ: ENGR 112.

**IE 432/IE 532. COMPUTER-AIDED MANUFACTURING II (3).** Computer controlled manufacturing machines. Topics include industrial vision systems, numerical control programming, robot programming, and factory floor communication. Emphasis on applications to design of manufacturing systems. PREREQ: IE 431.

**IE 434/IE 534. MANUFACTURING TOOLING AND PRODUCT DESIGN (3).** Analysis and design fundamentals of tooling for economical production. Forces and material properties in relation to the locational, positional, and securing requirements of cutting, forming, and fabrication operations. PREREQ: IE 335.

**IE 435/IE 535. DESIGN OF INDUSTRIAL ROBOTIC SYSTEMS (3).** Industrial robots in manufacturing systems. Topics include mechanics, control, programming, end-of-arm tooling, selection, safety, and system integration. Emphasis on industrial robot design and its impact on manufacturing system design. PREREQ: IE 431.

**IE 438/IE 538. INDUSTRIAL PROCESS CONTROL (3).** The optimal control of industrial feedback processes, including modeling feedback process, transformations, stability and optimization in the presence of noise. PREREQ: IE 251 or equivalent statistical material, MTH 256.

**IE 441/IE 541. HUMAN FACTORS ENGINEERING I (3).** Human sensory, motor, and information processing capabilities and their relationship to the design of workplaces and human-machine systems. Human errors and reliability. Experimental methods in human factors engineering. PREREQ: IE 341, IE 251 or equivalent statistical material.

**IE 442/IE 542. HUMAN FACTORS ENGINEERING II (3).** Topics: requirements definition, system analysis, user/ operator definition, mission analysis, function analysis function allocation, task analysis, information/action analysis, work module, and job design. PREREQ: IE 441/541. Lec/term project.

**IE 443/IE 543. HUMAN FACTORS ENGINEERING III (3).** Topics include workstation preliminary design, display and control prototyping, facilitator design, mockup and prototype construction, test and evaluation. PREREQ: IE 442/IE 542. Lec/term project (continuation of IE 442/IE 542 project).

**IE 444/IE 544. INDUSTRIAL SAFETY (3).** History, legislation, and organization of safety management; accident costs, causes, and prevention; role of environmental hazards and workplace design in industrial safety. PREREQ: IE 251 or ST 314.

**IE 450/IE 550. TOTAL QUALITY MANAGEMENT (3).** Principles of TQM. Vision/value statements and the management feedback process in TQM. Super and subordinate goals and the 10 step TQM problem solving process. Juran's trilogy and Deming's 14 principles. Team formation, team building and motivation. The Malcom Baldridge award. ISO 9000. PREREQ: Senior Standing.

**IE 451/IE 551. STATISTICAL PROCESS CONTROL (3).** Systematic analysis of industrial processes through the application of statistical techniques. Analysis of product quality and design of quality improvement programs; development of reliability models. PREREQ: STAT 314. Not available for students with baccalaureate degrees in industrial engineering.

**IE 452/IE 552. DESIGN OF INDUSTRIAL EXPERIMENTS (3).** Techniques for the statistical analysis and design of industrial control systems. Emphasis on the use of advanced mathematical models and techniques for the control and enhancement of industrial productivity. Applications include, but are not limited to, the estimation and control of process fallout and rework. PREREQ: IE 351 or IE 451.

**IE 453/IE 553. INDUSTRIAL SYSTEMS ANALYSIS (3).** Techniques for the analysis of relationships between factors in industrial and human-machine systems. Emphasis on the interpretation of computer simulation results, human-machine interactions and industrial process yields. PREREQ: IE 452.

**IE 464/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. PREREQ: Computer experience.

**IE 465/IE 565. FACILITY LAYOUT AND LOCATION ANALYSIS (3).** Analytic modeling of facility layout and location problems, including single- and multiple-facility location problems with Manhattan and Euclidian distance norms, warehouse layout, quadratic location problems, and allocation location problems. PREREQ: IE 481.

**IE 471/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 into the COM/PERT algorithms. Resource-constrained project scheduling case discussions and a term project are included in this course. PREREQ: ST 314 or equivalent, computer programming experience. CROSSLISTED as: EMGT 545/EMGT 645 at Portland State University.

**IE 474/IE 574. ENGINEERING MANAGEMENT (3).** Functions and techniques of management as they apply to the engineering environment. Special emphasis on the engineers transition to management and productivity improvement. PREREQ: Senior standing.

**IE 475/IE 575. MULTI-CRITERIA DECISION MAKING (3).** Multicriteria-multiobjective decision making; evaluation of existing and proposed industrial systems, cost and value of information, utility measurement, multiobjective programming and multidimensional risk analysis. PREREQ: ENGR 390, basic statistical knowledge.

**IE 482/IE 582. INDUSTRIAL SYSTEMS OPTIMIZATION II (3).** Techniques of analysis and solution of problems in industrial and management systems. Emphasis on application of dynamic programming, Markovian processes, queueing, and general optimization as applied to industrial problems. PREREQ: IE 481. Lec/rec.

**IE 491/IE 591, IE 492/IE 592, IE 493/IE 593. SELECTED TOPICS IN SYSTEMS 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 496. MANUFACTURING ENGINEERING ANALYSIS AND DESIGN (3).** Product function analysis, design of products and manufacturing processes, selection of equipment, control of process quality and manufacturing systems design. PREREQ: Senior standing in Industrial (Manufacturing) Engineering; IE 352, IE 362, IE 432, ENGR 390, Departmental approval required. Lec/rec.

**IE 497. ^INDUSTRIAL ENGINEERING ANALYSIS AND DESIGN (3).** 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. PREREQ: Senior standing in Industrial Engineering; IE 352, 363, 365, ENGR 390.

**IE 498. ^INDUSTRIAL ENGINEERING ANALYSIS AND DESIGN (3).** 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. PREREQ: Senior standing in Industrial Engineering; IE 352, 363, 365, ENGR 390.

### Graduate Courses

**IE 503. THESIS (1-16).**

**IE 505. READING AND CONFERENCE (1-16).**

**IE 506. PROJECTS (1-16).**

**IE 507. SEMINAR (1-16).**

**IE 561. MANUFACTURING SYSTEMS ENGINEERING (3).** Introduction to Concurrent Engineering, design for manufacturability and new product life cycles. Topics include forecasting, inventory control, sequencing and scheduling, and assembly line balancing. PREREQ: ST 514 and MTH 341. CROSSLIST: EMGT 540/EMGT 640 at Portland State University.

**IE 562. MANUFACTURING SYSTEMS MANAGEMENT (3).** Topics covered include aggregate production planning, master production scheduling, capacity planning MRP and resource planning. PREREQ: ST 514 and MTH 341. CROSSLISTED: EMGT 540/EMGT 640 at Portland State University.

**IE 572. COMMUNICATION AND TEAM BUILDING FOR ENGINEERS (3).** An examination of the basic principles or organization as applied to manufacturing and engineering teams. Effective communication in team settings is covered. PREREQ: ST 514, IE 571. CROSSLIST: EMGT 522/EMGT 622 at Portland State University.

**IE 573. STRATEGIC PLANNING IN ENGINEERING (3).** Critical issues in shaping the competitive strategy for the engineering-driven companies in a turbulent business environment; key steps and end results of the planning process; corporate mission; Key Result Areas (KRA's) and situational analysis including strengths, weaknesses, opportunities, and threats in KRA's. Identifying planning assumptions, critical issues, setting objectives, formulating strategy. Leadership, organizational culture and structure to support the implementation of a strategic plan as well as the strategic control systems. Case studies, presentation, term projects, teamwork, and interactive exercises. PREREQ: ST 514, IE 562. CROSSLIST: EMGT 525/EMGT 625.

**IE 593. SELECTED TOPICS IN SYSTEM STUDIES (1-5).** (See IE 493 for description.)

**IE 603. THESIS (1-16).**

**IE 605. READING AND CONFERENCE (1-16).**

**IE 606. PROJECTS (1-16).**

**IE 607. SEMINAR (1-16).IE 441/IE 541. HUMAN FACTORS ENGINEERING I (3).** Human sensory, motor, and information processing capabilities and their relationship to the design of workplaces and human-machine systems. Human errors and reliability. Experimental methods in human factors engineering. PREREQ: IE 341, IE 251 or equivalent statistical material.

**IE 442/IE 542. HUMAN FACTORS ENGINEERING II (3).** Topics: requirements definition, system analysis, user/ operator definition, mission analysis, function analysis function allocation, task analysis, information/action analysis, work module, and job design. PREREQ: IE 441/541. Lec/term project.

**IE 443/IE 543. HUMAN FACTORS ENGINEERING III (3).** Topics include workstation preliminary design, display and control prototyping, facilitator design, mockup and prototype construction, test and evaluation. PREREQ: IE 442/IE 542. Lec/term project (continuation of IE 442/IE 542 project).

**IE 444/IE 544. INDUSTRIAL SAFETY (3).** History, legislation, and organization of safety management; accident costs, causes, and prevention; role of environmental hazards and workplace design in industrial safety. PREREQ: IE 251 or ST 314.

**IE 450/IE 550. TOTAL QUALITY MANAGEMENT (3).** Principles of TQM. Vision/value statements and the management feedback process in TQM. Super and subordinate goals and the 10 step TQM problem solving process. Juran's trilogy and Deming's 14 principles. Team formation, team building and motivation. The Malcom Baldridge award. ISO 9000. PREREQ: Senior Standing.

**IE 451/IE 551. STATISTICAL PROCESS CONTROL (3).** Systematic analysis of industrial processes through the application of statistical techniques. Analysis of product quality and design of quality improvement programs; development of reliability models. PREREQ: STAT 314. Not available for students with baccalaureate degrees in industrial engineering.

**IE 452/IE 552. DESIGN OF INDUSTRIAL EXPERIMENTS (3).** Techniques for the statistical analysis and design of industrial control systems. Emphasis on the use of advanced mathematical models and techniques for the control and enhancement of industrial productivity. Applications include, but are not limited to, the estimation and control of process fallout and rework. PREREQ: IE 351 or IE 451.

**IE 453/IE 553. INDUSTRIAL SYSTEMS ANALYSIS II (3).** Techniques for the analysis of relationships between factors in industrial and human-machine systems. Emphasis on the interpretation of computer simulation results, human-machine interactions and industrial process yields. PREREQ: IE 452.

**IE 464/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. PREREQ: Computer experience.

**IE 465/IE 565. FACILITY LAYOUT AND LOCATION ANALYSIS (3).** Analytic modeling of facility layout and location problems, including single- and multiple-facility location problems with Manhattan and Euclidian distance norms, warehouse layout, quadratic location problems, and allocation location problems. PREREQ: IE 481.

**IE 474/IE 574. ENGINEERING MANAGEMENT (3).** Functions and techniques of management as they apply to the engineering environment. Special emphasis on the engineers transition to management and productivity improvement. PREREQ: Senior standing.

**IE 475/IE 575. MULTI-CRITERIA DECISION MAKING (3).** Multicriteria-multiobjective decision making; evaluation of existing and proposed industrial systems, cost and value of information, utility measurement, multiobjective programming and multidimensional risk analysis. PREREQ: ENGR 390, basic statistical knowledge.

**IE 482/IE 582. INDUSTRIAL SYSTEMS OPTIMIZATION II (3).** Techniques of analysis and solution of problems in industrial and management systems. Emphasis on application of dynamic programming, Markovian processes, queueing, and general optimization as applied to industrial problems. PREREQ: IE 481. Lec/rec.

**IE 491/IE 591. SELECTED TOPICS IN SYSTEMS STUDIES (3).** 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 492/IE 592. SELECTED TOPICS IN SYSTEMS STUDIES (3).** 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 each term.

**IE 493/IE 593. SELECTED TOPICS IN SYSTEMS STUDIES (3).** Recent advances in industrial engineerin pertaining to the theory and application of system studies. Analysis and design of natural resource systems; evaluation; detection extraction; processing and marketing systemsl 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 each term.

**IE 496. MANUFACTURING ENGINEERING ANALYSIS AND DESIGN (3).** Product function analysis, design of products and manufacturing processes, selection of equipment, control of process quality and manufacturing systems design. PREREQ: Senior standing in Industrial (Manufacturing) Engineering; IE 352, IE 362, IE 432, ENGR 390. Lec/rec.

**IE 497. ^INDUSTRIAL ENGINEERING ANALYSIS AND DESIGN (3).** 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. PREREQ: Senior standing in Industrial Engineering; IE 352, 363, 365, ENGR 390.

**IE 498. ^INDUSTRIAL ENGINEERING ANALYSIS AND DESIGN (3).** 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. PREREQ: Senior standing in Industrial Engineering; IE 352, 363, 365, ENGR 390.

**Graduate Courses**

**IE 503. THESIS (1-16).**

**IE 505. READING AND CONFERENCE (1-16).**

**IE 506. PROJECTS (1-16).**

**IE 507. SEMINAR (1-16).**

**IE 561. MANUFACTURING SYSTEMS DESIGN I (3).** New product life (NPI) cycle, management of the NPI cycle, design for manufacturing, concurrent engineering, manufacturing strategies, degree of automation, flexible automation, economics of automation, implementation, and global competition. PREREQ: ST 314 or equivalent, computer programming experience.

**IE 562. MANUFACTURING SYSTEMS DESIGN II (3).** Manufacturing systems analysis, aggregate production planning, master scheduling, MRP/CRP/JIT, scheduling, line balancing, information and decision support systems for manufacturing. PREREQ: ST 314 or equivalent, computer programming experience.

**IE 563. MANUFACTURING SYSTEMS DESIGN III (3).** Implementing change in manufacturing systems, management of manufacturing projects and products; resource-constrained project scheduling. PREREQ: ST 314 or equivalent, computer programming experience.

**IE 603. THESIS (1-16).**

**IE 605. READING AND CONFERENCE (1-16).**

**IE 606. PROJECTS (1-16).**

**IE 607. SEMINAR (1-16).**

## MECHANICAL ENGINEERING

E.A.C./A.B.E.T Accredited

Gordon M. Reistad, Head
204 Rogers Hall
Oregon State University
Corvallis, OR 97331-6001
(541) 737-3441

**Faculty**

*Professors* Bushnell☆, Kanury, Kassner, Kennedy☆, Liburdy, Reistad☆, Reiter, Ullman☆; *Associate Professors* Paasch, Peterson, Philbrick, Warnes☆, Wheeler, Wolff; *Assistant Professors* Costello, Spiewak, Walker, Zaworski☆

### Undergraduate Major

**Mechanical Engineering (B.S.)**

### Graduate Majors

**Mechanical Engineering (M.S., Ph.D.)**

*Graduate Areas of Concentration*

Applied Mechanics
Applied Thermodynamics
Combustion
Design
Dynamics
Energy
Fluid Mechanics
Heat Transfer
Materials Science
Mechanical Engineering
Physical and Mechanical Metallurgy
Solid Mechanics
Stress Analysis
Systems and Control

**Materials Science (M.S.)**

*Graduate Area of Concentration*

Materials Science

Mechanical engineers use the principles of science, together with mathematics, to design and develop equipment and processes for society. They play major roles in the design, testing and operation of machines, including processes for energy conversion and equipment used in 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.

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 capability is developed at the junior and senior levels, when the students have achieved proficiency in their basic technical capability. 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 which requires students in small teams to carry out the design of some product or process under the supervision of a faculty advisor.

The curriculum is broad in scope with course work and project activities in several areas. By proper choice of electives, students may achieve a degree of specialization and depth. The areas include applied stress analysis; design and analysis of mechanical and thermal/fluid systems; concurrent engineering; dynamics of physical systems; heating, ventilating, and air conditioning; heat transfer; fluid dynamics; metallurgy and materials; and power plant design. Digital computers are used extensively in departmental courses.

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 40 Pacific Northwest companies where interns work with a company mentor and improve their capabilities for the work environment.

Mechanical engineers often begin their professional careers with machinery, petroleum or electronics industries, government agencies, and firms producing transportation and energy conversion equipment. Because of increasing complexity of mechanical systems, graduate study for the M.S. and Ph.D. 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.

## CURRICULUM

### PRE-MECHANICAL ENGINEERING

**Freshman Year**

ME 101. Intro to Mechanical Engr (3)
Advanced Level Programming, Fortran, Pascal, or C; ME 102 or similar. (3)✣
CH 201✣, CH 202. General Chem (6)
MTH 251, MTH 252, MTH 253. Calculus (12)✣
PH 211. General Physics with Calculus (4)✣
WR 121. English Composition (3)✣
HHP 231. Fitness (3)[1]
Perspectives (9)[1]
Free Elective (3)
COMM 111. Public Speaking (3)[1]✣

**Sophomore Year**

MTH 254. Vector Calculus I (4)✣
MTH 256. Applied Differential Equations (4)✣
PH 212, PH 213. Gen Phys with Calculus (8)✣
ENGR 211✣, ENGR 212✣, ENGR 213. Statics, Dynam, and Mechanics of Materials (9)
ENGR 201✣, ENGR 202. Elec Fundamentals (6)
ST 314. Principles of Statistics/Phy Sci (3)[5]
Biological science (4)[1]
IE 335. Materials & Processes in Mfg (3)[5]
ENGR 248. Graphics and 3-D Modeling (3)
WR 327. Tech Writing (3)
TOTAL (96)

**PROFESSIONAL MECHANICAL ENGINEERING**

**Junior Year**

ME 316. Mechanics of Materials (3)
ME 317. Dynamics (3)
ENGR 311. Thermodynamics (3)
ENGR 312. Thermodynamic Application (4)
ENGR 331, ENGR 332. Momentum, Energy and Mass Transfer (8)
ENGR 321. Materials Science (3)
ENGR 322. Mech Properties of Materials (4)
ME 382. Introduction to Design (4)
ME 383. Mechanical Component Design (3)
ME 350. Instrument Laboratory (1)
ENGR 390. Engineering Economy (3)
Free electives (6)
ME 373. Numerical Methods in Mech Engr (3)

**Senior Year**

Perspectives (6)[1]
Synthesis (6)[1]
ME 451. Mechanical Laboratory (4)
ME 441. Thermal/Fluid System Design (3)
ME 430. System Dynam & Control (3)
ME 418, ME 419. Senior Design Project (4)
Approved laboratory course (3)[10]
ME 407. Seminar (1)
ME 417. Project Seminar (1)
Restricted ME design electives (6)[9]
Restricted ME analysis electives (9)[11]
Free electives (2)
TOTAL (96)

## COURSES

### Lower Division 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. PREREQ: Trigonometry.

**ME 102. INTRODUCTION TO MECHANICAL ENGINEERING (3).** Systematic approaches to engineering problem solving using computers. Flow charting, input/output design, computer programming in a high level language and use of engineering software. PREREQ: Trigonometry.

**ME 206. PROJECTS (1-16).** (Sophomore).

### Upper Division Courses

**ME 306. PROJECTS (1-16).** (Junior).

**ME 316. MECHANICS OF MATERIALS (3).** Determination of stresses, deflections, and stability of deformable bodies, including matrix structural analysis. PREREQ: ENGR 213, MTH 256.

**ME 317. DYNAMICS (3).** Continuation of the study of kinematics and kinetics of particles and rigid bodies, with applications to mechanical systems of current interest to engineers. PREREQ: ENGR 212, MTH 256.

**ME 350. INSTRUMENT LABORATORY (1).** Function, operation, and application of common mechanical engineering instruments, measurement principles, statistical analysis. Graded P/N. PREREQ: ENGR 202.

**ME 373. COMPUTATIONAL METHODS (3).** Solutions to mechanical engineering problems using digital computers. Numerical modeling and formulation of representative engineering problems suitable for computer solutions. PREREQ: MTH 256, ME 102.

**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. PREREQ: ENGR 248, IE 335. COREQ: ME 316.

**ME 383. MECHANICAL COMPONENT DESIGN (3).** Design of machine elements and power transmission components. PREREQ: ME 382.

**ME 401. RESEARCH (1-16).** Repeat 3 times 9 credits.

**ME 405. READING AND CONFERENCE (1-16).** Repeat 3 times 9 credits.

**ME 406. PROJECTS (1-16).** Repeat 5 times 15 credits.

**ME 407. SEMINAR (1-16).** Senior Seminar; Repeat 2 times 2 credits.

**ME 412/ME 512. KINEMATIC DESIGN OF LINKAGES (3).** Freedom and constraint in mechanical systems. Methods of planar linkage analysis and synthesis. Introduction to spatial linkage analysis and synthesis. PREREQ: ME 317, ME 383.

**ME 413/ME 513. COMPUTER-AIDED DESIGN (3).** Study of Computer-Aided Design (CAD) tools (hardware/software) and their applications to mechanical systems design. Design projects involving the application of CAD constitutes a major portion of the course. PREREQ: ME 373, ME 383.

**ME 414/ME 514. SMART PRODUCTS DESIGN (3).** Microprocessor applications for mechanical engineers. Design of electromechanical products which incorporate microprocessor technology. PREREQ: ME 373, ME 430. Lec/Lab.

**ME 415/ME 515. DESIGN OF ROBOT MANIPULATORS (3).** Kinematics, dynamics, and trajectory planning, and the design of serial connected and parallel connected robot manipulators. PREREQ: ME 317, ME 383.

**ME 417. SENIOR PROJECT SEMINAR (1).** Oral presentations of senior projects. COREQ: ME 419.

**ME 418. SENIOR PROJECT (1).** Planning for Senior Project. PREREQ: ME 382. COREQ: ME 351.

**ME 419. SENIOR PROJECT (3).** An investigation carried out under the supervision of a faculty member. Project may contain experimental, analytical, or computer work but must be design. A formal written report is required. PREREQ: ME 418, ME 351, ME 373, ME 383.

**ME 420/ME 520. APPLIED STRESS ANALYSIS (3).** Elasticity theory, failure theories, plasticity, and energy methods. PREREQ: ME 316.

**ME 421/ME 521. APPLIED STRESS ANALYSIS (3).** Finite element analysis, plate and shell structures. PREREQ: ME 420.

**ME 422/ME 522. MECHANICAL VIBRATIONS (3).** Dynamic response of single and multiple degree-of-freedom systems to periodic and nonperiodic loading. PREREQ: ME 317.

**ME 423/ ME 523. ADVANCED STRESS ANALYSIS (3).** Anlaytical and finite techniques applied to nonlinear problems in stress analysis including plasticity effects, creep, large deflections, buckling, and contact mechanics. PREREQ: ME 420/520 and ME 421/ME 521.

**ME 424/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. COREQ: ME 421/ME 521 or equivalent. Lec/Lab.

**ME 430. SYSTEMS DYNAMICS AND CONTROL (3).** Modelling, analysis and control of linear continuous systems; stability, design, compensation. Fundamentals of nonlinear and digital systems. PREREQ: ME 317, ME 373, ME 383.

**ME 431/ME 531. CONTROL SYSTEMS (3).** State-space methods for linear systems. Analysis; transition matrix, controllability, observability, stability. Control; pole placement, optimal control. Elements of digital control. PREREQ: ME 430. Lec/lab.

**ME 440/ME 540. TURBOMACHINERY DESIGN (3).** Design processes in turbomachinery, vector diagrams, blade forms, and heat exchanger configurations. Thermofluid design of pumps, gas, steam and hydraulic turbines. PREREQ: ENGR 332, ENGR 312, ME 373.

**ME 441. THERMAL/FLUID SYSTEM DESIGN (3).** Fluid system components, including pumps, fans, turbines, compressors, heat exchangers, piping, and ducting systems. Students design systems integrating these components. Project work with written and oral reports. PREREQ: ENGR 312, ENGR 332, ENGR 390, ME 373, ME 383. Lec/lab.

**ME 442/ME 542. THERMAL MANAGEMENT IN ELECTRONIC SYSTEMS (3).** Intermediate heat transfer course focusing on the problem of cooling electronic components, microprocessors, printed circuit boards, and large electronic structures such as computers where a more integrated thermal management approach must be taken. A finite element heat transfer package is introduced as an analysis tool for the course. PREREQ: ENGR 332. Lec.

**ME 443/ME 543. HEATING AND AIR-CONDITIONING (3).** Heating, ventilating and air-conditioning of buildings for human comfort or industrial processes; design, selection, construction, and operation of air-conditioning equipment, including warm air, steam, hot water, and refrigeration systems. PREREQ: ME 441. Lec/lab.

**ME 444/ME 544. POWER PLANT ENGINEERING (3).** Fuels and combustion equipment, steam generators and auxiliaries, and power generation equipment including combustion engines, gas turbines, hydroelectric and nuclear power plants. Economics of design and operation. PREREQ: ME 441. Lec/rec.

**ME 445/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. PREREQ: ENGR 312, ENGR 332.

**ME 451. ^MECHANICAL LABORATORY (4).** Selection, calibration, and application of instruments. Hands-on testing of machines and processes. Analysis of tests and preparation of engineering reports. PREREQ: ENGR 312, ENGR 332, ME 350. (Writing Intensive Course)

**ME 452/ME 552. INSTRUMENTATION (3).** The emphasis of the course is on dynamic measurements. Major elements of measurement systems are covered. These include transducers, and devices for signal conditioning, recording, storing and displaying (including digital data acquisition systems). PREREQ: ME 451, ME 430. Lec/lab.

**ME 453/ME 553. EXPERIMENTAL MECHANICS (3).** Stress analysis by strain measurement. Mechanical, optical, and electrical strain gages; brittle coating techniques; strain gage instrumentation; piezoelectric, capacitive, and inductive transducers; stress analysis by X-ray diffraction. PREREQ: ME 316, ME 317, ME 451. Lec/lab.

**ME 460/ME 560. INTERMEDIATE FLUID MECHANICS (3).** Ideal fluid flow including potential flow theory. Computer solutions in ideal fluid flow. Viscous flow and boundary layer theory. Introduction to turbulence. PREREQ: ENGR 331, ME 373.

**ME 461/ME 561. GAS DYNAMICS (3).** Dynamics and thermodynamics of compressible fluid flow. One-dimensional isentropic flow, nozzles, diffusers, normal and oblique shocks. Flow with friction and heating. Two-dimensional Prandtl-Meyer flow and method of characteristics. Computer solutions to general gas dynamic flow. PREREQ: ENGR 312, ENGR 331, ME 373.

**ME 462/ME 562. AERODYNAMICS (3).** Theories of flow of perfect, compressible, and viscous fluids; application of these theories to aerodynamic designs. PREREQ: ENGR 331, ME 373, ME 460, ME 461. order.

**ME 480/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. PREREQ: ENGR 322.

**ME 481/ME 581. ADVANCED MATERIALS SCIENCE (3).** Thermodynamics of solids. Thermodynamics of solutions and phase equilibrium. Phase diagrams and invariant reactions. Order and disorder in solutions. Applications to advanced materials development. PREREQ: ENGR 322

**ME 482/ME 582. ADVANCED MATERIALS SCIENCE (3).** Rate processes in materials. Diffusion in solids, including vacancy and interstitial diffusion and short-circuit diffusion. Phase transformations including classic nucleation and growth theory. Applications to materials development. Laboratory will emphasize microstructural evaluation and quantitative metallography. PREREQ: ENGR 322. Lec/lab.

**ME 483/ME 583. COMPOSITE MATERIALS (3).** Fibers and matrices, mechanics of composites, reinforcement and failure mechanisms, properties and applications. PREREQ: ENGR 322. Lec/lab.

**ME 484/ME 584. FRACTURE OF MATERIALS (3).** Fracture mechanics and fatigue mechanisms: Mechanisms of duclite and brittle fracture. Environmentally induced fracture and fatigue. Considerations in design of engineering materials and structures will be discussed. PREREQ: ENGR 322.

**ME 485. INTRODUCTION TO THE PHYSICS OF SOLIDS (3).** Elementary quantum mechanics of solids, including band theory. Basic electronic, optical and magnetic theory of metals, ceramics and covalent solids. PREREQ: ENGR 321.

**ME 487/ME 587. DISLOCATIONS AND THE MECHANICAL BEHAVIOR ON MATERIALS (3).** Imperfections in Crystalline Solids. Planar, line and point defects in solids. Emphasis will be placed on vacancies and dislocations. The static and dynamic features of dislocations will be discussed. Discussions on role of imperfections on materials behavior and development will be included. PREREQ: ENGR 322.

**ME 493/ME 593. MECHANICAL COMPONENT ANALYSIS (3).** Advanced techniques for the analysis of mechanical components. PREREQ: ME 383. Lec/rec.

### Graduate Courses

**ME 501. RESEARCH (1-16).** May be repeated many times.

**ME 502. INDEPENDENT STUDIES (1-16).**

**ME 503. THESIS (1-16).** May be repeated many times.

**ME 505. READING AND CONFERENCE (1-16).** May be repeated many times.

**ME 506. PROJECTS (1-16).** May be repeated many times.

**ME 507. SEMINAR (1-16).** May be repeated many times.

**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. PREREQ: ME 413 or equivalent, engineering advanced undergraduate or graduate standing.

**ME 517. OPTIMIZATION IN DESIGN (3).** Optimization methods as applied to engineering design, theory and application of non-linear optimization techniques for multivariate unconstrained and constrained problems. Model boundedness and sensitivity. PREREQ: ME 383, ME 413. 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. This course 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).** Topics in mechanical design selected from the following: design processes, quality engineering, design for assembly, statistical machine design, the Taguchi method, and parametric design. May be repeated several times.

**ME 525. CONTINUUM MECHANICS (3).** Kinematics and governing field laws for continua. Predictions of behavior of fluids and elastic and inelastic solids. PREREQ: ME 316, ME 317.

**ME 526. ELASTICITY (3).** Applications of the field equations of linear elasticity to two and three dimensional engineering problems using exact, approximate, and numerical solution techniques. PREREQ: ME 525. Not offered every year.

**ME 527. FRACTURE MECHANICS (3).** Calculation of stress fields around cracks by analytical and numerical techniques; consideration of fatigue, plasticity, and dynamic effects. Not offered every year.

**ME 528. MECHANICS OF COMPOSITE STRUCTURES (3).** Anisotropic elasticity theory, failure theories, classical lamination theories, delamination failure, mechanics of laminated beams, plates and shells. PREREQ: ME 525. Not offered every year.

**ME 529. SELECTED TOPICS IN SOLID MECHANICS (3).** Advanced topics in solid mechanics emphasizing research applications of current interest.

**ME 535. ADVANCED DYNAMICS (3).** Analysis of the motions of mechanical systems. Kinematics, constraints, generalized coordinates and speeds. PREREQ: ME 317. Offered alternate years.

**ME 536. ADVANCED DYNAMICS (3).** Analysis of the motions of mechanical systems. Kane's dynamical equations, with applications to systems of current interest. PREREQ: ME 535. Offered alternate years.

**ME 537. VIBRATION ANALYSIS (3).** Analytical mechanics and the fundamental equations of vibrating mechanical systems; inertia, stiffness, and flexibility matrices and their relationships with kinetic and potential energies. Prediction of response of multi-degree-of-freedom and distributed-parameter systems using normal coordinates. PREREQ: ME 422/ME 522. Offered alternate years.

**ME 539. SELECTED TOPICS IN DYNAMICS (3).** Advanced topics in dynamics emphasizing research applications of current interest. Maybe repeated.

**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. PREREQ: ENGR 332, ME 373.

**ME 547. CONDUCTIVE HEAT TRANSFER (3).** Analytical and numerical solutions to steady state and transient conduction problems. PREREQ: ENGR 332, ME 373.

**ME 548. RADIATION HEAT TRANSFER (3).** Analytical and numerical methods of solution of thermal radiation problems. PREREQ: ENGR 332, 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. May be repeated.

**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. PREREQ: ME 565.

**ME 567. COMPUTATIONAL FLUID DYNAMICS (3).** Application of modern computational techniques to solve a wide variety of fluid dynamics problems including both potential and viscous flow. Emphasis on computer code development. PREREQ: ME 565, ME 566, ME 575.

**ME 569. SELECTED TOPICS IN FLUID MECHANICS (3).** Topics in fluid mechanics emphasizing research applications of current interest. May be repeated.

**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. PREREQ: ME 373.

**ME 586. CREEP (3).** Time-dependent plasticity of solids at lower and especially elevated temperatures. Dislocation and diffusion theory as particularly relevant to the dependent flow. PREREQ: ENGR 322, ME 481.

**ME 588. STRUCTURE OF MATERIALS (3).** The space lattice; diffraction of x-rays by crystals; experimental techniques in x-ray and electron diffraction; electron microscopy; alloy phase transformations; microstructural examination techniques; other selected topics. PREREQ: Graduate standing. Not offered every year.

**ME 589. SELECTED TOPICS IN MATERIALS (3).** Topics in materials science to correspond to areas of graduate research. Topics will be chosen from following list; Optical materials, dielectrics, oxidation and corrosion, ceramics, thermophysical properties, polymers and viscoelasticity, coatings and thin films.

**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. May be repeated.

**ME 601. RESEARCH (1-16).** May be repeated.

**ME 603. THESIS (1-16).** May be repeated many times.

**ME 605. READING AND CONFERENCE (1-16).** May be repeated many times.

**ME 606. PROJECTS (1-16).** May be repeated.

**ME 607. SEMINAR (1-16).** May be repeated many times.

## METALLURGICAL ENGINEERING

A cooperative program with the University of Idaho. See head adviser, College of Engineering, for information.

## MINING ENGINEERING

A cooperative program with the University of Idaho. See head adviser, College of Engineering, for information.

## NUCLEAR ENGINEERING

E.A.C./A.B.E.T. Accredited

Andrew C. Klein, Acting Head
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**Faculty**

*Professors* Binney☆, Dodd, Klein☆, Reyes☆, Ringle☆; *Associate Professors* Higginbotham☆13; *Assistant Professors* Higley13, Palmer

**Undergraduate Major**
**Nuclear Engineering (B.S.)**
**Minor**
**Nuclear Engineering**
**Graduate Major**
**Nuclear Engineering (M.S., Ph.D.)**

*Graduate Areas of Concentration*
Application of Nuclear Techniques
In-Core Fuel Management
Nuclear Reactor Engineering
Nuclear Instrumentation and Applications
Nuclear Medicine
Nuclear Power Generation
Nuclear Systems Design and Modeling
Nuclear Waste Management
Numerical Methods For Reactor Analysis
Radiation Shielding
Radioisotope Production
Space Nuclear Power
Thermal Hydraulics

The nuclear engineering and radiation health physics curriculua are designed to prepare students for careers related to the many beneficial uses of nuclear energy, and research and development programs dealing with nuclear technology and applications. Particular attention is directed toward application of scientific principles to both design and operation of nuclear installations. 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 at Oregon State University offers B.S., M.S., and Ph.D. degrees in nuclear engineering and in radiation health physics. The B.S. in RHP may also be taken as a pre-med 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.

## CURRICULUM

### PRE-NUCLEAR ENGINEERING

**Freshman Year**
NE 111, NE 112✥, NE 113. Intro to Nuc Eng (9)
MTH 251. Differential Calculus (4)✥
MTH 252. Integral Calculus (4)✥
MTH 253. Infinite Series and Sequences (4)✥
CH 201✥, CH 202. Chem for Engr Majors (6)
PH 211. General Physics with Calc (4)✥
WR 121. English Composition (3)✥
COMM 111. Public Speaking or COMM 114. Argument and Critical Discourse (3)[1]✥
Perspectives (6)[1]
HHP 231. Lifetime Fitness (3)[1]
Free electives (2)

**Sophomore Year**
NE 231, NE 232. Nuc and Radiation Physics (6)
NE 233. Nuc Radiation Detection and Instr (3)
MTH 254. Vector Calculus I (4)✥
MTH 256. Applied Differential Equations (4)✥
PH 212, PH 213. Gen Physics with Calculus (8)✥
BI 101 or BI 102 or BI 103. Gen Biology (4)[1]
ENGR 201. Electrical Fundamentals (3)✥
ENGR 211. Statistics and ENGR 212. Dynamics (6)✥
ENGR 213. Strength of Materials (3)
CS 131. Intro FORTRAN Programming (4)
Perspectives (3)[1]
TOTAL (96)

### PROFESSIONAL NUCLEAR ENGINEERING

**Junior Year**
NE 361. Nuclear Reactor Systems (3)
NE 381. Principles of Radiation Safety (3)
NE 414. Nuclear Rules and Regulations (3)[6]
ENGR 311, ENGR 312. Thermodynamics (7)
ENGR 321. Materials Science (3)
ENGR 331, ENGR 332. Momentum, Energy and Mass Transfer (8)
ENGR 390. Engineering Economy (3)
ME 373. Numer Methods in Mech Engr (3)
MTH 482. Math Meth for Engr and Sci (3)
WR 327. Technical Writing (3)[1]
Perspectives (6)[1]
Free Electives (5)

**Senior Year**
NE 407. Nuclear Engineering Sem (3 terms) (3)
NE 444. Nuclear Fuel Cycle (3)[6]
NE 454, NE 455, NE 456. Nuc Reac Anlys (9)
NE 457. Nuclear Reactor Laboratory (3)
NE 467. Nuc Reactor Thermal Hydraulics (4)
NE 471, NE 472. Nuc Power Sys Dsg (6)
NE 484. Applied Radiation Safety (3)[7]
NE 486. Radiation Dosimetry (3)
Perspectives (3)[1]
Synthesis (6)[1]
Electives (restricted) (3)[3]
TOTAL (96)

### NUCLEAR ENGINEERING MINOR

Students not majoring in nuclear engineering or radiation health physics may take a minor in nuclear engineering. A minor in nuclear engineering consists of the following courses:

NE 231, NE 232. Nuc and Radiation Physics (6)
NE 361. Nuclear Reactor Systems (3)
NE 381. Principles of Radiation Safety (3)
NE 454. Nuclear Reactor Analysis (3)
Other NE courses (200 level or higher) (12)
TOTAL (27)

## COURSES

### Lower Division Courses

**NE 111, NE 111, NE 113. INTRODUCTION TO NUCLEAR ENGINEERING (3,3,3).** Introduction to all engineering fields, especially nuclear engineering; 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.

**NE 231, NE 232. NUCLEAR AND RADIATION PHYSICS (3,3).** Nuclear structure; basic nuclear physics; basic quantum mechanics; radioactivity; radioactive decay modes; nuclear reactions; fission and fusion basics; interaction of ionizing radiation with matter; cross sections; effects of radiation on solids. PREREQ: MTH 252. CROSSLISTED as RHP 231, RHP 232. Must be taken in order.

**NE 233. NUCLEAR RADIATION DETECTION AND INSTRUMENTATION (3).** 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. PREREQ: NE 232 or RHP 232. Lec/Lab. CROSSLISTED as RHP 233.

### Upper Division Courses

**NE 319. *SOCIETAL ASPECTS OF NUCLEAR TECHNOLOGY (3).** Description and discussion of nuclear-related issues as they impact society.

**NE 341. NUCLEAR MATERIALS (3).** Material properties of nuclear reactor systems; radiation damage to fuel and structural materials in fission and fusion reactors; radiation embrittlement and swelling; corrosion. PREREQ: ENGR 321. Not offered every year.

**NE 361. NUCLEAR REACTOR SYSTEMS (3).** Design features of existing and proposed nuclear power generation systems. Examination of light water reactor nuclear fuel, core, cooling systems, main steam systems, power generation equipment, process instrumentation, containment, and active and passive engineered safety features. Advanced reactor design concepts.

**NE 381. PRINCIPLES OF RADIATION SAFETY (3).** Principles and theory of radiation protection: regulatory agencies; dose units; sources of radiation; biological effects and risk; dose limits; introduction to external and internal dosimetry; shielding; reactor safety; atmospheric dispersion and reactor accidents. PREREQ: NE 232 or RHP 232. CROSSLISTED as RHP 381.

**NE 401/NE 501. RESEARCH (1-16).** Graded P/N.

**NE 405/NE 505. READING AND CONFERENCE (1-16).**

**NE 406/NE 506. PROJECTS (1-16).**

**NE 407/NE 507. NUCLEAR ENGINEERING SEMINAR (1).** Graded P/N. Lectures on current nuclear engineering topics.

**NE 410/NE 510. INTERNSHIP (1-12).** Graded P/N. Supervised technical work experience at approved organizations. PREREQ: Upper division standing.

**NE 414/NE 514. NUCLEAR RULES AND REGULATIONS (3).** 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. PREREQ: NE 381 or RHP 381. Offered alternate years. CROSSLISTED as RHP 414/RHP 514.

**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. Course may be repeated for credit. PREREQ: Consent of instructor.

**NE 444/NE 544. NUCLEAR FUEL CYCLE (3).** Technical and environmental aspects of the nuclear fuel cycle: mining, milling, conversion, and fuel fabrication; enrichment; fuel reprocessing; radioactive waste management; transport of radioactive material; interim fuel storage techniques. Offered alternate years. CROSSLISTED as RHP 444/RHP 544.

**NE 454/NE 554,NE 455/NE 555,NE 456/NE 556. NUCLEAR REACTOR ANALYSIS (3,3,3).** Theory of nuclear reactors based upon physical models; nuclear physics; steady state and transient reactor behavior; one speed diffusion theory; numerical methods; fast and thermal spectrum calculations; multigroup methods; fuel burnup; fuel management; reactivity control; perturbation theory. PREREQ: CS 131, MTH 256, NE 232. COREQ: ME 373. Must be taken in order.

**NE 457/NE 557,NE 458/NE 558. NUCLEAR REACTOR LABORATORY (3,3).** Experiments using the TRIGA reactor to measure reactor properties and verify nuclear reactor theory; steady state and transient behavior of nuclear reactors, including reactivity effects of control rods and fuel; approach to critical; measurement of neutron flux distributions; nuclear physics experiments; nuclear reactor and process instrumentation; experiments of students' own designs. COREQ: NE 456/556. Lec./lab.

**NE 467/NE 567. 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. PREREQ: ENGR 332.

**NE 471/NE 571, NE 472/NE 572, NE 473/NE 573. NUCLEAR POWER SYSTEMS DESIGN (3,3,3).** 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. PREREQ: NE 454/NE 554, NE 467/NE 567, ENGR 332 for NE 471/NE 571, NE 455/NE 555 for NE 472/NE 572. Must be taken in order.

**NE 479. INDIVIDUAL DESIGN PROJECT (1-4).** Individual project arranged by the student under the supervision of a faculty member. The design project is mutually agreed upon by the student and instructor and may be proposed by either. Number of credits are determined by the faculty member. Specific approval of the instructor is required before enrolling.

**NE 484/NE 584. ^APPLIED RADIATION SAFETY (3).** Application of radiation protection as practiced in the fields of nuclear science and engineering; application of health physics principles to reduce the health hazard at each of the following stages: design, preventative, assessment, and post-incident. PREREQ: NE 233 or RHP 233, NE 381 or RHP 381. Lec/lab. CROSSLISTED as RHP 484/RHP 584. (Writing Intensive Course)

**NE 486/NE 586. RADIATION DOSIMETRY (3).** Further development and more in-depth treatment of radiation dosimetry concepts introduced in NE 381, including the theoretical basis of radiation dosimetry, microdosimetry, external, internal and environmental dosimetry. PREREQ: NE 381 or RHP 381. CROSSLISTED as RHP 486/RHP 586.

**NE 499. SPECIAL TOPICS (1-16).**

### Graduate Courses

**NE 503. THESIS (1-16).**

**NE 526,NE 527. COMPUTATIONAL METHODS FOR NUCLEAR REACTORS (3,3).** Application of digital computers to problems in nuclear engineering. Topics include multigroup diffusion theory, kinetic equations, Monte Carlo methods, Sn, collision probability methods, criteria for selecting methods, and computer programming. Must be taken in order. PREREQ: ME 575. Not offered every year.

**NE 535. NUCLEAR RADIATION SHIELDING (3).** Theoretical principles of shielding for neutron and gamma radiation; applications to problems of practical interest; analytical and computer solutions emphasized. PREREQ: NE 381 or RHP 381, or consent of instructor. Offered alternate years. CROSSLISTED as RHP 535.

**NE 537. APPLICATIONS OF NUCLEAR TECHNIQUES (3).** Description of nuclear-related techniques used for analytical and process measurements; discussion of associated nuclear instrumentation and facilities. PREREQ: NE 233 or RHP 233, or equivalent. Offered alternate years. CROSSLISTED as RHP 537.

**NE 539. SELECTED TOPICS IN INTERACTION OF NUCLEAR RADIATION (1-3).** Topics associated with interactions of nuclear radiation not covered in other graduate courses; topics may vary from year to year. Course may be repeated for credit. PREREQ: Consent of instructor.

**NE 543. RADIOACTIVE WASTE MANAGEMENT (3).** Nuclear Waste Policy Act and Amendments; DOE, NRC, and EPA regulations related to high level radioactive waste; waste characteristics, forms, amounts, packages; geologic repositories and alternate disposal techniques; waste transportation; monitored retrievable storage; defense waste characteristics, amounts, disposal options; disposal plans in other countries. Offered alternate years. CROSSLISTED as RHP 543.

**NE 549. SELECTED TOPICS IN NUCLEAR FUEL CYCLE ANALYSIS (1-3).** Topics associated with the nuclear fuel cycle not covered in other graduate courses; topics may vary from year to year. Course may be repeated for credit. PREREQ: NE 444/NE 544 or RHP 444/RHP 544. CROSSLISTED as RHP 549.

**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. Course may be repeated for credit. PREREQ: NE 456/NE 556.

**NE 568. NUCLEAR REACTOR SAFETY (3).** Probabilistic risk assessment and system reliability analysis techniques applied to nuclear reactor safety. Examination of neutronic and thermal hydraulic transients, effectiveness of emergency systems, accident prevention and mitigation, assessment of radioactive releases to the environment. PREREQ: NE 454/NE 554, NE 467/NE 567. Offered alternate years.

**NE 569. SELECTED TOPICS IN NUCLEAR REACTOR ENGINEERING (1-3).** 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. Course may be repeated for credit.

**NE 585. ENVIRONMENTAL ASPECTS OF NUCLEAR SYSTEMS (3).** Federal and state regulations concerning environmental effects of nuclear power plants and other nuclear installations; development of analytical techniques for calculating quantities and effects of gaseous and liquid radioactive effluents released; effects of thermal discharge; atmospheric dilution and dispersion; cost-benefit studies. Not offered every year. CROSSLISTED as RHP 585.

**NE 599. SPECIAL TOPICS (1-16).**

**NE 601. RESEARCH (1-16).** Graded P/N.

**NE 603. THESIS (1-16).**

**NE 605. READING AND CONFERENCE (1-16).**

**NE 606. PROJECTS (1-16).**

**NE 607. NUCLEAR ENGINEERING SEMINAR (1).** Graded P/N. Lectures on current nuclear engineering topics.

**NE 651. NUCLEAR REACTOR DYNAMICS AND CONTROL (3).** Dynamic behavior of nuclear reactors; point kinetics and space-time kinetics models; feedback effects, stability, transient analysis and control design methods for light water reactor power plant systems. PREREQ: NE 456/NE 556. Not offered every year.

**NE 654. NEUTRON TRANSPORT THEORY (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. PREREQ: NE 456/NE 556. Offered alternate years.

**NE 655/NE 656. ADVANCED PARTICLE PHYSICS FOR REACTOR ANALYSIS (3).** Neutron slowing down and thermalization; fast spectrum calculations; cross section theory; scattering kernels; thermal spectra; and variational theory. PREREQ: NE 456/NE 556. May be taken in any order. Offered alternate years.

**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. PREREQ: NE 467/NE 567. Offered alternate years.

**NE 699. SPECIAL TOPICS (1-16).**

### Upper Division Courses

**NE 808. WORKSHOP (1-4).**

## RADIATION HEALTH PHYSICS

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### Undergraduate Major

**Radiation Health Physics (B.S.)**

### Minor

**Radiation Health Physics**

### Graduate Major

**Radiation Health Physics (M.S. Ph.D.)**

*Graduate Areas of Concentration*

Application of Nuclear Techniques
Boron Neutron Capture Therapy
Emergency Response Planning
Environmental Monitoring
Environmental Pathways Assessment
Nuclear Medicine
Nuclear Rules and Regulations
Radiation Detection Methods
Radiation Dosimetry
Radiation Instrumentation
Radiation Shielding
Radioactive Material Transport
Radioactive Waste Management
Research Reactor Health Physics
Risk Assessment

This specialized program in the Department of Nuclear Engineering is designed for students with professional interest in the field of radiation protection, which is also known as health physics. It involves an integrated study of the physical aspects of ionizing and non-ionizing 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.

Excellent facilities are available for the instructional and research programs at the Radiation Center, including a TRIGA Mark II nuclear reactor. Instruction is integrated with an extensive research program, with opportunities to participate at both the undergraduate and graduate levels.

#### Pre-Med Track

Students in Radiation Health Physics can also pursue a pre-med track in which they fulfill the requirements for the B.S. degree in Radiation Health Physics 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 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.

## CURRICULUM

### PRE-RADIATION HEALTH PHYSICS

#### Freshman Year

NE 111, NE 112, NE 113. Intro to Nuc Eng (9)
Mathematics (4)[1,8]✥
MTH 251. Differential Calculus (4)✥
MTH 252. Integral Calculus (4)✥
CH 121,CH 122,CH 123. General Chemistry (15)✥
CS 101. Computers: Applications and Implications or
CS 131. Intro to FORTRAN Programming (4)
WR 121. English Composition (3)[1]✥
COMM 111. Public Speaking or COMM 114. Argument and Critical Discourse (3)[1+]
Perspectives (3)[1]

#### Sophomore Year

RHP 231, RHP 232. Nuc and Rad Physics (6)
RHP 233. Nuc Radiation Detection and Instr (3)
BI 101, BI 102, BI 103. General Biology (12)[12]
PH 201,PH 202,PH 203. General Physics (15)✥
HHP 231. Lifetime Fitness (3)[1]
Perspectives (9)[1]
TOTAL (97)

### PROFESSIONAL RADIATION HEALTH PHYSICS

#### Junior Year

RHP 381. Prin of Radiation Safety (3)
RHP 414. Nuclear Rules & Regulations (3)[6]
ST 201, ST 202. Principles of Statistics (6) or ST 314. Intro. to Statistics for Engineers plus elective (free)
Z 331, Z 332, Z 333. Human Anatomy & Phys (9)
WR 327. Technical Writing (3)
Perspectives (6)[1]
Synthesis (3)[1]
Electives (restricted) (9)[3]
Electives (free) (6)

#### Senior Year

NE 407. Nuclear Engineering Sem (3 terms) (3)
RHP 444. Nuclear Fuel Cycle (3)[6]
RHP 480. Fld Prac in Rad Protection (3)
RHP 484. Applied Radiation Safety (3)
RHP 486. Radiation Dosimetry (3)
RHP 487. Radiation Biology (3)[6]
H 425. Prin of Epidemiology (3)
Synthesis (3)[1]
Electives (restricted in Health) (9)
Electives (restricted) (6)[3]
Electives (free) (8)
TOTAL (95)

### RADIATION HEALTH PHYSICS (PRE-MED EMPHASIS)

#### Pre-Radiation Health Physics (Pre-Med Emphasis)

#### Freshman Year

NE 111, NE 112, NE 113. Intro to Nuc Eng (9)
Mathematics (4)[1,✥8]
MTH 251. Differential Calculus (4)✥
MTH 252. Integral Calculus (4)✥
CH 221, CH 222, CH 223. Gen Chem (15)✥
CS 101. Computers: Applications and Implications or
CS 131. Intro to FORTRAN Programming (4)
BI 109. Health Professions: Medical (1)
WR 121. English Composition (3)[2]✥
COMM 111 or COMM 114. Public Speaking (3)[2]

#### Sophomore Year

RHP 231, RHP 232. Nuc & Radiation Phys (6)
RHP 233. Nuc Radiation Detection & Instrumentation (3)
BI 211✥, BI 212✥, Bi 213. Intro Biology (12)[12]
CH 219. General Chemistry Lab (2)
PH 201, PH 202, PH 203. Gen Physics (15)✥
HHP 231. Lifetime Fitness for Health (3)[2]
Perspectives (9)[1]
TOTAL (97)

#### Professional Radiation Health Physics (Pre-Med Emphasis)

#### Junior Year

RHP 381. Princ of Radiation Safety (3)
RHP 414. Nuclear Rules & Regulations (3)[6]
CH 334, CH 335, CH 336. Organic Chem (9)
BI 214. Cell and Molecular Biology (3)
BI 311. Genetics (4)
ST 351. Intro to Statistical Methods (4)
Z 331, Z 332, Z 333. Human Anat & Phys (9)
WR 327. Technical Writing (3)[2]
Perspectives (3)[1]
Electives (free)(6)

#### Senior Year

NE 407. Nuclear Engineering Sem (3 terms) (3)
RHP 444. Nuclear Fuel Cycle (3)[6]
RHP 480. Field Practice in Radiation Protection (3)
RHP 484. Applied Radiation Safety (3)[7]
RHP 486. Radiation Dosimetry (3)
RHP 487. Radiation Biology (3)[6]
CH 337. Organic Chem Lab (2)
BB 450, BB 451. General Biochemistry (7)
H 425. Prin of Epidemiology (3)
Synthesis: Contemporary Global Issues (3)[2]
Synthesis: Science, Technology & Society (3)[2]
Perspectives (6)[1]
Free Electives (6)
TOTAL (95)

### RADIATION HEALTH PHYSICS MINOR (30)

Students not majoring in radiation health physics or nuclear engineering may take a minor in radiation health physics. A minor in radiation health physics consists of the following courses:

RHP 231, RHP 232. Nuc and Radiation Physics (6)
RHP 233. Nuc Radiation Detection and Instrumentation (3)
H 425. Principles of Epidemiology (3)
RHP 381. Principles of Radiation Safety (3)
RHP 414. Nuclear Rules and Regulations (3)
RHP 480. Field Practices in Radiation Protection (3)
RHP 484. Applied Radiation Safety (3)
RHP 486. Radiation Dosimetry (3)
RHP 487. Radiation Biology (3)
TOTAL (30)

## COURSES

### Lower Division Courses

**RHP 231,RHP 232. NUCLEAR AND RADIATION PHYSICS (3,3).** Nuclear structure; basic nuclear physics; basic quantum mechanics; radioactivity; radioactive decay modes; nuclear reactions; fission and fusion basics; interaction of ionizing radiation with matter; cross sections; effect of radiation on solids. PREREQ: MTH 252. Must be taken in order. CROSSLISTED as NE 231, NE 232.

**RHP 233. NUCLEAR RADIATION DETECTION AND INSTRUMENTATION (3).** 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. PREREQ: RHP 232 or NE 232. Lec/Lab. CROSSLISTED as NE 233.

### Upper Division Courses

**RHP 381. PRINCIPLES OF RADIATION SAFETY (3).** Principles and theory of radiation protection: regulatory agencies; dose units; sources of radiation; biological effects and risk; dose limits; introduction to external and internal dosimetry; shielding; reactor safety; atmospheric dispersion and reactor accidents. PREREQ: RHP 232 or NE 232. CROSSLISTED as NE 381.

**RHP 401/RHP 501. RESEARCH (1-16).** Graded P/N.

**RHP 405/RHP 505. READING AND CONFERENCE (1-16).**

**RHP 406/RHP 506. PROJECTS (1-16).**

**RHP 410/RHP 510. INTERNSHIP (1-12).** Graded P/N. Supervised technical work experience at approved organizations. PREREQ: Upper division standing.

**RHP 414/RHP 514. NUCLEAR RULES AND REGULATIONS (3).** 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. PREREQ: RHP 381 or NE 381. Offered alternate years. CROSSLISTED as NE 414/NE 514.

**RHP 444/RHP 544. NUCLEAR FUEL CYCLE (3).** Technical and environmental aspects of the nuclear fuel cycle: mining, milling, conversion, and fuel fabrication; enrichment; fuel reprocessing; radioactive waste management; transport of radioactive material; interim fuel storage techniques. Offered alternate years. CROSSLISTED as NE 444/NE 544.

**RHP 479. INDIVIDUAL DESIGN PROJECT (1-4).** Individual project arranged by the student under the supervision of a faculty member. The design project is mutually agreed upon by the student and instructor and may be proposed by either. Number of credits are determined by the faculty member. Specific approval of the instructor is required before enrolling.

**RHP 480/RHP 580. FIELD PRACTICES IN RADIATION PROTECTION (1-3).** Individual participation in the operational functions of the radiation protection program at the OSU Radiation Center. Approval of the instructor is required before enrolling.

**RHP 484/RHP 584. ^APPLIED RADIATION SAFETY (3).** Application of radiation protection as practiced in the fields of nuclear science and engineering; application of health physics principles to reduce the health hazard at each of the following stages: design, preventative, assessment, and post-incident. PREREQ: RHP 233 or NE 233, RHP 381 or NE 381. Lec/lab. CROSSLISTED as NE 484/NE 584. (Writing Intensive Course)

**RHP 486/RHP 586. RADIATION DOSIMETRY (3).** Further development and more in-depth treatment of radiation dosimetry concepts introduced in RHP 381, including the theoretical basis of radiation dosimetry, microdosimetry, external, internal and environmental dosimetry. PREREQ: RHP 381 or NE 381. CROSSLISTED as NE 486/NE 586.

**RHP 487/RHP 587. RADIATION BIOLOGY (3).** Biological effects of ionizing radiation at the molecular, cellular, and organismal levels with emphasis on vertebrates; both acute and chronic radiation effects are considered. Offered alternate years. PREREQ: RHP 381 or NE 381 or senior standing.

**RHP 488/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. PREREQ: RHP 381 or NE 381 or senior standing.

**RHP 491/RHP 591. NON-IONIZING RADIATION PROTECTION (3).** Sources, characteristics, applications, biological effects, exposure limits, detection, measurement and protection as related to lasers, ultraviolet light, ultrasound and magnetic fields. PREREQ: Senior standing. Not offered every year.

**RHP 493/RHP 593. NON-REACTOR RADIATION PROTECTION (3).** Radiation protection principles applied to technologically enhanced natural radiation sources, medical uses of radiation and radioactive materials, educational and research uses of radiation and radioactive materials, industrial applications and accelerators. PREREQ: senior standing. Not offered every year.

**RHP 499. SPECIAL TOPICS (1-16).**

### Graduate Courses

**RHP 503. THESIS (1-16).**

**RHP 535. NUCLEAR RADIATION SHIELDING (3).** Theoretical principles of shielding for neutron and gamma radiation; applications to problems of practical interest; analytical and computer solutions emphasized. PREREQ: RHP 381 or NE 381, or consent of instructor. Offered alternate years. CROSSLISTED as NE 535.

**RHP 537. APPLICATIONS OF NUCLEAR TECHNIQUES (3).** Description of nuclear-related techniques used for analytical and process measurements; discussion of associated nuclear instrumentation and facilities. PREREQ: RHP 233 or NE 233, or equivalent. Offered alternate years. CROSSLISTED as NE 537.

**RHP 539. SELECTED TOPICS IN INTERACTION OF NUCLEAR RADIATION (1-3).** Topics associated with interactions of nuclear radiation not covered in other graduate courses; topics may vary from year to year. Course may be repeated for credit. PREREQ: Consent of instructor.

**RHP 543. RADIOACTIVE WASTE MANAGEMENT (3).** Nuclear Waste Policy Act and Amendments; DOE, NRC, and EPA regulations related to high level radioactive waste; waste characteristics, forms, amounts, packages; geologic repositories and alternate disposal techniques; waste transportation; monitored retrievable storage; defense waste characteristics, amounts, disposal options; disposal plans in other countries. Offered alternate years. CROSSLISTED as NE 543.

**RHP 549. SELECTED TOPICS IN NUCLEAR FUEL CYCLE ANALYSIS (1-3).** Topics associated with the nuclear fuel cycle not covered in other graduate courses; topics may vary from year to year. Course may be repeated for credit. PREREQ: RHP 444/RHP 544 or NE 444/NE 544. CROSSLISTED as NE 549.

**RHP 585. ENVIRONMENTAL ASPECTS OF NUCLEAR SYSTEMS (3).** Federal and state regulations concerning environmental effects of nuclear power plants and other nuclear installations; development of analytical techniques for calculating quantities and effects of gaseous and liquid radioactive effluents released; effects of thermal discharge; atmospheric dilution and dispersion; cost-benefit studies. Not offered every year. CROSSLISTED as NE 585.

**RHP 589. SELECTED TOPICS IN RADIATION PROTECTION (1-3).** Recent advances in radiation protection; greater in-depth study of current radiation protection issues. Topics may vary from year to year. Course may be repeated for credit.

**RHP 599. SPECIAL TOPICS (1-16).**

**RHP 601. RESEARCH (1-16).** Graded P/N.

**RHP 603. THESIS (1-16).**

**RHP 605. READING AND CONFERENCE (1-16).**

**RHP 606. PROJECT (1-16).**

**RHP 607. SEMINAR (1-16).** Graded P/N. Lectures on current radiation health physics topics.

**RHP 610. INTERNSHIP (1-12).** Graded P/N.

**RHP 699. SPECIAL TOPICS (1-16).**

### FOOTNOTES

*Baccalaureate Core Course

^Writing Intensive Course (WIC)

✣Required for entry into the professional program.

☆Licensed professional engineer.

[1]Must be selected to satisfy the requirements of the Baccalaureate Core.

[2]Approved engineering science elective from department list.

[3]Approved technical electives from department list.

[4]Recommended to satisfy core requirement.

[5]Prerequisite for several upper division courses. Recommended for completion prior to entry into the Professional Program.

[6]Taught alternate years.

[7]Writing Intensive course.

[8]MTH 111, MTH 112, MTH 241, MTH 245, MTH 251, MTH 252, MTH 253, MTH 254, MTH 256 approved courses.

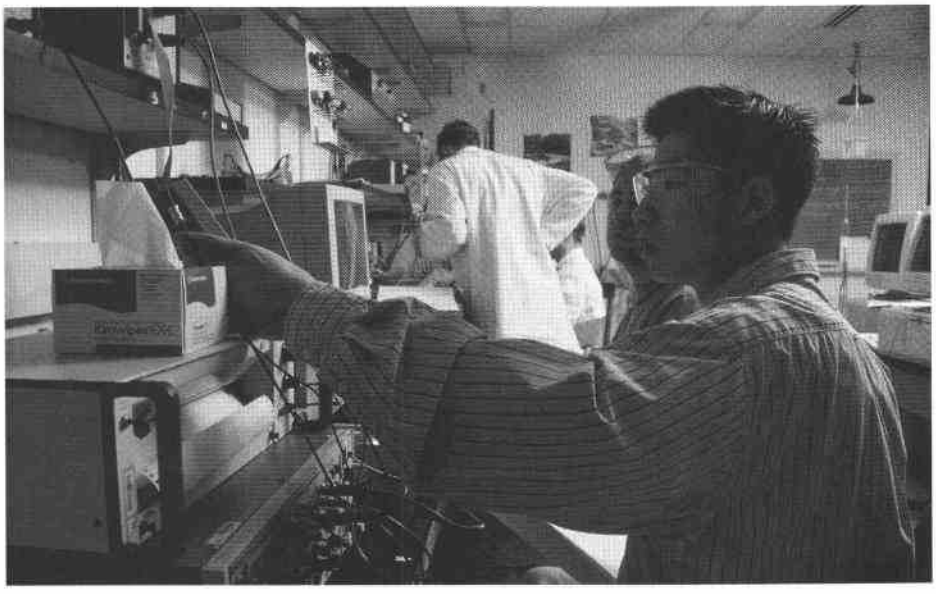
[9]The letter "L" indicates Laboratory for Senior electives.

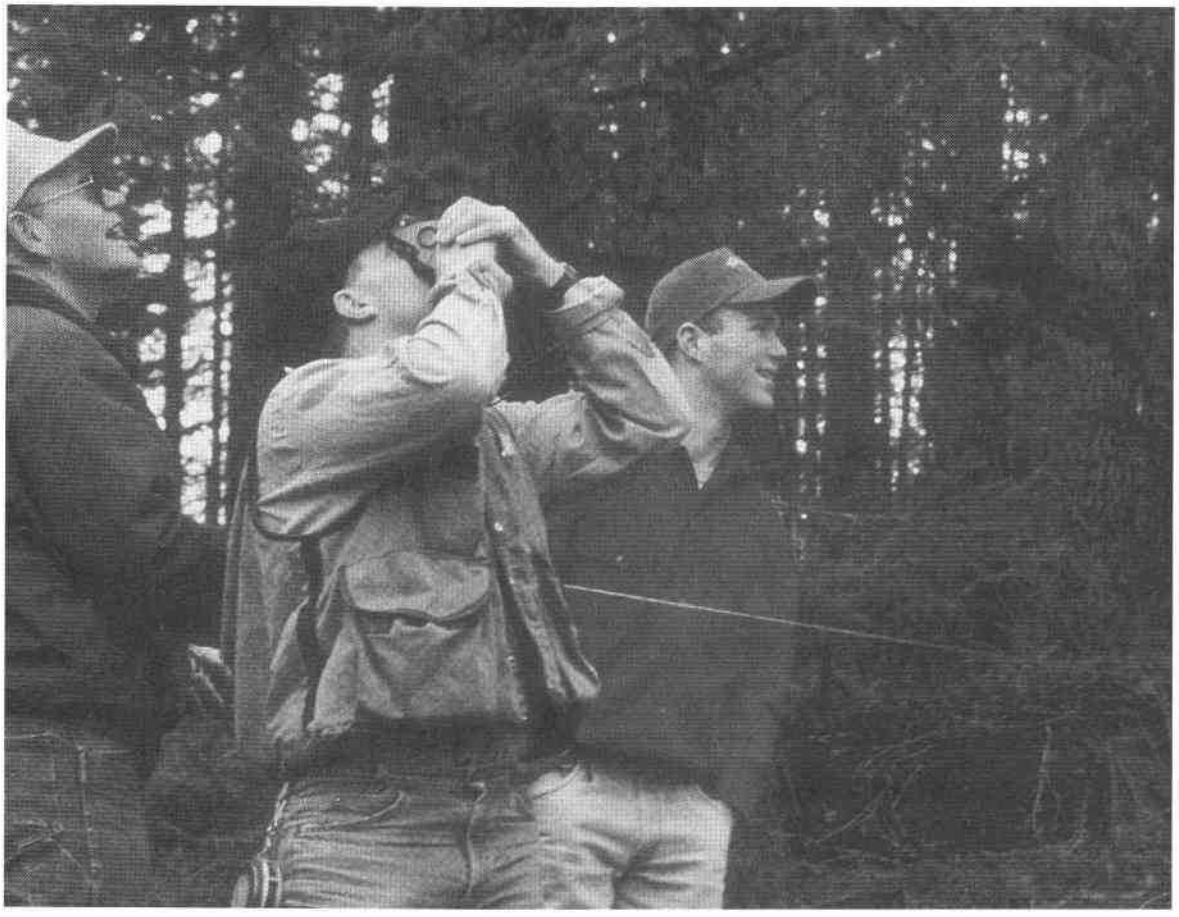
[10]The letter "D" indicates design for Senior electives.

[11]The letter "A" indicates analysis for Senior electives.

[12]Completion of any two of these courses is required for entry into the Professional Program.

[13]Certified Health Physicist.





*Forest ecosystems are important in the cultural base of societies worldwide, providing inspiration and a variety of goods and services. Nowhere are they more important than in Oregon, where forests and forest-related activities dominate the economic and social life of the state.*

The College of Forestry is dedicated to educational programs that produce perceptive, socially-responsible graduates who are capable of wisely managing forests and other natural resources for production and conservation purposes, and of communicating effectively about these activities. It is committed to maintaining relevancy and recognized excellence in undergraduate and graduate education.

The College works with the OSU Career Services Center to provide up-to-date information for both seasonal and permanent work and offers a full array of career services to prepare undergraduates and graduates for jobs.

All undergraduate forestry programs of the College of Forestry are accredited by either the Society of American Foresters or the Society of Wood Science and Technology. Selected M.F. programs in Forest Resources and Silviculture also are accredited by the Society of American Foresters.

## Departments and Degrees

Through three of its departments the College offers the Bachelor of Science (B.S.) degree in forest engineering, forest management, forest products, forest recreation resources, and natural resources. The Department of Forest Science offers graduate programs only (M.F., M.S., M.A.I.S., and Ph.D.). Graduate programs in other departments include the M.F., M.S., M.A.I.S., and Ph.D.

It is possible to complete requirements for more than one option within a department or to earn degrees in two departments if programs are planned carefully. Students may change majors within the College, although this may involve additional time to complete curricular requirements

The College also offers an interdisciplinary degree with several specialization options under the Natural Resources program and forestry specializations within the Environmental Science and Bioresource Research B.S. degrees.

## International Degree

Undergraduates with majors in the College of Forestry can earn a second degree in International Studies. See the Interdisciplinary Studies section of this catalog.

## Minors

The college offers minors in Forest Management, Forest Products and Forest Recreation Resources for students in other majors on campus and participates in the Earth-Information Systems Technology interdisciplinary minor for students in any major.

## High School Preparation

Students planning a major within the College of Forestry should include the following subjects in their high school programs: English, four years; mathematics, four years including trigonometry, and college algebra; chemistry, one year; physics, one year; graphics or mechanical drawing, one semester; computer science, one semester; social science, one year.

## 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.

## Advising

The College of Forestry is committed to helping students succeed. New students meet with a faculty adviser each term during their first year at OSU; thereafter, at least once a year. Faculty advisers are valuable sources of information about program options and choices, mentoring and other special opportunities in line with students' interests. Advising personnel in the Dean's office are also available to help with University rules and regulations, job placement, exchange programs, and referrals to cross-campus programs and services. We encourage students to take an active role in their program planning, and use their time at OSU to develop themselves both academically and professionally.

## Graduation

### Academic Requirements

180 quarter credits of university-level courses, (192 for Forest Engineering and Forest Products, and 245 for FE/CE joint degree program) including:

- Written/Oral communications, 13 credits including a senior writing intensive course
- OSU Core Curriculum, 36 credits
- Completion of an approved departmental curriculum.
- Approved work experience as noted below.

### Professional and Personal Requirements

Those majoring in Forest Management, Forest Engineering, or Forest Products must complete six months of satisfactory employment in an area related to their major. Those majoring in Forest Recreation Resources 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 forestry is highly regarded for its ethical and its academic

Footnotes for this section on page 255.

140 Peavy Hall
Oregon State University
Corvallis, OR
97331-5704
(541) 737-2004

**ADMINISTRATION**

**George W. Brown**
*Dean*

**Bart A. Thielges**
*Associate Dean*
*Research and International*

**A. Scott Reed**
*Associate Dean*
*Extended Education*

**Pam Henderson**
*Head Adviser and College Coordinator*
*Student Services*

standards, students are responsible for observing the honor code of the College in its entirety. Departure from these ethical requirements may be reason for terminating a student.

### EDUCATIONAL FACILITIES

Corvallis is one of the largest forestry research centers in America. Peavy Hall, the OSU forestry building, contains modern classroom, laboratory, and study facilities.

Classes use the nearby College forests for daily field instruction. In addition to these 11,000 acres in the McDonald and Dunn Forests, the College manages other forests in Benton and Columbia counties for education and research.

The college also makes extensive use of various public and private forestry programs and facilities for student benefit. Numerous field trips to forest and wood processing plant operations, recreation facilities, and research areas enable students to observe contemporary problems and practices.

An aggressive 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 facilities offer splendid 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.

### STUDENT ACTIVITIES

Numerous opportunities exist for students to get involved in social and academic forestry activities. 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 many scholarships for well-qualified students. Most are merit-based, and they range in value from $500 to $4,200. One application (forms available from the College) is used for all forestry scholarships, and applicants are selected each spring (deadline early March) for the following academic year.

### EXCHANGES

Residents of Alaska, Colorado, Hawaii Idaho, Montana, Nevada, New Mexico, North Dakota, South Dakota, Utah, and Wyoming are eligible for consideration for a reduction in the normal out-of-state tuition rate for selected programs, some of which are in the College of Forestry. Check a WUE Bulletin or contact the OSU Office of Adminissions at 503-737-4411.

## FOREST ENGINEERING

Steven Tesch, Head
213 Peavy Hall
Oregon State University
Corvallis, OR 97331-5706
(541) 737-4952

**Faculty:**
*Professors* Adams, Beschta, Garland☆, Kellogg, Sessions☆, Tesch; *Associate Professors* Olsen☆, Pyles☆; *Instructors* Bowers, Kiser, Kramer☆Skaugset

**Undergraduate Majors**

**Forest Engineering (B.S.)**
**Forest Engineering-Civil Engineering (B.S.)**

**Graduate Major**

**Forest Engineering (M.F., M.S., Ph.D.)**
*Graduate Areas of Concentration*
Forest Hydrology
Logging Engineering
Silviculture/Harvesting
Timber Harvesting Systems

The Forest Engineering curriculum prepares students to perform a wide range of engineering tasks associated with the management of forest lands. These include designing and constructing roads, bridges, and other structures; developing logging plans and adapting logging systems to achieve quality resource management.

Students are trained to analyze and evaluate engineering systems in order to integrate the mechanical and economic requirements of forest operations with the biological requirements of the forest and the need to protect soil and water resources. The curriculum includes courses in engineering, forest management, watershed management, and operations research. A five-year program is offered in cooperation with the Department of Civil Engineering. A graduate of this program receives a bachelor's degree in both Forest Engineering and Civil Engineering. Students must qualify for the College of Engineering's professional engineering program in order to be eligible for the dual degree. Students from both curricula are eligible to take the Fundamentals of Land Surveying and Fundamentals of Engineering examinations.

Forest Engineering graduates are employed by private forestry firms, public forestry agencies, logging and construction companies, and surveying firms. Some establish their own consulting businesses after a few years of field experience.

### ADVISING

Upon acceptance by the University, a student selecting the Forest Engineering major will be assigned a lower division adviser who will counsel the student during completion of the freshman, sophomore, and junior year programs. During the year, students will be assigned to a senior adviser. Forest Engineering-Civil Engineering majors will be advised by the dual degree adviser.

### CURRICULUM

The Forest Engineering Major (B.S.) is accredited by the Society of American Foresters—In addition to the curricula listed below, 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. Work performance and personal conduct are thoroughly appraised by the College of Forestry.

The Forest Engineering-Civil Engineering Program results in a B.S. in Forest Engineering that is accredited by the Society of America Foresters and a B.S. in Civil Engineering that is accredited by the Accreditation Board for Engineering and Technology. In addition to the curricula listed below, and the six-month employment requirement, students must be admitted to the College of Engineering professional program following completion of the pre-engineering curriculum. (See courses footnoted in the FE-CE program shown below.) For additional information, refer to the College of Engineering section of this catalog.

### FOREST ENGINEERING CURRICULUM

**Freshman Year (47)**
MTH 112. Elementary Functions (4)
MTH 251. Differential Calculus (4)
MTH 252. Integral Calculus (4)
CH 121. General Chemistry (5)
FOR 111. Introduction to Forestry (4)
FOR 220. Aerial Photo/Meas. (4)
FE 210. Intro to Forest Surv (3)
FE 215. Forest Engr Comp (3)
FP 210. Wood Technology (4)
WR 121. English Composition (3)
HHP 231. Lifetime Fitness (3)
ECON 201. Micro-Economics (3)
Western Culture elective (3)

**Sophomore Year (51)**
Math elective (4)
PH 201. General Physics (5)
PH 202. General Physics (5)
Geology elective (4)
ENGR 211. Statics (3)
ENGR 213. Strength of Materials (3)
FE 310. Forest Route Surveying (5)
FOR 141. Tree Identification (3)
STAT 351. Statistics (4)
FOR 240. Forest Biology (4)
FE 311. Advanced Forest Surveying (4)
Writing elective (3)
BA 215. Fundamentals of Accounting (4)

**Junior Year (47)**
FE 370. Harvesting Processes (4)
FE 470. Logging Mechanics (4)
FE 471. Logging Management (4)
FE 430. Watershed Processes (4)
FE 431. Fluid Mech & Hydrology (3)
FE 315. Forest Soil Properties (3)

FE 316. Forest Soil Mechanics (3)
ENGR 212. Dynamics (3)
FOR 321. Mensuration (5)
FE 440. Operations Anaysis (4)
FOR 441. Silviculture Principles (4)
Speech elective (3)
Literature & Arts elective (3)

**Senior Year (47)**
FE 415. Forest Roads (4)
FE 416. Forest Road Structures (4)
FE 441. Production Planning (4)
FE 450. Resource Trans. Planning (3)
FE 451. Harv Area Planning (4)
FE 407. Seminar (1)
FOR 430. Forest Economics (4)
FOR 431. Forest Economics (4)
FOR 354. Amenity Resource Management (3)
FOR 460. Forest Policy (WIC) (4)
Cultural Diversity elective (3)
Diff Power & Discr Elective (3)
Global Issues elective (3)
Science Tech. & Soc elective (3)

## FOREST ENGINEERING/CIVIL ENGINEERING DUAL DEGREE

**Freshman Year (45)**
MTH 251. Differential Calculus (4)✣
MTH 252. Integral Calculus (4)✣
MTH 253. Infinite Series (4)✣
CH 201. General Chemistry (3)✣
CH 202. General Chemistry (3)
PH 211. General Physics (4)✣
CE 101. Intro. to Civil Engr. (3)✣
FE 210. Intro. to Forst Surv (3)
FE 215. Forest Engr Comp (3)✣
FP 210. Wood Technology (4)
FOR 220. Aerial Photo/Meas. (4)
WR 121. English Composition (3)✣
HHP 231. Lifetime Fitness (3)

**Sophomore Year (51)**
MTH 254. Vector Calculus I (4)✣
MTH 256. Differential Equations (4)✣
PH 212. General Physics (4)✣
PH 213. General Physics (4)✣
ENGR 211. Statics (3)✣
ENGR 212. Dynamics (3)✣
ENGR 213. Strength of Materials (3)
ENGR 245. Graphics/CAD (3)✣
ECON 201. Micro-economics (3)
Geology elective (4)
STAT 314. Statistics (3)
FOR 240. Forest Biology (4)
ENGR 201. Electrical Fundamentals (3)✣
WR 327. Tech. Report Writing (3)✣
Speech electives (3)

**Junior Year (56)**
CE 381. Structural Theory I (4)
CE 382. Structural Theory II (4)
CE 383. Design of Steel Structures (4)
CE 311. Fluids Mechanics (4)
CE 312. Fluids Mechanics (4)
CE 313. Hydraulic Engineering (4)
CE 321. Civil Engineering Materials (WIC) (4)
FE 315. Forest Soils Properties (3)
FE 316. Forest Soil Mechanics (3)
FE 310. Forest Route Surveying (5)
CE 322. Civil Engr Materials (3)
ENVE 321. Environmental Engr Fund (4)
CE 392. Intro to Transportation Engr (4)
Western Culture elective (3)
Literature and Arts elective (3)

**Senior Year (55)**
FE 370. Harvesting Processes (4)
FE 470. Logging Mechanics (4)
FE 471. Logging Management (4)
FOR 321. Mensuration (5)
FE 440 Forest Operations Analysis (4)
FOR 441. Silviculture Principles (4)
CE 481. Reinforced Concrete I (3)
CE 491. Highway Engineering (4)
FOR 354. Amenity Resource Management (3)
FOR 460. Forest Policy (4)
FE 311. Advanced Forest Surveying (4)
ENGR 311. Thermodynamics (3)
Diff Pow & Disc elective (3)
Cult Diversity elective (3)
ABET Hum & Soc Sci. Elective (3)

**Fifth Year (47)**
FE 415. Forest Roads (4)
FE 416. Forest Road Structures (4)
FE 441. Production Planning (4)
FE 450. Resource Trans Planning (3)
FE 451. Harvest Area Planning (4)
FE 407. Seminar (1)
FOR 430. Forest Economics (4)
FOR 431. Forest Economics (4)
FE 430. Watershed Processes (4)
CE Design elective (9)
Sci Tech & Soc elective (3)
Global issues elective (3)

✣Required for acceptance in professional engineering program.

## COURSES

### Lower Division Courses

**FE 210. INTRODUCTION TO FOREST SURVEYING (3).** Introductory forest surveying for beginning forestry students or students minoring in forestry. Basic concepts of plane surveying using forestry problems. Emphasis will be low-order surveying using the compass, abney, clinometer, and hand-level. Also includes introduction to the U.S. Public Land Survey System, topography, and mapping. PREREQ: Trigonometry.

**FE 215. FOREST ENGINEERING COMPUTATIONS (3).** Computer programming in BASIC for forestry and engineering majors. Introduction to algorithms for numerical searches, sorting, matrix manipulation, plane area and volume calculations (numeric integration). Introduction to forest engineering applications of stochastic simulation. PREREQ: Trigonometry, calculus (recommended).

### Upper Division Courses

**FE 310. FOREST ROUTE SURVEYING (5).** Route surveying and site surveying applied to forestry problems. Use of surveying equipment; traversing; computations; stadia; leveling; horizontal, vertical, compound, reverse and spiral curves; earthwork; construction staking; and FE 210.

**FE 311. ADVANCED FOREST SURVEYING (4).** Advanced techniques for forest surveying. Directional instruments; electronic distance measurements; field astronomy; State Plane Coordinate Systems; horizontal control, specifications, triangulation and trilateration; U.S. Public Land Survey System; introductory survey law. PREREQ: FE 310. Taught alternate years.

**FE 315. ENGINEERING PROPERTIES OF FOREST SOILS (3).** Physical character of soils, mass-volume relationships, soil classification, capillarity, permeability, compressibility, soil strength theory and testing. Soil compaction, compaction testing, and field compaction control. PREREQ: ENGR 213.

**FE 316. FOREST SOIL MECHANICS (3).** Application of basic principles of engineering mechanics to soil problems; slope stability; lateral earth pressure theory; earth retaining structures. PREREQ: FE 315.

**FE 370. HARVESTING PROCESSES (4).** Timber harvesting methods from the forest to the mill. Technical feasibility and cost relationships in forestry operations. PREREQ: Junior standing in forestry.

**FE 405. READING AND CONFERENCE (1-16).**

**FE 406. PROJECTS (1-16).**

**FE 407. SEMINAR (1-16).**

**FE 415/FE 515. FOREST ROADS (4).** 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. PREREQ: FE 310.

**FE 416/FE 516. FOREST ROAD STRUCTURES (4).** Theory, design, construction, and cost estimating of stream crossing structures, timber bridges, and culverts. PREREQ: FE 415/FE 515, ENGR 211, ENGR 213.

**FE 430/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. PREREQ: Junior standing.

**FE 431/FE 531. FOREST ENGINEERING FLUID MECHANICS AND HYDROLOGY (3).** Fluid properties, pressure, pressure measurement, control volumes, continuity, flow states, energy equation, flow in closed conduits, pipe systems, flow in open channels, culvert hydraulics. The hydrograph, methods for estimating peak flows; rainfall-runoff models, statistical analysis of stream gage records. PREREQ: Junior standing in forest engineering.

**FE 440/FE 540. FOREST OPERATIONS ANALYSIS (4).** Identification and measurement of production components in harvesting systems, heavy equipment operations, and crew type activities. Methods analysis, productivity improvement and engineering economics. Report writing and oral presentation skills emphasized. PREREQ: ST 351, FE 370.

**FE 441/FE 541. PRODUCTION PLANNING (4).** Resource planning using critical path analysis, linear programming, and tactical approaches. Analysis of alter-natives using benefit foregone, intangibles, and regulations. Business planning including bidding, budgeting, scheduling, inventory control, equipment replacement analysis, and fleet maintenance. PREREQ: Junior standing in engineering, business or forestry.

**FE 450/FE 550. RESOURCE TRANSPORTATION PLANNING (3).** The basic elements of transportation planning are developed and applied. Various resource transportation model scenarios are developed. Fixed and variable transportation costs are studied in detail. Computer analysis is rigorously applied. PREREQ: Junior standing.

**FE 451/FE 551. TIMBER HARVEST AREA PLANNING AND ANALYSIS (4).** Integrated timber harvest, logging, and transportation. Plan alternatives are developed and analyzed, computer analysis rigorously applied. Physical and economic feasibility is determined. Current Oregon State Forest Practice Rules are applied. PREREQ: FE 450/FE 550 and FE 471/FE 571.

**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. PREREQ: An introductory course in Biology. CROSSLIST: FOR 456.

**FE 470/FE 570. LOGGING MECHANICS (4).** Relationship of torque, power, and thrust to the operation of cable and ground harvesting systems. PREREQ: FE 370, ENGR 211.

**FE 471/FE 571. LOGGING MANAGEMENT (4).** Practical skills necessary for logging planning; harvest system operations. Advanced instruction on harvest unit layout, operations management, crew supervision, and safe- productive logging practices. PREREQ: FE 470.

**Graduate Courses**

**FE 501. RESEARCH (1-16).**

**FE 503. THESIS (1-16).**

**FE 505. READING AND CONFERENCE (1-16).**

**FE 506. PROJECTS (1-16).**

**FE 507. SEMINAR (1-16).** Subject matter as required by graduate programs.

**FE 532. FOREST HYDROLOGY (3).** Application of hydrologic principles to forest and rangelands, with special emphasis on the influence of land management on the hydrologic cycle in both rain and snow dominated regions. PREREQ: FE 430/FE 530.

**FE 533. FOREST HYDROLOGY LABORATORY (1).** Laboratory application of hydrologic principles to forest and rangelands, with special emphasis on the influence of land management on the hydrologic cycle in both rain and snow dominated regions. COREQ: FE 532.

**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. PREREQ: FE 430/ FE 530.

**FE 536. INTEGRATED FOREST ENGINEERING AND HYDROLOGY (3).** Decision making and evaluation of integrated problems involving Forest Engineering and Forest Hydrology; slope stability; riparian zone management; soil compaction; and road system stabilization, protection, and maintenance. PREREQ: FE 430/FE 530.

**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. PREREQ: FE 215, FE 440/FE 540. REC: FE 541.

**FE 572. ADVANCED LOGGING MECHANICS I (4).** Performance of on-road and off-road logging vehicles including trucks, wheeled and tracked skidders and forwarders. Fundamentals of cable logging system performance. Payload analysis. PREREQ: FE 215, ENGR 211, FE 470/FE 570.

**FE 573. ADVANCED LOGGING MECHANICS II (3).** Influence of design upon performance and interactions between ground vehicles and support surface. Simulation of ground vehicle performance. Properties of wire rope. Load-tension relationships, payload calculation and carriage design for cable logging. Helicopter logging. PREREQ: FE 572.

**FE 601. RESEARCH (1-16).**

**FE 603. THESIS (1-16).**

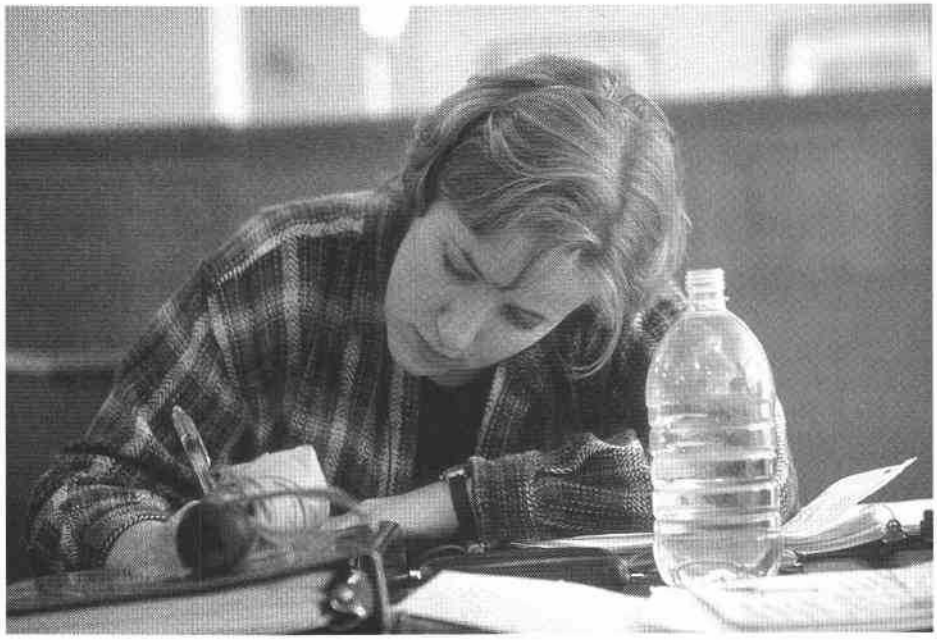
**FE 605. READING AND CONFERENCE (1-16).**

**FE 606. PROJECTS (1-16).**

**FE 607. SEMINAR (1-16).** Subject matter is required by graduate programs.

**FE 630. SPECIAL TOPICS IN FOREST HYDROLOGY (1-3).** Recent advances in various aspects of forest hydrology and watershed behavior and management. Subjects will vary with faculty. May be retaken for credit.

**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.



## FOREST PRODUCTS

Thomas McLain, Head
105 Forest Research Laboratory
Oregon State University
Corvallis, OR 97331-7402
(541) 737-4257

**Faculty**

*Professors* T. Brown, McLain, Wilson; *Associate Professors* Brunner, Funck, Humphrey, Karchesy, Laver, Leichti, Milota☆, Morrell; *Assistant Professors* Gartner, Gupta, Hansen, Reeb, Simonson

**Courtesy Faculty**

*Professor* Suddarth; *Associate Professors* Biermann, Kelley

### Undergraduate Major

**Forest Products (B.S.)**

*Options*

Wood Engineering and Science
Wood Industry Management

*Minor*

Forest Products

### Graduate Major

**Forest Products (M.S., M.F., Ph.D.)**

*Graduate Areas of Concentration*

Pulp and Paper Technology
Computer-Aided Wood Processing
Wood Anatomy and Quality
Timber Engineering
Wood Chemistry
Biodeterioration and Wood Preservation
Wood Physics/Moisture Relations
Materials Science/Wood Composites
Forest Products Marketing

The Department of Forest Products prepares students for a broad range of careers in forest products and associated industries. Graduates use their technical and managerial expertise to insure the efficient and wise use of forest resources by maximizing the production and value of wood products. Because society's demand for wood products is increasing at a time when available domestic resources are tightening, OSU graduates often become innovative leaders in resolving this dilemma. Students in this curriculum receive a combination of science and business with specific education in wood science and technology.

In addition to the core curriculum, students must also complete one of the following depending on their interests: 1) the Wood Industry Management option, 2) the Wood Engineering and Science option, or 3) an approved minor in another field such as Business Administration. Students may also earn concurrent bachelor's degrees in science, engineering or business by taking additional time to complete the requirements.

Students in other majors may minor in Forest Products which helps them apply their own specialty to the forest products industry. Forest Products major and minor students are employed by private industry or public agencies in management, technical services, sales, or marketing positions. Oualified students may pursue advanced degrees.

### CURRICULUM

The following schedule meets the core requirements for the Forest Products B.S. degree with the Wood Industry Management option or the Business Administration minor. Other minors may require some course substitutions. The Wood Engineering

and Science option has different mathematics, physics, statistics, and computer technology requirements as indicated below.

**Freshman Year (48)**
BA 131. Business Productivity Software (2)
CH 121, CH 122, CH 123. General Chemistry (5, 5, 5)
COMM 111. Public Speaking (3) or
COMM 114. Argument and Critical Discourse (3)
FOR 111. Introduction to Forestry (4)
FOR 141. Tree and Shrub Identification (3)
HHP 231. Lifetime Fitness for Health (3)
MTH 112. Elementary functions (4)
MTH 241. Calculus for Management and Social Science (4)
MTH 245. Mathematics for Management, Life, and Social Science (4)
WR 121. English Composition (3)
Option courses/electives (3)

**Sophomore Year (48)**
ECON 201. Introduction to Microeconomics (4)
ECON 202. Introduction to Macroeconomics (4)
FOR 240. Forest Biology (4)
FP 210. Wood Technology & Utilization (4)
FP 211. Wood Properties and Measurements Lab (1)
PH 201, PH 202. General Physics (5, 5)
WR 214. Writing in Business (3) or
WR 327. Technical Writing (3)
Baccalaureate Core Perspectives Courses (6) [Culture Diversity, Western Culture]
Option courses/electives (12)

**Jun~or Year (48)**
BA 275. Quantitative Business Methods (4)
FP 312. Wood and Fiber Anatomy (4)
FP 314. Wood and Fiber Physics (4)
FP 316. Wood and Fiber Chemistry (3)
FP 318. Mechanical Behavior of Wood (4)
FP 441. Primary Wood Processing (4)
Baccalaureate Core Perspective Courses (6) [Literature and the Arts, Difference, Power, & Discrimination]
Baccalaureate Core Synthesis Course (3) [Global Issues]
Option courses/electives (16)

**Senior Year (48)**
FP 407. Seminar (1)
FP 411, FP 412, FP 413. Forest Products Projects (2, 1, 2) [Writing intensive course]
FP 440. Drying and Preservation (3)
FP 442. Composites Manufacturing (4)
FP 445. Chemical Wood Processing and Pollution Control (3)
FP 446. Secondary Wood-Products Manufacturing (3)
FP 460. Wood as a Resource for Housing (3)
Option courses/electives (26)

## OPTIONS

Students are required to: (a) select one of two options or, (b) successfully complete a University recognized and Forest Products Department approved minor such as the Business Administration minor. These alternatives are designed to strengthen the student's preparation and focus in the student's areas of interest. The required courses are listed below for each option.

Students in the Wood Engineering and Science option substitute specific courses in mathematics, physics, statistics, and computer technology for those listed in the sample curriculum and select additional courses to complete a program which complements the Forest Products major. Faculty advisors assist in planning programs to maximize student benefit and interests.

**WOOD INDUSTRY MANAGEMENT OPTION (63)**
**CORE (28)**
BA 131. Business Productivity Software (2)
BA 275 Quantitative Business Methods (4)
MTH 112. Elementary functions (4)
MTH 241. Calculus for Management and Social Science (4)
MTH 245. Mathematics for Management, Life, and Social Science (4)
PH 201, PH 202. General Physics (5, 5)

**Required Courses (35)**
BA 215. Fundamentals of Accounting (4)
BA 230. Business Law (4)
BA 315. Accounting for Decision Making (4)
BA 340. Finance (4)
BA 350. Organizational Systems (4) or
BA 352. Organizational Behavior (4)
BA 357. Operations Management (4)
BA 390. Marketing (4)
FP 452. Process Control in Forest Products Industry (4)
FP 453. Forest Products Merchandizing (3)

**WOOD ENGINEERING AND SCIENCE OPTION (65)**
**CORE (27)**
FOR 112. Introduction to Computer Applications in Forestry (3) or Equivalent
MTH 112. Elementary functions (4)
MTH 251. Differential Calculus (4)
MTH 252. Integral Calculus (4)
PH 211, PH 212. General Physics with Calculus (4, 4)
ST 351. Introduction to Statistical Methods I (4)

**Required Courses (38)**
CH 219. General Chemistry Lab (2)
PH 203. General Physics (5)
ST 352. Introduction to Statistical Methods II (4)
Selection from a suite of courses in science and/or engineering (27).

## MINOR (27-28)

**CORE (9)**
FOR 111. Introduction to Forestry (4)
FP 210. Wood Technology & Utilization (4)
FP 211. Wood Properties and Measurement Laboratory (1)

*Select 3 of the following courses (10-12)*
FP 312. Wood & Fiber Anatomy (4)
FP 314. Wood & Fiber Physics (4)
FP 316. Wood & Fiber Chemistry (3)
FP 318. Mechanical Behavior of Wood (4)
FP 441. Primary Wood Processing (4)
FP 442. Composites Manufacturing (4)
FP 446. Secondary Wood Products Manufacturing (3)

*Select from the following courses or any not taken from those listed above (6-8) to reach 27 credits minimum.*
FP 407. Forest Products Seminar (1)
FP 440. Wood Drying & Preservation (3)
FP 445. Chemical Wood Processing & Pollution Control (3)
FP 452. Process Control in the Forest Products Industry (4)
FP 453. Forest Products Merchandising (3)
FP 460. Wood as a Resource for Housing (3)

## COURSES

**Lower Division Courses**

**FP 210. WOOD TECHNOLOGY AND UTILIZATION (4).** Characteristics and uses of wood and fiber products; manufacturing processes; effect of tree growth and harvesting on forest products manufacturing and properties. Wood identification.

**FP 211. WOOD PROPERTIES AND MEASUREMENTS LABORATORY (1).** Measurement of basic wood properties; measurement and grades of wood raw materials and products.

**Upper Division Courses**

**FP 312. WOOD AND FIBER ANATOMY (4).** Minute anatomy and variability of wood species; natural characteristics and deterioration; density, cell wall properties, and wood and fiber surfaces. PREREQ: FP 210.

**FP 314. WOOD AND FIBER PHYSICS (4).** Hygroscopic nature of the wood fiber and solid wood; wood-fluid relationships; steady-state flow processes; electrical, thermal, and sonic properties of wood and wood-based composite materials. PREREQ: PH 202; calculus.

**FP 316. WOOD AND FIBER CHEMISTRY (3).** Lignin, polysaccharides, and extractives of wood and bark; distribution, isolation, structure, and relationships with anatomy, properties and uses. PREREQ: One year of general chemistry.

**FP 318. MECHANICAL BEHAVIOR OF WOOD (4).** Statics and strength of materials emphasizing wood and wood-based composites; introduction to elasticity; mechanical properties of wood; introduction to wood design. PREREQ: PH 201.

**FP 401. RESEARCH (1-16).**

**FP 405. READING AND CONFERENCE (1-16).**

**FP 406. PROJECT (1-16).**

**FP 407. SEMINAR (1).**

**FP 411,FP 412,FP 413. ^FOREST PRODUCTS PROJECTS I, II, III (2,2,2).** Capstone course in which students plan, execute, and report a research-type project of their own choice related to the field of forest products. FP 411: Project selection and planning, culminating in a written work plan. PREREQ: FP 312, FP 314, FP 316, FP 318. FP 412: Project is executed according to the work plan developed in FP 411. PREREQ: FP 411. FP 413: Findings are analyzed and presented in a written report and an oral presentation. PREREQ: FP 412. (Writing Intensive Course)

**FP 440/FP 540. WOOD DRYING AND PRESERVATION (3).** Drying wood, including lumber, veneer, and particles. Moisture-related problems of wood during processing and in-service. Wood-destroying organisms; extending the life of wood using preservatives. PREREQ/COREQ: FP 314 or equivalent. Lec/lab.

**FP 441/FP 541. PRIMARY WOOD PROCESSING (4).** Mechanical breakdown of lumber, veneer, and chips from a processing perspective; mill/plant layout; quality and process control application. Field trips. PREREQ: FP 210; FP 440.

**FP 442/FP 542. COMPOSITES MANUFACTURING (4).** Composites, wood adhesive and adhesion processes and plant layouts; laminated and panel products; quality control, recovery and grades. Field trips. PREREQ: FP 210.

**FP 443/FP 543. PULP & PAPER MANUFACTURING I (4).** Chemistry and technology of fundamental processes of the pulp and paper industry including pulping, bleaching, refining, sheet forming, filling, sizing, coloring, and coating. Paper testing and relationship of fiber properties. Field trips. PREREQ: FP 316 or equivalent.

**FP 444/FP 544. PULP AND PAPER MANUFACTURING II (4).** Topics include unit process in pulp and paper; high polymer technology in pulp and paper; optical behavior of paper; colloidal properties of fibers and additives; paper machinery variables; paper specialties; air and water pollution problems. PREREQ: FP 443/FP 543.

**FP 445/FP 545. CHEMICAL WOOD PROCESSING AND POLLUTION CONTROL (3).** Survey of the chemical processing of wood with emphasis on its environmental impact. Topics include treating of wood to resist decay, pulping and papermaking, and adhesives used in wood composites. PREREQ: FP 316 or equivalent. Lec/lab.

**FP 446/FP 546. SECONDARY WOOD-PRODUCT MANUFACTURING (3).** Application of machining, assembling, and finishing techniques to wood-based products to increase their value; the use of computers for design and process planning; environmental considerations in secondary processing. PREREQ: FP 210.

**FP 452/FP 552. PROCESS CONTROL IN THE FOREST PRODUCTS INDUSTRY (4).** Use of sensing devices, analysis methods, and hardware to control variables found in typical wood products processes. PREREQ: FP 314, FP 441, FP 442 or FP 443, ST 351 or BA 275.

**FP 453/FP 553. FOREST PRODUCTS MERCHANDISING (3).** Sale and distribution of forest products by manufacturers, wholesalers, and retailers. Roles of trade associations and price reporting services in relation to marketing activities of companies. International trade in forest products. Trade practices and customs, described by speakers from industry. PREREQ: FP 210.

**FP 460. *WOOD AS A RESOURCE FOR HOUSING (3).** The role of wood as a renewable resource in construction of residential and commercial buildings; covering all aspects of its selection and use in planning, purchasing, construction, and maintenance. With a focus on the consequence of material selection upon, cost, performance, environment, and society. (Bacc Core Course)

**FP 499/FP 599. CURRENT TOPICS IN RECYCLING (1).** Guest lecturers from industry, academia, and government present the latest information on problems and opportunitiesin recycling paper, plastics, glass, metals, and wood.

**Graduate Courses**

**FP 501. RESEARCH (1-16).**

**FP 503. THESIS (1-16).**

**FP 505. READING AND CONFERENCE (1-16).**

**FP 506. PROJECTS (1-16).**

**FP 507. SEMINAR (1).** Section 1: Beginning Seminar; Section 2: Seminar.

**FP 511. ADVANCED WOOD SCIENCE AND TECHNOLOGY (4).** Formation and properties of wood, including its chemistry, anatomy and physics; essential concepts of wood processing; the wood resource globally, including environmental, cultural and economic issues. PREREQ: Graduate standing.

**FP 512. WOOD AND FIBER ANATOMY (4).** Development, structure, and function of cells and tissues in woody plants; cell types and distribution; cell wall ultrastructure and modifications; effect of anatomy on properties and uses; research techniques. PREREQ: FP 312.

**FP 514. WOOD AND FIBER PHYSICS (4).** Wood and fiber composites in terms of their physical behavior in heat, mass, and charge transport; dielectric theories, wood-fluid interactions; application to industrial processes; research techniques. PREREQ: FP 314, PH 202, MTH 252.

**FP 516. WOOD AND FIBER CHEMISTRY (4).** Chemistry of wood polysaccharides, lignin, polyphenolics, and other extractives; present and potential utilization; analytical procedures specific to chemical constituents of wood and bark. PREREQ: One year of organic chemistry.

**FP 518. WOOD AND FIBER MECHANICS (4).** Strength and orthotropic elasticity of solid-wood, paper, and reconstituted wood-based systems; nonlinear behavior; deformation and load-transfer mechanisms; mechanical and stochastic modeling; design considerations. PREREQ: FP 318, MTH 252.

**FP 535. MARKET STRUCTURE AND PRICES IN FORESTRY (3).** Applied forecasting and price analysis as they apply to the forest products industries. Industry structure, conduct, and performance; demand and supply factors and unique pricing strategies; lumber futures; and industry trends. CROSSLISTED as FOR 535.

**FP 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. CROSSLISTED as FOR 561.

**FP 601. RESEARCH (1-16).**

**FP 603. THESIS (1-16).**

**FP 605. READING AND CONFERENCE (1-16).**

**FP 606. PROJECTS (1-16).**

**FP 607. SEMINAR (1).** Section 11: Thesis Seminar

**FP 611. SELECTED TOPICS IN WOOD AND FIBER SCIENCE (1-3).** May be taken more than once.

## FOREST RESOURCES

John Walstad, Head
280 Peavy Hall
Oregon State University
Corvallis, OR 97331-5703
(541) 737-4951

**Faculty**

*Professors* Adams, Bliss, Boyle, Brodie, Fletcher, Hann, N. Johnson, Landgren, S. Reed, Shelby, Tappeiner, Walstad; *Associate Professors* Carson, Cloughesy, Daniels, Duddles, Elwood, Fitzgerald, Jackson, Jensen, R. Johnson, Ripple; *Assistant Professors* Kavanagh, Maguire, Marshall, Montgomery, Schrader, Shindler, Tynon; *Instructors* Clements, M. Reed

**Adjunct Faculty**

*Professors* Kimerling, Lavender, Lunch, Sessions, Tesch; *Associate Professors* Walker; *Professional* Buzzard

**Courtesy Faculty**

*Professors* Achterman, Beuter, Buckman, Curtis, Haynes, Merriam, Philpot, Stankey, Starkey, Winjum; *Associate Professors* Alig, Brooks, Larson, Peterson; *Assistant Professor* Alexander, Walters

### Undergraduate Majors

**Forest Management (B.S.)**

*Options*

Earth Information Science and Technology
Forest Biology
Forest Harvesting
Forest Recreation Resources
Forest Soils
Philosophy
Public Administration
Range Management
Statistics
Wildlife

**Forest Recreation Resources (B.S.)**

*Options*

Cultural Resource Management
Earth Information Science and Technology
Environmental Resource Interpretation
Forest Resources
Landscape Design
Law Enforcement
Public Administration
Resource Planning
Tourism

### Undergraduate Minors

Forest Management
Forest Recreation Resources

### Graduate Major

**Forest Resources (M.F., M.S., Ph.D.)**

*Graduate Areas of Concentration*

Community and Resource Development
Forest Biometrics
Forest Economics
Forest Management
Forest Management Science/Operations Research
Forest Modeling
Forest Planning Administration
Forest Policy
Forest Recreation
Forest Social Science
Forestry
Land Use Planning
Natural Resource Education and Extension
Remote Sensing and GIS
Silviculture
Soils

The Forest Resources Department provides broad-based education for those interested in natural resource systems and how to manage them. Two undergraduate degree options are offered: Forest Management, which emphasizes the understanding and management of forest resources for multiple uses, and Forest Recreation Resources, which prepares managers of recreational opportunities in forests and other natural resource areas.

Several forestry specialization areas are also offered under the Natural Resources Interdisciplinary Degree program.

### FOREST MANAGEMENT CURRICULUM

The successful forest manager must understand the biological and physical processes of the forest and the social and economic forces that influence policies and actions affecting forests. The Forest Management core curriculum includes basic courses in the biological, physical, and social sciences, as well as professional courses designed to prepare students to manage forest resources. Strength in a related field can be obtained by selecting a listed option or minor in a field such as

business administration, forest biology, forest harvesting, forest products, soils, philosophy, public administration, range management, recreation management, statistics, or wildlife.

## Minor in Forest Management (32)

Students majoring in other programs at OSU may elect a minor in Forest Management. This program provides basic knowledge about management of forest resources.

## Forest Recreation Resources Curriculum

Managers of wildland recreation resources must blend an understanding of social and biological sciences and management necessary to provide desired recreation opportunities. Thus, the Forest Recreation Resources curriculum includes the study of natural resources, recreational users of these resources, and recreational opportunities. Students must complete an approved option which will strengthen their ability to perform recreation planning and management with private and public organizations.

## Minor in Forest Recreation Resources (27)

Students majoring in other programs at OSU may elect a minor in Forest Recreation Resources. This program provides basic knowledge about recreation resource planning and management.

## Graduates

Graduates in Forest Management and Forest Recreation Resources find employment with a variety of governmental and private organizations. They work as analysts, managers, forestry and recreation consultants, suppliers of forestry services, guides, outfitters, concessionaires, managers of resort properties and recreation managers for federal, state, and local government agencies.

The Forest Management and Forest Recreation Resources undergraduate curricula and the M.F. in Forest Resources are accredited by the Society of American Foresters.

## Forest Management Curriculum

### Freshman Year (45)

BI 211, BI 212, BI 213. Principles of Biology (12)
CH 121, CH 122, CH 130. General Chemistry (14)
FE 210. Intro to Forest Surveying (3)
FOR 111. Introduction to Forestry (4)
FOR 112. Forestry Computer Applications (3)
FOR 241. Dendrology (5)
MTH 245. Math for Mgmt Life & Social Sci (4)

### Sophomore Year (47)

COMM 111 or COMM 114. Speech Communication (3)
ECON 201, ECON 202. Principles of Economics (4,4)
FOR 220. Aerial Photo Interp & Forest Measurments (4)
FOR 251. Recreation Resource Mgmt (4)
FP 210. Wood Technology & Utilization (4)
GEO 265. Geographic Information System (GIS) Practicum (3)
HHP 231. Lifetime Fitness for Health (3)
MTH 241. Calculus for Mgmt & Social Sci (4)
ST 351, ST 352. Intro to Stat Methods (4,4)
Writing I, II (6)

### Junior Year (46)

BOT 415/ENT 415. Forest Insect & Disease Mgmt (5)
CSS 305. Principles of Soil Science (5)
FOR 321. Forest Mensuration (5)
FOR 322. Forest Models (3)
*FOR 341. Forest Ecology (4)
*FOR 355. Mgmt for Multiple Resource Values (4)
FOR 365. Issues in Natural Resource Conserv (3)
*FOR 406-004. Integrated Project (1)
FOR 430. Forest Resource Economics I (4)
FOR 431. Forest Resource Economics II (4)
*FOR 442. Silviculture: Reforestation (4)
*FOR 443. Silvicultural Practices (4)
*Corequisites junior year spring term

### Senior Year (42)

FE 370. Harvesting Processes (4)
FE 430. Watershed Processes (4)
FOR 407. Seminar (1) or FOR 406 Starker Lecture
FOR 457. Techniques for Forest Res Analysis (4)
FOR 459. Forest Res. Planning & Decision Making (4)
FOR 460. Forest Policy (WIC) (4)
FS 453. Managed Forest and Wildlife Interactions (3)
BCC Perspectives (6)
BCC Perspectives (6)
BCC Science, Technology and Society (3)
Electives (3)

## Options (FM)

Options are not required in forest management, but are offered as ways to complement the core curriculum. Students may also enhance their major by addition of any minor offered at osu, such as business

administration earth information science and technology, or forest products.

Note that courses required for an option or minor are in addition to those required for the major. Some may require prerequisites not included in the core curriculum.

**EARTH INFORMATION SCIENCE AND TECHNOLOGY (21)**
Forest Management majors must take the five required core courses, plus two advanced courses from the list found in the Interdisciplinary Studies section of this catalog. The two advanced courses are selected in consultation with a departmental faculty adviser so as to best meet the student's professional interests.

**FOREST BIOLOGY OPTION (22)**
BOT 221. Introduction to Plant Systematics (4)
CSS 435. Soil Ecosystem Properties (4)
FS 444. Forest Genetics (4)

**Science Electives for Forest Biology Option:**
Plus a minimum of 10 hours in two or more of the following scientific areas:

**Biometry**
ST 431. Sampling Methods (3)
ST 411, ST 412, ST 413. Methods of Data Analysis (12)

**Botany**
BOT 412. Morphology of Vascular Plants (4)
BOT 433. Hormonal Reg of Plant Growth (3)

**Chemistry**
CH 440, CH 441, CH 442. Physical Chem (9)

**Entomology**
ENT 442. Princ of Insect Pest Management (3)
ENT 486. Biological Control (3)
FS 450. Integrated Forest Protection (4)

**General Biology**
BB 350. Elementary Biochemistry (4)

**Soils**
CSS 315. Nutrient Management and Cycling (4)
CSS 435. Soil Ecosystem Properties (4)
CSS 485. Environmental Appl of Soil Sci (4)

**FOREST HARVESTING OPTION (23)**
ENGR 211. Statics (3)
ENGR 213. Strengths of Materials (3)
FE 310. Forest Route Surveying (5)
FE 440. Operations Analysis (4)
FE 441. Production Planning (4)
FE 471. Logging Management (4)

**FOREST RECREATION RESOURCES OPTION (24-26)**
FOR 251. Recreation Resource Management (4)
FOR 351. Rec Behav and Mgmt (4)
FOR 356. Recreation Resource Planning (5)
FOR 391. Natural Resource Comm (3)
FOR 432. Econ of Recreation Resources (4)
*Select four credits from:*
FOR 352. Wilderness Management (3)
FOR 453. Nature Based Tourism (3)
FOR 451. Hist & Cult Asp of Rec (4)
FOR 493. Environmental Interpretation (4)
FOR 495. Interpretive Project (2)

**FOREST SOILS OPTION (23)**
GEO 202. Geol of the Surface of the Earth (4)
MB 448. Microbial Ecology (3)
CSS 315. Nutrient Management and Cycling (4)
CSS 435. Soil Ecosystem Properties and Processes (4)

CSS 445. Geochemistry of Soil Ecosystems (4)
CSS 466. Soil Morphology and Classification (4)

**PHILOSOPHY OPTION (26)**
PHL 201. Introduction to Philosophy (4)
PHL 205. Ethics (4)
PHL 301, PHL 302, PHL 303. Hist of West Philosophy (12)
PHL 365. Law in Phil Perspective (4) or PHL 470. Philosophy of Science (3)
PHL 342. Contemporary Ethics (4) or PHL 440. Environmental Ethics (3)

**PUBLIC ADMINISTRATION OPTION (26)**
ECON 435. The Public Economy (4)
PS 472, PS 473. Public Administration (8)
PS 474. Bureaucratic Politics (4)
PS 475. Environmental Politics and Policy (4)
Political Science electives (6)

**RANGE MANAGEMENT OPTION (26)**
ANS 121. Intro Animal Sci (4)
ANS 436. Sheep Production Systems (4) or
ANS 443. Beef Production Systems (4)
BOT 221. Introduction to Plant Systematics (4)
FW 251. Princ of Wildlife Conserv (3)
RNG 347. Arid Land Biomes (3)
RNG 348. Arid Land Plants (2)
RNG 350. Grassland Ecosystems (3)
RNG 477. Agroforestry (3)

**STATISTICS OPTION (30)**
MTH 251. Differential Calculus (4)
MTH 252. Integral Calculus (4)
MTH 253. Infinite Series and Seq (4)
MTH 254. Vector Calculus I (4)
ST 421, ST 422. Intro to Math Stat (8)
ST 431. Sampling Methods (3)
ST 448. Operations Research Methods (3)

**WILDLIFE OPTION (24)**
BOT 221. Introduction to plant systematics (4)
FW 251. Prin of Wildlife Conserv (3)
FW 317. Biology of Mammals (3)
FW 311. Biology of Birds (4)
FW 321. Fish & Wildlife Resource Ecology (3)
FW 458. Management of Big Game Animals (4)
FW 481. Wildlife Ecology (3)

## MINOR IN FOREST MANAGEMENT (32)

(Not for students in Forest Engineering, Forest Management, and Forest Recreation Resources)

**Core**
FOR 111. Intro to Forestry (4)
FOR 141. Tree and Shrub Identification (3)
FOR 220. Arrial Photo Interpretation and Forest Measurements (4)
FOR 240. Forest Biology (4) OR
FOR 341. Forest Ecology (4)
FOR 365. Issues in Natural Resource Conservation (3)
FOR 441. Silviculture Principles (4)
FOR 430. Forest Resource Economics I (4)

**Select a minimum of 6 credits from:**
FOR 251, FOR 321, FOR 351, FOR 352, FOR 354, FOR 390, FOR 391, FOR 431, FOR 432, FOR 439, FOR 444, FOR 457, FOR 460, FE 370, FE 430, FP 210, FS 444, FS 450, FS 453

## FOREST RECREATION RESOURCES CURRICULUM

**Freshman Year (45)**
ECON 201. Principles of Economics (4)
FOR 111. Introduction to Forestry (4)
FOR 112. Forestry Computer Applications (3)
OR 251. Recreation Resource Management (4)
FW 251. Principles of Wildlife Conserv (3)
MTH 245. Math for Mgmt, Life, & Social Science (4)
GEO 265. Geographic Information Systems (GIS) Practicum (3)
Writing I, II (6)
HHP 231. Lifetime Fitness for Health (3)
Electives/option/minor (6)
BCC Perspectives (5)

**Sophomore Year (45)**
FOR 220. Aerial Photo Interp. & Forest Measurements (4)
FOR 240. Forest Biology (4)
FOR 241. Dendrology (5)
RNG 341. Rangeland Resources (3)
ST 351. Intro to Statistical Methods (4)
COMM 111 or COMM 114. Speech Communication (3)
BCC Perspectives (15)
BCC Science, Technology & Society (3)
Electives/option/minor (4)

**Junior Year (45)**
FOR 323. Recreation Research Methods (3)
FOR 351. Recreation Behavior and Management (4)
FOR 352. Wilderness Management (3)
FOR 353. Field School (3)
FOR 356. Recreation Resource Planning (5)
FOR 365. Issues in Natural Resource Conservation (3)
FOR 391. Natural Resource Communication (3)
FOR 407-20. Seminar: Career Development (1)
FOR 410. Forest Recreation Internship (8)
FOR 441. Silviculture Principles (4)
FOR 444. Ecological Aspects of Park Management (3)
Electives/option/minor (5)

**Senior Year (45)**
FOR 430. Forest Resource Economics I (4)
FOR 432. Economics of Recreaton Resources (4)
FOR 451. History and Cultural Aspects of Rec (4)
FOR 457. Techniques or Forest Resource Analysis (4)
FOR 459. For Resource Planning & Decision Making (4)
FOR 460. Forest Policy (WIC) (4)
FS 453. Managed Forest and Wildlife Interactions (3)
Electives/option/minor (18)

## OPTIONS/MINORS

Completion of an approved option or minor is REQUIRED for the Forest recreation Resources degree. Declaration 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 minor must be approved by a faculty adviser. Currently approved minors include business administration, earth information science and technology, range resources, resource economics, fisheries and wildlife, philosophy, and sociology

The following options are for students majoring in Forest Recreation Resources only. In addition to the options listed below, students may work with a faculty adviser to develop an individualized option.

**CULTURAL RESOURCE MANAGEMENT OPTION (33)**
ANTH 330. Evolution of People, Technology and Society (3)
ANTH 110. Intro to Cultural Anth (3)
ANTH 431. Archaeological Theory (3)
ANTH 435. Cultural Resources: Policies and Procedures (3)
HST 420. Historiography (4)
*Plus a minimum of 9 credits from each of these two groups:*

**Anthropology**
ANTH 230. Time Travelers (3)
ANTH 380. Cultures in Conflict (3)
ANTH 411. World Cult: North America (4)
ANTH 432. Arch of Domest and Urban (3)
ANTH 433. First Americans, Last Front (3)
ANTH 436. Northwest Prehistory (3)
ANTH 472. Contemporary Indian Issues (3)
ANTH 481. Natural Resources and Community Values (3)

**History**
HST 366, HST 367. Hist of Amer Indians (3,3)
HST 460, HSTS 461, HSTS 462. American Thought and Culture (3,3,3)
HST 467, HST 468. Hist of the Amer West (3,3)
HST 469. History of the Pacific Northwest (3)
HST 481. Environ History of the U.S. (3)
HSTS 418. Science & Society (3)
HSTS 421. Technology and Change (3)

**EARTH INFORMATION SCIENCE AND TECHNOLOGY (EIST)**

Forest Recreation Resources majors must take the five required core courses, plus two advanced courses from the list found in the Interdisciplinary Studies section of this catalog. The two advanced courses are selected in consultation with a departmental faculty adviser so as to best meet the student's professional interests.

**ENVIRONMENTAL RESOURCE INTERPRETATION OPTION (30)**
ANTH 330. Evolution of People, Technology and Society (3)
ANTH 110. Intro to Cult Anth (3)
ED 463. Environmental Education (3)
FOR 390. Forestry for Teachers (3)
FOR 493. Environmental Interpretation (4)
FOR 495. Interpretive Projects (2)
*Select a minimum of 6 credits from each group:*

**Natural History**
BI 301. Human Impact/Ecosystems (3)
ENT 350. Biology of Insects (4)
FW 311. Biology of Birds (4)
GEO 202. Geology of Surface of Earth (4)
GEO 305. Geology of Volcanic Cascades (3)
Z 371, Z 372. Vertebrate Biology (3,2)
Z 473. Herpetology (4)

**Cultural Resources**
ANTH 230. Time Travelers (3)
ANTH 431. Archaeological Theory (3)
ANTH 433. First Americans, Last Front (3)
HST 366, HST 367. Hist of Amer Indians (3,3)
HST 467, HST 468. Hist of the American West (3,3)
HST 469. History of the Pacific Northwest (3)

**FOREST RESOURCES OPTION (27)**
FE 210. Intro. to Forest Surveying (3)
FE 430. Watershed Processes (4)
FOR 321. Forest Mensuration (5)
FOR 431. Forest Resource Economis II (4)
FOR 442. Silviculture: Reforestation (4)
*Select 7 credits from the following:*
BOT 415. Forest Insect and Disease Mgmt (5)
FOR 439. Industrial Forestry (3)
FOR 443. Silvicultural Practices (4)

**LANDSCAPE DESIGN OPTION (25)**
HORT 112. Intro to Turf and Landscape Mgmt (2)
HORT 226, HORT 227. Landscape Plant Materials (3,3)
HORT 280. Landscape Design Theory (3)
HORT 281. Landscape Design Studio (3)
HORT 301. Principles of Horticultural Technology (4)
HORT 315. Prin and Pract of Landsc Maint (4)
HORT 358. Landscape Construction: Site Measurement and Project Layout (3)

**LAW ENFORCEMENT OPTION (25)**

COMM 440. Theories of Conflict and Conflict Mgmt (3)
PHL 205. Ethics (4)
SOC 340. Dev Behav and Soc Control (3)
SOC 440. Juvenile Delinquency (3)
SOC 441. Criminology and Penology (3)
SOC 448. Law and Society (3)
*Select 6 credits from:*
SOC 324. Groups and Organizations (3)
SOC 421. Social Change and Modernization (3)
SOC 424. Social Psychology (3)
SOC 426. Social Inequality (3)
SOC 437. Minority Groups and Issues (3)
SOC 470. Collect Behav and Soc Mvmts (3)

Attendance at a law enforcement training school such as the Santa Rosa (California) Training Center (NPS oriented) or Skagit Valley College (Washington) (State Park oriented) is required for one term. Students are advised to apply to the Oregon State Police cadet program to gain work experience

**PUBLIC ADMINISTRATION OPTION (27-28)**

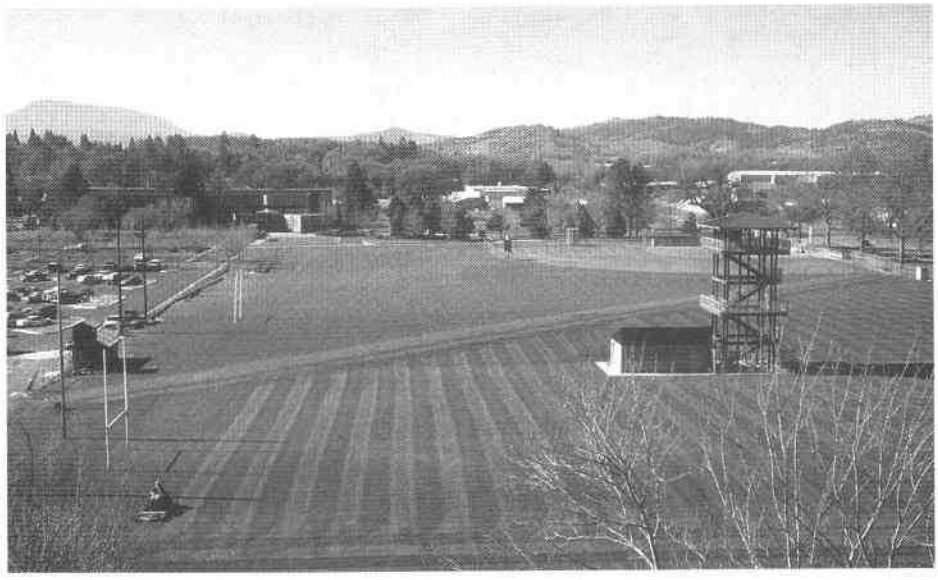
PS 300. Political Analysis (5)
PS 472, PS 473. Public Administration (4,4)
*Plus four of the following:*
PS 371. Public Policy Problems (4)
PS 414. Interest Groups (4)
PS 415. Politics and the Media (4)
PS 474. Bureaucratic Politics (4)
PS 475. Environmental Politics and Policy (4)
PS 476. Science and Politics (4)
PS 479. Topics in Publ Pol and Publ Adm (4)
ECON 435. Public Economy (4)
AREC 477. Econ., Politics & Government (3)

**RESOURCE PLANNING OPTION (27)**

BA 432. Environ Law: Water and Air (4)
AREC 250. Introduction to Environmental Economics and Policy (3)
FE 430. Watershed Processes (4)
GEO 301. Map and Image Interpretation (4)
GEO 360. Cartography (4)
GEO 420. Geography of Resource Use (3)
GEO 423. Land Use (3)
GEO 465. Geographic Information Systems (3)

**TOURISM OPTION (29-31)**

BA 390. Marketing (4)
BA 492. Consumer Behavior (4)
ECON 490. Regional Economics (4)
FOR 443. Nature Based Tourism (3)
GEO 484. Travel and Tourism Impacts (3)
GEO 485. Tourism and Recreation Resources (3)
SOC 454. Leisure and Culture (3)
*Plus two from the following group:*
BA 497. Global Marketing (4)
BA 498. Services Marketing (4)
GEO 423. Land Use (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)



## Minor in Forest Recreation Resources (27)

(Not for Forest Resources students)
**Core**
FOR 251. Recreation Resource Management (4)
FOR 351. Rec Behav and Mgmt (4)
FOR 356. Recreation Resource Planning (5)
FOR 391. Natural Resource Communication (3)
*Select at least 11 credits from:*
FOR 352. Wilderness Management (3)
FOR 443. Nature Based Tourism (3)
FOR 444. Ecol Aspects of Park Mgmt (3)
FOR 432. Econ of Rec Res (4)
FOR 451. Hist and Cult Aspects of Rec (4)
FOR 493. Environmental Interpretation (4)
FOR 495. Interpretive Projects (2)
FOR 460. Forest Policy (4)
FOR 365. Iss in Nat Res Conservation (3)

## Graduate Studies

Graduate and research programs in the Department of Forest Resources focus on forest biometrics, forest economics, forest management, operations research, forest modeling, forest policy, forest recreation, community and resource development, natural resource education and extension, geographic information systems, remote sensing, silviculture, soils, and resource-based tourism. Degree programs lead to the Master of Forestry (M.F.), Master of Arts in Interdisciplinary Studies (M.A.I.S.), Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees in Forest Resources.

Two tracks are available in the M.F. degree program, depending on the student's academic background.

Track 1 of the General M.F. degree and Track 1 of the M.F. in Silviculture degree are intended to provide focus and further enhancement to professional forestry careers. As such, Track 1 enrollment is limited to those students who have a B.S. degree in Forestry (or equivalent) from an institution accredited by the Society of American Foresters (SAF).

Track 2 of both of these M.F. options is intended for those students who do not have a forestry degree from an institution accredited by the SAF. In addition to opportunities for focus and specialization, Track 2 provides the course requirements essential to earning a "first professional degree" in forestry, and the M.F. degrees are thus accredited by the Society of American Foresters.

## Courses

### Lower Division Courses

**FOR 111. INTRODUCTION TO FORESTRY (4).** Forest resources in the world; forests and human wellbeing; 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. REQ: Field trips.

**FOR 112. INTRODUCTION TO COMPUTER APPLICATIONS IN FORESTRY (3).** Introduction to word processing DOS on IBM compatible computers and spreadsheet graphics software for forestry applications.

**FOR 119. SPECIAL STUDIES (1-16).**

**FOR 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. REQ: Field trips.

**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 related to the building of a geographic information system. Successful completion of FOR 220 should help students compete for summer jobs requiring measurements skills. PREREQ: MTH 105, FOR 111.

**FOR 240. *FOREST BIOLOGY (4).** Forest plants and animals, communities, and ecosystems, their functioning and their relationship to resource management. REQ: Field trips. PREREQ: FOR 141 or equivalent (Bacc Core Course)

**FOR 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. REQ: Field trips.

**FOR 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 wildland areas of the forest, range and coast.

### Upper Division Courses

**FOR 319. SELECTED TOPICS (1-3).** Contemporary recreation resource management issues for undergraduate students. Topics vary from term to term. May be repeated for credit. Graded P/N.

**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. PREREQ: FOR 220, ST 351, 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. PREREQ: FOR 321, ST 351, ST 352.

**FOR 323. RECREATION RESEARCH METHODS (3).** Research methods applied to the study of outdoor recreation issues and problems. Interpretation of research results. PREREQ: FOR 251, ST 351.

**FOR 341. FOREST ECOLOGY (4).** 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. PREREQ: BI 211, BI 212, BI 213, FOR 241, CSS 305. COREQ: FOR 442, FOR 443, FOR 355, FOR 406-4; 2-day field trip.

**FOR 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.

**FOR 352. WILDERNESS MANAGEMENT (3).** Wildemess history, preservation, planning and management. Wildemess in the context of other land uses.

**FOR 353. FIELD SCHOOL (3).** A field course focused on current management in park and recreation areas. A major field trip is required. PREREQ: FOR 251. Additional fee.

**FOR 354. AMENITY RESOURCE MANAGEMENT (3).** Management of amenity resources such as recreation, fish, wildlife, and visual aesthetics in the context of multiple use land management. PREREQ: FOR 111, FW 251, RNG 341 or FOR 251. Not for FM or FRR majors.

**FOR 355. MANAGEMENT FOR MULTIPLE RESOURCE VALUES (4).** Management of a variety of resource attributes in multiple use context, including considerations for recreation, fish wildlife aesthetics, watersheds, and forest products. PREREQ: FOR 111, FW 251, RNG 341 or FOR 251. COREQ: FOR 341, FOR 442, FOR 443, FOR 406-4. Not for FRR majors.

**FOR 356. RECREATION RESOURCE PLANNING (5).** Theory and function of recreation resource planning. Techniques for collection, storage, analysis and display of planning data. Practice in use of recreation planning models. PREREQ: FOR 251, ST 351.

**FOR 365. *ISSUES IN NATURAL RESOURCES CONSERVATION (3).** Background of major current issues in natural resources conservation with emphasis on forests, soils, and water. Focus on analyzing facts and opinions related to issues. Basics of terrestrial and aquatic ecology, Recreation management. Recent and current issues of soil, water, and forest use and management. (Bacc Core Course)

**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. REQ: Cascades, Coast Range field trips.

**FOR 391. NATURAL RESOURCE COMMUNICATIONS (3).** Concepts and techniques for communication with various constituents in the natural resources arena. Principles of public relations, interpretation, and public participation are presented.

**FOR 401. RESEARCH (1-16).**

**FOR 405/FOR 505. READING AND CONFERENCE (1-16).**

**FOR 406/FOR 506. PROJECTS (1-16).** Section 2: Starker Lectures, Graded P/N; Section 4: Integrated Projects, graded.

**FOR 407/FOR 507. SEMINAR (1-16).** Section 2: Presentation Skills , graded; Section 6: Professionalism; Section 4: Forestry and Wildlife (2 credits); Section 5: International Forestry; Section 20: Career Development; Section 21: Senior Seminar; Graded P/N.

**FOR 408/FOR 508. WORKSHOP (1-3).**

**FOR 410. INTERNSHIP (8).** Full-time supervised professional experience emphasizing functional proficiency under joint sponsorship of university and agency personnel. PREREQ: FRR 251, FRR 321, FRR 381, FRR 391, FRR 407. Graded P/N.

**FOR 420/FOR 520. ADVANCED AERIAL PHOTOS AND REMOTE SENSING (3).** Planning the photo mission, height measurements, photo mensuration, introduction to remote sensing. Use of an analytic stereoscopic plotter to make precise photo measurements and planimetric and topographic maps from photos. PREREQ: A photo interpretation course (FOR 220 or GEO 415/GEO 515) or the equivalent; a remote sensing course (GEO 444/GEO 544) or the equivalent.

**FOR 421/FOR 521. ADVANCED GIS APPLICATIONS IN FORESTRY (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 digitized data. PREREQ: A course in photointerpretation (FOR 220) and a GIS course (GEO 465/GEO 565) or the equivalent.

**FOR 430/FOR 530. FOREST RESOURCE ECONOMICS I (4).** Basic arithmetic of interest and capital budgeting. Welfare economics of forest resource management and production. Economics of timber management and scheduling, nonmarket valuation, and multiple use forestry. PREREQ: ECON 213, MTH 245.

**FOR 431/FOR 531. FOREST RESOURCE ECONOMICS II (4).** Forest product and timber price analysis. Contractual arrangements in timber sales and purchasing; spatial and locational impacts on forest production and manufacturing. Supply and demand of forest products. Impact of forest management and policy decision on public welfare. PREREQ: FOR 430, ST 352, ECON 214.

**FOR 432/FOR 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. PREREQ: ECON 201, ST 351.

**FOR 439/FOR 539. INDUSTRIAL FORESTRY (3).** Topics in industrial management in the Pacific Northwest, including property and income taxation, labor problems, and timber sales and contracts. PREREQ: Senior standing. Not offered every year.

**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. PREREQ: FOR 141, FOR 240.

**FOR 442/FOR 542. SILVICULTURE REFORESTATION (4).** Seed, seedlings, and cuttings. Nursery operation, planting techniques, seeding and vegetation management. Herbivores, uses of fire in reforestation. REQ: Field trips. PREREQ: BI 211, BI 212, BI 213; CSS 305; FOR 322; COREQ: FOR 443, FOR 341, FOR 355, FOR 406-4; 2-day field trips.

**FOR 443/FOR 543. SILVICULTURAL PRACTICES (4).** 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. PREREQ: FOR 322 COREQ: FOR 442, FOR 341, FOR 355, FOR 406-4; 2-day field trips.

**FOR 444/FOR 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. PREREQ: FOR 251, plus an ecology course.

**FOR 446/FOR 546. FIRE ECOLOGY AND ENVIRONMENT (3).** Impact of fire on vegetation succession. Effects of fire on soil, nutrient cycling, forest development. Use of fire as a silvicultural and hazard treatment tool. PREREQ: RNG 341; FOR 443.

**FOR 451/FOR 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. PREREQ: FOR 251

**FOR 453/FOR 553. NATURE BASED TOURISM (3).** The relationship between natural resource based recreation and tourism. Issues of tourism planning, management and impacts are explored. PREREQ: FOR 251

**FOR 456. INTERNATIONAL FORESTRY (3).** An introduction to the biological, physical, and sociological factors that shape the world's forest and the activities used to manage those forests. What influence these factors have on forest policies, practices, and outcomes. PREREQ: Introductory course in Biology. CROSSLIST: FE 456.

**FOR 457/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. REQ: Field trips. PREREQ: FOR 430.

**FOR 459/FOR 559. 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. REQ: Field trips. PREREQ: Senior standing in forestry.

**FOR 460/FOR 560. ^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. PREREQ FOR 460: Senior standing. PREREQ: FOR 560: FOR 356, FOR 391, FOR 432, FOR 444, FOR 460. (Writing Intensive Course)

**FOR 493/FOR 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. PREREQ: FOR 356, FOR 391, FOR 432, FOR 444, FOR 460.

**FOR 495/FOR 595. INTERPRETIVE PROJECTS (2).** Development of specific natural and cultural resource interpretive projects including interpretive plans, brochures, audio-visual programs and displays. PREREQ: FOR 493/FOR 593.

**FOR 499/FOR 599. SPECIAL TOPICS (1-16).** Topics of current importance in forestry 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 5: Natural Resource Law and Policy. Section 8: Social aspects of Natural Resource Management (3 credits) graded. PREREQ: Senior or graduate standing.

**Graduate Courses**

**FOR 501. RESEARCH (1-16).**

**FOR 503. THESIS (1-16).**

**FOR 524. ADVANCED FOREST MENSURATION (3).** Growth determination; mensuration aspects of level of growing stock; variable plot and 3P sampling; current forest inventories; use of the Tele-Relaskop. REQ: Field trips PREREQ: FOR 322, ST 511.

**FOR 525. FOREST MODELING (3).** Evolution of regression techniques and assumptions; examination of general model forms; techniques for modeling growth, mortality, recruitment, volume, residues, and stand structure. PREREQ: ST 512, FOR 524.

**FOR 533. ECONOMICS OF PRIVATE FORESTRY (3).** Economic and social characteristics of owners of small woodlands. Study of credit, incentives, leasing, and other measures to increase production on small woodlands. PREREQ: FOR 430. Not offered every year.

**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. PREREQ: FOR 430, FOR 431 or equivalent. Offered alternate years.

**FOR 535. MARKET STRUCTURE AND PRICES IN FORESTRY (3).** Applied forecasting and price analysis as they apply to the forest products industries. Industry structure, conduct, and performance. Demand and supply factors and unique pricing strategies. Lumber futures and industry trends. PREREQ: FOR 431 or equivalent. Offered alternate years.

**FOR 536. HARVEST SCHEDULING DEVELOPMENT AND ANALYSIS (3).** Harvest scheduling theory techniques, and development. Harvest schedule synthesis and analysis. PREREQ: FOR 534. Offered alternate years.

**FOR 537. FOREST RECREATION ECONOMICS (3).** Public goods and externalities in forest resources. Institutional analysis of forest amenities. Demand and valuation of forest amenity resources. Theory and application of nonmarket valuation techniques. Offered alternate years.

**FOR 538. DYNAMIC RESOURCE SCHEDULING (3).** Technique and theory of optimal control applied to minerals, crops, forests and fisheries, dynamic programming, calculus of variations, Pontryagin principle. Offered alternate years.

**FOR 558. CONCEPTS OF FOREST RECREATION PLANNING AND MANAGEMENT (3).** Examines research which forms the conceptual basis for tool, techniques, and approaches used in recreation planning and management. PREREQ: Senior standing.

**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. CROSSLISTED as FP 561.

**FOR 590. FORESTRY EDUCATION FOR TEACHERS (3).** Explores a range of information and activities to bring general forest understanding into the classroom. Project Learning Tree and the Forestry Education Project are used along with other natural resource based K-12 curricula.

**FOR 601. RESEARCH (1-16).**

**FOR 603. THESIS (1-16).**

**FOR 605. READING AND CONFERENCE (1-16).**

**FOR 606. PROJECTS (1-16).**

**FOR 607. SEMINAR (1-16).**

**FOR 808. WORKSHOP (1-9).**

## FOREST SCIENCE

Logan Norris, Head
020 Forest Science Lab
Oregon State University
Corvallis, OR 97331-7501
(541) 737-2244

**Faculty**

*Professors* Adams, Bondi, Cromack, Emmingham, Hibbs, Hobbs, Newton, Norris, Perry, Radosevich, Sollins, Stafford, Strauss, Thielges, Trappe, Waring, Zaerr; *Associate Professors* A. Campbell, Filip, Griffiths, Harmon, Oester, R. Rose, Ross; *Assistant Professors* Acker, Anekonda, Garman, Hayes, Luoma, C. Maguire, Meilan, Rousch, Webb, Weber, Yoder: *Instructor* Reichenbach

**Adjunct Faculty**

*Professor:* E. Hansen, Myrold, Showalter, Tesch; *Associate Professors* Dost, J.A. Jones, Ripple; *Assistant Professor* Gartner

**Courtesy Faculty**

*Professors* Blair, Collopy, Copes, Ryan, Sedell, Spies, Swanson; *Associate Professors* R. Campbell, Bormann, Dixon, Li, Liegel, Molina, Owston, Sorensen, Thies; *Assistant Professors* Aitken, Bradshaw, Castellano, Cohen, Means, Minore, Rygiewicz, St. Clair°

### Graduate Major

**Forest Science (M.F., M.S., Ph.D.)**
*Graduate Areas of Concentration*
Forest Biology
Forest Ecology
Forest Genetics
Forest Science (M.F., M.S. only)
Integrated Forest Protection
Silviculture
Silviculture/Harvesting (Ph.D. only)
Tree Physiology

The Department of Forest Science offers programs leading to the Master of Forestry (M.F.), Master of Science (M.S.), and Doctor of Philosophy (Ph.D.) degrees. The M.F. program emphasizes three areas: biology, silviculture, and integrated forest protection. The M.F. in silviculture (accredited by Society of American Foresters) is administered jointly with the Department of Forest Resources. Students in the three M.F. programs prepare for careers as professional biologists, silviculturists, or pest managers capable of analyzing opportunities in the context of the natural resource management objectives of a landowner, with sensitivity to all forest resource values—physical, biological, economic, and environmental. The M.S. and Ph.D. programs, structured specifically for those interested in careers in research, teaching, and specialized areas of forest science and forestry practice, are available in five areas of concentration: forest ecology, forest genetics (including biotechnology), forest physiology, silviculture, and integrated forest protection. A special doctoral program, administered cooperatively with the Department of Forest Engineering, is offered in silviculture/harvesting systems. This program is concerned with both biological and engineering aspects of forest harvesting and subsequent reforestation. The Department of Forest Science also participates in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) graduate program.

Research in the Department of Forest Science focuses on fundamental and applied research to support forest practices in areas of reforestation, silviculture of young and mature natural stands and plantations, and land capability classification. All biological levels of organization within natural and managed forest communities and individual trees are addressed by current departmental research projects.

Graduate study is structured specifically for those students interested in careers in research and teaching, and in specialized areas of forest science and practice. Emphasis in graduate education is placed on the ability to define and solve researchable problems in forest biology related to the practice of forestry. 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.

### COURSES

**Upper Division Courses**

**FS 405. READING AND CONFERENCE (1-16).**

**FS 444/FS 544. FOREST GENETICS (4).** Genetic principles as applied to forest trees: role of evolutionary forces on patterns of natural variation, impacts of management on forest gene pools, tree breeding theory and practice, biotechnology. REQ: Field trips. PREREQ: FOR 341 or BOT 341.

**FS 450/FS 550. INTEGRATED FOREST PROTECTION (4).** Management of forest pests (insects, diseases, weeds, and vertebrates) with an ecological perspective and in a silvicultural context. PREREQ: FOR 341, BOT 415/ENT 415.

**FS 453/FS 553. MANAGED FORESTS AND WILDLIFE INTERACTIONS (3).** Management of stands and landscapes to achieve wildlife objectives. PREREQ: FOR 341 or equivalent course in ecology. CROSSLISTED AS FW 453/FW 553.

**FS 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.

**Graduate Courses**

**FS 501. RESEARCH (1-16).**

**FS 503. THESIS (1-16).**

**FS 505. READING AND CONFERENCE (1-16).** Some sections graded P/N.

**FS 506. PROJECTS (1-16).**

**FS 507. SEMINAR (1-16).** Some sections graded A/F.

**FS 521. NATURAL RESOURCE RESEARCH PLANNING (2).** Research project development and analysis and study planning, investigative procedures, the principles and ethics of natural resource science, principles and practices in scientific communication.

**FS 523. NATURAL RESOURCE DATA ANALYSIS (4).** Hands-on experience in applied statistical data analysis and research data management. Students are encouraged to use data sets from their own research for final projects. Widely used, commercially available statistical software packages, e.g., SAS are used. Emphasis is placed on micro- and mini-computers in the practical application and actual implementation of statistical analysis techniques. PREREQ: ST 412/ST 512, and concurrent registration in ST 415/ST 515.

**FS 542. CONCEPTS OF FOREST REGENERATION (3).** Examination of ten major areas in forest regeneration from a brief history of early reforestation through nursery systems and plant physiology to vegetation management and the statistical design of forest regeneration experiments. PREREQ: Baccalaureate degree in forestry or related field; open to outstanding undergraduates in forestry or related field; FOR 442 highly recommended.

**FS 543. ADVANCED SILVICULTURE (4).** The scientific basis of forest regeneration and silvicultural practices and prescriptions in immature and mature stands. REQ: Field trips. PREREQ: F 432, F 433.

**FS 545. ADVANCED FOREST COMMUNITY ECOLOGY (4).** Dynamics of undisturbed forest ecosystems, responses of ecosystems to perturbation, optimization of response for attainment of management objectives. REQ: Field trips. PREREQ: FOR 433, BOT 441, or BOT 442, or BOT 443, or equivalent.

**FS 547. FOREST NUTRIENT CYCLING (3).** Examine current research issues in forest nutrient cycling. Topics vary but generally include: Soil organic matter dynamics, N availability and N-gas fluxes, Controls on weathering and soil pH, P dynamics and availability, Plant/soil interactions. Required: Field trip.

**FS 548. WEED ECOLOGY AND MANAGEMENT (2).** Ecology and physiology of vegetation in agriculture and forestry. PREREQ: BOT 331 or BOT 341. CROSSLISTED as CSS 548.

**FS 552. CURRENT RESEARCH IN FOREST SCIENCE (2).** Introduction to current research in the basic disciplines within forest science (ecology, genetics, physiology, silviculture, and protection). Graded P/N.

**FS 561. PHYSIOLOGY OF WOODY PLANTS (3).** The structure, growth and physiological processes of trees and shrubs. PREREQ: CH 221, CH 222, CH 223, CH 331, CH 332, and BOT 331.

**FS 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. PREREQ: PH 201, MTH 251, BI 201. CROSSLISTED as ATS 564.

**FS 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.

**FS 601. RESEARCH (1-16).**

**FS 603. THESIS (1-16).**

**FS 605. READING AND CONFERENCE (1-16).**

**FS 606. PROJECTS (1-16)**

**FS 699. SPECIAL TOPICS (1-16).**

**FS 646. ECOSYSTEMS ANALYSIS AND APPLICATION (4).** The structure and function of forests and associated streams in natural and managed ecosystems. Nutrient cycling processes and their long-term effects on forest growth and yield. Emphasizes current research and growth simulation models. PREREQ: FOR 341; CSS; 420; MB 448. Required: Field trips.

**FS 691. 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.

**FS 699. SPECIAL TOPICS (1-16).**

SOURCe Research

Bioresource Research students acquire research experience and broadly-based knowledge in interdisciplinary fields of agricultural, environmental, food, and forest sciences. Students determine their fields of study by choosing among ten different option areas. After two years of research in the program of a faculty mentor, each student writes a senior thesis. In addition to research expertise, students graduate with strong basic science backgrounds and problem-solving and communication skills. Many will become industrial or academic research professionals, in areas of science where there will be a shortage of qualified individuals for the foreseeable future. Others will enter graduate and professional schools in the life sciences, or become highly effective secondary school science teachers. There are over one hundred Bioresource Research faculty mentors, from fifteen departments in the colleges of Agricultural Science, Forestry, and Science: Agricultural Chemistry, Animal Science, Bioresource Engineering, Botany and Plant Pathology, Chemistry, Crop and Soil Science, Entomology, Fisheries and Wildlife, Food Science and Technology, Forest Resources, Forest Science, Horticulture, Microbiology, Rangeland Resources, and Zoology. The faculty are organized into ten interdepartmental option groups according to their research interests. See complete description under Interdisciplinary Studies.

## BIORESOURCE RESEARCH

See the Interdisciplinary Studies section of this catalog for description more information.

## NATURAL RESOURCES

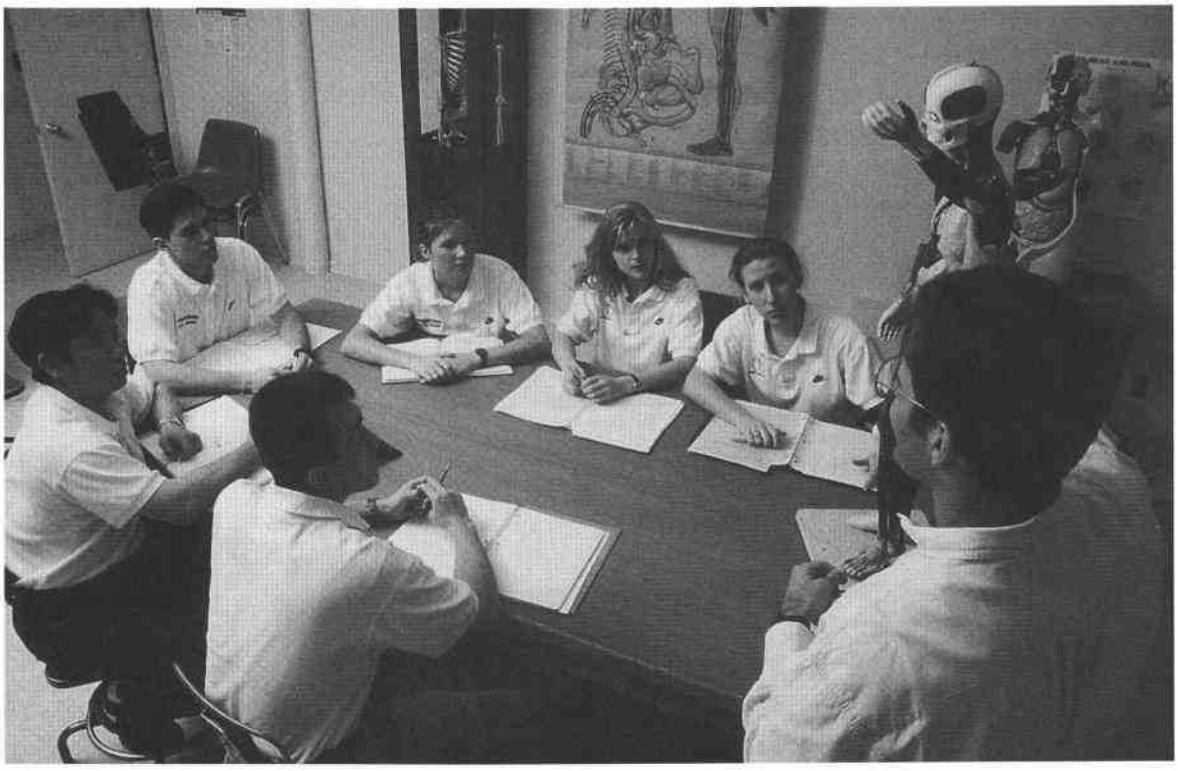
The College of Forestry, in conjunction with the Colleges of Agricultural Sciences, Liberal Arts, and Science, offers a general natural resources degree that provides a broad liberal education with a natural resources orientation. The curriculum is designed to produce graduates who have an understanding of a broad range of natural resource problems, are able to work with issues and experts in a variety of resource fields, and deal with social and political components of resource management.

**FOOTNOTES**

☆Licensed Professional Engineer

❖ Required courses for professional engineering program.

# College of Health and Human Performance



*The College of Health and Human Performance offers the Pacific Northwest's most comprehensive array of undergraduate and graduate degree programs in Public Health and Exercise and Sport Science.*

We are committed to providing a supportive and challenging academic environment that encourages students to discover the scientific and professional bases of public health and the exercise sciences. The College of Health and Human Performance has a unique mission to prepare professionals for vital careers in human health, fitness, and sport science, and enjoys the distinction of being the lead program in this field among public institutions in Oregon.

Students in Health and Human Performance are prepared for a variety of careers, including the health and fitness industry, health promotion and education in communities and schools, health care administration, physical education, athletic training, and environmental health and safety. Many of the College's undergraduate students choose to pursue graduate studies in medical, allied health, professional, and scientific fields.

## ADVISING

The recently expanded Office of Academic Advising and Student Support is a primary source of information for all College of Health and Human Performance students. Here, students receive accurate, thorough, and timely information regarding their academic progress, job opportunities, and campus activities. Two full-time professional advisers oversee the undergraduate students within the College. Faculty members also have a vital role in undergraduate advising 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.

## TEACHER EDUCATION

Students who plan to pursue careers as public school teachers in health or physical education, grades preprimary through twelve, must complete the Master of Arts in Teaching (M.A.T.) teacher education program. Students should follow this process:

1. Select an academic major in the area (health or exercise and sport science) in which the student wishes to teach.
2. Complete the baccalaureate degree.
3. In consultation with an academic adviser, select field experiences.
4. Apply for admission to the professional education program.

Requirements for admission to the professional education program include:

1. Demonstration of basic skills in reading, writing and mathematics by passing the California Basic Educational Skills Test (CBEST).
2. Passing score on PRAXIS subject area tests.
3. Holding a baccalaureate degree.
4. Admission as a regular graduate student.
5. Favorable recommendations from immediate supervisors regarding ability to work with school-aged children.
6. Recommendations and statement on "good character."
7. Subject matter competence as specified by the appropriate department.

A major in public health or exercise and sport science is a recommended academic major for students who wish to be elementary classroom teachers. Consult an adviser in the College of Health and Human Performance for further information.

## INTERNSHIPS AND PRACTICUMS

To help prepare College of Health and Human Performance graduates for careers, all students participate in an intensive internship and/or practicum program toward the completion of their academic course work. These opportunities provide students with invaluable work experience in their field of study and often lead to post-graduate employment. Faculty members help place students in the workforce and work with on-site mentors to create a meaningful internship experience.

## INTERNATIONAL DEGREE

Undergraduates with majors in the College of Health and Human Performance can earn a second degree in International Studies. See the Interdisciplinary Studies section of this catalog for more information.

## SCHOLARSHIPS

The College of Health and Human Performance offeres a variety of scholarships to deserving students. Additional information and application forms are available from the College of Health and Human performance, Women's Building, Room 120.

## INTRAMURAL SPORTS AND RECREATIONAL ACTIVITIES

The Department of Intramural Sports provides a variety of opportunities for students to participate in organized sports events. Over 35 sport activities offered each year range from the major team sports to racquet sports, aquatic events, runs, cycling, and special events. Previous skill or experience is not necessary as most events offer divisions to accommodate various skill levels. For more information contact the Intramural Sports office in Langton Hall, Room 131.

## USE OF FACILITIES

Regular registration fees entitle every student to the use of locker rooms and shower facilities. Also provided are towels, gym clothing, a lock and a basket in the locker room for his or her exclusive use. Free laundry of these items is also provided to encourage students to maintain an active and healthy lifestyle.

124 Women's Bldg.
Oregon State University
Corvallis, OR
97331-6802
(541) 737-3220

**ADMINISTRATION**

**TIMOTHY P. WHITE**
*Dean*

**LINDA JOHNSON**
*Head Adviser*

Footnotes for this section on page 273.

## Master of Arts in Teaching Health Education and Physical Education

The Master of Arts in Teaching (M.A.T.) in the areas of Health Education and Physical Education is housed primarily in the College of Health and Human Performance. The program is coordinated through The School of Education in the College of Home Economics and Education.

The M.A.T. is a graduate professional degree involving both graduate courses and extensive practical experience in the public schools at all levels, K-12. The 63 credits required in the program include 24 credits in health education or physical education pedagogy, 18 credits of internship in the public schools, 12 credits in professional education courses, and 9 credits of selected public health or exercise and sport science courses. The cohort of students enters the program during summer term and completes certification and master's degree requirements the following June.

The Health Education program places a strong emphasis on health education in elementary and middle schools in addition to the traditional secondary school focus. Students involved in the program have opportunities to interact with and instruct children and youth across the public school age span. They develop knowledge and skills essential for working with communities in order to further the development of comprehensive school health education programs.

The Physical Education program offers students the opportunity to gain a true K-12 certification as students will participate in continuous on-site supervised internships in elementary, middle and high school settings. In association with the nationally recognized graduate program in Movement Studies for the Disabled, students will work with special needs children and youth in physical education environments. Activities in the Instructional Analysis Laboratory offer students the opportunity to improve their teaching behavior through analysis.

A strong public school partnership including collaboration with area public school teachers is an essential feature of both programs. Master teachers are selected from the schools and invited to participate in this joint effort to prepare outstanding teachers.

Admission requirements for the program are listed under the Teacher Education section on the preceding page.

## HEALTH EDUCATION

### Upper Division Courses

**HLED 407/HLED 507. SEMINAR (1-3).**

### Graduate Courses

**HLED 510. PROFESSIONAL INTERNSHIP: HEALTH EDUCATION (1-16).** A full-time 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. PREREQ: Admission to MAT Program.

**HLED 580. TRENDS AND RESEARCH ISSUES IN HEALTH EDUCATION (3).** Introductory course in health education in a school setting; historical and philosophical foundations for school health education; current trends explored; research directions examined; health education as a chronology of developmental progress. PREREQ: Admission to MAT Program.

**HLED 581. PLANNING, ESTABLISHING AND EVALUATING HEALTH (3).** EDUCATION INSTRUCTION Emphasizes processes for planning and establishing instructional environments, as well as processes for evaluating health education instruction. PREREQ: Admission to MAT Program.

**HLED 583. INTRODUCTION TO INSTRUCTIONAL METHODOLOGY AND (3).** ANALYSIS IN HEALTH EDUCATION This is a laboratory-based class. Course content is directed toward analysis of teaching and introductory teaching methodologies. Students participate in group and self-analysis of teaching methodologies in a laboratory setting (Teaching Analysis Lab). PREREQ: Admission to MAT Program.

**HLED 584. CURRICULUM DESIGN AND COMMUNITY INVOLVEMENT (1).** Exploration of health education curricula design and development; special consideration to factors which influence the direction of curricula; acceptance of health education curricula by multiple community factions; philosophical basis for curricular development; Comprehensive school health education (as subject specific): community processes for curricular development. PREREQ: Admission to MAT Program.

**HLED 585. PLANNING, ESTABLISHING AND EVALUATING HEALTH (3).** EDUCATION CURRICULUM Focus on this course is on planning, implementation and evaluation of a comprehensive school health education curriculum. This course includes analysis of various district-based plans, as well as analysis of the Oregon Common Curriculum Goals, and Common Knowledge and Skills in Health Education. This course provides students with essential skills needed to develop a comprehensive PP-12 school health education curriculum. PREREQ: Admission to MAT Program.

**HLED 587. DEVELOPMENT OF INSTRUCTIONAL METHODOLOGY AND (3).** ANALYSIS IN HEALTH EDUCATION Laboratory based class; content is directed toward the development of existing teaching methodologies and acquisition of methods which build on those identified in HLED 583. Students participate in group and self-analysis of teaching methodologies in a teaching laboratory setting (Teaching Analysis Lab) and in a health sciences laboratory. PREREQ: Admission to MAT Program.

**HLED 589. HEALTH EDUCATION LEADERSHIP IN PLANNING, IMPLEMENTING (3).** AND EVALUATING HEALTH EDUCATION PROGRAMS Health education programs, their planning, implementation and evaluation. School specific, as well as programs; leadership as a factor in planning, implementing and evaluating; the school health coordinator; health evaluation mechanisms and concerns addressed. PREREQ: Admission to MAT program.

**HLED 591. REFINEMENT OF INSTRUCTIONAL METHODOLOGIES AND ANALYSIS (2).** IN HEALTH EDUCATION Laboratory based class; content is directed toward the refinement of existing teaching methodologies and the acquisition of advanced methods which build on those identified in HLED 583 and HLED 587. Students participate in group and self-analysis of teaching methodologies in a teaching laboratory setting (Teaching Analysis Lab) and in the university classroom. PREREQ: Admission to MAT Program.

**HLED 592. THE HEALTH EDUCATOR AS A PROFESSIONAL (2).** This is a summative course of the Fifth-Year Teacher Education Program in Health Education. This course addresses the challenges and convictions related to the teaching profession as well as issues which often specifically confront health educators as professionals. PREREQ: All HLED courses in the Fifth-Year Teacher Preparation Program - Health Education and admission to MAT Program.

## PHYSICAL EDUCATION

### Upper Division Courses

**PED 407/PED 507. SEMINAR: PHYSICAL EDUCATION (1-3).**

### Graduate Courses

### Upper Division Courses

**PED 407/PED 507. SEMINAR: PHYSICAL EDUCATION (1-3).**

### Graduate Courses

**PED 510. PROFESSIONAL INTERNSHIP: PHYSICAL EDUCATION (1-15).** A full-time 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. PREREQ: Admission to MAT Program.

**PED 563. INSTRUCTIONAL ANALYSIS TECHNIQUES I (3).** Introduction to techniques of instructional analysis. This course provides in-depth information and training in systematic observation techniques, raw data conversion and inter/intraobserver reliability. PREREQ: Admission to MAT Program.

**PED 564. 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 student teaching experience.

**PED 565. MEASUREMENT AND EVALUATION IN THE INSTRUCTIONAL PROCESS (3).** Introductory course in measurement and evaluation for physical education teachers. Focus on measurement and evaluation in the cognitive, affective and psychomotor domains as applied to the physical education instruction setting. PREREQ: EXSS 471 or equivalent.

**PED 566. INSTRUCTIONAL SKILLS I (3).** Skills of planning implementing and evaluation programs of instruction in physical education, grades K-12. PREREQ: Admission to MAT Program.

**PED 567. INSTRUCTIONAL SKILLS II (2).** Applying and refining skills of planning, implementing and evaluating programs of instruction in physical education, grades K-12. PREREQ: Admission to MAT Program.

**PED 568. ADMINISTRATIVE AND CURRICULAR PRACTICES IN (3).** PHYSICAL EDUCATION Curricular programs and variations from kindergarten through grade twelve, administrative policies and practices. PREREQ: Admission to MAT Program.

**PED 569. 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 which lead to a successful career. PREREQ: Admission to MAT Program.

## EXERCISE AND SPORT SCIENCE

Anthony Wilcox, Chair
214 Langton Hall
Oregon State University
Corvallis, OR 97331-3302
(541) 737-2643

**Faculty**
*Professors* White; *Associate Professors* Cusimano, Ebbeck, Harter, McCubbin, Michael, Smith, Snow, Soleau, van der Mars, Wilcox, Wood; *Assistant Professors* Borsa, B. Cardinal, Collier, Widrick, Williams; *Instructors* Asbell, M. Cardinal, Dark, Fisher, Maddalozzo, Mingo; *Research Associate* Fox

**Adjunct Faculty**
Fruend, Harry, Ph.D.

**Courtesy Faculty**
Burkhart, Bob, R.P.T., Corvallis; Dunn, John M., Ed.D., Salt Lake City; Lague, Richard E., R.P.T., Corvallis; Lawson, LaJean, Ph.D., Portland; Marker, Thomas L., M.D., Corvallis; Ross, Leonard A., D.P.M., Corvallis; Ritson, Robert J., Ph.D., Salem; Stanley, Rick, M.D., Albany; Waldron, Elizabeth, M.D., Corvallis

### Undergraduate Major

**Exercise and Sport Science (B.S.)**
*Options*
Athletic Training
Fitness Program Management
Physical Activity and Development
Pretherapy
Applied Exercise and Sport Science

### Minor

**Athletic Administration**

### Graduate Majors

**Health Education and Physical Education (M.A.T.)**
**Human Performance (M.S., Ph.D.)**
*Graduate Areas of Concentration*
Biomechanics
Exercise Physiology
Motor Control and Learning
Movement Studies in Disability
Sport Pedagogy
Sport Psychology
Sport Studies
Sports Medicine
**Movement Studies in Disability (M.S.)**

The Department of Exercise and Sport Science embraces an academic body of knowledge focused on the causes and consequences of physical activity, and is grounded in the biological, psychological, physical, and social sciences. This applied discipline is concerned with the effect of physical activity and sport on the health and fitness of people and society. Graduates are knowledgeable of the physiological, anatomical, psychological, and social aspects of human movement.

Graduate programs train professionals and scientists to work in many aspects of public health and exercise science. In Exercise and Sport Science, students may pursue Master of Science and Doctor of Philosophy degrees with a concentration in Biomechanics, Exercise Physiology, Motor Control and Learning, Movement Studies in Disability, Sport Pedagogy, Sport & Exercise Psychology, and Sports Medicine.

The department supports a Special Physical and Motor Fitness Clinic, which provides specialized physical activity programs for children and youth.

## UNDERGRADUATE STUDIES

**Preparation**
Entering freshmen and undergraduate transfer students should prepare to enter the College of Health and Human Performance 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 biology and/or chemistry.

**Admission**
Any student who has met the admission requirements of Oregon State University may be admitted to an exercise and sport science program of study. To transfer from another OSU college or school, the student must have the approval of the Head Adviser of the College of Health and Human Performance.

**Retention**
Students are expected to make satisfactory progress toward a degree. Satisfactory progress includes, but is not limited to:

1. Maintaining a minimum program GPA of 2.25.

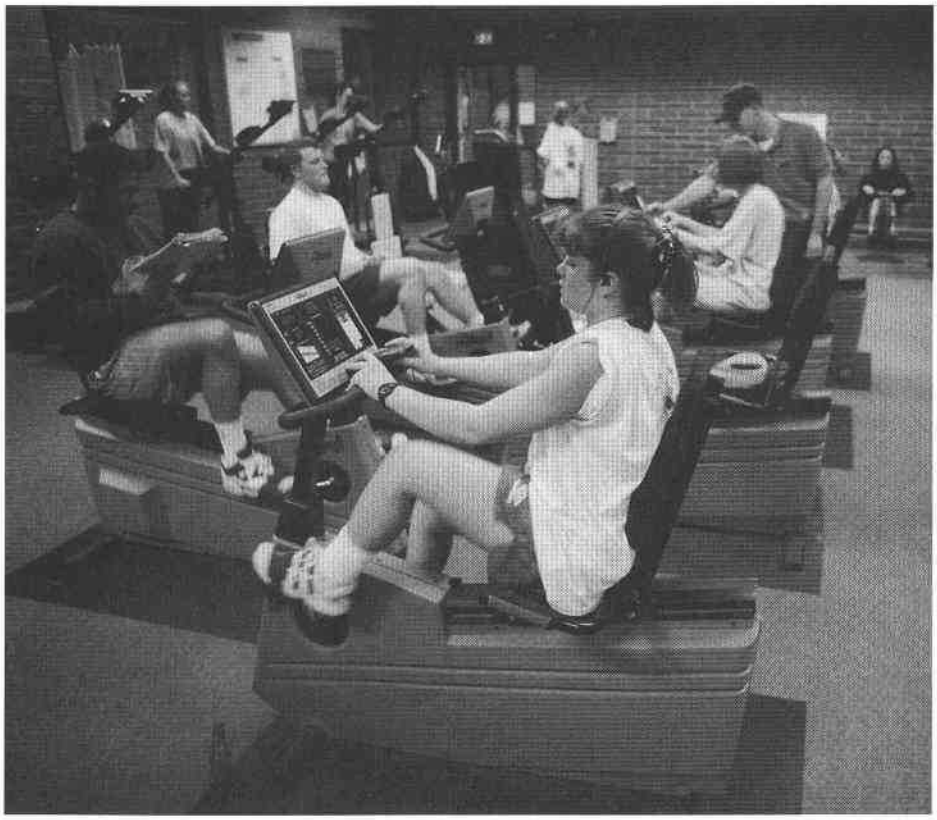
2. Maintaining a minimum GPA of 2.50 in professional exercise and sport science courses.

**CURRICULUM REQUIREMENTS**
The basic exercise and sport science curriculum meets University requirements for the bachelor's degree and provides general education needed for professional preparation. In addition to the general education and professional courses listed in the core program, undergraduate major students complete an option selected from athletic training, fitness program management, physical activity and development, pretherapy, or applied exercise and sport science.

**Baccalaureate Core Requirements (48)**

**Skills**
Writing I (3)
Writing II (3)
Writing III/speech (3)
Mathematics (3)
Fitness (3)
Writing intensive course

**Perspectives**
Physical science (lab) (4)
Biological science (lab) (4)
Plus choice of either of above (4)
Western culture (3)



Cultural diversity (3)
Literature and the arts (3)
Social processes and institutions (3)
Difference, power and discrimination (3)

**Synthesis**
Contemporary global issues (3)
Science, technology, and society (3)

## OPTIONS

### ATHLETIC TRAINING OPTION

Students completing the Athletic Training option are eligible to sit for the National Athletic Training Association certification exam. With certification, the graduate is prepared to work with high school, collegiate, and professional athletic teams. The program at OSU is accredited by the Committee on Allied Health Education and Accreditation (CAHEA).

Upon satisfactory completion of prerequisite course work and a year-long directed observation clinical program, qualified students apply for admission to the athletic training education program, typically at the conclusion of the sophomore year. Consult an adviser for program guidelines and application instructions.

The athletic training education program is two-fold, involving extensive academic course work and clinical experience. To qualify for the national certification examination offered by the National Athletic Trainers' Association (NATA), students must complete the baccalaureate degree, the curriculum listed herein, and a minimum of 900 hours of clinical experience under the direct supervision of a certified athletic trainer. (No more than 450 hours of clinical experience may be earned in any one academic year.) Consult the program director for additional information regarding NATA membership and certification.

**Curriculum**
Requirements for the four-year program are listed below.

**Baccalaureate Core Requirements (34)**
14 of the 48 credits required in the baccalaureate core may be fulfilled by courses in the athletic training option.

**Exercise and Sport Science Core (33)**
EXSS 194. Pro Act/Basic Movement Skills (1)
EXSS 271. Prin of Comput in EXSS (3)
EXSS 312. Sociocul Dimens of Phys Act (3)
EXSS 313. Lifespan Motor Development (4)
EXSS 322. Anatomical Kinesiology (4)
EXSS 323. Biomechanics of Spts & Exer (4)
EXSS 324. Physiology of Exercise (3)
EXSS 325. Fitness Assessment and Exercise Prescription (2)
EXSS 370. Psychology of Sport and Physical Activity (3)
EXSS 394. Pro Act/Resistance Training (2)
EXSS 411. Mvmt Skill Learning & Control (4)

**Athletic Training Option Courses (42)**
EXSS 356. Care & Prev of Athl Inj (3)
EXSS 357, EXSS 358, EXSS 359. Athl Tr Practicum (9)
EXSS 365. Emerg Management of Sports Trauma (3)
EXSS 424. Applied Exercise and Sport Phys (3)
EXSS 425. Biomechanics of the Skeletal System (3)
EXSS 442. Athletic Training Programs (3)
EXSS 443. Therapeutic Modalities (4)
EXSS 444. Adapted Physical Activity (4)
EXSS 445. Therapeutic Exercise (3)
EXSS 450. Advan Assess of Ath Inj (4) WIC
EXSS 471. Tests & Meas in EXSS (4)

**Supporting Courses (12)**
H 225. Social & Individual Health Determinants (3)
H 386. Adv First Aid/First Resp (3)
NFM 225. Human Nutrition (4)
PHAR 210. Terminology of the Hlth Sc (2)

**Science and Social Science (35)**
CH 121, CH 122, CH 123. General Chem or CH 221, CH 222, CH 223. General Chem (15)
Z 331, Z 332, Z 333. Human Anat & Phys (9)
Z 341, Z 342. Hum Anat and Physiology Lab (4)
PSY 201. General Psychology (3)
MTH 112. Elementary Functions (4)

**Electives[1] (24)**
Total 180

### FITNESS PROGRAM MANAGEMENT OPTION

This option prepares graduates to establish or operate fitness and wellness programs in corporate, commercial, and clinical settings.

**Curriculum**
Requirements for the four-year program are listed below:

**Baccalaureate Core Requirements (34)**
14 of the 48 credits required in the baccalaureate core may be fulfilled by courses in the fitness program management option.

**Exercise and Sport Science Core (36)**
EXSS 194. Pro Act/Basic Movement Skills (1)
EXSS 271. Princ of Comput in EXSS (3)
EXSS 312. Sociocul Dimens of Phys Act (3)
EXSS 313. Lifespan Motor Development (4)
EXSS 322. Anatomical Kinesiology (4)
EXSS 323. Biomech of Sports & Exer (4)
EXSS 324. Physiology of Exercise (3)
EXSS 325. Fitness Assessment and Exercise Prescription (2)
EXSS 370. Psy of Sport and Phys Act (3)
EXSS 394. Pro Act/Resistance Training (2)
EXSS 411. Mvmt Skill Learning & Control (4)
EXSS 481. Analy Crit Issues in EXSS (3) WIC

**Fitness Program Management Option Courses (41-47)**
EXSS 252. Role of Fitness in American Soc (3)
EXSS 307. Pre-Internship (1)
EXSS 333, EXSS 334, EXSS 335. EXSS Practicum (6)
EXSS 340. Org & Adm of Sports Prog (4)
EXSS 356. Care & Prev Athl Injuries (3)
EXSS 394. Pro Act/Aerobics (2)
EXSS 410. Internship (9-15)
EXSS 414. Fitness and Aging (3)
EXSS 424. Appl Exer & Sport Phys (3)
EXSS 434. Phys of Streng Dev (3)
EXSS 436. Cardiovascular Dynamics (3)
EXSS 474. Stress Physiology Instr (1)

**Supporting Courses (22)**
H 263. Psychsoc Dimens of Health (3)
H 386. Adv First Aid/First Resp (3)
NFM 225. Human Nutrition (4)
Courses selected with adviser approval (12)

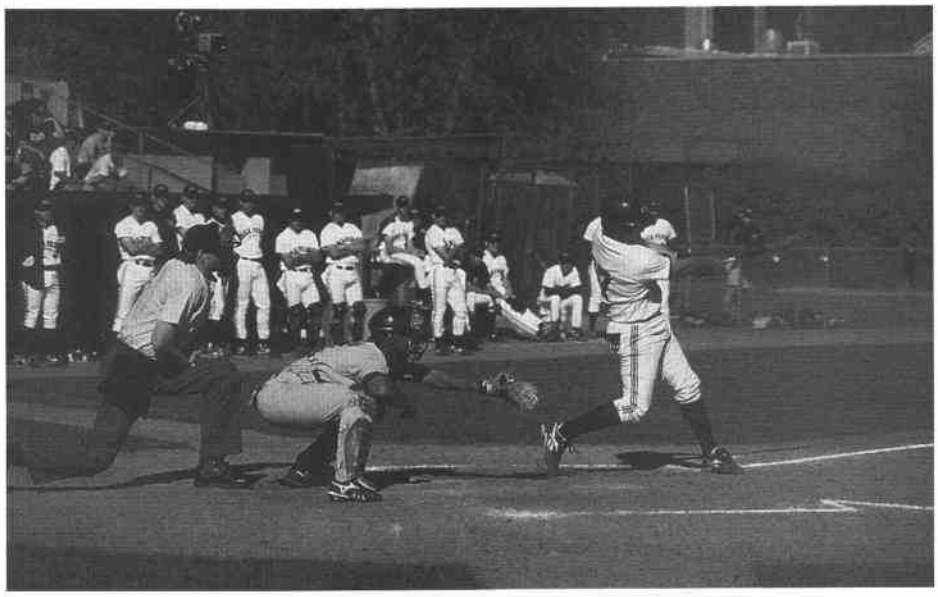
**Science and Social Science (35)**
CH 121, CH 122, CH 123. Gen Chem or CH 221, CH 222, CH 223. Gen Chem (15)
Z 331, Z 332, Z 333. Hum Anat & Phys (9)
Z 341, Z 342. Hum Anat and Physiology Lab (4)
PSY 201. General Psychology (3)
MTH 112. Elementary Functions (4)

**Electives[1] (6-12)**
Total 180

### PHYSICAL ACTIVITY AND DEVELOPMENT OPTION

Students who seek careers in teaching physical education select the physical activity and development option. Graduates are prepared to enter the Master of Arts in Teaching program to earn teaching certificates as educators or coaches at the primary or secondary level.

**Curriculum**
Requirements for the four-year program are listed below:



**Baccalaureate Core Requirements (34)**
14 of the 48 credits required in the baccalaureate core may be fulfilled by courses in the Physical Activity and Development Option.

**Exercise and Sport Science Core (36)**
EXSS 194. Pro Act/Basic Movement Skills (1)
EXSS 194. Pro Act/Basic Rhythms (2)
EXSS 271. Princ of Comp in EXSS (3)
EXSS 312. Sociocult Dimens of Phys Act (3)
EXSS 313. Lifespan Motor Development (4)
EXSS 322. Anatomical Kinesiology (4)
EXSS 323. Biomech of Sports & Exercise (4)
EXSS 324. Physiology of Exercise (3)
EXSS 325. Fitness Assessment and Exercise Prescription (2)
EXSS 370. Psych of Sport & Phys Act (3)
EXSS 411. Mvmt Skill Learning & Control (4)
EXSS 481. Anal Crit Issues in EXSS (3)

**Physical Activity and Development Option Courses (42-43)**
PAC courses approved by adviser (6)
EXSS 353, EXSS 354, EXSS 355. EXSS Practicum (6)
EXSS 340. Organiz & Admin of Sports Prog (4)
EXSS 356. Care & Prev Athl Injuries (3)
EXSS 360. Sport Skill Analysis (3 courses) (6)
EXSS 394. Pro Act/Aerobics (2)
EXSS 394. Pro Act/Resistance Training (2)
EXSS 394. Pro Act/Aquatics *or* EXSS 236. Water Safety Instruction (2-3)
EXSS 420. Physical Activity for Children (3)
EXSS 444. Adapted Physical Activity (4)
EXSS 471. Test & Meas in EXSS (4)

**Science and Social Science Courses (35)**
CH 121, CH 122, CH 123. General Chem or CH 221, CH 222, CH 223. General Chem (15)
Z 331, Z 332, Z 333. Hum Anat & Phys (9)
Z 341, Z 342. Hum Anat and Physiology Lab (4)
PSY 201. General Psychology (3)
MTH 112. Elementary Functions (4)

**Electives[1] (32-33)**
Total 180

### PRETHERAPY OPTION

This program is designed for the student interested in pursuing additional education in a clinical or medical field. Students typically enter graduate programs in occupational or physical therapy programs, nursing, or physician's assistant programs.

**Curriculum**
Requirements for the four-year program are listed below:

**Baccalaureate Core Requirements (34)**
14 of the 48 credits required in the baccalaureate core may be fulfilled by courses in the pretherapy option.

**Exercise and Sport Science Core (33)**
EXSS 194. Pro Act/Basic Movement Skills (1)
Professional Activity Courses (2)
EXSS 271. Princ of Comp in EXSS (3)
EXSS 312. Sociocul Dimens of Phys Act (3)
EXSS 313. Lifespan Motor Development (4)
EXSS 322. Anatomical Kinesiology (4)
EXSS 323. Biomech of Sports & Exer (4)
EXSS 324. Physiology of Exercise (3)
EXSS 325. Fitness Assessment and Exercise Prescription (2)
EXSS 370. Psychology of Sport and Exercise (3)
EXSS 411. Mvmt Skill Learning & Control (4)

**Pretherapy Option Courses (23-26)**
EXSS 132. Pretherapy (2)
EXSS 343. EXSS Practicum (2)
EXSS 414. Fitness & Aging: Dev & Prog Perspec (3)
EXSS 415. Motor Control & Mov Disfunc (3)
EXSS 443. Therapeutic Modalities (3)
EXSS 444. Adapted Physical Activity (4)
EXSS 445. Therapeutic Exercise (3)
ST 201. Principles of Statistics (3)
Studio Arts Course (Pre OT only) (3)

**Science and Social Science Courses (64-79)**
CH 121, CH 122, CH 123. General Chem or CH 221, CH 222, CH 223. General Chem (15)
PH 201, PH 202, PH 203. General Physics (Pre-physical therapy only) (15)
BI 211, BI 212, BI 213. General Biology (12)
Z 331, Z 332, Z 333. Hum Anat & Phys (9)
Z 341, Z 342, Z 343. Hum Anat and Physiology Lab (6)
PSY 201, PSY 202. General Psychology (6)
PSY 350. Human Life Span Dev (3)
PSY 330. Brain & Behav (3)
PSY 481. Abnormal Psych (3)
SOC 204. Intro to Sociology (3)
MTH 112. Elem Functions (4)

**Electives[1] (11-23)**
Total 180

### WICHE PROGRAMS FOR OCCUPATIONAL AND PHYSICAL THERAPY

Students selecting the pretherapy area of emphasis in the Department of Exercise and Sport Science may be interested in the WICHE Professional Student Exchange Program. This interstate cooperative allows students to obtain professional training not available in their home states and to pay resident tuition at state supported institutions, or reduced tuition at private institutions.

For further information about the WICHE program write to: Certifying Officer for Oregon, WICHE Student Exchange Program, Oregon State System of Higher Education, P.O. Box 3175, Eugene, OR 97403-0175.

### APPLIED EXERCISE AND SPORT SCIENCE OPTION

The applied option allows students to develop an academic experience designed to meet very specific career goals that are not met by one of the other four options.

## MINORS

An undergraduate minor in athletic administration is offered for students who complete undergraduate major programs in other colleges, schools, or departments.

### ATHLETIC ADMINISTRATION

The athletic administration minor provides professional preparation for students who seek sport and athletic administrative positions while completing an undergraduate major in another field.

Required courses in the athletic administration minor are:
EXSS 312. Sociocul Dimens of Phys Act (3)
EXSS 313. Lifespan Motor Development (4)
EXSS 352. Sport in American Life (3)
EXSS 370. Psych of Sport & Physical Act (3)
EXSS 406. Projects: Athletic Admin (4)
EXSS 452. Sport and Society (3)
EXSS 455. Facilities (3)
EXSS 463. Admin of Exercise & Sport Sci (3)
BA 215. Fundamentals of Accounting (4)

## GRADUATE PROGRAM

The Department of Exercise and Sport Science offers M.S. and Ph.D. degrees in Human Performance and a M.S. degree in Movement Studies in Disability. Graduate areas of concentration available through the department include biomechanics, exercise physiology, motor control and learning, sport studies, sport pedagogy, sport psychology, sports medicine and movement studies in disability. The department participates in a Master of Arts in Interdisciplinary Studies degree offered through the Graduate School.

## COURSES

### ■ FITNESS REQUIREMENT FOR BACCALAUREATE CORE

HHP 231, Lifetime Fitness for Health, fulfills the fitness requirement in the baccalaureate core implemented for students entering in 1990.

**HHP 231. *LIFETIME FITNESS FOR HEALTH (3).** The role of physical activity and health behaviors in the well being of the human body; principles for developing and maintaining physical fitness.

### ■ PHYSICAL ACTIVITY

Physical activity courses are designed to promote general health, physical fitness and individual motor skills that will help students make intelligent decisions regarding current and future lifestyles. A total of 11 credits of PAC may be counted toward graduation.

**Lower Division Courses**
**Lower Division Courses**

**PAC 100. ADAPTED PHYSICAL ACTIVITY (1).** A special class for those with physical handicaps and those who sustain injuries in regular PAC sections during the term.

**PAC 102. AQUA AEROBICS (1).** A variation of traditional water aerobics utilizing jogging in the pool.

**PAC 103. DEEP WATER AEROBICS (1).**

**PAC 106. AEROBIC MACHINE WORKOUT (1).** Fitness through cycling on cycle ergometers.

**PAC 107. DANCE AEROBICS (1).** Cardiorespiratory fitness; dancing to music, safe exercise procedures and having fun.

**PAC 108. STEP AEROBICS (1).** Low-impact, high intensity workout adjustable to all fitness levels utilizing adjustable height benches.

**PAC 109. POWER STEP AEROBICS (1).** Advanced high intensity step workout that includes plyometric jumps and movements through a wide range of motion. PREREQ: PAC 131 or equivalent.

**PAC 113. BADMINTON I (1).** Beginning level instruction; skills in singles and doubles play.

**PAC 114. BADMINTON II (1).** Advanced skill development in badminton. PREREQ: Fundamental skills, rules and strategy of singles and doubles play.

**PAC 116. BASKETBALL I (1).** Fundamental offensive and defensive skills, some competitive play.

**PAC 117. BASKETBALL COMPETITIVE/MR (1).** Team play, individual and team skills developed and refined, competitive round robin tournaments. For skilled individuals.

**PAC 120. MOUNTAIN BIKING (1).** Touring trails in Corvallis area; riding techniques, safety, maintenance, environmental concerns. Required equipment: mountain bike, repair kit, helmet.

**PAC 121. ROAD CYCLING (1).** Touring Corvallis area; bicycle safety, cycling technique, and bicycle maintenance.

**PAC 123. BOWLING I (1).** Fudamentals of the game including spot bowling, natural hook and straight ball delivery, scoring, handicap computation, spare pickup, and error correction. Additional fee; equipment supplied.

**PAC 126. CANOEING (1).** Canoe safety skills, basic paddling strokes, endurance paddling. PREREQ: Ability to swim 400 yds in 14 minutes or less.

**PAC 127. CREW I (1).** Basic rowing technique, conditioning, terminology and safety for the student with no rowing background. PREREQ: Ten minutes continuous lap swim, five minute treading water.

**PAC 128. CREW II (1).** For rowers with previous experience; appropriate water safety instruction; technical and physical skills. Review and refinement of rowing techniques; conditioning oriented practices. PREREQ: PAC 127 or instructor permission.

**PAC 130. CONDITIONING (1).** Total body approach to fitness, cardiorespiratory conditioning, muscular strength and endurance; flexibility emphasized.

**PAC 131. SKI CONDITIONING (1).** Conditioning activities for skiing. Exercises emphasizing strengthening of legs and cardiovascular endurance. Jogging, running, and weight training activities are used.

**PAC 135. BALLETSPORT: BALLET SKILLS FOR ATHLETES (1).** Fundamental ballet technique to enhance balance, agility, alignment, strength and rhythmic movement in sports; no prior ballet experience is needed. Do not need to be an OSU athlete.

**PAC 136. DANCE/BALLET I (1).** Introduction to basic ballet technique and aesthetics, terminology, alignment, stretch and strength exercises. No previous dance experience is necessary.

**PAC 137. DANCE/BALLET II (1).** Review and practice of beginning ballet technique, introduction of more advanced stretches, steps, and combinations. PREREQ: Ballet I or previous ballet experience.

**PAC 138. DANCE/BALLET III (1).** Intermediate and advanced ballet technique, comprehensive exploration of the discipline. PREREQ: Ballet II, previous comparable experience or consent of instructor.

**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.

**PAC 141. DANCE/JAZZ II (1).** Intermediate jazz technique, isolations and combinations. PREREQ: Jazz I or comparable experience.

**PAC 142. DANCE/JAZZ III (1).** Advanced approach to jazz technique; challenging warm ups, combinations, and dances. Performance opportunity. PREREQ: Jazz II, comparable experience, or consent of instructor.

**PAC 143. DANCE/NEW YORK STYLE JAZZ (1).** A soft modern jazz dance style popular among New York City dancers. PREREQ: Previous dance experience or consent of instructor.

**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 is necessary.

**PAC 146. DANCE/MODERN II (1).** An intermediate level of modern dance technique and movement expression. PREREQ: Modern Dance I or comparable experience.

**PAC 147. DANCE/MODERN III, OREGON DANCE PERFORMANCE (1).** Modern dance advanced technical skills, compositions, and combinations. PREREQ: Previous intermediate modern dance experience or consent of instructor.

**PAC 151. DANCE/AFRICAN STYLE (1).** Basic dance steps and patterns from regions of Africa; background information on cultural aspects; class may specialize in a specific region of Africa.

**PAC 153. DANCE/COUNTRY WESTERN LINE (1).** Popular country western line dances.

**PAC 154. DANCE/COUNTRY WESTERN I (1).** Couple dances done Texas-style; swing, two-step, waltz, schottische, and polka.

**PAC 155. DANCE/COUNTRY WESTERN II (1).** For experienced country western dancers.

**PAC 157. DANCE/PERFORMANCE COUNTRY (1).** Advanced instruction; refining of steps and routines preparing for potential public performance. Department approval required.

**PAC 159. DANCE/BALLROOM I (1).** Posture and alignment, fundamentals of leading and following, basic steps and variations for: Waltz, Foxtrot, Swing, Tango, Cha Cha, and Rhumba.

**PAC 160. DANCE/BALLROOM II (1).** Additional steps and patterns of popular ballroom dances. PREREQ: Ballroom I.

**PAC 161. DANCE/BALLROOM III (1).** Styling; additional dances; advanced dance figures; composition and choreography; performance opportunities. PREREQ: Ballroom II.

**PAC 163. DANCE/LATIN (1).** Latin dances including Cha Cha, Mambo, Salsa, Rhumba, Merengue, Bolero, Salso, and Paso Doble. Emphasis on proper styling and technical execution of each dance; effective leading and following techniques. PREREQ: PAC 134.

**PAC 164. DANCE/LATIN II (1).** Continuation of Latin Dance I; more advanced dance patterns in Cha Cha, Salsa, Merenque, Rhumba and Samba. Introduction to Mambo and Bolero; emphasis on technical and stylistic details of each dance. PREREQ: PAC 147.

**PAC 165. DANCE/WEST COAST SWING (1).** Focus on style, technique and many different step patterns of the West Coast Swing dance. PREREQ: Intermediate dance level.

**PAC 167. FLY FISHING II (1).** Advanced fly casting and fly fishing techniques for trout, fly-typing, equipment selection, basic aquatic organism identification, terminology, and regulations for fishing in Oregon's freshwater environment.

**PAC 169. DANCE/PERFORMANCE (1).** Advanced instruction; refining steps and routines preparing for potential public performance.

**PAC 172. FENCING I (1).** Basic foil fencing skills, strategies, attacks and parries.

**PAC 175. FLOOR HOCKEY I (1).** Skills, strategies and competition with a unique adaptation of ice hockey on wood; fitness with fun and excitement.

**PAC 176. FLOOR HOCKEY II (1).** Emphasis is on competitive play for those who have mastered basic skills in Floor Hockey I or its equivalent.

**PAC 178. FLY FISHING I (1).** Casting and fishing techniques, lure making, equipment selection, terminology, and regulation for fishing in Oregon's marine environment.

**PAC 179. FLY FISHING II (1).** Advanced fly casting and fly fishing techniques for trout, fly-typing, equipment selection, basic aquatic organism identification, terminology, and regulations for fishing in Oregon's freshwater environment.

**PAC 180. STEELHEAD FISHING (1).** Casting and fishing techniques, lure making, equipment selection, terminology, and regulations for fishing in Oregons marine environment for steelhead.

**PAC 181. ADVANCED FLY TYING (1).** Tying of artificial files useful for trout, steelhead, and bass fishing; dubbing techniques, spinning heair, parachute hackling, and precise winging methods included. PREREQ: PAC 178 or previous fly tying experience.

**PAC 184. GOLF I (1).** Basic fundamental principles in all phases of golf; rules, terminology, etiquette, safety and scoring. Equipment provided.

**PAC 185. GOLF II (1).** Individual practice and course play; skill refinement as continuation of Golf I. Equipment available. Course play expected, additional fee. PREREQ: Golf I.

**PAC 186. GOLF III (1).** Advanced skills, knowledge involved in competitive play. Course play expected, additional fee. PREREQ: HDCP below 12; competitive play.

**PAC 188. GYMNASTICS (1).** Fundamental techniques on floor and apparatus.

**PAC 189. ST/GOLF (1).** Specialized courses emphasizing certain golf skills. May require prerequisite of currently offered course.

**PAC 190. KARATE (1).** Exercise and techniques plus evaluation of private karate club programs.

**PAC 191. BEGINNER RIDING I (1).** Introduction to either English or Western riding position and control of the horse at the walk, trot and canter. CROSSLISTED AS ANS 191. Additional fee.

**PAC 192. BEGINNER RIDING II (1).** Review of the basics of either English or Western riding, improves rider's position and control at the trot and canter and introduces riding over fences or patterns. CROSSLISTED AS ANS 192. Additional fee.

**PAC 193. INTRODUCTORY DRESSAGE (1).** Terminology and techniques of Dressage. CROSSLISTED AS ANS 193. Additional fee.

**PAC 194. INTRODUCTORY JUMPING (1).** Riders are coached through several exercises designed to improve their riding ability. CROSSLISTED AS ANS 194. Additional fee.

**PAC 198. RACQUETBALL I (1).** Individual skills; rules, court positioning, player movement, strategy, competitive play. Additional fee.

**PAC 199. RACQUETBALL II (1).** Competitive play; kill shots, court positioning, player movements. PREREQ: Competitive experience or good skill level. Additional fee.

**PAC 201. RELAXATION (1).** Introduction to relaxation techniques; common applications.

**PAC 209. ROCK CLIMBING/CONDITIONING (1).** Physical conditioning for, and instruction in, the skills and techniques of rock climbing; environmental impact issues; on campus laboratory. Additional fee may be required for off campus practice.

**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. Additional fee may be required for off campus practice. PREREQ: PAC 209 or consent of instructor.

**PAC 212. RUNNING/JOGGING (1).** Cardiorespiratory fitness with scenic running routes; training, nutrition, and physiology.

**PAC 213. RUNNING/10K TRAINING (1).** Conditioning and training program for road racing.

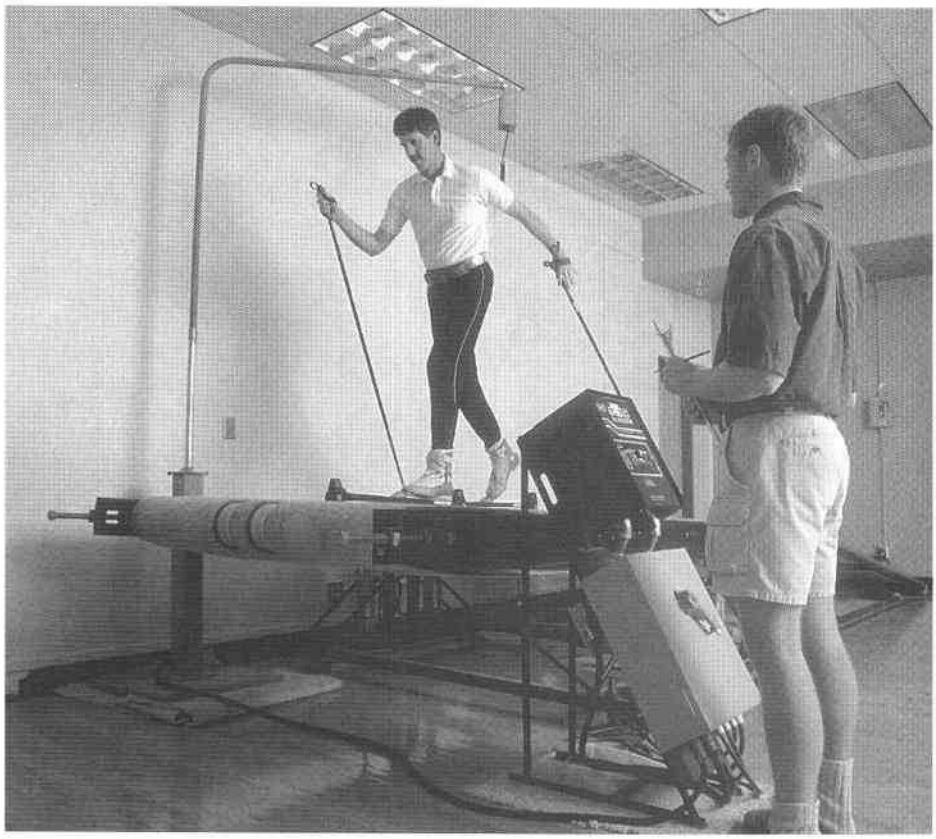
**PAC 217. SELF DEFENSE (1).** Non-violent self defense. Develop self confidence and skills for assault situations. Conditioning and practical skills. Men and women, all levels.

**PAC 220. SKATING/IN-LINE (1).** Aerobic fitness exercise class utilizing rollerblades instead of running, jogging, cycling or swimming.

**PAC 222. SKATING/IN-LINE HOCKEY (1).** Ice hockey on land using in-line skates. Skills, games, and tournaments. Department approval required.

**PAC 225. DOWNHILL SKIING (1).** Eight days at a ski area, 1-1/2 hour lesson daily, students grouped according to skill level: beginner, intermediate, advanced, racer. Special fee covers bus transportation, and lifts. Additional fee for rentals.

**PAC 226. SKIING/CROSS COUNTRY (1).** Eight days at a ski area, 1-1/2 hour lesson daily, students will learn and practice flat track, uphill and downhill technique, and gain knowledge of back country touring and skating. Special fee covers bus transportation and facility usage. Additional fee for rentals.



**PAC 227. SNOWBOARDING (1).** Eight days at a ski area, 1 1/2 hour lesson daily, students grouped according to skill level: beginning, intermediate, advanced. Special fee covers bus transportation and lifts. Additional fee for rentals.

**PAC 229. SOCCER I (1).** Basic skills of controlling the ball; conditioning; lead-up games; team play.

**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. PREREQ: 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. PREREQ: 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. PREREQ: 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.

**PAC 239. SCUBA/RESEARCH DIVING LECTURE (1).** Essential knowledge for under-water diving and exploration; provides a proper background for eventual research diving. NAUI Basic Certification available with successful completion of lecture and lab courses and open water dive. COREQ: PAC 240.

**PAC 241. SCUBA/OPEN WATER LECTURE (1).** Instruction in physiology, water environment, equipment, and techniques necessary for fundamental open water scuba diving. Instruction may lead to P.A.D.I. certification. Required laboratory. Additional fee.

**PAC 242. SCUBA/OPEN WATER LAB (1).** Instruction and practice in techniques, skills, equipment usage necessary for fundamental open water scuba diving. Instruction may lead to P.A.D.I. certification. Required lecture. PREREQ: 200-yard swim and 10 minute survival skills. Additional fee, includes open water dive trip.

**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 P.A.D.I. certification.

**PAC 244. SCUBA/RESCUE DIVER (1).** Techniques, skills, knowledge, and practice in self-rescue and rescue of others in underwater emergencies; may lead to P.A.D.I. certification; lecture and pool laboratory; open water dive required. PREREQ: Advanced Open Water or equivalent.

**PAC 24S. 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.

**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.

**PAC 250. SWIM I (1).** Swimming concepts, survival and breathing techniques, front crawl and elementary backstroke as minimum instruction. PREREQ: Minimal swimming skill.

**PAC 251. LAP SWIM/STROKE ASSISTANCE (1).** Non-competitive swim, exercise program with individual stroke skill assistance.

**PAC 252. SWIM II (1).** Conditioning; swimming strokes (particularly front crawl, sidestroke, and breaststroke); swimming skills. PREREQ: 75 yd. front crawl. Swim I skills.

**PAC 253. SWIM TRAINING WORKOUT (1).** Competitive skills and strokes; emphasis on training. PREREQ: Ability to do interval training.

**PAC 256. TAICHI (1).** Traditional Chinese martial art form; series of 88 moves with continually soft, slow, steady motions broken into separate movements and combinations intended to unite body and mind.

**PAC 260. TENNIS I (1).** Introduction to fundamental strokes and basic concepts in tennis.

**PAC 261. TENNIS II (1).** Review and refinement of fundamental strokes; volley, lob, return of serve; introduction to singles and doubles play. PREREQ: Tennis I.

**PAC 262. TENNIS III (1).** Focus on ground stroke serve consistency; approach shots and overheads; tactics for net and baseline play. PREREQ: Tennis II.

**PAC 266. TRIATHLON TRAINING (1).** A performance training class designed to prepare individuals to participate in local triathlon competitions during the term. PREREQ: Individuals should be capable of swimming 1000 yards, running 3 miles, and cycling 12 miles at the start of class.

**PAC 268. TRACK/COMPETITIVE CROSS COUNTRY (1).** Training, including hills, intervals, and track workouts in preparation for cross country competition. Participation in some cross country meets is expected.

**PAC 269. TRACK AND FIELD COMPETITION (1).** Workouts, training, technique in preparation for outdoor track and field competition. Competition in some track and field meets is expected.

**PAC 271. ULTIMATE FRISBEE I (1).** Fundamentals for the beginning and intermediate player; individual skill development, rules, game play, and strategy.

**PAC 274. VOLLEYBALL II (1).** Fundamental skills and knowledges refined; intermediate skills developed, competitive play. PREREQ: Volleyball I and good fundamental skills.

**PAC 27S. VOLLEYBALL III (1).** Skill refinement and development; intense, highly competitive drills and game situations, doubles through sixes play.

**PAC 278. FITNESS WALKING (1).** Establishment of personal fitness programs through walking with emphasis on warm-up, warm-down and aerobic components.

**PAC 282. WATER POLO (1).** Team game, similar to soccer, played in deep water; instruction in skills, drills, strategies, techniques; team play; knowledge of rules and terminology. PREREQ: PAC 220 or equivalent.

**PAC 286. WEIGHT TRAINING/CIRCUITS (1).** Fast paced aerobic weight exercise program. No prior experience required.

**PAC 287. WEIGHT TRAINING I (1).** Exercise techniques in both free and fixed equipment; safety procedures, terminology, and principles of exercise.

**PAC 288. WEIGHT TRAINING II (1).** Intermediate level of weight training in free and fixed weights. PREREQ: Weight Training I.

**PAC 289. WEIGHT TRAINING III (1).** Advanced level of training and instruction with emphasis on the power lifts (bench press, dead lift and squat). PREREQ: Weight Training II.

**PAC 292. WRESTLING (1).** Collegiate wrestling Fall and Winter terms; freestyle and Greco wrestling Spring term. All levels.

**PAC 294. YOGA I (1).** Principles and practice of basic yoga postures and techniques of posture alignment.

**PAC 29S. YOGA II (1).** Intermediate level course to improve yoga practice and develop balance and alignment in more advanced postures. PREREQ: Yoga I or previous experience in Iyengar style methods.

**PAC 299. ST/PEAK PERFORMANCE (1).**

## ■ EXERCISE AND SPORT SCIENCE

**SPORT SCIENCE (3).** 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.

**EXSS 132. PRETHERAPY (2).** Selected paramedical fields; objectives, goals and modalities as they relate to the various needs of patients. Personal and professional qualifications associated with various therapies; emphasis on occupational therapy and physical therapy and their relationship to the medical field.

**EXSS 194. PROFESSIONAL ACTIVITIES (1/2).** Basic movement skills, basic rhythms, track and field.

**EXSS 199. SPECIAL STUDIES (1-3).**

**EXSS 235. LIFEGUARD TRAINING (2).** Victim recognition, surveillance, equipment-based rescue skills, victim removal and resuscitation, care for spinal injury. Red Cross Certification in Lifeguard Training, First Aid and CPR for the Professional Rescuer. PREREQ: Ability to swim 500 yards.

**EXSS 236. WATER SAFETY INSTRUCTION (3).** Physical laws, stroke analysis, safety skills, skill progressions, variety of teaching approaches. Red Cross Certification. PREREQ: Ability to swim 500 yards using three strokes.

**EXSS 252. ROLE OF FITNESS IN AMERICAN SOCIETY (3).** Examination of the role of physical fitness in American society and in its institutions including education, economic, and family; the societal factors affecting fitness activities; the delivery systems of fitness; and fitness as a component of wellness education.

**EXSS 271. PRINCIPLES OF COMPUTING IN EXERCISE AND SPORT SCIENCE (3).** Overview of computer hardware and software structures with emphasis on applications in exercise and sport science.

**EXSS 294. PROFESSIONAL ACTIVITIES (2).** Basketball, volleyball, football, gymnastics, hockey, soccer.

**EXSS 299. SPECIAL TOPICS (1-3).**

### Upper Division Courses

**EXSS 301. RESEARCH (1-16).**

**EXSS 305. READING AND CONFERENCE (1-16).**

**EXSS 306. PROJECTS (1-16).**

**EXSS 307. SEMINAR (1-3).** Section 2: SEMINAR PREINTERNSHIP; 1 credit.

**EXSS 312. SOCIOCULTURAL DIMENSIONS OF PHYSICAL ACTIVITY (3).** Physical activity in contemporary society. Relationships with the social processes; interrelationships between physical activity and the cultural institutions. PREREQ: 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. PREREQ: EXSS 322.

**EXSS 322. ANATOMICAL KINESIOLOGY (4).** Anatomical aspects of human movement; actions of bones and muscles in motor activities. PREREQ: Z 331,Z 341.

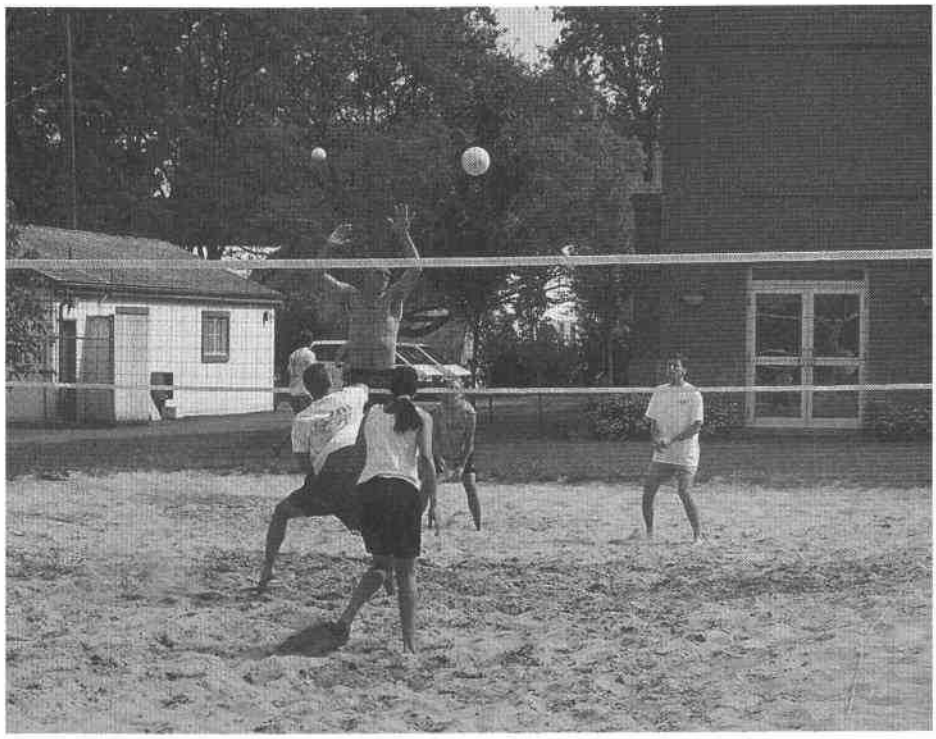
**EXSS 323. BIOMECHANICS OF SPORTS AND EXERCISE (4).** The physical laws and mechanical aspects governing human motor function; analytical processes emphasized. PREREQ: Z 331, Z 341, MTH 112.

**EXSS 324. PHYSIOLOGY OF EXERCISE (3).** Physiological effects of physical activity on the human body. PREREQ: Z 332, CH 121,CH 122,CH 123 or CH 221,CH 222,CH 223.

**EXSS 325. FITNESS ASSESSMENT AND EXERCISE PRESCRIPTION (2).** Introduction to field-based physical fitness assessment; application of physiological principles to design safe and effective exercise programs for the apparently healthy as well as for individuals with obesity, coronary disease, diabetes, and other degenerative diseases. PREREQ: EXSS 324 or take concurrently with EXSS 324.

**EXSS 333. EXERCISE AND SPORT SCIENCE PRACTICUM (2).** Field experience under professional supervision. PREREQ: Instructor approval. May be repeated for credit.

**EXSS 334,EXSS 335. EXERCISE AND SPORT SCIENCE PRACTICUM (2,2).** Field experience under professional supervision. PREREQ: Instructor approval. May be repeated for credit.



**EXSS 340. ORGANIZATION OF SPORTS 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. PREREQ: Sophomore standing.

**EXSS 352. SPORT IN AMERICAN LIFE (3).** Nature of sport in contemporary society; interrelationships between sport and cultural institutions. PREREQ: 6 credits social science.

**EXSS 353,EXSS 354,EXSS 355. PHYSICAL ACTIVITY AND DEVELOPMENT PRACTICUM: TEACHER EDUC (2,2,2).** Laboratory application of Physical Activity and Development option with follow-up seminars. Supervised work experience in elementary, middle, and high school physical education classes. One of three placements may be in a coaching environment within a middle or high school setting with instructor approval. EXSS 353 PREREQ: 2.5 cumulative GPA, EXSS 194. COREQ: EXSS 360 or EXSS 420. EXSS 354 PREREQ: EXSS 353. EXSS 355 PREREQ: EXSS 354.

**EXSS 356. CARE AND PREVENTION OF ATHLETIC INJURIES (3).** Theoretical and practical aspects of the prevention, treatment, and rehabilitation of athletic injuries. PREREQ: Z 331, Z 341. PHAR 210 recommended.

**EXSS 357. ATHLETIC TRAINING PRACTICUM (3).** Laboratory application of athletic training for prevention, treatment, and rehabilitation of athletic injuries with follow-up seminars. PREREQ: EXSS 356 and acceptance into athletic training curriculum.

**EXSS 358,EXSS 359. ATHLETIC TRAINING PRACTICUM (3,3).** Laboratory application of athletic training for prevention, treatment, and rehabilitation of athletic injuries with follow-up seminars. PREREQ: EXSS 356 and acceptance into athletic training curriculum.

**EXSS 360. SPORT SKILL ANALYSIS (2).** Introduction to a variety of sports skills; opportunities for sports skill analysis. May be repeated for credit.

**EXSS 361. COACHING AND OFFICIATING OF SPORT (2).** Sport fundamentals; organization; practice sessions; strategy and tactics; rule knowledge; and officiating mechanisms and responsibilities. May be repeated for credit for different sports.

**EXSS 370. PSYCHOLOGY OF SPORT AND PHYSICAL ACTIVITY (3).** Interaction between psychological variables and human motor performance.

**EXSS 394. PROFESSIONAL ACTIVITIES (2).** Aerobics, aquatics, resistance training, self-defense, tennis, golf, wrestling.

**EXSS 399. SPECIAL TOPICS (1-3).**

**EXSS 401. RESEARCH (1-16).**

**EXSS 405. READING AND CONFERENCE (1-16).**

**EXSS 406. PROJECTS (1-16).**

**EXSS 407. SEMINAR (1-16).**

**EXSS 408. WORKSHOP (1-16).**

**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. PREREQ: Completion of required courses, cumulative EXSS program GPA of 2.25 and EXSS overall GPA of 2.50, completion of 165 credit hours or Academic Advisor's Approval. May be repeated for credits.

**EXSS 411. MOVEMENT SKILL LEARNING AND CONTROL (4).** Motor control and learning, including neural mechanisms, practice, feedback, retention, and transfer; application of theoretical concepts emphasized. PREREQ: EXSS 322.

**EXSS 412/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. PREREQ: EXSS 411.

**EXSS 414. FITNESS AND AGING: DEVELOPMENTAL AND PROGRAMMING (3).** PERSPECTIVES. Examination of neurological, physiological, and psychological changes occurring after adolescence and implications for the planning, implementation, and evaluation of physical activity programs for the adult population.

**EXSS 415/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. PREREQ: EXSS 411, EXSS 444/544. (Writing Intensive Course)

**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 424. APPLIED EXERCISE AND SPORT PHYSIOLOGY (3).** Physiological adaptations to exercise regimens for sport and fitness, with consideration of factors that affect physical performance and the methods for evaluating physiological capacities. PREREQ: EXSS 324.

**EXSS 425/EXSS 525. BIOMECHANICS OF THE SKELETAL SYSTEM (3).** Application of biomechanical principles in the analysis of bone, cartilaginous and collagenous tissues, and of reactions occurring at joints, with emphasis on the current research literature. PREREQ: EXSS 323. Not offered every year.

**EXSS 426/EXSS 526. BIOMECHANICAL ANALYSIS TECHNIQUES (3).** Techniques for collecting and analyzing quantitative human movement data from high-speed film, including theories supporting three-dimensional analysis and data-smoothing methodologies. PREREQ: EXSS 323, EXSS 411.

**EXSS 434/EXSS 534. PHYSIOLOGY OF STRENGTH DEVELOPMENT (3).** Theory and methodology of strength development. PREREQ: EXSS 424.

**EXSS 436/EXSS 536. CARDIOVASCULAR DYNAMICS (3).** Responses of the cardiovascular system to exercise and principles of exercise testing prescription. PREREQ: EXSS 424.

**EXSS 437/EXSS 537. RESPIRATORY DYNAMICS (3).** Responses of the respiratory system during work and exercise; role of ventilation in energy metabolism and the influence of environmental factors on pulmonary function. PREREQ: EXSS 424.

**EXSS 442. ATHLETIC TRAINING PROGRAMS (3).** Medical-legal implications, professional personnel relationships, scope of employment, current issues and problems associated with athletic training. PREREQ: EXSS 357.

**EXSS 443. THERAPEUTIC MODALITIES (4).** Indications, contraindications, techniques, and effects of various physical agents involved in the care and treatment of musculoskeletal injuries and diseases. PREREQ: Admission to the athletic training curriculum or enrollment in a pretherapy program (Department of Exercise and Sport Science or College of Science).

**EXSS 444/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. PREREQ: EXSS 411, EXSS 324.

**EXSS 445/EXSS 545. THERAPEUTIC EXERCISE (4).** Principles and techniques of therapeutic exercises; activities and programs for a variety of injuries, conditions, and diseases that require physical rehabilitation. PREREQ: EXSS 356 or EXSS 444/ EXSS 544.

**EXSS 450. ^ORTHOPEDIC PHYSICAL ASSESSMENT (4).** Advanced course designed to develop knowledge and skills related to the recognition, assessment, and appropriate medical referral of athletic injuries and illnesses. PREREQ: EXSS 356. (Writing Intensive Course)

**EXSS 452/EXSS 552. SPORT AND SOCIETY (3).** Investigation of sport as a social phenomenon, including small groups in sport, sport organizations, sport subcultures, socializing institutions, and an in-depth analysis of interscholastic and intercollegiate sport programs. PREREQ: EXSS 312 and 6 credits of sociology.

**EXSS 455/EXSS 555. FACILITIES (3).** Planning construction of indoor and outdoor physical activity facilities; relationship of staff, architect, and community; analysis of gymnasium and field space.

**EXSS 456/EXSS 556. THE OLYMPIC GAMES (3).** Examination of the modern Olympic Games in society with an emphasis on recent Olympiads. Offered even-numbered years. PREREQ: 6 credits of social science.

**EXSS 463/EXSS 563. ADMINISTRATION IN EXERCISE AND SPORT SCIENCE (3).** Analysis of administrative methods with unique applications to the administration of programs in the school, in commercial and industrial settings, and in sport and recreational programs. PREREQ: BA 302, or EXSS 340.

**EXSS 471. TESTS AND MEASUREMENTS IN EXERCISE AND SPORT SCIENCE (4).** Techniques for constructing, evaluating, and administering tests in the cognitive, affective, and psychomotor domains; analysis and interpretation of test data. PREREQ: Senior standing, college algebra.

**EXSS 472/EXSS 572. COMPUTER UTILIZATION IN HEALTH AND EXERCISE AND SPORT SCIENCE (3).** Implementation of computer hardware and software in research applications among the subdisciplines of health and exercise and sport science. PREREQ: EXSS 271, ST 201.

**EXSS 474/EXSS 574. STRESS PHYSIOLOGY INSTRUMENTATION (1).** Instrumentation, calibration, validity and reliability of exercise physiology measurement in metabolism, pulmonary function, body composition, and electrocardiography. PREREQ: EXSS 424. May be repeated for credit.

**EXSS 481. ^ANALYSIS OF CRITICAL ISSUES IN EXERCISE AND SPORT SCIENCE (3).** Analysis of current literature, professional issues, and societal interrelationships in exercise and sport science; intensive course designed to emphasize writing as a tool for learning and the products of writing. PREREQ: Senior standing. (Writing Intensive Course)

**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. PREREQ: Senior standing.

### Graduate Courses

**EXSS 501. RESEARCH (1-16).**

**EXSS 503. THESIS (1-16).**

**EXSS 505. READING AND CONFERENCE (1-16).**

**EXSS 506. PROJECTS (1-16).**

**EXSS 507. SEMINAR (1-16).** SECTION 1: SEMINAR. Graduate research seminar which 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. May be repeated for credit. 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.

**EXSS 508. WORKSHOP (1-16).**

**EXSS 511. HUMAN MOVEMENT, PERCEPTION AND COGNITION (3).** Current theories underlying control of human movement and acquisition of motor skill; role of perception, attention and memory upon skill acquisition and performance. PREREQ: EXSS 411 or EXSS 412 or equivalent.

**EXSS 523. BIOMECHANICS OF MOTOR ACTIVITIES (3).** Kinematic and kinetic analysis of volitional human movement with emphasis on analytical techniques and quantitative problem solving. PREREQ: EXSS 323 or PH 201.

**EXSS 530. ORTHOPEDIC ASPECTS OF SPORTS MEDICINE (3).** In-depth study of the current concepts and theories related tot he epidemiology, etiology, prevention, physical assessment, clinical management, and rehabilitation of sports-related musculoskeletal injuries. PREREQ: EXSS 450 or equivalent.

**EXSS 533. ADVANCED EXERCISE PHYSIOLOGY (3).** Physiological adaptations to physical exercise and training; emphasis on recent research. PREREQ: EXSS 424.

**EXSS 538. SKELETAL ADAPTATIONS TO EXERCISE (3).** Examination of alterations in, and adaptations of the skeletal system to exercise. Includes bone modeling, remodeling and repair as well as clinical pathologies of the skeleton such as osteoporosis and stress fractures. PREREQ: EXSS 324.

**EXSS 547. MAINSTREAMING IN EXERCISE AND SPORT SCIENCE (3).** Effectiveness of integrated exercise and sport science and sport experiences on handicapped and non-handicapped participants. PREREQ: EXSS 444/EXSS 544.

**EXSS 548. ASSESSMENT AND PROGRAMMING FOR SPECIAL POPULATIONS (3).** Use of appropriate assessment procedures for developing effective psychomotor programs for the disabled. PREREQ: EXSS 444,EXSS 471.

**EXSS 549. PHYSICAL ACTIVITY FOR THE SEVERELY DISABLED (3).** Effectiveness of motor programs, instructional strategies, behavior management practices, and data analysis systems on the psychomotor performance of the severely disabled. PREREQ: EXSS 444/EXSS 544.

**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. PREREQ: 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. PREREQ: EXSS 560.

**EXSS 562. LIFESPAN SPORT AND EXERCISE PSYCHOLOGY (3).** Social-psychological issues across the lifespan in the context of sport and exercise. PREREQ: 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. PREREQ: EXSS 471, ST 511.

**EXSS 575. RESEARCH IN HUMAN MOVEMENT (3).** Investigation and evaluation of research methods applicable to human movement study and professional physical education. PREREQ: EXSS 471, ST 511.

**EXSS 577. MULTIVARIATE ANALYSIS IN HUMAN PERFORMANCE RESEARCH (3).** Using SPSS to obtain and interpret multivariate analyses of data collected in health and human performance settings. PREREQ: Graduate standing, and ST 411/511 or ST 412/512 or H 524.

**EXSS 580. ANALYSIS OF TEACHING BEHAVIOR IN SPORT AND PHYSICAL (3).** EDUCATION Introduction to current strategies used to analyze and evaluate instruction in sport and physical education settings.

**EXSS 591. SELECTED TOPICS (1-3).** Topics vary; include recent advances in exercise science, motor behavior, and sport studies and their application to special fields of study. May be repeated for credit when topics differ. PREREQ: Graduate standing.

**EXSS 601. RESEARCH (1-16).**

**EXSS 603. THESIS (1-16).**

**EXSS 605. READING AND CONFERENCE (1-16).**

**EXSS 606. PROJECTS (1-16).**

**EXSS 607. SEMINAR (1-16).** Section 1: Graduate Research (1). Seminar which 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. May be repeated for credit. 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. science. Required of all doctoral students.

# PUBLIC HEALTH

Rebecca Donatelle, Chair
256 Waldo Hall
Oregon State University
Corvallis, OR 97331-6406
(541) 737-2686

**Faculty**
*Professors:* Rossignol; *Associate Professors* Chi, Donatelle, Harding, Lawson, Tricker, Veltri; *Assistant Professors* Beeson, Champeau, Friedman, Neumann, Prows, Schindler; *Instructors* Garets, Hudson, Jarvis, Spencer

**Adjunct Faculty**
Beary, Janet, Ph.D.; Graham, Cheryl, M.S.; Molina, Jan, M.S.

**Courtesy Faculty**
Bird, Sheryl, Ph.D., Bonnlander, Heinke, Ph.D., Albany; Chase, Karen, M.S., Portland; Engle, Tom, RN, M.S.; Fugi, Gerald, D.D.M., Hendricks, Charles, Ph.D., Corvallis; Holstedt, Peggy, M.S., Salem; Mullins, Larry, M.A., Corvallis; Stevens, Nancy, Ph.D., Portland; Terhune, Charles, M.D., Corvallis; Webster, Claudia, Portland; Wilson, Robert, R.S., Corvallis; Wright, Gary, M.D.

## Undergraduate Majors

**Environmental Health and Safety (B.S.)**
*Options*
Environmental Health

**Health Promotion and Education (B.S.)**
*Options*
Applied Health
Applied Health and Gerontology
Child and Adolescent Health
Community Health
Worksite Health Promotion

**Health Care Administration (B.S.)**
*Options*
General Health Care Administration
Long Term Care Administration

## Minors

Applied Health
Community Health
Environmental Health
Health Science
Worksite Health Promotion

## Graduate Majors

**Public Health (Ph.D.)**
(Gerontology, Health Promotion and Education, Health Care Administration and Environmental Health and Safety Concentrations)
Community Health
Health Education

**Environmental Health Management (M.S.)**
*Graduate Areas of Concentration*
Environmental Health Management
Occupational Safety

**Health and Safety Administration (M.S.)**
*Graduate Areas of Concentration*
Health Care Administration
Health Promotion
Safety Management

**Oregon Master of Public Health (M.P.H.)**
*Graduate Areas of Concentration*
Health Policy and Management
Public Health Promotion and Education
Gerontology

The Department of Public Health offers study programs leading to baccalaureate (B.S.) and advanced degrees (M.S., M.P.H. Ph.D.) for non-clinical professionals seeking public health careers. It also participates in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) and Master of Arts in Teaching (M.A.T.) Public Health is a collective body of knowledge grounded in the health and social sciences. The field is concerned with the effect of human behavior, social and governmental policies and programs, industrial environments, and health service systems on individual and population health and well-being.

## UNDERGRADUATE STUDIES

The undergraduate health curriculum includes study of the humanities and the biological, physical, and social sciences as well as intensive study in at least one professional public health area.

## MAJOR AREAS OF STUDY

### ENVIRONMENTAL HEALTH AND SAFETY

Environmental Health and Safety graduates coordinate efforts related to reduction of risks from environmental threats and safety hazards, and they design programs and policies to protect population health and reduce costs due to environmental health and safety prolems. The curriculum provides a broadly based background in toxicology, air quality, epidemiology, disease transmission, drinking water quality, food protection, occupational health, solid and hazardous waste control, and environmental health policy and regulations. Many professional courses have an additional focus in contemporary problems associated with the adverse health effects of global environmental contaimination.

### ENVIRONMENTAL HEALTH

**Baccalaureate Core Requirements (27)**
21 of the 48 credits required in the baccalaureate core may be fulfilled by courses in the environmental health curriculum.

**Department of Public Health Core (12)**
H 225. Social & Individual Health Determinants (3)
H 220. Intro to Epidem & Hlth Data Analysis (3)
H 320. Introduction to Human Disease (3)
H 323. Introduction to Public Health (3)

**Environmental Health and Safety Core (34)**
H 181. Safety Principles & Foundations (3)
H 281. Elements of Industrial Hygiene (3)
H 344. Environmental Science: A Global Perspective (3)
H 407. Pre-Internship (1)
H 410. Internship (12)
H 440. Environmental Health (3) WIC
H 441. Environmental Health (3)
H 445. Occupational Health (3)
H483. Safety & Environmental Health Management (3)

**Environmental Health Option Courses (23)**
H 411. Environmental Health Policy & Regulation (3)
H 412. Air Quality & Public Health (3)
H 425. Principles of Epidemiology (3)
H 443. Environ Sampling and Analysis (4)
H 446. Industrial Hygiene Instrumentation (3)
H 447. Solid & Hazardous Waste Mgmt (3)
H 448. Public Health Toxicology & Risk Assessment (4)

**Supporting Courses (69)**
CH 121, CH 122, CH 123. Gen Chemistry (or) CH 221, CH 222, CH 223. Gen Chem (15)
COMM 111. Public Speaking OR COMM 114. Argument & Critical Discourse (3)
MTH 111. College Algebra (4)
MTH 241. Calculus for Management & Social Science OR MTH 112. Elementary Functions (4)
Z 331, Z 332 or 333. Human Anatomy & Physio (6)
MB 230. Introductory Microbiology (4)
WR 327. Technical Writing (3)
CSS 305. Principles of Soil Science (5)
CH 331, CH 332. Organic Chemistry (8)
BI 101, BI 102, BI 103. Introductory Biology (12)
PH 201. General Physics (5)

**Electives (27)**

**Total (192)**

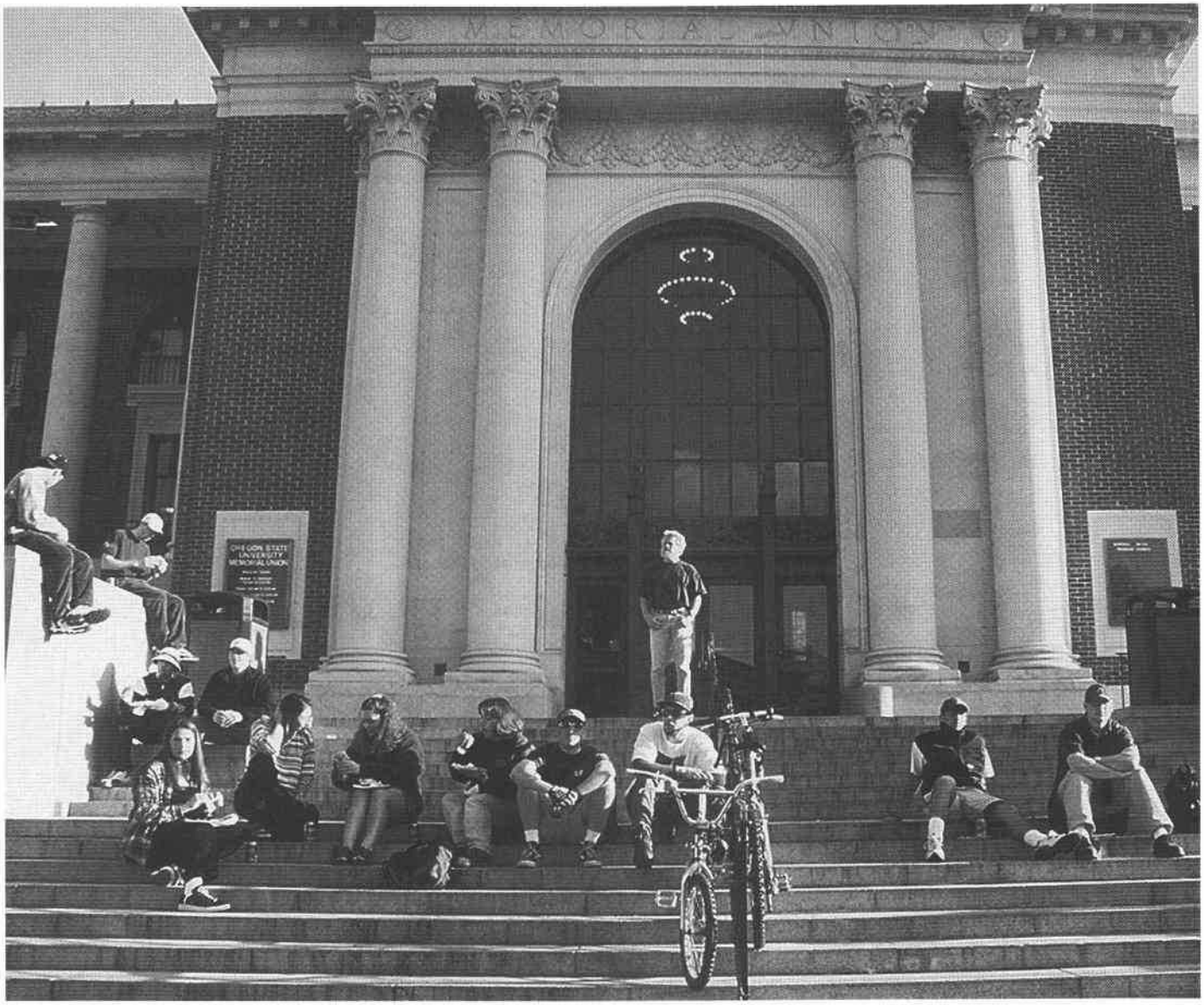
## HEALTH PROMOTION AND EDUCATION

Graduates in this major hold positions in a wide range of public and private organizations. Careers focus on risk reduction, program planning and evaluation, health policy and advocacy, and the prevention of premature death and disability among diverse populations.

Students receive academic and practical experiences that can lead to enrollment in the five-year teacher preparation program. Students who major in Health Promotion and Education select an option from community health, worksite health promotion, applied health and gerontology, child and adolescent health, or applied health.

**Admission Criteria**
To be accepted into the Health Promotion and Education program a student must:

1. Complete a minimum of 45 credits of course work applicable toward a degree in Health Promotion and Education with a cumulative (OSU and transfer, if applicable) GPA of 2.75 or higher, including a GPA of 2.75 or higher in the following pre-Health Promotion and Education course work:
H 225. Social & Individual Health Determinants (3)
H 220. Introduction to Epidemiology and Health Data Analysis
H 256. History, Theory and Practice of




Health Promotion and Education
H 263. Psychosocial Dimensions of Health
PSY 201. General Psychology
SOC 204. Introduction to Sociology
NFM 225. Human Nutrition
BI 101, BI 102. Introductory Biology
MB 230. Introductory Microbiology
CH 121 or CH 221. General Chemistry
ANTH 210. Comparative Cultures (3)
WR 121. English Composition
All of the above courses must be taken graded.

2. Submit a written request for admission to the Health Promotion and Education program upon completion of the above courses. Students will receive written notification of their admission into the program.

**Baccalaureate Core Requirements (34)**
18 of the 52 credits required in the baccalaureate core may be fulfilled by courses in the major of Health Promotion and Education.

**Department of Public Health Core (12)**
H 225. Social and Individual Health Determinants (3)
H 220. Intro to Epidem & Hlth Data Analysis (3)
H 320. Introduction to Human Disease (3)
H 323. Introduction to Public Health (3)

**Health Promotion and Education Core (93)**
H 210. Introduction to Health Services & Organizations (3)
H 256. History, Theory & Prac in Hlth Prom & Educ (3)
H 263. Psychosocial Dimensions of Health (3)
H 310. Health Field Experiences (3)
H 319. Hlth Policy Form & the Consumer (3)
H 344. Intro to Environmental Science (3)
H 364. Drugs, Society & Human Behavior (3)
H 407. Pre-Internship (1)
H 410. Internship (12)
H 421. Mental Health & Social Policy (3)
H 449. Health Risk Communication (3)
H 455. Risk Factors Over the Lifespan (3)
H 461. Sexuality: A Health Sci Perspective (3)
H 473. Stress and Health: Controlling Individual and Environmental Hazards (3)
H 475. Eval Hlth Promo & Educ Programs (3)
H 476. Planning Health Programs (4)
ANTH 210. Comparative Cultures (3)
CH 121 or CH 221. General Chemistry(5)
EXSS 324. Physiology of Exercise (3)
BI 101, or BI 102, or BI 103. General Biology (4)
MB 230. Intro Microbiology (4)
NFM 225. Human Nutrition (4)
PSY 201. General Psychology (3)
SOC 204. Intro to Sociology (3)
Z 331. Human Anatomy & Physiology (3)
Z 332 or 333. Human Anat & Physiology (3)

**COMMUNITY HEALTH OPTION (24)**
H 312. AIDS and Sexually Transmitted Dis in Mod Soc (3)
H 420. Minority Health (3)
H 422. Control of Chronic Disease (3)
H 423. Health Aspects of Aging (3)
H 425. Principles of Epidemiology (3)
H 470. Introduction to Worksite Health Promotion (3)

H474. Public Health and Violence in Society (3)
H 477. Obesity and Wgt Mgmt: a Theoretical Approach (3)

**WORKSITE HEALTH PROMOTION OPTION (24)**

H 262. Consumer Health (3)
H 312. AIDS and Sexually Transmitted Dis in Mod Soc (3)
H 420. Minority Health (3)
H 422. Control of Chronic Disease (3)
H 423. Health Aspects of Aging (3)
H 445. Occupational Health (3)
H 470. Introduction to Worksite Health Promotion (3)
H 474. Public Health and Violence in Society (3)

**APPLIED HEALTH AND GERONTOLOGY OPTION (24)**

H 420. Minority Health (3)
H 422. Control of Chronic Disease (3)
H 423. Health Aspects of Gerontology (3)
H 430. Health Policy Analysis (3)
H 464. Perspectives on Death (3)
H 467. Long Term Care Alternatives (3)
H 474. Public Health and Violence in Society (3)
SOC 432. Sociology of Aging (3)

**CHILD AND ADOLESCENT HEALTH OPTION (24)**

H 262. Consumer Health (3)
H 369. School Health Education (3)
H 386. Adv First Aid/First Responder (3)
H 420. Minority Health (3)
H 460. Health Challenges Facing Youth (3)
H 464. Perspectives on Death (3)
H 465. Public Health & Women: Social & Policy Issues (3)
H 474. Public Health and Violence in Society (3)

**APPLIED HEALTH OPTION (24)**

H 312. AIDS and Sexually Transmitted Dis in Mod Society (3)
H 420. Minority Health (3)
H 422. Control of Chronic Disease (3)
H 460. Health Challenges Facing Youth (3)
H 465. Public Health & Women: Social & Policy Issues (3)
H 474. Public Health and Violence in Society (3)
plus two additional courses selected with adviser approval

Total (180)

## HEALTH CARE ADMINISTRATION

This major prepares students for careers in the fast-growing health care industry. Graduates have the skills to work in hospital administration, long-term care, or other health services management positions. The Health Care Administration program has full membership in the Association of University Programs in Health Administration. The curriculum comprises a series of courses relating to a set of common requirements and to a set of specialized options.

### ADMISSION CRITERIA

To be accepted into the program, a student must:

1. Complete 90 credits of course work applicable toward a degree in health care administration with an overall GPA of 2.8 or higher.

2. Complete the following pre-HCA courses with a GPA of 2.8 or higher:
H 210. Intro to Health Services & Organizations
H 225. Social & Individual Health Determinants
H 250. Intro to Health Care Organization & Administration
BA 131. Business Productivity Software
BA 215. Fundamentals of Accounting
BA 275. Quantitative Business Methods
ECON 201. Introduction to Microeconomics
ECON 202. Introduction to Macroeconomics
MTH 245. Mathematics for Management, Life & Social Science
MB 230. Introductory Microbiology
All of the above courses must be taken graded

3. Submit a request for admission into the HCA program.

**BACCALAUREATE CORE REQUIREMENTS (38)**

10 of the 48 credits required by the Baccalaureate Core may be satisfied by HCA curriculum.

**Department of Public Health Core (13)**

H 175. Personal Health Priorities (3)
BA 275. Quantitative Business Methods (4)
H 320. Introduction to Human Disease (3)
H 323. Introduction to Public Health (3)

**Health Care Administration (54)**

H 210. Intro to Health Services & Organizations (3)
H 250. Intro to Health Care Organization & Administration (3)
H 323. Introduction to Public Health (3)
H 407. Seminar in Current Issues (2)
H 407. Pre Internship (1)
H 410. Internship (12)
H 425. Principles of Epidemiology (3)
H 430. Health Policy Analysis (3)
H 431. Health Care Marketing (3)
H 432. Health Care Finance (3)
H 434. Health Care Law & Regulation (3)
H 436. Health Services Admin & Mgt (3)
H 438. Health Systems Analysis (3)
H 456. Strategic Planning & Mgt in HC Orgs (3)
H 457. Financial Mgt of HC Orgs (3)
H 458. Reimbursement Systems (3)

**Business (22)**

BA 131. Business Productivity Software (2)
BA 215. Fundamentals of Accounting (4)
BA 315. Accounting for Decision Making (4)
BA 350. Organizational Systems (4)
BA 352. Organizational Behavior (4)
BA 452. Leadership and Team Building (4)

**Supporting Courses (17)**

ECON 201. Intro to Microeconomics (3)
ECON 202. Intro to Macroeconomics (3)
MB 230. Introductory Microbiology (4)
MTH 245. Math for Mgt, Life & Social Science (4)
HDFS 315. Perspectives on Aging (3)

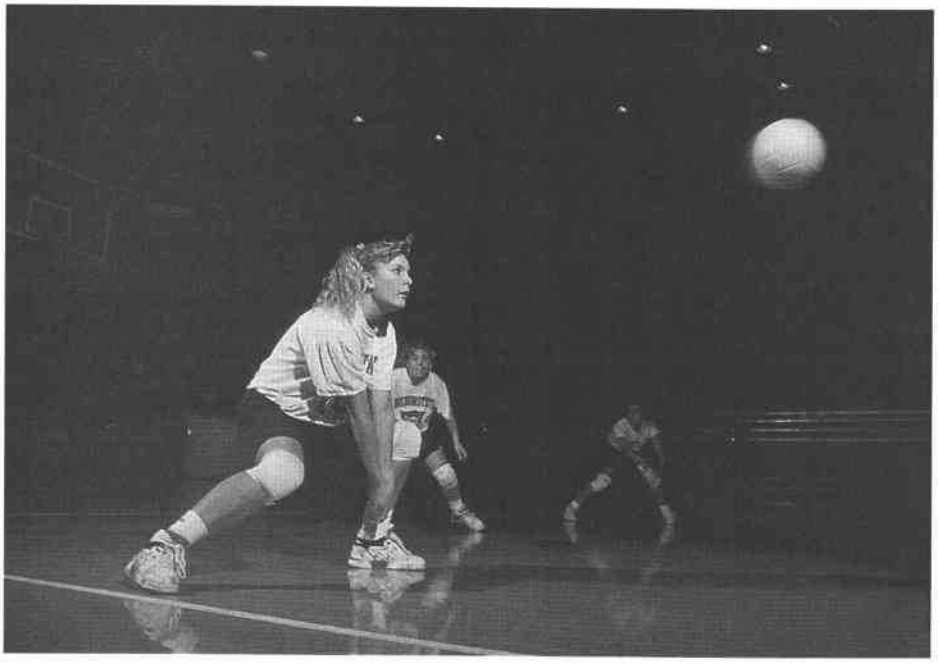
**Option Requirements**
**General Health Care Administration (24)**

24 credits from list of recommended electives

**Long Term Care (37)**

H 467. Alternatives to Long Term Care (3)
H 468. Financing and Administration of Long Term Care (3)
NFM 225. Human Nutrition (4)
NFM 440. Meal Systems for the Elderly (3)
H 422. Control of Chronic Disease (3) or
H 423. Health Aspects of Gerontology (3)
H 464. Perspectives on Death (3) or
HDFS 314. Adult Development and Aging (3) or
SOC 432. Sociology of Aging (3)
15 credits from a list of recommended electives
Note: Students in the Long Term Care option earn a gerontology certificate as part of their program. Application for this certificate must be made.

**Total (192)**



## Traffic Safety Education Program

Students wishing to qualify to teach driver and traffic safety education or seek employment in driver improvement programs should complete the following courses:

H 480. Driver & Traffic Safety Education (3)
H 481. Prog in Traffic Safety Education (3)
H 482. Problems & Research in Safety (3)
H 492. Training & Educ Persp in Safety or
H 595. Organ, Admin & Sprv of Safety Progs (3)

## Minors

The minors are designed for students from majors outside the Department of Public Health as well as for students who are majoring in the department and wish to complement their major option with a related public health minor.

### Environmental Health Minor (28)

H 181. Safety Princ & Foundations (3)
H 220. Intro to Epidem & Hlth Data Analysis (3)
H 320. Introduction to Human Disease (3)
H 344. Intro to Environmental Science (3)
H 425. Principles of Epidemiology (3)
H 440, H 441. Environmental Health (6)
H 447. Solid & Hazardous Waste Mgmt (3)
MB 230. Intro Microbiology (4)

### Community Health Minor (32)

H 225. Social & Individual Determinants (3)
H 263. Psychosocial Dimensions of Health (3)
H 320. Introduction to Human Disease (3)
H 323. Introduction to Public Health (3)
H 344. Intro to Environmental Science (3)
H 364. Drugs, Society and Human Behavior (3)
H 461. Sexuality: A Health Science Persp (3)
H 470. Intro to Worksite Health Promotion (3)
H 476. Planning Health Programs (4)
NFM 225. Human Nutrition (4)

### Worksite Health Promotion Minor (32)

H 225. Social & Individual Determinants (3)
H 263. Psychosocial Dimensions of Health (3)
H 320. Introduction to Human Disease (3)
H 323. Introduction to Public Health (3)
H 364. Drugs, Society and Human Behav (3)
H 445. Occupational Health (3)
H 470. Intro to Worksite Health Promotion (3)
H 473. Stress & Hlth: Cntrl Indiv & Env Haz (3)
H 476. Planning Health Programs (4)
NFM 225. Human Nutrition (4)

### Applied Health Minor (37)

H 225. Social & Individual Determinants (3)
H 181. Safety Principles & Foundations (3)
H 320. Introduction to Human Disease (3)
H 344. Intro to Environmental Science (3)
H 364. Drugs, Society and Human Behavior (3)
H 421. Mental Health (3)
H 461. Sexuality: A Health Science Persp (3)
NFM 225. Human Nutrition (4)
Approved electives (12)

### Health Science Minor (31)

H 181. Safety Principles & Foundations (3)
H 220. Intro to Epidem & Hlth Data Analysis (3)
H 320. Introduction to Human Disease (3)
H 425. Principles of Epidemiology (3)
H 445. Occupational Health (3)
NFM 225. Human Nutrition (4)
Z 331, Z 332. Human Anatomy & Physio (6)

*Two courses selected from:*
H 319. Health Policy and the Consumer (3)
H 344. Environmental Science (3)
H 422. Control of Chronic Disease (3)
H 461. Sexuality: A Health Science Persp (3)

## Graduate Programs

The Department of Public Health offers the M.S. and Ph.D. degrees in Public Health with graduate areas of concentration in Community Health and Health Education. The department offers the M.S. in Environmental Health Management with areas of concentration in Environmental Health, Environmental Epidemiology and Occupational Safety. The department also offers the M.S. in Health and Safety Administration with areas of concentration in Health Promotion, Health Care Administration, and Safety Management. The department offers the Oregon Master of Public Health with areas of concentration in Health Policy and Management, Public Health Promotion and Education, and Gerontology. This degree is offered jointly by Oregon State University, Oregon Health Sciences University and Portland State University. In addition, the department participates in the Master of Arts in Interdisciplinary Studies degree program in cooperation with the Graduate School.

## Courses

### Lower Division Courses

**H 170. PERSONAL HEALTH (3).** Fundamental principles of the impact of individual lifestyle, environmental, psychosocial, biological, and health care system on human health. Emphasis on health promotion and disease prevention at the micro (individual) and macro (public) levels. Students may not receive credit for both H 170 and H 175.

**H 175. PERSONAL HEALTH PRIORITIES (3).** Application of health science to personal health issues; an examination of health behaviors, environmental influences; psychosocial influences, and genetic factors, health policy, economic and health care system influences on health promotion and disease prevention. Micro (individual) and macro (public) emphasis. Students may not receive credit for both H 170 and H 175.

**H 181. SAFETY PRINCIPLES AND FOUNDATIONS (3).** Study of principles of safety program; analysis of causation and effect factors and foundations needed to prevent injury; strategies for counteracting hazardous practices.

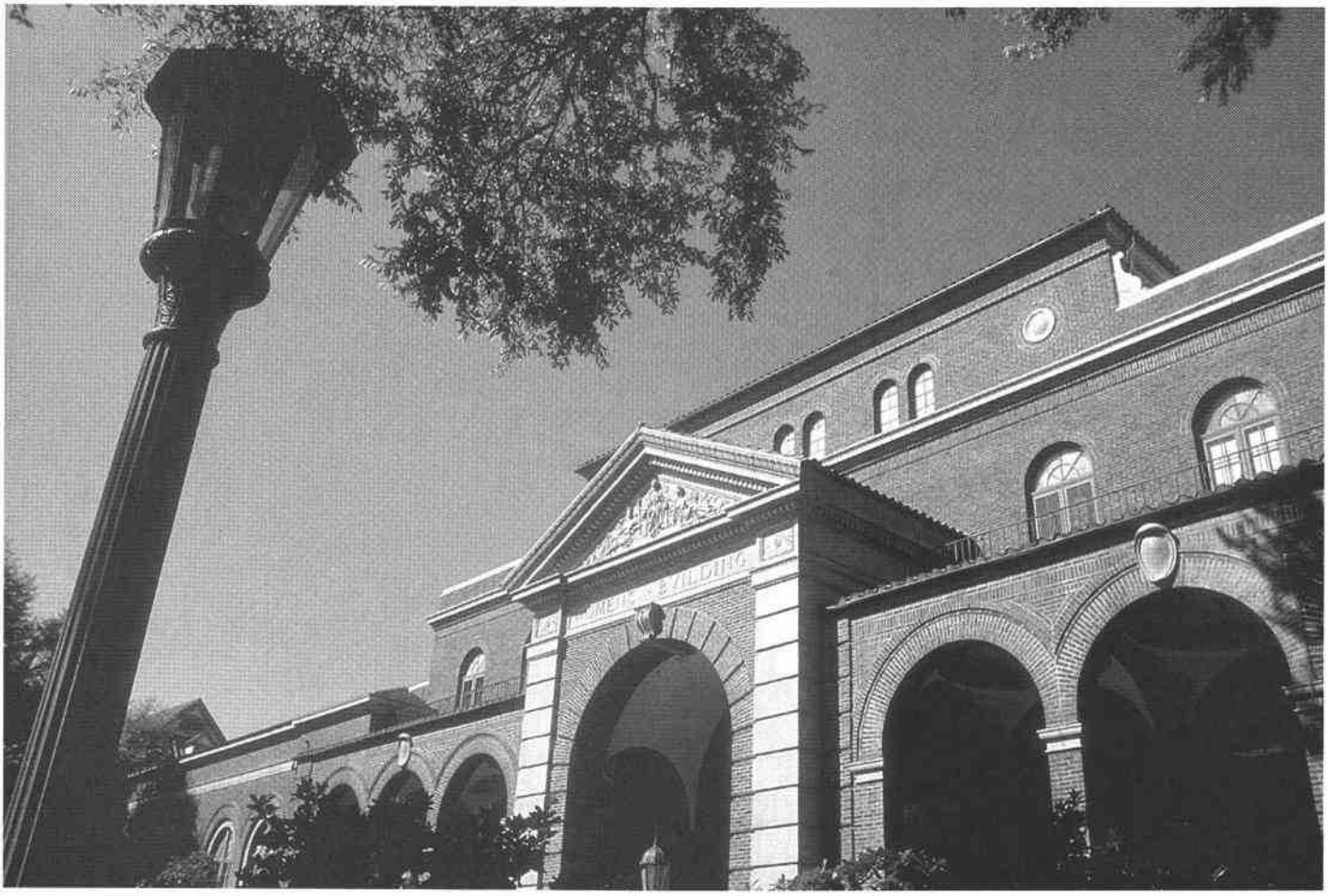
**H 199. SPECIAL STUDIES (1-16).**

**H 210. INTRODUCTION TO HEALTH SERVICES AND ORGANIZATIONS (3).** An overview of the United States health care system. Focus on organization of public and private sector health services at federal, state and local levels as well as emerging health care issues.

**H 220. INTRODUCTION TO EPIDEMIOLOGY AND HEALTH DATA ANALYSIS (3).** Introduction to the application of epidemiologic biometry and probability theory to the health sciences. Topics include quantitative analysis and inference, statistical and epidemiologic methodology, and quantitative study to evaluate and control health problems. Open to major or minor students in Public Health, or by consent. PREREQ: MTH 105 or higher mathematics.

**H 225. *SOCIAL AND INDIVIDUAL HEALTH DETERMINANTS (3).** Investigation through lecture, presentation, discussion, and field study, the major social and individual contributors to preventable disease, premature death and general health status.

**H 250. INTRODUCTION TO HEALTH CARE ORGANIZATION AND ADMINISTRATION (3).** An introduction to the administrative operations of health care organizations. Examines the various service settings and their organization, personnel and resources. PREREQ: H 210.



**H 256. HISTORY, THEORY, AND PRACTICE OF HEALTH PROMOTION AND EDUCATION (3).** History, current role, theoretical foundations, practice and future of health promotion and health education in the United States. Students will become familiar with new professional standards, competencies, issues, and controversies within the field. The general practice of health promotion and education will be viewed more specifically by examining program financing, program planning, delivery of direct services and program evaluation. School, occupational and clinically-based intervention efforts to improve health status for diverse population will be analyzed.

**H 262. CONSUMER HEALTH (3).** Health aspects of consumer protection; decision making regarding health products and services; superstitions and misconceptions, advertising, quackery, selection of medical and dental services. PREREQ: H 170 or H 175.

**H 263. PSYCHOSOCIAL DIMENSIONS OF HEALTH (3).** Examination of social, psychological, cultural, attitude, behavior, and environmental factors that influence individual and public health. Overview of behavior models that influence individual and society decision-making and resultant health behaviors.

**H 281. ELEMENTS OF INDUSTRIAL HYGIENE (3).** A basic course in industrial hygiene. A survey of toxic agents and stresses on employees; emphasis on recognition, evaluation and control of environmental factors and stresses associated with the workplace. PREREQ: H 181.

## Upper Division Courses

**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. PREREQ: Junior standing. Graded P/N.

**H 310. HEALTH FIELD EXPERIENCES (3-6).** Introductory field experience in a health or health-related worksite. Enrollment limited to department majors. PREREQ: H 175, H 220 and junior standing; consent of cooperating professional and faculty supervisor required. Graded P/N.

**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. HEALTH POLICY FORMATION AND THE CONSUMER (3).** History of consumer protection laws and agencies; an examination of health care providers and facilities; consumer advocacy groups and their impact on policy decisions; health insurance and its role in consumer health; an examination of the media's role in consumer health.

**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. PREREQ: An introductory course in microbiology.

**H 323. INTRODUCTION TO PUBLIC HEALTH (3).** History, evolution, and current status of health programs and services in the United States. Includes philosophical perspectives of the various health disciplines and the role of health education, health promotion, and public health in contemporary society.

**H 344. ENVIRONMENTAL SCIENCE: A GLOBAL PERSPECTIVE (3).** Survey of the major environmental issues that affect human health interrelatedness in the global society. Topics include ecological principles, population pressures, air and water pollution, waste, pesticides and energy.

**H 349. PEER HELPER SKILLS DEVELOPMENT (3).** This course is designed to prepare 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 of this course will be affective learning situations designed to promote self-awareness and personal growth. PREREQ: Department approval.

**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. PREREQ: PSY 201 OR PSY 202; SOC 204.

**H 369. SCHOOL HEALTH EDUCATION (3).** Developing ability of the public school student to understand and guide personal health and to contribute to the health of the community. PREREQ: H 170; one year of biological science.

**H 380. PROCESSES AND HAZARDS IN THE INDUSTRIAL WORK ENVIRONMENT (3).** Hazards of materials and processes found in industrial settings with an emphasis on common unit operations encountered in the industrial work environment. PREREQ: H 181.

**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 386. ADVANCED FIRST AID/FIRST RESPONDER (3).** Emergency treatment for various types of injuries; control of bleeding, artificial respiration, CPR, transportation, splinting, and bandaging. Course leads to Red Cross Advanced First Aid and CPR Certification. Open as a service course to all departments.

**H 401/H 501. RESEARCH (1-16).**

**H 403/H 503. THESIS (1-16).**

**H 405/H 505. READING AND CONFERENCE (1-16).**

**H 406. PROJECTS (1-16).**

**H 407/H 507. SEMINAR (1-6).** H 407, Section 1, Internship (1). Graded P/N.

**H 408/H 508. WORKSHOP (1-16).**

**H 409/H 509. PRACTICUM (1-6).** Supervised work experience in a public health or health care administration setting. Open to majors in Public Health. PREREQ: Senior standing and departmental approval. Graded P/N.

**H 410/H 510. INTERNSHIP (6-12).** Directed field experience with participation community, worksite, or health agency, or program. Experience is individually arranged to meet student needs. PREREQ: Senior standing in Public Health Department, consent. Graded P/N

**H 411/H 511. ENVIRONMENTAL HEALTH POLICY AND REGULATIONS (3).** History and environmental health policy, regulations and standards by the U.S. Environmental Protection Agency, Federal Drug Administration and other pertinent federal agencies. PREREQ: H 344.

**H 412/H 512. AIR QUALITY AND PUBLIC HEALTH (3).** Ambient and indoor air pollutants, sources, health effects and pertinent regulations. PREREQ: One year basic college chemistry.

**H 420/H 520. MINORITY HEALTH (3).** Major health issues facing U.S. minorities, population- specific prevention/education, disease control; emphasis on access to preventative services, increasing longevity, decreasing disparity between populations.

**H 421/H 521. MENTAL HEALTH AND SOCIAL POLICY (3).** Influence of public opinion, legal government services and regulations, private services, public health, public policy, financial and insurance issues on mental health services, examination of solutions. PREREQ: One term of psychology.

**H 422/H 522. CONTROL OF CHRONIC DISEASE (3).** Epidemiology of the major chronic diseases, risk factors, potential methods of prevention, and efficacy of current methods of control and treatment. Includes an examination of contemporary research on social, psychological, ethical, economic, and health care issues and their relationship to chronic disease. PREREQ: Nine credits of health course work.

**H 423/H 523. HEALTH ASPECTS OF AGING (3).** Promotion of normal health in the aged; physiological aspects of the normal aging process; community, state and federal health programs and services for the aged. PREREQ: Nine credits of health course work.

**H 425/H 525. FOUNDATIONS OF EPIDEMIOLOGY (3).** Measures of disease frequency; measures of effect; association and causation; sources of inaccuracy; experimental and observational study designs.

**H 429/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. PREREQ: Senior standing.

**H 430/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 430 is a Writing Intensive Course. PREREQ: H 250.

**H 431/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. PREREQ: BA 340.

**H 432/H 532. HEALTH CARE FINANCE (3).** Focus on the variety of public and private mechanisms for financing of the treatment of physical and mental illness; trends and constraints associated with each mechanism. Considers new developments in private health insurance, the potentialities of national health insurance and needs of special population groups. PREREQ: BA 340.

**H 434/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. PREREQ: BA 230.

**H 435/H 535. 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. PREREQ: Two semesters of biology or general zoology. CROSSLISTED as ENT 435/ENT 535.

**H 436/H 536. HEALTH SERVICES ADMINISTRATION AND MANAGEMENT (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. PREREQ: H 250, admission to HCA Program.

**H 440/H 540,H 441/H 541. ^ENVIRONMENTAL HEALTH (3,3).** Environmental factors affecting public health. H 440/H 540: Risk assessment and communication; infectious agents in food; food protection and safety; assessment of pesticide risk; public health assessments; residential and institutional environmental hazards; urbanization and public health issues; insect and rodent control. (H 440 is a Writing Intensive Course.) H441/541: Indoor and outdoor air quality management; human illness related to water resources and water pollution; private and public water supplies; swimming/recreational areas; private and public sewage disposal; radiation; emergency planning and right-to-know. Both integrated global environmental health problems, include ethical, political, and social forces involved in legislation and policy formation. Recommend taking in order. PREREQ: H 320, H 344.

**H 443/H 543. ENVIRONMENTAL SAMPLING AND ANALYSIS (4).** Field sampling methods and lab analyses of drinking water and surface water; physical and chemical parameters of water; microbiological criteria of drinking water. Discussion of related topics: e.g. hazardous materials sampling; inspection procedures for food/dairy establishments; health hazard assessment and documentation, regulatory procedures. PREREQ: H 440/H 540, H 441/H 541.

**H 445/H 545. *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. PREREQ: 9 credits of health-related course work. (Bacc Core Course)

**H 446/H 546. INDUSTRIAL HYGIENE INSTRUMENTATION (3).** Information and practice related to routine sampling procedures and measurement techniques used to evaluate chemical, physical, and biological hazards in places of work. PREREQ: H 281.

**H 447/H 547. SOLID AND HAZARDOUS WASTE MANAGEMENT (3).** Study of the relationship of public health, environmental, economic, and policy factors with solid and hazardous waste generation and disposal. Topics include: 1) historical development of solid waste problem, processing, disposal, legislation, minimization strategies; 2) hazardous waste generation, development of policy, management strategies including waste reduction, hazard communication, auditing; 3) special topics including Superfund, medical wastes, radioactive waste, hazardous waste in Third World, and Oregon's clandestine drug lab cleanup program. PREREQ: H 344.

**H 448/H 548. PUBLIC HEALTH TOXICOLOGY AND RISK ASSESSMENT (3).** Principles of toxicology and risk assessment with a public health perspective. Topics covered include: toxico- kinetics, target organ toxicity, carcinogenesis and chemical-specific case studies relevant to public health and risk assessments. PREREQ: One year basic college chemistry and biology and two terms organic chemistry.

**H 449/H 549. HEALTH RISK COMMUNICATION (3).** Designed to improve the effectiveness of health risk communication strategies in promotion of health and prevention of disease and disability. Review of applicable behavioral science theory, research on risk perception and persuasive communication; instruction in effective methods and techniques of risk communication; initial process by which risks are identified and assessed; scientific, institutional, political and social forces that affect the transfer of information in public health programs.

**H 451/H 551. CONSUMER HEALTH PROBLEMS (3).** Consumer health protection; selection of health products and services, community sources of health information, health advertising, quackery, health care delivery programs, consumer health protection agencies. PREREQ: H 319 or equivalent.

**H 455/H 555. RISK FACTORS OVER THE LIFESPAN (3).** Health enhancing behaviors across the life span; health concerns and problems at particular life stages which challenge the health of the nation; additional emphasis on specific at risk population/age groups. PREREQ: 9 credits of health-related course work.

**H 456/H 556. STRATEGIC PLANNING AND MANAGEMENT IN HEALTH CARE (3).** ORGANIZATIONS Theories and methodologies of long range planning and strategic management in health care organizations. PREREQ: Admission to HCA program.

**H 457/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.

**H 458/H 558. REIMBURSEMENT MECHANISMS (3).** Indepth analysis of the methods of paying for health care services in the U.S.; includes hospital, physician and long term care health care services.

**H 460/H 560. HEALTH CHALLENGES FACING YOUTH (3).** Special health problems and the educational establishments, opportunities and responsibilities; focus on standing.

**H 461/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. PREREQ: Senior standing.

**H 464/H 564. PERSPECTIVES ON DEATH (3).** Exploration of the meaning of death from a variety of contemporary perspectives; formulation of realistic plans in order to enhance quality of life and death for self and others. PREREQ: Two terms of psychology, senior standing.

**H 465/H 565. PUBLIC HEALTH AND WOMAN: SOCIAL AND POLICY ISSUES (3).** Public health concepts as they apply to the identification of special health needs of women. Epidemiological analysis of the major causes of morbidity and mortality of women; discussion of the impact of social and behavioral influences on women's health; analysis of the relationship of social and political trends to women's health and health services for women; comparison of national and international women's health issues. PREREQ: Nine credits in Public Health, including a course in health policy or consent.

**H 466/H 566. ALCOHOL STUDIES (3).** Physiology and health aspects of alcohol use and abuse; knowledge, values and other factors that influence use or abuse of alcohol; impact of alcohol use and abuse on society, the family and special populations such as women and adolescents; recognition of problem drinking and alcoholism; intervention; alcoholism treatment and recovery; abuse prevention. PREREQ: Senior standing.

**H 467/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. PREREQ: H 210 and HDFS 314 or HDFS 315.

**H 468/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 470/H 570. INTRODUCTION TO WORKSITE HEALTH PROMOTION (3).** Overview of practical and operational aspects of planning, implementing, and evaluating health promotion/disease prevention programs in a variety of public and private organizations. General principles of risk management, programming for special needs/special populations, and the examination of the relative acceptability, efficacy, and costs/benefits of alternative health promotion/disease prevention strategies. PREREQ: 9 credits of health-related course work.

**H 473/H 573. STRESS AND HEALTH: CONTROLLING INDIVIDUAL AND ENVIRONMENTAL (3).** HAZARDS Overview of the physiological, psychological and behavioral responses to stress and resultant impact on health. Theories of causation (intrinsic and extrinsic); legal and ethical aspects of stress-producing environments; stress and special populations; and the appropriate mechanisms for the development of programs and policies designed to control and facilitate positive stress management at the individual, community, and organizational levels. PREREQ: 6 credits of psychology and H 263, or consent.

**H 474/H 574. PUBLIC HEALTH AND VIOLENCE IN SOCIETY (3).** Examination of violence as a major public health issue in the 1990's. 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 475/H 575. EVALUATION OF HEALTH PROMOTION AND EDUCATION PROGRAMS (3).** Fundamental principles of evaluation theories; application of process, impact, outcome evaluations for determination of the efficacy and efficiency of selected prevention and intervention strategies for health promotion and education programs; emphasis on formative and summative evaluations using quantitative and qualitative measures. PREREQ: H 476.

**H 476/H 576. ^PLANNING HEALTH PROGRAMS (4).** Planning, development and implementation of health promotion and education programs in public and private community, industrial, and health care settings. Develop skills to identify health-related problems, assess needs, prioritize health promoting and disease-preventing strategies, and plan effective programs. PREREQ: For H 476, senior standing. For H 576, 9 credits of graduate course work in public health. (Writing Intensive Course)

**H 477/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 which pertain to health promoters/educators. PREREQ: NFM 225.

**H 482/H 582. ^PROBLEMS AND RESEARCH IN SAFETY (3).** Applications of research strategy and methodology for resolving risks, dangers, and losses to the resources of the enterprise. PREREQ: Senior standing and consent.

**H 483/H 583. SAFETY AND ENVIRONMENTAL HEALTH MANAGEMENT (3).** Analysis of the safety and health management function; strategy, structure and research. Emphasis on strategy formulation, organization structure, positioning arrangements, implementation strategy and evaluation. PREREQ: Senior standing and instructor approval required.

**H 485/H 585. SAFETY, HEALTH AND ENVIRONMENTAL LAW (3).** Legal and regulatory aspects of safety, occupational health, and environmental law and the socio-economic impact achieved from the legislation. PREREQ: H 385 or graduate standing.

**H 487/H 587. INSTRUCTOR COMPETENCIES IN EMERGENCY CARE (3).** A theory and technique course designed to provide advanced first aiders with the background and experiences essential for providing emergency care and CPR instruction in schools, governmental agencies, businesses and local communities. PREREQ: H 386 and current Advanced First Aid and Emergency Care Certification and/or EMS Certification.

**H 491/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. PREREQ: Senior standing.

**H 492/H 592. TRAINING AND EDUCATIONAL PERSPECTIVES IN SAFETY (3).** Analysis of the principles of learning and instructional theory and the application of these principles as they relate to the safety training process within the enterprise. PREREQ: Senior standing.

**H 493/H 593. TRANSPORTATION AND MOTOR FLEET SAFETY (3).** Current information relating to transportation safety issues including human factors, education and enforcement, and other highly interrelated components of the transportation system. Emphasis placed on motor fleet safety and types of losses in motor fleets.

**H 494. APPLIED ERGONOMICS (3).** A study of the dimensions of occupational ergonomics practice and applications that are intended to reduce worker-hardware-environmental mismatch problems that affect the effectiveness and efficiency of worker performance. PREREQ: H 281, H 385; one year of physics.

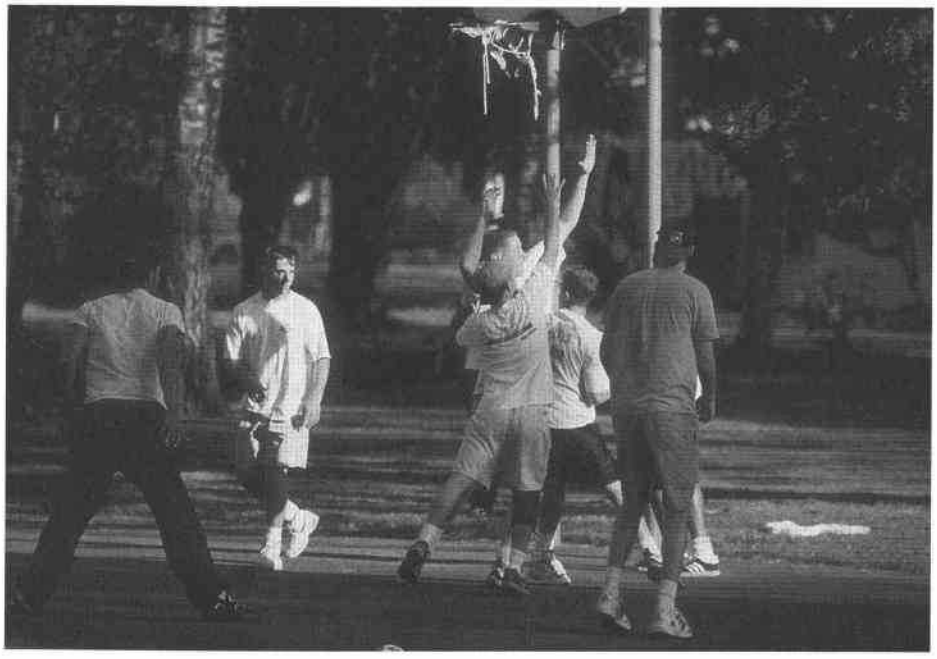
**H 496/H 596. THE PROCESS OF HAZARD CONTROL I (3).** The first of a two-course sequence, addressing the strategies, tactics, and specialized analytical (system safety) methods for recognizing, evaluating, and controlling exposures to hazards emanating from the occupational environment. This first part focuses on strategy, structure, processes, competencies, incident (accident), investigation, and recent developments. PREREQ: H 281, H 385, one year of college chemistry and physics.

**H 498/H 598. FIRE PROTECTION AND PREVENTION (3).** Fire hazards and causes; codes and standards; prevention and control techniques; fire detection and extinguishing systems; hazardous and toxic substances; storage and human safety. PREREQ: Senior standing.

### Graduate Courses

**H 506. PROJECTS (1-16).**

**H 515. RESEARCH METHODOLOGY IN HEALTH AND SAFETY (3).** Research methods used in health and safety studies with emphasis on the nature of research, problem identification and formulation, methods of observation and data collection, analysis and interpretation, research communications, and project development. PREREQ: H 524.



**H 524. HEALTH DATA ANALYSIS (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. PREREQ: H 220, ST 201.

**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. PREREQ: H 425/H 525.

**H 537. MANAGEMENT OF HUMAN RESOURCES IN HEALTH CARE SETTINGS (3).** Elements of managing personnel in health care settings, including the nature of the health professional, motivation, communications, compensation, legal issues, stress, time management, and achieving excellence.

**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 542. ENVIRONMENTAL AND OCCUPATIONAL HEALTH (3).** Fundamental issues in environmental and occupational health. Topics such as air/water pollution, overpopulation, waste disposal, food protection, radiation, pesticides, and occupational injury are presented by experts in each of the areas. Environmental and occupational hazards that affect human health are examined in the context of current social, political and regulatory pressures.

**H 553. ADVANCED TOPICS: ISSUES IN HEALTH PROMOTION (3).** Relationship of social, economic, legal, and political forces on the development and effectiveness of health promotion programs in various settings. PREREQ: H 470/H 570, H 471/H 571, or consent.

**H 562. ADVANCED TEACHING STRATEGIES (3).** Advanced methods and materials for implementing altered health behaviors in individuals and groups; method and material selection, use, and evaluation; laboratory techniques and development of materials; focus on health education/promotion. PREREQ: Graduate standing.

**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 morality in children and women of child-bearing age; impact of social, political and economics 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 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 588. SURVEY OF THE SAFETY FUNCTION (3).** A critical survey of strategy and structure of the safety function; special attention is placed on models for improving decision-making and operating action capabilities and on approaches for justifying the organizational existence of the safety function within any enterprise. PREREQ: Graduate standing.

**H 589. EMERGENCY AND DISASTER MANAGEMENT (3).** Examination of emergency and disaster preparation models, research, and applications designed to minimize the effects of losses. PREREQ: Graduate standing.

**H 601. RESEARCH (TBA) (1-16).**

**H 603. THESIS (TBA) (1-16).**

**H 605. READING AND CONFERENCE (TBA) (1-16).**

**H 606. PROJECTS (TBA) (1-16).**

**H 607. SEMINAR (TBA) (1-16).**

**H 608. WORKSHOP (TBA) (1-16).**

**H 610. INTERNSHIP (TBA) (1-16).**

**FOOTNOTES**

*Baccalaureate Core Course

^Writing Intensive Course (WIC)

[1]EXSS 131. Intro to Exercise and Sport Science is a recommended elective for all students new to exercise and sport science.

*The College of Home Economics and Education prepares professionals for careers related to individual and family needs and resources. Graduates are employed in positions related to human needs for food, shelter, clothing, education, and interpersonal relationships. These careers may be in government, business, industry, school or agency settings.*

This program of study addresses the changing psychological, social, physical, and educational needs of individuals and families across the life span, from a local, national and global perspective. In addition to resident instruction for undergraduate and graduate students, the college faculty are engaged in comprehensive research and extended education programs.

## Degree Programs

Degrees are offered by the:

- Department of Apparel, Interiors, Housing, and Merchandising (AIHM)
- Department of Human Development and Family Sciences (HDFS)
- Department of Nutrition and Food Management (NFM)
- School of Education

The Bachelor of Science (B.S.) degree is offered in six home economics majors: apparel design, housing studies, human development and family sciences, interior merchandising, merchandising management, and nutrition and food management. These degree programs are accredited by the Council for Accreditation of the American Association of Family Consumer Sciences.

A Bachelor of Science (B.S.) degree in Technology Education is the undergraduate degree offered by the School of Education.

Advanced degrees in home economics include the Master of Science (M.S.), Master of Arts (M.A.), and Doctor of Philosophy (Ph.D.). The M.S. degree is offered in all departments and the M.A. in the Department of Apparel, Interiors, Housing and Merchandising. The Ph.D. is offered in apparel, interiors, housing, and merchandising; family resource management; human development and family studies; and nutrition and food management. All departments also participate in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) graduate degree program.

The School of Education offers degree programs in Adult Education with an emphasis on Developmental Education, English as a Second or Foreign Language, or Professional and Technical Education in Business, Industry and Agencies (Master of Education, Ed.M.); Community College Education (Doctor of Education, Ed.D.); Counselor Education (Master of Science, M.S., Doctor of Philosophy, Ph.D.); and Teacher Education including Teacher Licensure (Bachelor of Science in Technology Education, B.S., Master of Arts in Teaching, M.A.T.), Standard Licensure (Master of Education, Ed.M.); and Research and Teaching (Master of Education, Ed.M.; and Doctor of Philosophy, Ph.D.). In addition, a minor emphasis in Adult Education is offered for those interested in Community College Instruction or Extension Program Development.

## Teacher Education

The College of Home Economics and Education, in cooperation with the Colleges of Agricultural Science, Health and Human Performance, Liberal Arts, and Science offers graduate teacher licensure programs for students wishing to enter the teaching profession as well as for teachers wishing to complete standard licensure requirements. In addition, the School of Education offers some undergraduate course work for students who are exploring elementary and/or secondary education as a career goal. Undergraduate students interested in elementary education can choose to complete a Bachelor's degree in Human Development and Family Sciences with the Early Childhood Education option, or a degree in General Science in the College of Science, or a degree in Liberal Studies in the College of Liberal Arts as preparation for applying for admission to the M.A.T. in Elementary Education.

## Undergraduate Field Study and Internships

Upper division students in home economics may earn credit for off-campus, supervised work experience related to their career goals. A maximum of 18 credits may be applied toward graduation. Approval must be given prior to registration. Students wishing to explore careers in teaching may enroll in special field practicum classes. Details are available from advisers.

## Scholarships

The College of Home Economics and Education offers a variety of scholarships to deserving students. Many are reserved for students in designated majors or for first-year students. A listing of scholarships and application forms are available from the student services office in Milam Hall 116 and from the Assistant Director of the School of Education. Also, see the Scholarship section in the front of this catalog.

## Additional Programs

In addition to the specialized majors and options listed below for the home economics departments, students are encouraged to consider other choices which allow programs to meet specific needs.

**Family and Consumer Sciences** is intended for students who want to combine the various subject areas of family and consumer sciences in preparation for careers requiring generalized knowledge such as teaching family and consumer studies. For more information on this option, refer to the B.S. in Human Development and Family Sciences.

**International Studies** is a new degree at Oregon State University which allows students in any undergraduate program to internationalize their field of study by combining a traditional degree with an international degree. As an example, a student earning a B.S. in Nutrition and Food Management could also earn a B.S. in

Footnotes for this section on page 295.

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**ADMINISTRATION**

**Kinsey B. Green**
*Dean*

**Sandra A. Helmick**
*Associate Dean for Instruction and Research*

**Kim McAlexander**
*Head Adviser*

**Gene Newburgh**
*Academic Adviser*

International Studies in Nutrition and Food Management. Information is available from the Student Services office in Milam Hall 116. Also see the Interdisciplinary Studies section of this catalog.

**Family Resource Management** is a field of study that can be pursued by undergraduates through the Family Finance option in the B.S. in Human Development and Family Sciences degree. Graduate work leading to interdepartmental M.S. and Ph.D. degrees is also available. At the master's level, areas of emphasis include family and consumer economics, home management, housing, and food systems management. The doctoral program focuses broadly on family resource management and its effect on individual and family well-being, with specialized dissertation areas.

**The Program on Gerontology**, administered through the College of Home Economics and Education, offers course work to undergraduate and graduate students throughout the university. See the Gerontology section of this college.

## GRADUATION REQUIREMENTS

To graduate with a B.S. degree in any of the home economics majors, a student must complete 180 credits, of which 60 are upper division, and fulfill the following requirements:

**University Baccalaureate Core (48)**

**Home Economics Professional Core (9)**
Approved speech course (3)
Department requirements (listed below for each major)

**First-year Program**

First-year students usually take 45 credits in their first three terms, selected from the following in consultation with their adviser:

**Baccalaureate Core**
*Skills:*
WR 121. English Composition (3)
MTH 105. Intro to Contemporary Math or higher mathematics course (3)
HHP 231. Lifetime Fitness for Health (3)
*Perspectives:*
Physical or biological science (minimum 12)
Western Culture (3)
Literature and the Arts (3)
Social Processes and Institutions (3)
HOEC 201. Individual & Family Dev (3)
Other courses from major or baccalaureate core (11)

## HOME ECONOMICS PROFESSIONAL CORE COURSES

**Lower Division**

**Lower Division Courses**

**HOEC 100. PERSPECTIVES IN HOME ECONOMICS (1).** Introduction to home economics as a dynamic profession, worldwide in scope, which prepares students to work with individuals and families in a wide variety of business, education, and human services related careers. Students identify goals and competencies which serve as a basis for academic and career decisions.

**HOEC 201. *INDIVIDUAL AND FAMILY DEVELOPMENT (3).** Using a lifespan developmental approach, this course is a study of individual and family development, dynamics, and relationships, both within the family and as part of the larger environment. (Bacc Core Course)

**HOEC 202. RESOURCES AND WELL-BEING (3).** The study of the professional integration of human and material resources relating to finances, shelter, clothing, and foods. The influences of the near and far environment on the individual and family.

**Upper Division Courses**

**HOEC 300. MANAGEMENT OF RESOURCES (3).** This course examines the process of management through a systems approach and its importance for and influence on family well-being. A variety of environmental influences will be examined with regard to meeting the needs of individuals and families. Case study with projects will be provided to allow students to exercise critical analysis skills. PREREQ: HOEC 100, HOEC 201, junior standing.

**HOEC 400. PROFESSIONAL ISSUES IN HOME ECONOMICS (2).** This course examines the scope of home economics as a dynamic profession which integrates diverse occupational specializations to meet the changing needs of individuals and families. A wide range of societal and professional issues, perspectives, strategies, and trends will be analyzed and integrated to prepare students for the profession. PREREQ: HOEC 202 or HOEC 300, senior standing.

**Graduate Courses**

**HOEC 533. FAMILY POLICY AND PROGRAM DEVELOPMENT (3).** Principles, processes, and practices in the creation of family policies and subsequent programs which address well-being across the lifespan. Offered alternate years.

**HOEC 534. FAMILY POLICY AND PROGRAM EVALUATION (3).** Models of evaluation and application of research methods to assessment of family policies and programs. PREREQ: HDFS 531 or introduction to research/statistics; HOEC 533 recommended. Offered alternate years.

# APPAREL, INTERIORS, HOUSING, AND MERCHANDISING

Sally Francis, Head
224 Milam Hall
Oregon State University
Corvallis, OR 97331-5101
(541) 737-3796

**Faculty**
*Professors* Bryant, Burns, Francis; *Associate Professors* Brandt, Pedersen; *Assistant Professors* Carey, Caughey, Chen, Douglass, Jordan

## Undergraduate Majors

**Apparel Design (B.S.)**
**Interior Merchandising (B.S.)**
**Merchandising Management (B.S.)**
**Housing Studies (B.S.)**
*Options*
Housing Design
Housing Services

## Graduate Majors

**Apparel, Interiors, Housing, and Merchandising (M.A., M.S., Ph.D.)**
***Areas of Concentration (M.A., M.S.)***
Cultural/Historic Aspects of the Near Environment
Human Behavior and the Near Environment
Design in the Near Environment
Merchandising Management
***Areas of Concentration (Ph.D.)***
Cultural/Historic Aspects of the Near Environment
Human Behavior and the Near Environment

**Family Resource Management (M.S., Ph.D.)**
***Area of Concentration (M.S., Ph.D.)***
Housing

The Department of Apparel, Interiors, Housing and Merchandising offers undergraduate instruction in the areas of apparel design, interior merchandising, housing studies and merchandising management. Advanced courses prepare students for positions in retailing of apparel and home furnishings, housing design and policy, apparel production, promotional work for manufacturers, and for graduate work leading to research and college teaching. The Housing Design Option is endorsed by the National Kitchen and Bath Association; graduates may apply to sit for the Certified Kitchen Designer and/or Certified Bath Designer examinations.

The department offers the M.S., M.A., and Ph.D. degrees. Areas of emphasis for the M.S. and M.A. degrees include Cultural/Historic Aspects of the Near Environment, Human Behavior and the Near Environment, Design in the Near Environment, and Merchandising Management. Areas of emphasis for the Ph.D. degree include Cultural/Historic Aspects of the Near Environment and Human Behavior and the Near Environment.

**Pre-Professional Studies**
To be considered for admission to the Housing Studies and Interior Merchandising majors, a student must complete 45 credits with a minimum cumulative grade point average of 2.2. The list of designated courses is available in the Undergraduate Advising Office, Milam 116.

**APPAREL DESIGN**

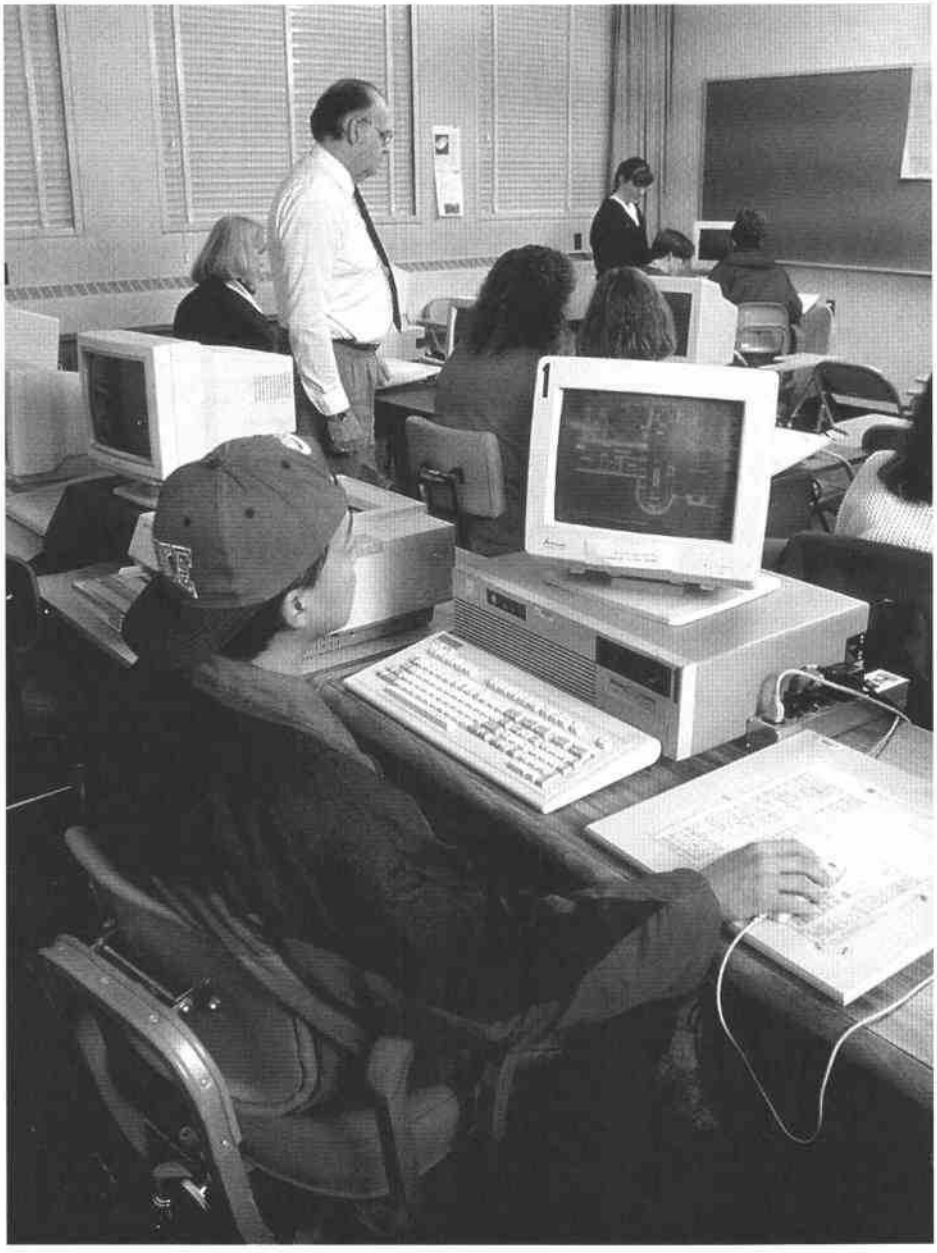
**Baccalaureate Core (48)**

**Home Economics Core (9)**
WR 214. Writing in Business (3) or WR 222. English Composition (3) or WR 323. English Composition (3) or WR 327. Technical Writing (3)
COMM 111. Public Speaking (3) or COMM 114. Argument and Critical Discourse (3)
HST 102, HST 103. Hist of Western Civ (6)
ECON 201, ECON 202. Intro to Economics (8)
ART 115. Design I (4)
ART 131. Drawing I (4)
ART 234. Drawing II/Figure (3)
*Select one course from:*
ART 204. Intro to Art History—Western
ART 261. Photography I (3)
ART 367. History of Design (3)
ART 101. Intro to the Visual Arts (3)
PSY 201 or PSY 202. General Psychology (3)
MTH 111. College Algebra (4)

**Apparel Design (65-68)**
AIHM 225. Construction Lab (1)
AIHM 226. Analysis of Apparel Const (3)
AIHM 227. Apparel Construction (4)
AIHM 255. Textiles (5)
AIHM 270. Fashion and Society (4)
AIHM 319. Comp Asst Design & Drafting (3)

AIHM 321. Fash Illustr and Design (3)
AIHM 327. Flat Pattern Design (4)
AIHM 360. Twentieth Century Fashion (3)
AIHM 370. Textile & Appar Mkt Analysis (4)
AIHM 421. Adv Fash Illust & Design (3)
AIHM 427. Draping (4)
*Select three courses from:*
AIHM 425. Special Clothing Needs (4)
AIHM 428. Apparel Prod Processes (3)
AIHM 429. Adv Prob in Apparel Design (3)
AIHM 450. Adv in Textile Tech (3)
AIHM 453. Eval of Textile Perform (3)
AIHM 455. Econ of Textile & Apparel Indus (3)
AIHM 470. Retail Merchandising (4)
*Select one from:*
AIHM 461. History of the Near Environment I (4)
AIHM 462. History of the Near Environment II (4)
AIHM 466. Research in the Cross Cultural Aspects of the Near Environment (3)
AIHM 410, Section 3. Field Exp: Apparel Design or 12 additional credits from listed "Select" groups with at least 7 credits of AIHM and no more than 5 credits of BA courses and not counted twice. AIHM 499 can count toward 12 credit total.

**Business Administration (14-16)**
BA 390. Marketing (4)
*Select three from:*
BA 131. Business Prod Software (2)
BA 215. Fundamentals of Accounting (4)
BA 347. International Business (4)
BA 350. Organization Systems (4)
BA 352. Organizational Behavior (4)
BA 492. Consumer Behavior (4)



**Electives**
Sufficient (together with baccalaureate and home economics cores) to ensure 180 total credits (60 upper division)

**HOUSING STUDIES**
**Baccalaureate Core (48)**
**Home Economics Core (9)**
COMM 111. Public Speaking (3) or
COMM 114. Argument and Critical Discourse (3)

**Housing Studies (46-55)**
AIHM 178. Housing & Architectural Phil (3)
AIHM 180. Arch House Planning (3)
AIHM 218. Building Construction (3)
AIHM 219. Resident Space Plan (3)
AIHM 378. Consumer Housing (3)
AIHM 410, Section 4, (6,9,12)
or 6 additional credits from:
HORT 280. Landscape Des Theory (3)
HORT 281. Land Des Studio (3)
AIHM 244. Pres Tech Interiors (3)
AIHM 478. Housing Finance (3)
AIHM 479. Hous Serv for Elderly & Disabled (3)
HDFS 271. Consumers in Society (3)
HDFS 381. Pers & Fam Finance (3)
ECON 201. Intro to Microeconomics (4)
ECON 202. Intro to Macroeconomics (4)

**Complete one of the following options:**
**Housing Design Option (30)**
AIHM 179. Architectural Drawing (3)
AIHM 220. Kitchen Planning (3)
AIHM 240. Introduction to Interiors (3)
AIHM 318. Bathroom Planning (3)
AIHM 319. Comp Asst Des & Draft (3)
AIHM 320. Adv Comp Asstd Des & Draft (3)
AIHM 340. Interior Envir Systems (3)
AIHM 461. History of the Near Environment I (4)
AIHM 462. History of the Near Environment II (4)
AIHM 418. Adv Housing Des & Client Comm (3)

**Housing Services Option (28)**
AIHM 480. Hsing Probs & Public Policy (3)
HDFS 360. Applied Research Methods or
ST 201. Principles of Statistics (3)
HDFS 461. Program Devel & Evaluation (3)
HDFS 472. Consump Patterns & Living Stds (3)
HDFS 473. Consumer Economics (3)
*Select 12 credits from:*
AIHM 179. Architectural Drawing (3)
AIHM 220. Kitchen Planning (3)
AIHM 240. Intro to Interiors (3)
AIHM 255. Textiles (5)[1] or NFM 225. Nutrition (4)[1]
AIHM 318. Bathroom Planning (3)
AIHM 319. Cmptr Assistd Des & Drftng (3)
AIHM 320. Adv Cmptr Asst Des & Drftng (3)
AIHM 340. Interior Envir Systems (3)
AIHM 461. History of the Near Environment I (4)
AIHM 462. History of the Near Environment II (4)
AIHM 418. Adv Hsng Desg/Client Commun (3)
BA 215. Fundamentals of Accounting (4)
BA 340. Finance (4)
BA 350. Managing Organizations (4)
ECON 330. Money & Banking (4)
ECON 435. The Public Economy (4)
ECON 490. Regional Economics (4)
GEO 300. Environ Conservation (3)
HDFS 314. Adult Develop & Aging (3)

HDFS 315. Perspectives on Aging (3)[1]
HDFS 361. Lifespan Issues (3)
PS 311. Legislative Politics (4)
PS 472. Public Administration (4)
PS 473. Public Administration (4)
SOC 360. Population Trends & Policy (3)
SOC 421. Social Change (3)
SOC 475. Rural-Urban Sociology (3)

**Electives**
Sufficient (together with baccalaureate and home economics cores) to ensure 180 total credits (60 upper division)

**INTERIOR MERCHANDISING**
**Baccalaureate Core (48)**
**Home Economics Core (9)**
COMM 111. Public Speaking (3) or COMM 114. Argument and Critical Discourse (3)
HST 101, HST 102, HST 103. Hist of West Civ (9)
ART 204, ART 205, ART 206. Intro to Art Hist (9)
PSY 201 or PSY 202. General Psychology (3)
MTH 111. College Algebra (4)

**Interior Merchandising (78)**
ART 115. Design I (4)
ART 117. Design II (4)
ART 131. Drawing I (4)
ART 234. Drawing/Figure II (3)
AIHM 179. Architectural Drawing (3)
AIHM 218. Building Constr (3)
AIHM 240. Introduction to Interiors (3)
AIHM 244. Presentation Techniques (4)
AIHM 255. Textiles (5)
AIHM 319. Comp Assist Des & Draft (3)
AIHM 340. Interior Environ Systems (3)
AIHM 344. Studio I: Resident Design (4)
AIHM 345. Inter Profes Pract & Proc (3)
AIHM 352. Textiles for Interiors (3)
AIHM 461. History of the Near Environment I (4)
AIHM 462. History of the Near Environment II (4)
AIHM 444. Studio II: Comm Design (4)
AIHM 410, Section 2. Field Experience (6-12)
or *Select 12 credits from:*
AIHM 450. Adv in Text Technol (3)
AIHM 453. Eval of Text Performance (3)
HORT 291. Landscaape Design & Management (4)
AIHM 379, AIHM 380. Built Environ of West Cult (3)
ART 261. Photography I (3)
ART 367. History of Design (3)
AIHM 220. Kitchen Planning (3)
AIHM 378. Consumer Housing (3)
AIHM 479. Hous Serv for Elderly & Disabled (3)

**Business Administration and Economics (15)**
ECON 201. Prin of Economics (3)
BA 390. Marketing (4)
*Select 2 courses from:*
BA 230. Business Law (4)
BA 347. International Business (4)
BA 350. Organizational Systems (4)
BA 352. Organizational Behavior (4)
BA 492. Consumer Behavior (4)
BA 495. Retail Management (4)
BA 497. Global Marketing (4)

**Electives**
Sufficient (together with baccalaureate and home economics cores) to ensure 180 total credits (60 upper division)

**MERCHANDISING MANAGEMENT**
**Baccalaureate Core (48)**
**Home Economics Core (9)**
WR 214. Writing in Business or WR 222. English Composition or WR 327. Technical Writing (3)
COMM 111. Public Speaking (3) or COMM 114. Argument & Critical Discourse
HST 102, HST 103. Hist of West Civ (6)
PSY 201, PSY 202. Gen Psychology (6)
MTH 111. College Algebra (4)

**Other Requirements (8)**
ART 115. Design I (4)
MTH 245. Math for Mgmt, Life & Soc Sci (4)

**Merchandising Management (52-54)**
AIHM 225. Construction Laboratory (1)
AIHM 226. Analysis of Apparel Const (3)
AIHM 255. Textiles (5)
AIHM 270. Fashion & Society (4)
AIHM 360. Twentieth Century Fashion (3)
AIHM 370. Texti & Appl Mkt Anlys (4)
AIHM 450. Adv in Text Tech (3)
AIHM 455. Econ of Text & App Ind (3)
AIHM 470. Retail Merchandising (4)
AIHM 472. Merch Plan & Control (4)
AIHM 410, Section 1. Merch Mgmt Field Exp (12)
OR
BA 350. Org Systems (4) and
BA 352. Org Behavior (4) or
PSY 360. Social Psych (3)
*And two additional courses from:*
AIHM 321. Fashion Illust & Design (3)
AIHM 421. Advanced Fash Illust & Des (3)
AIHM 425. Special Clothing Needs (4)
AIHM 453. Eval of Textile Perform (3)
AIHM 461. History of the Near Environment I (4)
AIHM 462. History of the Near Environment II (4)
AIHM 466. Research in the Cross Cultural Aspects of the Near Environment (3)

**Business Administration and Economics (31-34)**
BA 131. Bus Prod Software (2) or CS 101. Comp: Appl & Imp (4)
BA 215. Fundamentals of Acct (4)
BA 390. Marketing (4)
ECON 201, ECON 202. Intro to Economics (8)
*Select four courses from:*
BA 347. International Business (4)
BA 350. Organizational Systems (4)[2]
BA 352. Org Behav (4)[2]
BA 452. Leadership & Team Building (4)
BA 453. Human Res. Mgmt. (4)
BA 492. Consumer Behavior (4)
BA 493. Advertising Mgmt (4)
BA 495. Retail Management (4)
BA 497. Global Marketing (4)

**Electives (33-39)**
Sufficient (together with baccalaureate and home economics cores) to ensure 180 total credits (60 upper division)
Recommended electives:
PHL 101. Critical Thinking (4)
ART 367. History of Design (3)

**Lower Division Courses**

**AIHM 178. HOUSING AND ARCHITECTURAL PHILOSOPHY (3).** Residential architecture. Single-family housing in relation to societal needs. Emphasis on planning principles and graphic communication in design.

**AIHM 179. ARCHITECTURAL DRAWING (3).** Residential and small frame structures, development of working and detail drawings from preliminary studies. Introduction to fundamental principles of construction, application of materials to design, and current developments in light-frame building construction.

**AIHM 180. ARCHITECTURAL HOUSE PLANNING (3).** Multi-family, condominium, and cooperative housing, with emphasis on programming and design of these types of environments. PREREQ: AIHM 178.

**AIHM 199. SPECIAL TOPICS (1-16).**

**AIHM 218. BUILDING CONSTRUCTION (3).** Material and methods, individual research and observation, sketching existing examples, discussion, nature and functions of structure relating to building design, structures under load with study of limits and physical adequacy appropriate to their use.

**AIHM 219. RESIDENTIAL SPACE PLANNING (3).** Residential space and activity planning using established human performance and product standards. PREREQ: AIHM 180. Course open only to students admitted to professional majors in Housing Studies or Interior Merchandising.

**AIHM 220. KITCHEN PLANNING (3).** Planning kitchens which meet individual and family preferences. Application of basic kitchen design principles which will meet a variety of individual and family functional needs. PREREQ: AIHM 219. Course open only to students admitted to professional majors in Housing Studies &/or Interior Merchandising.

**AIHM 225. APPAREL CONSTRUCTION LABORATORY (1).** Basic construction concepts and skills, the operation of the sewing machine, and terminology of construction techniques. REQ: Diagnostic tests administered first class meeting. Graded P/N.

**AIHM 226. ANALYSIS OF APPAREL CONSTRUCTION (3).** Analysis of quality of materials and construction in ready-to-wear and custom-made garments; comparison of processes involved in the development of apparel; concepts of sizing and principles of fit in men's, women's, and children's wear. PREREQ: AIHM 225,AIHM 255.

**AIHM 227. APPAREL CONSTRUCTION (4).** Principles of pattern adjustment and fitting of garments to the body. Application of construction techniques to situations encountered in actual garment construction, with emphasis on advanced construction techniques, decision making, and evaluation. PREREQ: AIHM 226.

**AIHM 240. INTRODUCTION TO INTERIORS (3).** Introduction to the principles of interior design, color theory, materials selection, space planning, and the profession of interior design. PREREQ: ART 115.

**AIHM 244. PRESENTATION TECHNIQUES FOR INTERIORS (4).** Practical graphic communication skills for preparation of interiors and their arrangement. Emphasis on a professional, non-mechanical approach for illustrating interior environments. Primary focus will be on pencil, ink, and marker techniques. PREREQ: ART 131,ART 115.

**AIHM 250. FUNDAMENTALS OF TEXTILES (4).** Properties, characteristics, selection, and use of textile fibers, yarns, and fabrics; fabrication and finishing processes. Not open to Apparel Design, Interior Merchandising, or Merchandising Management majors.

**AIHM 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. Lecture and laboratory.

**AIHM 270. *FASHION AND SOCIETY (4).** Survey of the cultural, sociological, psychological, economic, and aesthetic influences on fashion and the fashion process. (Bacc Core Course)

**AIHM 299. SPECIAL TOPICS (1-16).**

### Upper Division Courses

**AIHM 318. BATHROOM PLANNING (3).** Bathroom design and standards in planning space to meet a variety of family and individual functions and needs. Consideration of resource conservation, safety and special needs. PREREQ: AIHM 220. Course open only to students admitted to professional majors in Housing Studies &/or Interior Merchandising.

**AIHM 319. COMPUTER ASSISTED DESIGN AND DRAFTING (3).** Instruction in computer assisted design and drafting techniques, and professional applications in areas such as housing, interiors, apparel design, and commercial and service facilities. Students will complete a project in their own area of professional interest. PREREQ: Drawing and design skills in a professional area; sophomore standing.

**AIHM 320. ADVANCED COMPUTER ASSISTED DESIGN AND DRAFTING (3).**[1] Customizing the CADD systems, basic programming. Use of auto lisp and data base management. Use of CADD programs in desktop publishing and word processing. Estimating with CADD. PREREQ: AIHM 319. Course open only to students admitted to professional majors in Housing Studies &/or Interior Merchandising.

**AIHM 321. FASHION ILLUSTRATION AND DESIGN (3).** Basic fashion illustration techniques; designing clothing for the women's wear apparel industry using various sources of inspiration. PREREQ: AIHM 226,AIHM 270; ART 115.

**AIHM 327. FLAT PATTERN DESIGN (4).** Pattern design using the flat pattern method including use of the computer aided design systems; development and construction of design prototypes. PREREQ: AIHM 227, AIHM 319.

**AIHM 340. INTERIOR ENVIRONMENTAL SYSTEMS (3).** The study of environmental systems of interiors including lighting, heating, and acoustics. PREREQ: AIHM 240, AIHM 178; AIHM 218. Course open only to students admitted to professional majors in Housing Studies &/or Interior Merchandising.

**AIHM 344. STUDIO I: RESIDENTIAL DESIGN (4).**[1] Involves the creative application and use of residential space, development of basic client presentation skills, and specification knowledge of residential interior products. Synthesizes space planning and furnishing of residential interiors. Application of presentation skills and computer-aided design. Not offered every year. PREREQ: AIHM 179, AIHM 218, AIHM 340. Course open only to students admitted to professional majors in Housing Studies &/or Interior Merchandising.

**AIHM 345. *^INTERIOR PROFESSIONAL PRACTICES AND PROCEDURES (3).**[1] Study of interior merchandising procedures; ethics, business, and legal aspects. Professional opportunities and preparation to professional positions related to individual competencies. PREREQ: BA 215, BA 390. (Writing Intensive Course) (Bacc Core Course)

**AIHM 352. TEXTILES FOR INTERIORS (3).** Types, qualities, and maintenance of functional and decorative fabrics for homes and public buildings. Use of specifications, standards, and legislation. PREREQ: AIHM 255.

**AIHM 360. TWENTIETH CENTURY FASHION (3).** Historic analysis of fashion from 1890 to the present in relation to the social and cultural environment; 20th century American and international fashion designers. PREREQ: AIHM 255, AIHM 270, HST 103.

**AIHM 366. CROSS CULTURAL ASPECTS OF THE NEAR ENVIRONMENT (4).** Socio-cultural study of the function and design of clothing, housing, interiors, and textiles. Cultural diversity; impact of cross-cultural contact; ethnicity.

**AIHM 370. ^TEXTILE AND APPAREL MARKET ANALYSIS (4).** Organization, operation, and merchandising activities of the domestic textile and apparel industries. Analysis of the marketing channel and the product/service mix of textile and apparel manufacturers. PREREQ: AIHM 226, AIHM 270, PREREQ/COREQ: BA 390. (Writing Intensive Course)

**AIHM 378. ^CONSUMER HOUSING (3).** Introduction to housing as a product, environment, process and service. Housing alternatives (with emphasis on home buying and financing) and consumer decision-making that contribute to individual, family, and community well-being. PREREQ: HDFS 271; sophomore standing. (Writing Intensive Course)

**AIHM 399. SPECIAL TOPICS (1-16).**

**AIHM 401. RESEARCH (1-16).**

**AIHM 402. INDEPENDENT STUDY (1-16).**

**AIHM 403. THESIS (1-16).**

**AIHM 405. READING AND CONFERENCE (1-16).**

**AIHM 406. PROJECTS (1-16).**

**AIHM 407. SEMINAR (1-16).**

**AIHM 408. WORKSHOP (1-16).**

**AIHM 409. PRACTICUM (1-16).**

**AIHM 410. FIELD EXPERIENCE (6-12).** On-the-job experience to integrate academic theory and to apply knowledge in a work situation with supervision by the participating field site and University supervisor. Application must be made prior to participation. REQ: Written consent of department; junior standing. Section 1: MERCHANDISING MANAGEMENT (12) PREREQ: AIHM 470, BA 390, BA 215. Section 2: INTERIOR MERCHANDISING (6,9,12) PREREQ: AIHM 444, 9 credits BA; Section 3: APPAREL DESIGN; (12). PREREQ: AIHM 321, AIHM 427; Section 4: HOUSING (6,9,12). PREREQ: AIHM 219, AIHM 378.

**AIHM 418/AIHM 518. ADVANCED HOUSING DESIGN AND CLIENT COMMUNICATIONS (3).**[1] Application of design techniques to clients' design problems. Students work with clients on remodeling projects and produce full working drawings. PREREQ: AIHM 219,AIHM 318,AIHM 319. Course open only to students admitted to professional majors in Housing Studies &/or Interior Merchandising.

**AIHM 421/AIHM 521. ADVANCED FASHION ILLUSTRATION AND DESIGN (3).** Fashion illustration techniques using a variety of media; designing apparel for the men's wear, women's wear, and children's wear industries. PREREQ: AIHM 321.

**AIHM 425/AIHM 525. SPECIAL CLOTHING NEEDS (4).** Physiological, socio-psychological, aesthetic, and economic factors influencing clothing needs for recreational and occupational clothing, for selected life cycle stages and for the physically challenged. PREREQ: AIHM 255.

**AIHM 427/AIHM 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. PREREQ: AIHM 327.

**AIHM 428/AIHM 528. APPAREL PRODUCTION PROCESSES (3).** Production pattern making and production assembly processes for the apparel industry; pattern sizing related to human anatomy; hand, mechanical and computer-aided pattern grading, marker making; garment specification writing and garment cost analysis. PREREQ: AIHM 319, AIHM 327.

**AIHM 429/AIHM 529. ADVANCED PROBLEMS IN APPAREL DESIGN (3).** Creation of unique garments from sketch through prototype using flat pattern and draping principles. Garment designs are developed to meet a specific need ranging from a functional garment for a person with a physical disability to a high-fashion couture garment. PREREQ: AIHM 427.

**AIHM 444/AIHM 544. STUDIO II: COMMERCIAL DESIGN (4).**[1] Commercial and contract design and space planning for offices, retail spaces, health care facilities, hospitality spaces, and public institutions. Includes preparation of a design portfolio. PREREQ: AIHM 344, AIHM 345. Not offered every year.

**AIHM 450/AIHM 550. ADVANCES IN TEXTILE TECHNOLOGY (3).** Analysis of recent literature on textile fibers, yarns, fabric construction, color, and finish. New textile products in varied applications. PREREQ: AIHM 255.

**AIHM 453/AIHM 553. EVALUATION OF TEXTILE PERFORMANCE (3).** Investigation of physical properties of textile products, with evaluation of data in relation to specifications, standards, and serviceability. Study of quality control in production, manufacturing and retailing of textile goods. PREREQ: AIHM 255.

**AIHM 455/AIHM 555. ECONOMICS OF THE TEXTILE AND APPAREL INDUSTRIES (3).** Economic analysis of the textile and apparel industries on a national and international basis. Effect of material and labor costs, supply and demand, and imports and exports on the production, distribution and consumption of textile products. PREREQ: ECON 201, AIHM 370.

**AIHM 461/AIHM 561. HISTORY OF THE NEAR ENVIRONMENT I (4).** History of clothing, furniture, interiors, textiles, and housing and building styles; primarily Euro-American, from the late Renaissance to 1899. The influence of social and cultural factors upon the design of the near environment. Need not be taken in sequence.

**AIHM 462/AIHM 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 the design of the near environment. Need not be taken in sequence.

**AIHM 466/AIHM 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. PREREQ: AIHM 366 or equivalent.

**AIHM 470/AIHM 570. RETAIL MERCHANDISING (4).** Principles of retail merchandising as applied to fashion-oriented soft goods. Planning, procuring, promotion, and managing merchandise inventories at the retail level. Organization, operation, and competitive behavior of soft goods retailers. PREREQ: AIHM 370.

**AIHM 472/AIHM 572. MERCHANDISE PLANNING AND CONTROL (4).** Theory and quantitative analysis of inventory planning, pricing, and control for the profitable management of a soft goods department or retail store. Solution of management problems utilizing quantitative analysis and merchandising principles. PREREQ: AIHM 470, BA 131 or CS 101, BA 215, MTH 245.

**AIHM 478/AIHM 578. HOUSING FINANCE (3).** Methods and procedures by which consumers purchase their housing. Considerations of the financial and legislative environment in which the home-buying decision is made. PREREQ: ECON 201,ECON 202; HDFS 381; AIHM 378. Not offered every year.

**AIHM 479/AIHM 579. HOUSING SERVICES FOR THE ELDERLY AND DISABLED (3).** Shelter alternatives that meet the special housing needs and problems of elderly and handicapped persons. Emphasis on housing-service packages and community resources available along the continuum from independent living and aging-in-place to long term care facilities. PREREQ: AIHM 378 or 6 credits HDFS, SOC, or PSY.

**AIHM 480/AIHM 580. HOUSING PROBLEMS AND PUBLIC POLICY (3).** Analysis of local, state, and federal housing and community development programs and public-private partnerships that are directed at the housing problems of lower income people, minorities, and other special need populations. PREREQ: AIHM 378.

**AIHM 490/AIHM 590. STUDY TOUR (1-6).** Planned study tour with specific professional focus. PREREQ: Prior written consent of department head and advanced registration and deposit. Course prerequisites as appropriate to topic. Graded P/N.

**AIHM 499/AIHM 599. SPECIAL TOPICS IN APPAREL, INTERIORS & MERCHANDISING (1-16).**

**Graduate Courses**

**AIHM 501. RESEARCH (1-16).**

**AIHM 502. INDEPENDENT STUDY (1-16).**

**AIHM 503. THESIS (1-16).**

**AIHM 505. READING AND CONFERENCE (1-16).**

**AIHM 506. PROJECTS (1-16).**

**AIHM 507. SEMINAR (1-16).**

**AIHM 508. WORKSHOP (1-16).**

**AIHM 509. PRACTICUM (1-16).**

**AIHM 510. WORK EXPERIENCE; INTERNSHIP (1-16).**

**AIHM 577. FASHION THEORY (3).** Examination of historical, sociological, psychological, marketing, and economic concepts, theories, and research that contribute to current understanding of the fashion process. PREREQ: AIHM 370. 6 credits of social science.

**AIHM 582. AESTHETIC AND PERCEPTUAL THEORIES OF DESIGN (2).** Analysis of design from the philosophical and theoretical bases formulated in art; art history; historic costume and interiors; apparel and interior design.

**AIHM 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. PREREQ: 6 credits of social science.

**AIHM 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. PREREQ: AIHM 472.

**AIHM 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 home economics plus root disciplines related to housing.

**AIHM 593. METHODS OF RESEARCH IN AIHM I (3).** Review and critique of published research in apparel, interiors, housing and merchandising. Introduction to the research process; identification of research questions, delineation of objectives, and development of a formal review of related literature. PREREQ: Minimum of one graduate only course.

**AIHM 594. METHODS OF RESEARCH IN APPAREL, INTERIORS, HOUSING & MERCHANDISING (3).** Philosophy and methods of research with emphasis on application of theories and problems in apparel, interiors, housing and merchandising. Research paper. PREREQ: AIHM 593, one statistics course.

**AIHM 601. RESEARCH (1-16).**

**AIHM 602. INDEPENDENT STUDY (1-16).**

**AIHM 603. THESIS (1-16).**

**AIHM 605. READING AND CONFERENCE (1-16).**

**AIHM 606. PROJECTS (1-16).**

**AIHM 607. SEMINAR (1-16).**

**AIHM 608. WORKSHOP (1-16).**

**AIHM 609. PRACTICUM (1-16).**

**AIHM 610. INTERNSHIP/WORK EXPERIENCE (1-16).**

**AIHM 665. HISTORICAL/CULTURAL THEORIES AND RESEARCH METHODS IN AIHM (3).** Critical analysis of historical and cultural paradigms, theories, and research methods. PREREQ: AIHM 566 and AIHM 540 or AIHM 541 or AIHM 560 or AIHM 565 or equivalent.

**AIHM 677. THEORETICAL FRAMEWORKS IN FASHION AESTHETICS AND HOUSING (3).** An in-depth study of current literature focusing on the synthesis and integration of fashion, aesthetics, and housing theories. Content varies with each offering. PREREQ: AIHM 577 or AIHM 582 or AIHM 588.

**AIHM 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 develops and research methods. Content varies with each offering. PREREQ: AIHM 585 or equivalent.

**AIHM 687. THEORETICAL FOUNDATIONS FOR MERCHANDISING RESEARCH (3).** Critical analysis of merchandising research; application of current theoretical developments and methodologies to the study of selected topics within merchandising management. PREREQ: AIHM 587 or equivalent.

**AIHM 690. THEORY DEVELOPMENT IN AIHM (3).** Critical analysis of the functions of science, scientific explanation, research, theory, and theory development within the fields of apparel, interiors, housing, and merchandising. PREREQ: AIHM 593, AIHM 594.

## GERONTOLOGY

Alexis Walker, Director
Oregon State University
Corvallis, OR 97331-5102
(541) 737-1083

**Certificate Program**

**Gerontology**

**Graduate Programs**

**Gerontology Minor**
*Area of Concentration*
Gerontology

The University-wide 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 of career opportunities, the OSU Program on Gerontology offers course work in gerontology through twelve departments. The program is administered by the College of Home Economics and Education.

Undergraduate and graduate students have the opportunity to study gerontology in conjunction with their major field. Undergraduate students in any major may earn a Certificate in Gerontology coordinated through the University-wide Program on Gerontology. The Masters of Public Health Program has a Gerontology Track, and Gerontology is a field of study in the Master of Interdisciplinary Studies (M.A.I.S.) program. Graduate students in any field may earn an integrated minor in gerontology. Masters and doctoral students in Human Development can concentrate in adult development and aging.

To be considered a gerontology course, at least 50 percent of the content of a course must address gerontology related issues. Gerontology courses include:

AIHM 479/AIHM 579. Housing Services for Elderly & Disabled
ANTH 370. Family, Gender and Generations
BA 437/BA 537. Employee Benefits and Estate Planning
COUN 583. Death, Dying and Grieving
ECON 495/595. Health Economics
ED 568. Education and Training for Adults
ED 578. Adult Development and Learning
EXSS 414/EXSS 514. Fitness and Aging
H 422/H 522. Control of Chronic Disease
H 423/H 523. Health Aspects of Aging
H 432/H 532. Health Care Finance
H 436/H 536. Health Services Admin and Mgmt
H 458/H 558 Reimbursement Mechanisms
H 464/H 564. Perspectives on Death
H 465/H 565. Public Health & Women: Social & Policy Issues
H 467/H 567. Long Term Care Alternatives
H 468/H 568. Financing and Administration of Long Term Care
HDFS 314. Adult Devel & Aging
HDFS 315. Perspectives on Aging
HDFS 407/HDFS 507. The Meaning of Aging
HDFS 422/HDFS 522. Topics in Adult Development and Aging (can be repeated)
HDFS 445/545. Families in Middle and Later Life
HDFS 482/HDFS 582. Financial Planning for Later Years
HDFS 514. Social Gerontology
HDFS 617. Adv Topics in Adult Devel & Aging (can be repeated)
NFM 420/NFM 520. Nutrition in Disease
NFM 429/NFM 529. Nutrition and Aging
PHL 444/PHL 544. Bioethics
PHL 455/PHL 555. Death and Dying
PHL 490/PHL 590. The Meaning of Aging
SOC 432/SOC 532. Sociology of Aging

In addition to gerontology courses, seminars, field study (310/410/510/610) and projects (406/506/606) in gerontology are offered through the Department of Human Development and Family Sciences (HDFS). Field study and projects in gerontology may also be available through other departments. Students may register for field study or projects credit in the department that best meets their needs for supervision given the nature of the experience.

### CERTIFICATE CURRICULUM

Undergraduate students may earn a Certificate in Gerontology. This certificate includes a required core through which students are introduced to aging as an interactive process of physical, social and psychological forces.

**Requirements**

**Core (9)**

HDFS 315. Perspectives on Aging (3)
HDFS 314. Adult Development/Aging or SOC 432. Sociology of Aging (3)
H 423. Health Aspects of Aging or H 422. Control Chronic Disease (3)
Field Study or Field Projects in Gerontology (3-6)

Electives (9-12)
Selected from gerontology courses listed above or others approved annually by the Program on Gerontology

Students pursuing a certificate must apply to the Program on Gerontology. An overall minimum GPA of 2.5 is required at graduation. All gerontology courses must have grades of C or better. For more information and application for study, contact the Program on Gerontology, Bates Hall, (541) 737-1090/1099.

### GRADUATE STUDY IN GERONTOLOGY

An integrated minor in gerontology is available to graduate students from throughout the University in any major field of study. The minor requires 15-36 credits, including HDFS 514, Social Gerontology. The balance of the course work is selected from the graduate gerontology courses (listed above), field study or research.

Students majoring in Human Development and Family Studies may choose adult development and aging as a major area of concentration.

The Master of Public Health Program has a Gerontology Track, and Gerontology is a field of study in the Master of Interdisciplinary Studies (M.A.I.S.) program.

## HUMAN DEVELOPMENT AND FAMILY SCIENCES

Alan Acock, Head
322 Milam Hall
Oregon State University
Corvallis, OR 97331-5102
(541) 737-4765

**Faculty**

*Professors* Acock, Morrow, Pratt, Sugawara, Walker; *Associate Professors* Holyoak, Hooker, Olson, Southers, Vuchinich, Zvonkovic; *Assistant Professors* Bowman, Moran, Richards; *Instructors* Brewer, Burke, Burt, Chase, Sorte, Traeger

**Undergraduate Major**

**Human Development and Family Sciences (B.S.)**
*Options*
Early Childhood Education
Family Finance
Family and Consumer Sciences
Individual and Family Development

**Certificate Program**

Certificate in Gerontology

**Graduate Majors**

**Family Resource Management (M.S., Ph.D.)**
**Home Economics (M.S.)**
**Family & Consumer Sciences (M.A.T.)**
**Human Development and Family Studies (M.S., Ph.D.)**

**Graduate Minor**

**Gerontology**

### UNDERGRADUATE MAJOR AND OPTIONS

The B.S. in Human Development and Family Sciences can be pursued in one of four options: Early Childhood Education, Family Finance, Family & Consumer Sciences, or Individual and Family Development.

The Early Childhood Education option provides preparation for students interested in working with young children or in entering the School of Education's Master of Arts in Teaching (M.A.T.) program for elementary education.

The Individual and Family Development option prepares students for work in professional programs serving various age groups, human services and agencies, and for graduate study.

The Family & Consumer Sciences option is intended for students interested in broader study of home economics subjects combined with communication skills to be applied to careers such as consumer affairs, education, extension, or positions requiring cross-cultural or international expertise. It also is for people preparing for the School of Education's Masters of Arts in Teaching (M.A.T.) program for Family and Consumer Sciences.

The Family Finance option offers undergraduate study in family and consumer economics, financial planning and counseling.

### GRADUATE PROGRAMS

Graduate programs leading to the M.S. and Ph.D. are also offered. Graduate degrees in Human Development and Family Studies emphasize lifespan human development, adult development and aging, child and adolescent development, family studies, or early childhood education. Emphasis is on preparation for professional careers in research, teaching, and human services. Human development, early childhood education, family studies, and gerontology can be used as minor areas in the M.A.I.S.

The M.S. in Home Economics is available for family and consumer science specialists.

A Master of Arts in Teaching degree and licensure for teaching family and consumer sciences is offered in cooperation with the School of Education.

The M.S. and Ph.D. in Family Resource Management is offered as an interdepartmental program. See Family Resource Management in the *Graduate Catalog*.

### UNDERGRADUATE DEGREE REQUIREMENTS

**HUMAN DEVELOPMENT AND FAMILY SCIENCES**

**Baccalaureate Core (48)**
**Home Economics Core (12)**
**Human Development and Family Sciences Core (35) as follows:**
HDFS 240. Human Sexuality (3)
HDFS 360. Applied Research Methods (3)
HDFS 361. Lifespan Issues, Policies & Prog (3)
HDFS 381. Personal and Family Finance (3)
HDFS 461. Program Development & Eval (4)
COMM 111. Public Speaking (3) or
COMM 114. Argum & Critical Disc (3)
NFM 225. Human Nutrition (4)
SOC 204. Introduction to Sociology (3)
PSY 201. General Psychology (3)
*One of the following:*
HDFS 311. Infant & Child Development (3)
HDFS 313. Adolescent Development (3)
HDFS 314. Adult Development & Aging (3)
HDFS 315. Perspectives on Aging (3)
*One of the following:*
HDFS 271. Consumers in Society (3)
HDFS 340. Relationship Development (3)
HDFS 341. Family Development (3)
HDFS 481. Financial Planning for Families with Children (3)
HDFS 482. Finan Planning for Later Years (3)
*Recommended:*
At least one year of a foreign language.
CS 101. Computers: Applications and Implications (4)

**Choose one of the following options**

**INDIVIDUAL AND FAMILY DEVELOPMENT OPTION (39-54)**

HDFS 410. Field Experience (6) or
HDFS 330. Direct/Exp/ECE (3) and
HDFS 430. Super/Exp/ECE (9)
ST 201. Principles of Statistics or
MTH 211, MATH 212, MTH 213. Found of Elem Math (3 or 9)
*Include all of the following not already taken for major (15-30)*
HDFS 311. Infant/Child Development (3)
HDFS 313. Adolescent Development (3)
HDFS 314. Adult Development and Aging (3)
HDFS 341. Family Development (3)
*Choose 15 credits from the following:*
*Not to exceed 6 credits from:*
HDFS 310. Directed Experience/Human Development (3)
HDFS 330. Directed Experience/ECE (3)
HDFS 401. Research (TBA)
HDFS 405. Reading and Conference (TBA)
HDFS 406. Projects (TBA)
HDFS 410. Field Experience (TBA)
HDFS 430. Supervised Experience/ECE (9)
*Any of the following not taken for core or option*
HDFS 312. Programs for the Early & Middle Childhood (3)
HDFS 315. Perspectives on Aging (3)
HDFS 340. Relationship Development (3)
HDFS 420. Children with Special Needs (3)
HDFS 421. Topics in Child and Adolescent Development (3)
HDFS 422. Topics in Adult Development and Aging (3)
HDFS 436. Parenting and Parent Educ (3)
HDFS 440. Families and Work (3)
HDFS 442. Gender and Fam Relationships (3)
HDFS 443. US Fam, Gender, Race & Class (3)
HDFS 444. Family Dysfunctions (3)
HDFS 445. Topics in Family Studies (3)
HDFS 450. Family & Quality of Life (3)
HDFS 464. Public Policy and Family Issues (2)
HDFS 465. Topics in Family Policy (3)
HDFS 471. The World Consumer (3)

**Other courses (9)**
PSY 202. General Psychology (3)
Any additional 6 credits of upper division in PSY and/or SOC.

**Electives**
Sufficient to ensure 180 credits, 60 upper division.

**EARLY CHILDHOOD EDUCATION OPTION (81-87)**
HDFS 330. Direct/Exp/ECE (3)
HDFS 430. Super/Exp/ECE (9)
MTH 211. Found of Elem Math (3)
MTH 212. Found of Elem Math (3)
MTH 213. Found of Elem Math (3)
*Include all of the following not taken for major requirements (36-42):*
HDFS 311. Infant/Child Development (3)
HDFS 312. Programs for Early/Middle Childhood (3)
HDFS 313. Adolescent Development (3)
HDFS 314. Adult Development & Aging (3)
HDFS 341. Family Development (3)
HDFS 420. Children with Special Needs (3)
HDFS 430. Supervised Experience/ECE (9)
HDFS 436. Parenting and Parent Educ (3)
*Other required courses (42 credits including courses that meet Bacc Core requirements)*
PSY 202. General Psych (3)
MTH 391. Elem Problem Solving (3)
HST 203. History of US (3)
and 2 other courses from Bacc Core Western Culture
GEO 105. Geography of the Non Western World (3)
GEO 106. Geography of the Westem World (3)
Three ENG courses from Bacc Core (9)
ED 309. Practicum (3)
ED 411. Ed Psych/Learning and Dev (3)
ED 312. Intro to Curric & Instruction (3)
ED 313. Trends & Issues in Education (3)
*Choose from the following (3):*
One science course from approved Bacc Core Physical and Biological Sciences in addition to Bacc Core requirement or one from the following:
BI 301, BI 333, BI/BOT 489, ENT 300/BI 300, FOR 365, FW 325, GEO 203, GEO 300, GEO 327, GEO 328, GS 302, GS 333, GS 489, MB 302, MB 303, PH 313, PH 331, PH 332, RNG 477, CSS 390, Z 331, Z 332, Z 333, Z 345, Z 427.

**Electives**
Sufficient to ensure 180 credits, 60 upper division.

**FAMILY AND CONSUMER SCIENCES OPTION (38-50)**
ST 201. Principles of Statistics OR MTH 211, MTH 212, MTH 213. Foundations of elem. Math (3-9)
HDFS 330. Direct/Exp/ECE (3)
HDFS 410. Field Experience (6)
NFM 235. Science of Foods (4)
AIHM 378. Consumer Housing (3)
HDFS 271. Consumers in Society (3)
HDFS 311. Infant & Child Development (3)
HDFS 313. Adolescent Development (3)
HDFS 314. Adult Development & Aging (3)
HDFS 341. Family Development (3)
HOEC 300. Management of Resources (3)
ECON 201. Introduction to Microeconomics or ECON 202. Intro. to Macroeconomics (4)
*One of the following:*
NFM 310. Science & Mgmt. Of Food (4)
NFM 312. Issues in Nutri. & Health (3)
NFM 325. Nutri. Through the Life (3)
*Choose 12 credits not taken previously from the following:*
NFM 310. Science & Mgmt. Of Food (4)
NFM 312. Issues in Nutri. & Health (3)
NFM 325. Nutri. Through the Life Cycle (3)
HDFS 340. Relationship Development (3)
HDFS 382. Computer App/Pers. & Fam. Finance (1)
HDFS 420. Children w/Special needs (3)
HDFS 436. Parenting & Parenting Education (3)
ED 411. Educational Psyc, Learning & Dev. (3)

**Electives**
Sufficient to ensure 180 total credits, 60 upper division. List of recommended electives will be available.

**FAMILY FINANCE OPTION (49)**
HDFS 271. Consumers in Society (3)
HDFS 382. Computer Applications in Pers/Fam Finance (1)
HDFS 410. Field Experience (6)
HDFS 472. Consumption Patterns & Living Standards (3)
HDFS 481. Financial Planning for Families with Children (3)
HDFS 482. Financial Planning for Later Years (3)
HDFS 483. Financial Planning and Counseling Process (3)
AIHM 378. Consumer Housing (3)
BA 215. Fundamentals of Accounting (4)
BA 340. Finance (4)
ECON 201. Intro to Microeconomics (3)
ECON 202. Intro to Microeconomics (3)
PSY 202. General Psychology (3)
PSY 483. Counseling & Interviewing Skills (4)
ST 201. Principles of Statistics (3)

**Recommended Electives**
HDFS 315. Perspectives on Aging (3)
HDFS 440. Families and Work (3)
HDFS 450. Family & Quality of Life (3)
HDFS 471. The World Consumer (3)
HDFS 473. Consumer Economics (3)
BA 435. Insurance Planning for Individuals (4)
BA 437. Empl Insurance & Retire Plan (4)
BA 442. Investments (4)
ECON 330. Money & Banking (3)
ECON 331. Money & Banking (3)
ECON 495. Health Economics (3)

## Courses

### Lower Division Courses

**HDFS 199. SPECIAL STUDIES (1-16).**

**HDFS 240. *HUMAN SEXUALITY (3).** An introduction to human sexuality including physiological, psychological, social, and historical aspects of sexuality. Particular emphasis is placed on developmental and relationship aspects of sexuality. (Bacc Core Course)

**HDFS 271. CONSUMERS IN SOCIETY (3).** Development of the consumer role in the U.S., rights and responsibilities of today's consumer, factors influencing consumption attitudes and decisions, understanding the forces which operate in the marketplace and learning how to influence them, analysis of the impact of consumer behavior on society.

### Upper Division Courses

**HDFS 310. DIRECTED EXPERIENCE IN HUMAN DEVELOPMENT (3).** Experience interacting with individuals at a particular point in the life span. Range of placement opportunities identified by department. PREREQ: 6 credits of human development. Graded P/N.

**HDFS 311. INFANT AND CHILD DEVELOPMENT (3).** Research and theory related to development from infancy (birth) through middle childhood (10 years). Includes discussion of biological, familial and sociocultural influences. PREREQ: HOEC 201.

**HDFS 312. PROGRAMS FOR EARLY AND MIDDLE CHILDHOOD (3).** Development and implementation of programs for children ages 3-9; emphasis on educational settings. PREREQ: HDFS 311.

**HDFS 313. ADOLESCENT DEVELOPMENT (3).** Advanced theories and research on physical, social and psychological development during adolescence; emphasizes influences of family, peers, schools and community. PREREQ: 6 credits or HDFS, SOC or PSY.

**HDFS 314. ADULT DEVELOPMENT AND AGING (3).** Advanced theories and research related to developmental changes and stability in early, middle, and late adulthood. Gender issues, personality, cognition, and adaptation. PREREQ: 6 credits of HDFS, PSY, or SOC.

**HDFS 315. PERSPECTIVES ON AGING (3).** Analysis of the social, economics, physical and psychological factors influencing the processes and consequences of aging. PREREQ: 6 credits of HDFS, SOC or PSY.

**HDFS 330. DIRECTED EXPERIENCE IN EARLY CHILDHOOD DEVELOPMENT (3).** Participation in early childhood education program focused on applying guidance techniques and development of educational activities for young children. PREREQ: HDFS 311, HDFS 312.

**HDFS 340. RELATIONSHIP DEVELOPMENT (3).** A developmental approach to the study of close relationships. Includes processes of attraction, interdependence, love, and commitment. A variety of close relationships are covered including friendships and romantic relationships—heterosexual, lesbian, and gay.

**HDFS 341. FAMILY DEVELOPMENT (3).** Developmental approach to family studies in western culture; diversity of family types, parent-child relations, families in later life, and other developmental issues and transitions.

**HDFS 360. APPLIED RESEARCH METHODS (3).** Basic research methods as they are applied in human development and family studies. PREREQ: 6 credits of HDFS, ST 201, or MTH 211, MTH 212, MTH 213.

**HDFS 361. LIFESPAN ISSUES, POLICIES AND PROGRAMS (3).** Introduction to the public policy process: how policies affect individuals and families across the lifespan. Selected policies that affect individuals in the general population and in special needs groups.

**HDFS 381. PERSONAL AND FAMILY FINANCE (3).** Understanding financial planning, income taxes, loans, credit and housing costs. Protection through insurance: property, liability, automobile, health, disability and life. Increasing income through investments: time deposits, government securities, stocks and bonds, mutual funds, and real estate. Planning for retirement and estate transfer. PREREQ: Sophomore standing.

**HDFS 382. COMPUTER APPLICATIONS IN PERSONAL AND FAMILY FINANCE (1).** Use of microcomputers and personal and family financial management. Laboratory applications of concepts using existing commercial software and spreadsheet programs. PREREQ: HDFS 381.

**HDFS 401. RESEARCH (1-6).**

**HDFS 402. INDEPENDENT STUDY (1-16).**

**HDFS 403. THESIS (1-16).**

**HDFS 405. READING AND CONFERENCE (1-6).**

**HDFS 406. PROJECTS (1-6).**

**HDFS 407. SEMINAR (1-16).**

**HDFS 408. WORKSHOP (1-16).**

**HDFS 410. FIELD EXPERIENCE (3-15).** Supervised work experience with professional level responsibilities. Supplementary conferences, readings and reports. Supervised by agency/firm and instructor. PREREQ: Senior standing. Restricted to students in HDFS professional major/options. Graded P/N.

**HDFS 420. CHILDREN WITH SPECIAL NEEDS (3).** An overview of developmental issues and concerns related to children with special needs (disabled, gifted, abused and neglected, and other). PREREQ: 6 credits of HDFS, SOC or PSY.

**HDFS 421/HDFS 521. TOPICS IN CHILD AND ADOLESCENT DEVELOPMENT (3).** Examination of a particular area of study related to children. Topics may include gender role development, social competence, prosocial development, moral development, cognition, contemporary issues. PREREQ: 6 credits of HDFS, SOC or PSY. (May be repeated for credit.)

**HDFS 422/HDFS 522. TOPICS IN ADULT DEVELOPMENT AND AGING (3).** Examination of a particular area of study within adult development and aging. Topics may include: Women and Aging; Stress, Coping and Adaptation; Support Systems for the Elderly. PREREQ: 6 credits of HDFS, SOC or PSY. (May be repeated for credit.)

**HDFS 430. SUPERVISED EXPERIENCE IN EARLY CHILDHOOD DEVELOPMENT (9).** Participation in an early childhood program focused on student teaching, program development and evaluation, parent education and administration. PREREQ: HDFS 330.

**HDFS 436. PARENTING AND PARENT EDUCATION (3).** Parenting and parent education concepts for parents with children from infancy through adolescence. Resources and skills in parenting and in designing programs for parents at home and in child care settings emphasized. Importance of parent-child teacher relationships in development and learning discussed. PREREQ: HDFS 311.

**HDFS 440/HDFS 540. FAMILIES AND WORK (3).** Examination of the bidirectional influences of work and family relationships, paid and unpaid work and varieties of work experiences including those associated with social class. How work differentially affects (and is affected by) diverse family structures. PREREQ: 6 credits of HDFS, SOC or PSY.

**HDFS 442/HDFS 542. GENDER AND FAMILY RELATIONSHIPS (3).** The role of gender in the lives of individuals and in family relationships and processes, including both mens and womens experience. Developmental issues are considered but the emphasis is on the effects rather than the causes of gender-role socialization. PREREQ: 6 credits of HDFS, SOC or PSY.

**HDFS 443/HDFS 543. *UNITED STATES FAMILIES, GENDER, RACE, AND CLASS (3).** Explores the influence of gender, race/ethnicity, and social class in individual life and family structures and processes; similarity and diversity among families emphasized. PREREQ: 6 credits of HDFS, SOC, or PSY. (Bacc Core Course)

**HDFS 444/HDFS 544. FAMILY DYSFUNCTIONS (3).** An examination of individual, interpersonal, and social problems which develop in the context of family life. These problems include marital distress, family violence, divorce, parenting difficulties, and child psychopathology. PREREQ: 6 credits of HDFS, SOC or PSY.

**HDFS 445/HDFS 545. TOPICS IN FAMILY STUDIES (3).** An overview of a particular area of study within family studies. Content varies with each offering. Topics may include divorce, family violence, family dynamics, intergenerational families. PREREQ: 6 credits of HDFS, SOC or PSY. May be repeated for credit.

**HDFS 450. *FAMILIES AND QUALITY OF LIFE IN THE DEVELOPING WORLD (3).** Analysis of quality of life for families in the developing world through an interdisciplinary approach. Quality of life indicators and influencing factors such as economic, social, political, cultural, environmental resources, health, and education. Satisfies Baccalaureate Core in Contemporary Global Issues. PREREQ: Social processes and institutions course. (Bacc Core Course)

**HDFS 461. ^PROGRAM DEVELOPMENT AND EVALUATION (4).** Implementation of process for planning and evaluating human service programs for all age groups. PREREQ: HDFS 360, restricted to students in HDFS professional major. (Writing Intensive Course)

**HDFS 465/HDFS 565. SPECIAL TOPICS: FAMILY POLICY (3).** Advanced study of policy issues affecting families across the lifespan. Topics may be selected from among: Children, Families and the Law, Legislative Perspectives on Family Policy; Policy and Care for Dependent Family Members, other current issues. May be repeated for credit. PREREQ: HDFS 361 or equivalent; 6 additional credits of HDFS, SOC, PSY; upper division status.

**HDFS 471. *THE WORLD CONSUMER (3).** A multidiciplinary survey of consumer problems and issues emphasizing factors that influence global consumption values, patterns and trends. Students are challenged to examine their own consumer economic behavior and are encouraged to use course information pragmatically. Satisfies Bacc Core requirements in Contemporary Global Issues. PREREQ: Completion of all perspectives requirements in baccalaureate core. (Bacc Core Course)

**HDFS 472/HDFS 572. CONSUMPTION PATTERNS AND LIVING STANDARDS (3).** Study of the consumption patterns of individuals and societies, and the factors which influence them. Understanding the development and relationships between expenditure patterns and budgets. Concepts of consumpation, savings, and accumulation of wealth. Measurement of levels and standards of living, and their components. PREREQ: HDFS 271, HDFS 381.

**HDFS 473/HDFS 573. CONSUMER ECONOMICS (3).** Economic theory as a basis for consumer choice. Current consumer economic issues, including information processing; product pricing; product quality and liability; legislation and regulation; ecological considerations of consumption; and implications for consumer education. PREREQ: HDFS 271.

**HDFS 481/HDFS 581. FINANCIAL PLANNING FOR FAMILIES WITH CHILDREN (3).** Methods of helping families with children plan investment, tax, and risk management strategies appropriate to their income, family composition, and stage in the family life cycle. Includes an analysis of the cost of raising a child; appropriate investments for saving for children's college educations; appropriate savings mediums for family emergency funds; tax strategies for child care expenses, etc. PREREQ: HDFS 381.

**HDFS 482/HDFS 582. FINANCIAL PLANNING FOR LATER YEARS (3).** Management of financial resources before and during retirement to meet family needs. Emphasis on personal tax-deferred retirement programs; means of calculating annual savings needed to reach retirement income objectives; pension design; government sponsored plans, including Social Security, Medicare; federal civil service; federal estate and gift taxation; and characteristics of wills, intestacy, and the probate process. PREREQ: HDFS 381.

**HDFS 483/HDFS 583. FINANCIAL PLANNING AND COUNSELING (3).** Analysis of financial management and counseling tools appropriate for individuals and families in varying circumstances. Special financial needs of families facing transitions such as marriage, divorce, unemployment, bankruptcy, birth, short and long term disability, death, and retirement will be considered. Preparation for application of planning and counseling skills to life situations. PREREQ: HDFS 481 or HDFS 482, PSY 483.

### Graduate Courses

**HDFS 501. RESEARCH (1-6).**

**HDFS 502. INDEPENDENT STUDY (1-6).**

**HDFS 503. THESIS (1-16).**

**HDFS 505. READING AND CONFERENCE (1-6).**

**HDFS 506. SPECIAL PROBLEMS; PROJECTS (1-6).**

**HDFS 507. SEMINAR (1-16).**

**HDFS 508. WORKSHOP (1-16).**

**HDFS 509. PRACTICUM (1-16).**

**HDFS 510. INTERNSHIP (3-15).**

**HDFS 511. THEORIES OF HUMAN DEVELOPMENT (3).** Critical examination of various theories of human development. Emphasizes evolution of theories and impact on current human development research.

**HDFS 512. CONCEPTS IN LIFESPAN DEVELOPMENT (3).** A multidisciplinary approach to understanding human development across the lifespan. Emphasis on exploring how biological and environmental factors influence both change and constancy in cognitive, social, and personality development.

**HDFS 514. SOCIAL GERONTOLOGY (3). (3).** Advanced theories and research related to social development and change in middle and late adulthood. Gender, social roles, person-environment congruence, period and cohort influences are emphasized.

**HDFS 523. TOPICS IN EARLY CHILDHOOD EDUCATION (3).** Examination of a particular area of study in early childhood education. Topics may include philosophy and models; children with special needs; parenting and parent education; curriculum development; teacher-child relations; administration of programs; guidance. Maybe repeated for credit.

**HDFS 531. METHODS OF BEHAVIORAL RESEARCH (3).** Philosophy and methods of behavioral research related to human development and family studies.

**HDFS 546. THEORIES OF FAMILY STUDIES (3).** Graded P. An overview of the major theoretical perspectives used in the study of families. Issues of theory construction and evaluation are also covered. The goal of this course is to enable the student to apply conceptual frameworks to a particular area of interest.

**HDFS 548. ADVANCED FAMILY DEVELOPMENT (3).** Study of contemporary American families from a developmental perspective. Covers marriage, parent-child relations, and transitions associated with family life. Attention is given to the diversity of family structures and processes.

**HDFS 570. FAMILY MANAGEMENT SYSTEMS (3).** Theory, principles, and research in family management systems building on social systems concepts.

**HDFS 571. THEORIES IN FAMILY ECONOMICS (3).** Analysis of the determinants of family economic well-being. Theories and measurement of household income, income distribution, levels of living, poverty, and wealth. Analysis of household work patterns and their economic effects. Policies affecting economic choices and well-being. PREREQ: At least one course in microeconomics.

**HDFS 580. SELECTED TOPICS: FAMILY RESOURCE MANAGEMENT (3).** May be repeated for credit.

**HDFS 601. RESEARCH (1-6).**

**HDFS 602. INDEPENDENT STUDY (1-6).**

**HDFS 603. DISSERTATION (1-16).**

**HDFS 605. READING AND CONFERENCE (1-6).**

**HDFS 606. SPECIAL PROJECTS (1-6).**

**HDFS 607. SEMINAR (1-16).**

**HDFS 608. WORKSHOP (1-16).**

**HDFS 610. INTERNSHIP (3-15).**

**HDFS 616. ADVANCED TOPICS IN CHILD-ADOLESCENT DEVELOPMENT (3).** Advanced critical study of theory and research related to specific topics of social and emotional development during infancy, childhood and/or adolescence. May be repeated for credit.

**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.

**HDFS 632. ADVANCED RESEARCH METHODS (3).** An in-depth study of a particular area of research methods related to human development and family study. PREREQ: HDFS 531.

**HDFS 635. QUALITATIVE RESEARCH METHODS (3).** An overview of qualitative methods in social science research. Covers issues of sampling, development of the problem, measurement, analysis, and interpretation. Issues of validity and reliability are also addressed.

**HDFS 648. ADVANCED TOPICS IN FAMILY STUDIES (3).** An in-depth study of a particular area within family studies. Content varies with each offering. May be repeated for credit.

**HDFS 670. DEVELOPMENT IN FAMILY MANAGEMENT THEORY (3).** Current theory development in family management; development of management philosophy and analytical skills related to family managerial problems; application of research and measurement tools. PREREQ: HDFS 570.

**HDFS 671. RESEARCH PERSPECTIVES IN FAMILY RESOURCE MANAGEMENT (2).** Identification of research issues and priorities. Research resources in land grant-universities related to the field of family resource management.

## ■ FAMILY AND CONSUMER SCIENCE EDUCATION

### COURSES

#### Upper Division Courses

**FCSE 405. READING AND CONFERENCE (1-3).**

**FCSE 406. PROJECTS (1-3).**

**FCSE 407. SEMINAR (1-3).** FCSE 407a: Seminar: Student Teaching (3). To be taken concurrently with FCSE 416/FCSE 516. Student Teaching: Home Economics.

#### Graduate Courses

**FCSE 501. RESEARCH (1-16).**

**FCSE 503. THESIS (1-16).**

**FCSE 505. READING AND CONFERENCE (1-3).**

**FCSE 506. PROJECTS (1-3).**

**FCSE 507. SEMINAR (1-3).**

**FCSE 508. WORKSHOP (1-3).**

**FCSE 509. PRACTICUM (1-3).**

**FCSE 510. PROFESSIONAL INTERNSHIP: FAMILY AND CONSUMER SCIENCES EDUCATION (1-15).** A full-time field experience in which the intern 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. PREREQ: Admission to MAT Program.

**FCSE 514. CURRICULUM DESIGNS IN FAMILY AND CONSUMER SCIENCES EDUCATION (3).** Analysis of curricular approaches to family and consumer sciences education principles of curriculum development and strategies for implementing curricular changes.

**FCSE 540. SELECTED TOPICS IN FAMILY AND CONSUMER SCIENCES EDUCATION (1-3).** Current literature and research in a specific topic of concern to family and consumer sciences education. May be taken for a maximum of nine credits.

**FCSE 553. APPLIED INSTRUCTIONAL STRATEGIES (3).** Techniques for establishing a classroom climate conducive to learning; emphasizes instructional design and accompanying strategies.

**FCSE 556. LINKING RESEARCH, TEACHING, AND PRACTICE (3).** This course links research to teaching. Students will work with cooperating teachers and university supervisors to identify and apply research to teaching. PREREQ: Admission to MAT and apply research to teaching. PREREQ: Admission to MAT Program.

**FCSE 557. ISSUES AND TRENDS IN CURRICULUM AND INSTRUCTION (3).** Emphasizes trends related to all content areas in professional-technical education as well as those unique to program areas.

## NUTRITION AND FOOD MANAGEMENT

Ann M. Messersmith, Head
108 Milam Hall
Oregon State University
Corvallis, OR 97331-5103
(541) 737-3561

**Faculty**
*Professors* Holmes, Leklem, Messersmith, Raab; *Associate Professors* Cerklewski, Georgiou, Kelsey, Wander; *Assistant Professor* Cluskey; *Senior Faculty Research Assistant* Ridlington; *Faculty Research Assistants* Du, Hardin; *Emeritus Professor* Woodburn

### Undergraduate Major

**Nutrition and Food Management (B.S.)**
*Options*
Dietetics
Food Systems Management
Foods in Business
Nutrition Science

### Minors

**Food Systems Management**
**Nutrition**

### Graduate Major

**Nutrition and Food Management (M.S., Ph.D.)**
*Graduate Areas of Concentration*
Determinants of Food Behavior
Foodservice Systems Management
Human Nutrition
Human Nutrition & Metabolic Study
Management in Dietetics
Nutrient Requirements and Interrelationships
Nutritional Biochemistry
Nutritional Status Assessment
Physical-Chemical Aspects of Food Quality
Sensory Evaluation of Food Quality
Dietetic Management, M.S. Distance Delivery

**Family Resource Management (M.S., Ph.D.)**
*Graduate Area of Concentration*
Food Systems Management

The Department of Nutrition and Food Management offers an undergraduate major in Nutrition and Food Management and courses for both majors and nonmajors in human nutrition, foods, and food systems management. Four options are available to the student: (1) Dietetics, (2) Food Systems Management, (3) Foods in Business and (4) Nutrition Science.

The Dietetics Option meets the academic requirements for membership in The American Dietetic Association. This degree qualifies the student for preprofessional experience which leads to taking the national registration exam. This option has strong nutrition, food management and science emphases. Graduates find careers as dietitians in health care facilities;

in industrial, school, and university foodservices; in private practice; in community nutrition services; as sales representatives for foodservice or health products; as well as many other related fields.

The Food Systems Management Option has a business emphasis and prepares the student for entry level or traineeship positions in foodservice and restaurant management. Career opportunities include foodservices in colleges or universities, public and private schools, hospitals, health care, restaurants and industry; positions in marketing, and consulting; and teaching and research in universities and food industries after graduate study.

The Foods in Business Option is for students interested in food product development and/or promotion of consumer services in business, industry, and government.

The Nutrition Science Option provides a strong background in basic sciences and human nutrition for students planning further study in health-related professions, such as medicine or dentistry, or graduate school.

Minors in nutrition and food systems management are available. The department's courses are included in curricula of other majors in the College of Home Economics and Education as well as majors in Food Science and Technology; Health Care Administration; Health and Human Performance; Prenursing; Premed and Public Health.

Graduate programs within the department lead to M.S., M.A.I.S. and Ph.D. degrees. Master's and Doctoral programs may emphasize nutrition, foods, or food systems management or a combination. Graduate programs in food systems management are also offered in the graduate area of Family Resource Management. The Ph.D. program is an approved Western Regional Graduate Program (WICHE) for in-state tuition.

### NUTRITION AND FOOD MANAGEMENT

**Baccalaureate Core (48)**

**Home Economics Core (9)**

**Nutrition and Food Management Core (23-25)**

NFM 104. Orientation (1)
NFM 225. Human Nutrition (4)
NFM 235. Science of Foods (4)
NFM 310. Science & Management of Foods (4)
COMM 114. Argument & Critical Discourse or COMM 111. Public Speaking (3)
MB 230. Introductory Microbiology (4) or MB 302, MB 303. Gen Micro (3,2)
ST 201. Principles of Statistics (3) or ST 351. Intro to Statistical Methods (4)

### DIETETICS OPTION

(Meets The American Dietetic Association academic requirements.)
CH 121, CH 122, CH 123, or CH 221, CH 222, CH 223. General Chemistry (15)
CH 331, CH 332 Organic Chemistry (8) or CH 334, CH 335, CH 336. Organic Chem (9)
BB 350 or BB 351. Elementary Biochem (4-5)
Z 332, Z 333. Human Anat & Physiol (6)
ED 411. Educational Psychology (3)
ECON 201. Intro Microecon (3)
PSY 201, PSY 202. General Psychology (6)
BA 215. Fundamentals of Accounting or BA 211 and BA 213 (4,4)
BA 350. Organization Systems (4)
NFM 219. Food Merch & Serv Promo (3)
NFM 311. Quantity Food Production (3)
NFM 315. Computer Applications in Foodservice Management (3)
NFM 325. Nutrition Through the Life Cycle (3)
NFM 407. Seminar-Majors (1)
NFM 417, NFM 418. Human Nutrition (6)
NFM 419. Human Nutrition Laboratory (2)
NFM 420. Nutrition in Disease (3)
NFM 423. Community Nutrition (4)
NFM 442. Foodser Procur and Invent Sys (4)
NFM 446. Organiz and Manag of Foodserv (3)
NFM 447. Management of Food Systems Lab (2)

**Electives**

Sufficient (together with baccalaureate and home economics cores) to ensure 180 total credits (60 upper division)

### FOOD SYSTEMS MANAGEMENT OPTION

A 3-term lab sequence in either physical or biological science, chosen from:
CH 121, CH 122, CH 123. General Chemistry (15) (rec seq) or
BI 101, BI 102, BI 103. General Biology (12) or PH 201, PH 202, PH 203. Gen Physics (15)
ECON 201. Intro Microeconomics (3)
ECON 202. Intro Macroeconomics (3)
ECON 481. Economics of Labor Unions (3) or ECON 482. Labor Legislation (3) or BA 455 or BA 453. Human Resources Management (3) or BA 455. Management and Union Relations (4)
PSY 201, PSY 202. General Psychology (6)
NFM 219. Food Merch & Service Promotion (3)
NFM 311. Quantity Food Production (3)
NFM 314. Beverage Management (3)
NFM 315. Computer Applications in Foodservice Management (3)
NFM 407. Seminar: Majors (1)
NFM 410. Field Experience (4-12)
NFM 416. Cultural Aspects of Foods (3)
NFM 442. Foodserv Procur & Inventory Sys (4)
NFM 446. Org & Management of Foodserv (3)
NFM 447. Management of Food Systems Lab (2)
BA 215. Accounting Principles or BA 211 and BA 213 (4,4)
BA 340. Finance (4)
BA 350. Organization Systems (4)
BA 390. Marketing (4)

**Electives**

Sufficient (together with baccalaureate and home economics cores) to ensure 180 total credits (60 upper division)

### FOODS IN BUSINESS OPTION

CH 121, CH 122, CH 123 or CH 221, CH 222, CH 223. General Chemistry (15)
CH 331, CH 332 or CH 334, CH 335, CH 336. Organic Chemistry (8-9)
NFM 416. Cultural Aspects of Foods (3)
NFM 425. Advanced Science of Foods (4)
NFM 433. Food Product Dev & Promotion (3)
NFM 435. Experimental Foods (5)
ECON 201. Intro to Microeconomics (3)
ECON 202. Intro to Macroeconomics (3)
CS 101. Computers: Apps and Implications (4)
BA 390. Marketing (4)
BA 492. Consumer Behavior (4)
FST 420. Sensory Evaluation of Food (3)
Complete at least 12 credits from one of the two emphases below:

*Food Product Development Emphasis (12)*

NFM 311. Quantity Food Production (3)
NFM 410. Field Experience (3-9)
IE 451. Analysis & Design of Quality Assurance Systems (3)
CH 219. Gen Chem Lab (2) (if CH 121 is taken)
CH 324. Quantitative Analysis (4)
MB 440, MB 441. Food Microbiology (5)

*Food Product Promotion Emphasis (12)*

ART 115. Basic Design (4)
ART 241. Photography (3)
LS 201. News Writing (3)
WR 214. Writing in Business (3)
WR 414. Advertising and Public Relations Writing (3)
NFM 410. Field Experience (3-9)
NFM 415. Global Food Res & Nutrition (3)
HDFS 271. Consumers in Society (3)

**Electives (53-62)**

Sufficient (together with baccalaureate and home economics cores) to ensure 180 total credits (60 upper division)

### NUTRITION SCIENCE OPTION

CH 121, CH 122, CH 123 or CH 221, CH 222, CH 223. General Chemistry (15)
CH 219. General Chemistry Lab (2) (if CH 121 taken)
CH 331, CH 332 or CH 334, CH 335, CH 336. Organic Chem (8-9)
CH 324. Quantitative Analysis (4)
BI 211, BI 212, BI 213. Biology (12)
MTH 111. College Algebra (4)
MTH 112. Elementary Functions (4)
MTH 251. Differential Calculus (4)
PH 201, PH 202. General Physics (10)
BB 350 or BB 450, BB 451. Biochemistry (4-7)
Z 331, Z 332, Z 333. Human Anat & Phys (9)
Z 430. Prin Physiol, Z 431 or Z 441, Z 442, Z 443. Vertebrate Physiology (12)
PSY 201. General Psychology (3)
NFM 401. Research
NFM 417, NFM 418. Human Nutrition Sci (6)
NFM 419. Human Nutrition Lab (2)
NFM 420. Nutrition in Disease (3)

**Electives (27-40)**

Sufficient (together with baccalaureate and home economics cores) to ensure 180 total credits (60 upper division)

### MINORS

27 credits including 12 upper division

**Minor in Nutrition**

Students are strongly encouraged to consult an adviser in the Department of Nutrition and Food Management to be sure that prerequisites are taken.
NFM 225. Human Nutrition (4)
NFM 235. Science of Foods (4)
NFM 310. Science and Mgmt of Foods (4)
Z 332, Z 333. Human Anatomy and Physiol (6)
BB 350. Elementary Biochemistry (4) or BB 351. Elementary Biochemistry (5)
NFM 417, NFM 418. Human Nutrition (6)

**Minor in Food Systems Management**

NFM 104. Orien: Nutrition & Fd Mgmt (1)
MB 230. Intro Microbiology (4)

NFM 225. Human Nutrition (4)
NFM 235. Science of Foods (4)
NFM 310. Science and Mgmt of Foods (4)
NFM 311. Quantity Food Production (3)
NFM 314. Beverage Management (3)
NFM 442. Fdserv Procuremt & Inventory Sys (4)
NFM 446. Org & Mgmt of Foodservices (3)
NFM 447. Mgmt of Food Systems Laboratory (2)

## COURSES

### Lower Division Courses

**NFM 104. ORIENTATION: NUTRITION AND FOOD MANAGEMENT (1).** Identify professional resources, job opportunities, market and trends. Study academic and professional requirements for successful entry to the professional careers in dietetics, food systems management, foods in business, and nutrition science. Graded P/N.

**NFM 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. (Bacc Core Course)

**NFM 219. FOOD MERCHANDISING AND SERVICE PROMOTION (3).** Food systems management responsibilities and consumer interests when promoting menu items and services. The selection, presentation, and marketing of products and services through merchandising and retailing concepts and techniques for profit and not-for-profit organizations.

**NFM 225. HUMAN NUTRITION (4).** 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.

**NFM 235. SCIENCE OF FOODS (4).** Composition, functional properties, and structure of foods, including modified ingredients. Principles underlying preparation of food products of standard quality. Laboratory. PREREQ: NFM 225 or course in chemistry.

### Upper Division Courses

**NFM 310. SCIENCE AND MANAGEMENT OF FOODS (4).** Interactions of components in food systems, including food quality, safety and regulatory aspects. Management of resources to meet food needs. Laboratory. PREREQ: NFM 235; NFM 225; one year of physical or biological science.

**NFM 311. QUANTITY FOOD PRODUCTION (3).** Quantity food production planning and control, recipe standardization and costing, equipment, menu planning, safety and sanitation. Laboratory experience and recitation. PREREQ: NFM 310.

**NFM 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. PREREQ; NFM 225; completion of Science in baccalaureate core. (Bacc Core Course)

**NFM 314. BEVERAGE MANAGEMENT (3).** Principles of food systems management applied to beverage management for profit and nonprofit organizations. Development of standards, procedures, and controls for beverages: dairy products, fruit juices, carbonates, nonalcoholic, alcoholic, decaffeinated, and caffeinated. Laboratory fee.

**NFM 315. COMPUTER APPLICATIONS IN FOODSERVICE MANAGEMENT (3).** Opportunity to develop a broad understanding of where computer assistance is being applied in foodservice management, how output assists in managerial decision making, and selection of appropriate software for specific applications. Computer simulation activity for recipe development, inventory control, and meal preparation and service. COREQ: NFM 311.

**NFM 325. NUTRITION THROUGH THE LIFE CYCLE (3).** Nutritional needs and concerns in pregnancy and lactation, infancy, childhood, adolescence, adult and later years. PREREQ: NFM 225.

**NFM 401. RESEARCH (1-16).** Graded P/N.

**NFM 403. THESIS (1-16).** Graded P/N.

**NFM 405. READING AND CONFERENCE (1-16).** Graded P/N.

**NFM 406. SPECIAL PROBLEMS; PROJECTS (1-16).** Graded P/N.

**NFM 407. SEMINAR (1-16).** Graded P/N.

**NFM 408. WORKSHOP (1-16).** Graded P/N.

**NFM 410. FIELD EXPERIENCE (3-12).** 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. May be repeated for a maximum of 15 credits. Graded P/N.

**NFM 415/NFM 515. *GLOBAL FOOD RESOURCES AND NUTRITION (3).** Resources and constraints (natural, political, economic, and social) that impact achievement of adequate food and nutrition for all. Analysis of global interactions that influence the prevention of hunger and malnutrition. PREREQ: Economics, NFM 225. (Bacc Core Course)

**NFM 416/NFM 516. ^CULTURAL ASPECTS OF FOODS (3).** Regional, ethnic, and religious influences on food patterns; world wide trends in food practices. Laboratory experience with foods from several cultures. PREREQ: NFM 310. Laboratory fee. (Writing Intensive Course)

**NFM 417/NFM 517. HUMAN NUTRITION SCIENCE (3).** Application of biochemistry and physiology to nutrition of the individual. Must be taken in order. PREREQ: Biochemistry; physiology; one course in nutrition.

**NFM 418/NFM 518. HUMAN NUTRITION SCIENCE (3).** Application of biochemistry and physiology to nutrition of the individual. Must be taken in order. PREREQ: Biochemistry; physiology; NFM 417.

**NFM 419/NFM 519. ^HUMAN NUTRITION LABORATORY (2).** Techniques of nutritional assessment; laboratory experiences covering basic nutrition and chemical assays. PREREQ: NFM 417/ NFM 517. (Writing Intensive Course)

**NFM 420/NFM 520. NUTRITION IN DISEASE (3).** Application of nutrition principles to organic, functional and metabolic disorders which may alter nutritional requirements or respond to dietary modification. PREREQ: NFM 418/NFM 518.

**NFM 421/NFM 521. CHILD NUTRITION (3).** Physiological and biochemical bases for nutritional needs from prenatal life through childhood: applications to nutritional recommendations. PREREQ: NFM 418/NFM 518.

**NFM 423/NFM 523. COMMUNITY NUTRITION (4).** Meeting nutrition needs in community settings; nutrition status of individuals and groups; programs of public and private agencies and industry; intervention techniques. Roles of community nutritionist. PREREQ: NFM 310, NFM 325.

**NFM 425/NFM 525. ADVANCED SCIENCE OF FOODS (4).** Polysaccharides, lipids, and proteins; structures and functional properties in foods. Laboratory. PREREQ: NFM 310; CH 332.

**NFM 429. NUTRITION AND AGING (3).** Application of research about nutritional status and services for older people in various life settings. Physical, social and demographic influences on food intake will be considered. PREREQ: NFM 225.

**NFM 433/NFM 533. FOOD PRODUCT DEVELOPMENT AND PROMOTION (3).** Principles of the development and promotion of new food products with current case studies. PREREQ: NFM 310 or FST 412. Offered alternate years.

**NFM 435/NFM 535. EXPERIMENTAL FOOD STUDIES (5).** Subjective and objective evaluation techniques applied to individual studies using the experimental approach. PREREQ: NFM 310 or FST 412. Graded P/ N.

**NFM 442/NFM 542. PURCHASING AND CONTROLLING FOOD, MATERIALS, AND EQUIPMENT (4).** Selecting, purchasing, and storing of food items in foodservice. Forecasting and inventory control systems in management of food, equipment, and supplies. Methods in purchasing, maintaining and controlling food, equipment, and supplies. PREREQ: NFM 311.

**NFM 446/NFM 546. ORGANIZATION AND MANAGEMENT OF FOODSERVICES (3).** Philosophy and functions of management applied to foodservice organizations; utilization of resources: personnel, space and equipment, time and money; evaluation of food systems. PREREQ: NFM 311; NFM 441/NFM 541; NFM 442/NFM 542.

**NFM 447/NFM 547. MANAGEMENT OF FOOD SYSTEMS LABORATORY (2).** Application of foodservice management theory by planning, providing, and evaluating meals for the public in a university food service facility. PREREQ: NFM 446/546 or concurrent registration.

**Graduate Courses**

**NFM 501. RESEARCH (1-16).** Graded P/N.

**NFM 502. INDEPENDENT STUDY (1-16).** Graded P/N.

**NFM 503. THESIS (1-16).** Graded P/N.

**NFM 505. READING AND CONFERENCE (1-16).** Graded P/N.

**NFM 506. SPECIAL PROBLEMS; PROJECTS (1-16).** Graded P/N.

**NFM 507. SEMINAR (1-16).** 1 credit graded P/N.

**NFM 508. WORKSHOP (1-16).** Graded P/N.

**NFM 509. PRACTICUM (1-16).** Graded P/N.

**NFM 510. FIELD EXPERIENCE/INTERNSHIP (3-12).** 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 term preceding enrollment. No more than 6 credits may be applied to a masters degree program.

**NFM 522. RESEARCH TECHNIQUES (4).** Methods and techniques for the analysis of nutrients and metabolites in foods and other biological materials, including blood studies. PREREQ: CH 324; PREREQ/COREQ: NFM 418/NFM 518.

**NFM 529. NUTRITION AND AGING (3).** (See NFM 429 for description.)

**NFM 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. PREREQ: NFM 418/NFM 518.

**NFM 551. SELECTED TOPICS IN NUTRITION (3).** Topics vary but include protein and amino acid metabolism, lipid metabolism, hormone and vitamin interrelationships, intermediary metabolism, nutrition behavior and education. Emphasis on recent advances in human nutrition. May be repeated for maximum of 6 credits. PREREQ: NFM 418/NFM 518. Not offered every year. Graded P/N.

**NFM 552. SELECTED TOPICS IN FOODS (3).** Topics vary but include food safety, sensory qualities of foods, and structural aspects of foods. Emphasis on the research literature. PREREQ: CH 332; NFM 425/NFM 525. Not offered every year. Graded P/N.

**NFM 556. ADVANCED MANAGEMENT OF FOOD AND DIETETIC SERVICES (3).** Interpretation of management principles and current research used at the policy-making level to administer foodservice, dietetic, or nutrition-related services. PREREQ: NFM 446/546; NFM 447/547.

**NFM 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. PREREQ: BB 452 OR BB 492 or equivalent. Offered alternate years. CROSSLISTED as ANS 560.

**NFM 601. RESEARCH (1-16).** Graded P/N.

**NFM 602. INDEPENDENT STUDY (1-16).** Graded P/N.

**NFM 603. THESIS (1-16).** Graded P/N.

**NFM 605. READING AND CONFERENCE (1-16).** Graded P/N.

**NFM 607. SEMINAR (1-16).** Graded P/N.

**NFM 609. PRACTICUM (1-16).**

**NFM 610. INTERNSHIP (1-16).** Graded P/N.

**NFM 617. METABOLIC INTERRELATIONSHIPS IN NUTRITION (3).** Interrelationships between nutrients and metabolism at the cellular and human level as influenced by external and internal factors, including age, and environment. PREREQ: NFM 418/518. Offered alternate years.

**NFM 618. METABOLIC INTERRELATIONSHIPS IN NUTRITION (3).** Interrelationships between nutrients and metabolism of humans at the cellular level as influenced by external and internal factors. PREREQ: NFM 418/518. May be taken out of order. Offered alternate years.

## SCHOOL OF EDUCATION

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97331-3502
(541) 737-4661
Ruth Stiehl, *Associate Director*
R. Lance Haddon, *Assistant Director*

**Faculty**

*Professors* Collison, Duvall, Evans, Haverson, Kenneke, Stern, Stiehl; *Associate Professors* Cohen, Engel, Firth, Gray, McEwan, Southers, Suzuki, Winograd; *Assistant Professors* Higgins, Ingram, Kim, Mary-Lou, Merickel, Osborne, Waldschmidt; *Instructor* Prickel

**Undergraduate Majors**
- **Technology Education (B.S.)**

**Graduate Majors**
- **Adult Education (Ed.M.)**
- **Counseling (M.S., Ph.D.)**
- **Education (Ed.M., M.S., Ed.D., Ph.D.)**
- **Teaching (M.A.T.)**

**Graduate Minors**
- **Adult Education**
- **Community College Education**
- **Education**

The School of Education, a unit of the College of Home Economics and Education, offers an array of graduate degrees to prepare teachers, counselor educators, and other education professionals for careers in schools, community colleges, business and industry and other post-secondary settings. The undergraduate degree in Technology Education is a component of the Professional Technical Education theme which prepares educators to address the relationships between education and work in schools and the workplace. In addition, there are electives for undergraduate students who wish to explore education as a career choice.

All programs reflect research-based approaches in education and counseling developed by University faculty, K–adult teachers and administrators, counselors and leaders from business and industry. Students gain application skills and administrative experience through extensive internships in public schools, community colleges, business and industry, and other post-secondary settings.

### AUTHORIZATION AND ACCREDITATION

The School 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 Basic, Initial, Standard, and Continuing licensure.

All 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).

### ADVISING

Early and continuous advising is an important aspect of education and counseling in both the undergraduate and graduate programs. Students are urged to declare their interest in education or counseling and/or specialization programs and to seek advice at the earliest possible date. While undergraduates are advised by their college of choice, those interested in the teaching profession are invited to meet with faculty in the School of Education when questions arise about graduate programs in education and counseling and appropriate undergraduate preparation.

Applicants for teacher or counselor licensure must meet TSPC requirements in effect at the time of admission to a licensure program. Licensure rules are controlled by TSPC and may change. All persons expecting to be recommended for Basic, Standard Initial or Continuing Oregon teaching licenses should consult regularly with an education or counseling adviser.

**Undergraduate Electives/Field Experiences**

The School of Education has developed education electives for undergraduate students. These include opportunities for students to participate in field experiences in the public schools. Students who major in one of the undergraduate pre-elementary programs are required to complete a 9-credit sequence in education as part of a pre-professional core.

### ■ TEACHER EDUCATION PROGRAM

The School of Education collaborates with other colleges to offer the professional Teacher Education Program. The Professional Program is at the graduate level and offers teacher licensure preparation for those students wishing to enter the teaching professional as well as for teachers wishing to complete a Standard or Continuing License. The OSU teacher licensure program prepares public school teachers for 21st century schools in early childhood (age 3 - grade 4), elementary (grades 3-8), middle (grades 5-10) and high school (grades 7-12). Pre-service students meet the requirements for an Initial oregon Teaching License in a nine month program. Completion of a Continuing Oregon Teaching License require 15-18 hours beyond the Initial License and three years of teaching.

Standard and Continuing licensure programs are available for teachers who wish to meet Oregon requirements for these licenses.

Elective courses are offered for undergraduate students who are exploring early childhood, elementary, middle or high school education as a career goal.

### Graduate Degree

**Master of Arts in Teaching (M.A.T.)**
*Areas of Concentration*
Biology
Chemistry
Early Childhood Education
Elementary
Integrated Science
English
French
German
Mathematics (Advanced)
Music
Physics
Professional Technical
- •Agriculture
- •Business
- •Family and Consumer Sciences
- •Marketing
- •Technology

Health Education
Physical Education
Spanish

The Master of Arts in Teaching degree involves both graduate courses and extensive internship experiences. Students seeking information about the M.A.T. should select an appropriate contact from the following:

- *Agricultural Education:* Agricultural Education & General Agriculture
- *Business Education:* School of Education
- *Elementary Education and the Early Childhood Endorsement:* School of Education, College of Home Economics and Education, College of Liberal Arts, or College of Science
- *Biology, Chemistry, Integrated Science, Mathematics, and Physics Education:* Science and Mathematics Education Dept
- *Family and Consumer Sciences:* School of Education
- *Foreign Language Education in French, German and Spanish:* Department of Foreign Languages & Literatures
- *Health Education, Physical Education and the Adaptive Physical Education Endorsement:* College of Health and Human Performance
- *Language Arts:* English Department
- *Marketing Education:* School of Education
- *Music Education:* Music Department
- *Technology Education:* School of Education

**Degree Requirements**
The M.A.T. is a 48-credit program intended for pre-service teacher education students. The program of study includes both course work and extensive internship experience. Emphases are on school reform, and multicultural education, as well as the latest research on schools, learning, and teaching.

The course of study is four quarters long beginning in June and concluding the following June.

Professional education core (3)
Course work in the teaching specialization (18-21)
Internship (15-18)
Electives (6-9)

**Admission to the Professional Teacher Education Program**
Admission is competitive and selective and is by application to the Graduate School and to the Professional Teacher Education Program. Admission is not based exclusively on academic success. The following are the requirements for admission consideration:

- Completed bachelor's degree,
- 3.0 GPA in the last 90 graded quarter credits, (Some programs may set higher GPA standards. They may also set specific GPA requirements in the teaching specialty.)
- Successful experience working with children or youth (preferably in a public school) verified by a recommendation or evaluation,
- Subject competence as determined by the program faculty (see appropriate department or Office of the Assistant Director for advising information), and
- Satisfactory answers to "good conduct" questions as required by the Oregon Teacher Standards and Practices Commission.

Applicants must submit a resume, three letters of recommendation, and a statement of professional goals as part of the application process. Interviews are also required by most licensure areas for admission consideration. Writing samples may also be required.

Applications received by the second Friday of January will be given priority.

**Preparation for the M.A.T. in Elementary Education**
It is suggested that students intending to apply for the M.A.T. in Elementary Education choose a bachelor's degree in Human Development and Family Sciences with the Early Childhood Education option, or a degree in General Science in the College of Science, or a degree in Liberal Studies in the College of Liberal Arts. Other degrees with appropriate academic depth and breadth may also be appropriate. During the undergraduate experience, students should complete a 9-credit sequence in Education. In addition, preparation in the following areas of study commonly found in the elementary school curriculum is recommended:

Writing (9)
Mathematics (12-15)
Science (18-20)
Social Studies (9)
Art (3)
Music (3-4)
Fitness (3)
Child/Human/Family Development (9)
Literature (9)
Geography (6)

**Preparation for the M.A.T. in Secondary and K-12 Education**
Students who intend to apply for the M.A.T. in Secondary or K-12 programs choose an undergraduate major(s) in the area they plan to teach.

## ■ STANDARD AND CONTINUING LICENSURE

### Graduate Major

**Education (Ed.M., M.S.)**

Standard licensure for in-service teachers is offered in the following areas:

Agriculture Education
Biology Education
Business Education
Chemistry Education
Elementary Education
French Education
German Education
Health Education
Integrated Science Education
Language Arts Education (English)
Marketing Education
Mathematics Education (advanced)
Music Education
Physical Education
Physics Education
Spanish Education
Technology Education

The Master of Education degree may be earned while completing Standard or Continuing licensure requirements if the candidate is eligible for graduate admission.

**Admission to Standard and Continuing Licensure Programs**

Application dates are open for acceptance to Standard and Continuing programs. Candidates must hold or be eligible to hold a Basic Teaching License in the State of Oregon and submit a current resume, transcripts, statement of professional goals, and three letters of recommendation when applying for admission.

The EdM and MS in Education require the completion of a 45 quarter hour program which must include the following:

ED 551. Cognitive Psychology and Learning or ED 552. Learning and Technology
ED 565. Applied Research in Education
ED 599. Cross Cultural Communication and
ED 596. Technology for Teachers
Ed 531. Instructional Systems Design
ED 578. Adult Development
Ed 520 Classroom Management
COUN 525. Fundamentals of Counseling

## ■ COMMUNITY COLLEGE EDUCATION PROGRAM

### Graduate Major

**Adult Education (Ed.M.)**
**Education (Ed.M., Ed.D.)**
*Areas of Concentration*
**Community College Education**

### Graduate Minors

**Community College Education**
*Areas of Concentration*
Instruction

**Master of Education**

The Ed.M. in Adult Education to prepare Workforce Education specialists can be pursued in the following areas of concentration:

- *Workplace and Adult Skills Development:* Preparation to teach literacy, numeracy and work-related competencies enabling adults to succeed in the workplace and the community. Commitment to accommodating and mentoring diverse groups of learners with a wide range of learning styles is essential;
- *Organization Development and Training:* Preparation to train other professionals in a collaborative process to create better learning environments in organizations. Commitment to participative styles of leadership in addition to possessing a high level of skills in technical training processes is essential;
- *Work Force Development (Professional Technical Education):* Addressing the relationship between education and work, and education and technology, preparation to design, deliver and manage instruction in community colleges, public agencies, business and industry.

Course work in Adult Education may also be used as a pre-service concentration or minor in extension program development, community college instruction, and for other graduate degrees. The Adult Education minor requires a minimum of 18 credit hours approved course work in the following areas:

Adult Development (3)
Instructional Systems (3)
Instructional Strategies (3)
Assessment (3)
Learning Theories (3)
Internship (3)

Admission to the concentrations in Workplace and Adult Skills Development and in organization Development and Training is competitive by cohorts.

**Degree Requirements**

The Ed.M. in Adult Education or education requires a minimum of 45 credits beyond the baccalaureate degree. The Adult Education degree requires a 15 quarter hour minor.

**Admission**

Admission is selective and competitive. Factors considered in making admission decisions include: completion of a bachelor's degree, cumulative grade point average (3.0 in the last 90 graded quarter hours of the bachelor's degree and all post baccalaureate course work), written and oral communication skills, career objectives and commitment, career experience, and professional references.

Applicants submit a letter of intent, resume, 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.

**DOCTOR OF EDUCATION**

Graduates who receive the Ed.D. in Education with a concentration in Community College leadership will be prepared to hold a variety of positions in community college or closely related educational settings.

Field advisers and mentors selected from senior staff of community colleges assure relevance to the community college setting.

**Degree Requirements**

The Ed.D. degree in Education with a concentration in Community College leadership requires a minimum of 108 credits beyond the baccalaureate degree. The residency requirement is met by enrolling in three out of four consecutive quarters and completing a minimum of 36 credits. The following credits must be completed:

Foundational Core (15)
Research Core (9)
Area of Specialization (48)
Internship (12)
Thesis (24)

**Admission**

Applicants for the EdD must have an earned master's degree or the equivalent, a 3.0 GPA, and 3-5 years of professional community college experience. Transcripts of previous college work; a resume; three letters of recommendations; 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. Applications received by the deadline will be given priority.

## ■ DOCTOR OF PHILOSOPHY PROGRAM

### Graduate Major

**Education (Ph.D.)**

The Ph.D. with a major in Education is intended for K–12 and Adult Education/ Workforce Development educators whose career paths are that of research and teaching in collegiate or public or private sector educational leadership roles.

**Degree Requirements**

The Ph.D. degree with a major in Education requires a minimum of 122 credits beyond the baccalaureate degree. The residency requirement is met by full-time enrollment for one calendar year beginning with the fall quarter after admission. The following credits must be completed:

Core Seminars (9)
Research Methods (12)
SubCore Seminars (3–9)
Area of Specialization (45–48)
Internship (3–6)
Research Seminars (3)
Thesis (36)
Focus/Concentration (variable)

**Admission**

A master's degree in Education or related field, or equivalent to a master's degree in post baccalaureate course work is required. In addition, applicants to the Ph.D. 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. A minimum of two years of related professional experience beyond the master's degree is required.

Admission to the Ph.D. program is selective and competitive with a limited number selected each year.

Applicants must submit transcripts of all previous college or university course work; a statement of experience, goals and philosophy; a reflection paper on how the application materials submitted address the admission criteria; a current resume or curriculum vita, and three letters of recommendation. International students must submit TOEFL (minimum score of 575) and TWE scores (minimum score of 4). Applications are reviewed by a faculty committee and finalists are interviewed before an admission decision is made. Applications received by the second Friday of February will be given priority.

## COURSES

**Lower Division**

**ED 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.

**ED 312. INTRODUCTION TO CURRICULUM AND INSTRUCTION (3).** This course will cover an overview of public school curricula K-12 and various instructional approaches, models and strategies that are used in school to facilitate learning.

**ED 313. TRENDS AND ISSUES IN EDUCATION (3).** This course includes the relationship between school and society in America, the role of the teacher, exploration of curricula trends and issues which affect the structure and directions of education. Designated for undergraduate students who wish to explore education as a professional goal.

**ED 341. OTHER WAYS OF KNOWING (3).** An introductory course which covers three central themes: the psychology of learning and brain research, the nature of science as a system of thought, and learning theory and its application.

**ED 406. PROJECTS (1-3).**

**ED 407. SEMINAR (1-16).**

**ED 408. WORKSHOP (1-3).**

**ED 411. EDUCATIONAL PSYCHOLOGY, LEARNING AND DEVELOPMENT (3).** This course is designed as an opportunity to begin the transition from student to teacher. Explores the relationship between human development and learning through the life cycle.

**ED 412/ED 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 students.

**ED 415. STRUCTURE AND DYNAMICS OF PROFESSIONAL TECHNICAL EDUCATION (3).** Major forces influencing work force education and training. Professional technical programs examined in the context of a continuously changing world.

**ED 416/ED 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. PREREQ: Admission to the Professional Teacher Education Program or consent of instructor.

**ED 417. RESEARCH AND EXPERIMENTATION IN TECHNICAL EDUCATION (3).** Application of research procedures to work place systems and technology. This course examines relationships between education, technology, work place, workers, family, and community. Issues such as the changing work place and work force, worker demographics, global systems, higher performance work place standards, management strategies (TQM), productivity and retraining will be explored.

**ED 418. CIVIL RIGHTS IN EDUCATION (2).** Overview of legal issues directly related to teachers and students. Course focuses on Supreme Court decisions fundamental to schools and classrooms. PREREQ: Admission to the Professional Teacher Education Program or consent of instructor.

**ED 419/ED 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. PREREQ: Admission to the Professional Teacher Education Program or consent of instructor.

**ED 463. ENVIRONMENTAL EDUCATION (3).** Acquaintance with basic concepts with special attention to meaning, scope, value, and philosophical foundations.

**ED 464. ENVIRONMENTAL EDUCATION PRACTICUM (3).** Planning, conducting, and evaluating field experiences.

**ED 465. ADMINISTRATION OF ENVIRONMENTAL EDUCATION (3).** Planning, supervision, administration,personnel, financing and evaluation of program.

**Graduate Courses**

**ED 501. RESEARCH (1-16).** PREREQ: Departmental approval required.

**ED 502. INDEPENDENT STUDY (1-16).** PREREQ: Departmental approval required.

**ED 503. THESIS (1-16).** PREREQ: Departmental approval required.

**ED 505. READING AND CONFERENCE (1-16).** PREREQ: Departmental approval required.

**ED 506. PROJECTS (1-3).** PREREQ: Departmental approval required.

**ED 507. SEMINAR (1-16).** PREREQ: Departmental approval required.

**ED 508. WORKSHOP (1-16).** PREREQ: Departmental approval required.

**ED 509. PRACTICUM (1-16).**

**ED 510. INTERNSHIP (1-18).** By special permission and arrangement.

**ED 511. HUMAN DEVELOPMENT, LEARNING AND EDUCATION (3).** Covers the implications in interdependence of human development and learning on educational processes. COREQ: Admission to Professional Teachers Education Program or permission of instructor.

**ED 514. THE EDUCATOR AND THE LAW (3).** For teachers and administrators concerned with the law as it relates to public education.

**ED 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.

**ED 518. CIVIL RIGHTS IN EDUCATION (2).** See ED 418 for description.

**ED 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 which influence behavior problems, including those associated with social and/or multicultural students populations.

**ED 521. SELECTED TOPICS IN EDUCATION (1-3).** May be repeated for nine (9) hours.

**ED 522. CURRICULUM FOUNDATIONS (3).** An examination of the development of contemporary frameworks of curricula and instruction; social forces; including the treatment of existential, humanism, behaviorism, social reconstructionism, scientific-technological approaches and curricula anchored on academic subject matter.

**ED 526. DEVELOPMENTALLY APPROPRIATE CURRICULUM (3).** This course covers major theories of child development, developmental patterns in cognitive, social, and emotional development of children and appropriate environment that promotes the growth, development, and learning of children.

**ED 530. TRAINING AND DEVELOPMENT IN BUSINESS AND INDUSTRY (3).** Purpose and function of training and development programs within an organization; philosophy, goals, precursors, and trends.

**ED 531. INSTRUCTIONAL SYSTEMS DESIGN (3).** Instructional systems theory, conceptual and procedural models. Emphasis on the role of the professional instructional designer in training systems development and instructional project management.

**ED 532. EVALUATING TRAINING PROGRAMS (3).** Strategies for determining if planned results are being achieved and what impact results are having on the host organization.

**ED 533. ANALYZING PERFORMANCE PROBLEMS (3).** Principles of performance technology. Approaches and procedures for analyzing performance discrepancies as preliminary steps in the design and development of training or other performance interventions. PREREQ: ED 530.

**ED 534. TRAINING MATERIAL DESIGN (3).** Design principles for print and non-print training materials for adult learners. Emphasis on the development of materials for four major training strategies: group presentations, group participation, individual self training and on-the-job performance aids. PREREQ: ED 530.

**ED 535. SELF TRAINING SYSTEMS (3).** Principles of self training strategies for adult learners; factors that affect the success of self training systems in an organization; design of the self training materials including computer and video delivery systems. PREREQ: ED 578

**ED 536. MANAGING TRAINING PROJECTS (3).** This course is intended for the person who will manage training projects. Course work is organized around a five-step approach to project management: activating the project, establishing the project organization, developing implementation plans, obtaining resources, and establishing information and control systems. PREREQ: ED 531.

**ED 538. PLANNING AND MANAGING TRAINING (3).** Establishing a training system within an organization; strategic planning, budgeting, staffing, evaluation and cost-benefit analysis. PREREQ: ED 530, ED 533.

**ED 539. SCRIPTING TRAINING PRODUCTIONS (3).** Forms, styles, treatments and technical processes for developing training scripts. Emphasis on training the trainer manuals, documentation video and slide/sound scripts. PREREQ: ED 534.

**ED 540. THE AMERICAN COMMUNITY COLLEGE (3).** History and philosophy of the community and junior college; goals, functions, populations served, faculty and student characteristics, organizations and issues confronting the two-year colleges in America. PREREQ: Graduate standing.

**ED 541. COMMUNITY COLLEGE CURRICULUM (3).** Curriculum development and management; faculty evaluation; issues within curricular functions; staff development; and techniques for assessing and evaluating the effectiveness of curricular functions.

**ED 543. TEACHING AND TRAINING OVERSEAS (3).** Teaching strategies for customizing training on the local situation.

**ED 544. MANAGING INTERNATIONAL TRAINING PROGRAM (3).** Planning, organizing, scheduling, monitoring, and controlling international training program.

**ED 547. POSTSECONDARY INSTRUCTIONAL STRATEGIES (3).** Professional awareness of the competence, concerns, methods, techniques of postsecondary teaching. The college instructors role in relation to the missions of postsecondary institutions.

**ED 551. COGNITIVE PSYCHOLOGY AND LEARNING (3).** Examine current research on human learning from the perspective of both cognitive and behavioral theorists. Emphasis on learning within the content areas such as mathematics, science, writing as well as other content areas of the curriculum.

**ED 552. MODELS OF TEACHING, LEARNING AND TECHNOLOGY (3).** Impact of technological innovation on the knowledge base of teaching and learning as applied to models of teaching. PREREQ: ED 553 or equivalent; ED 596 or equivalent.

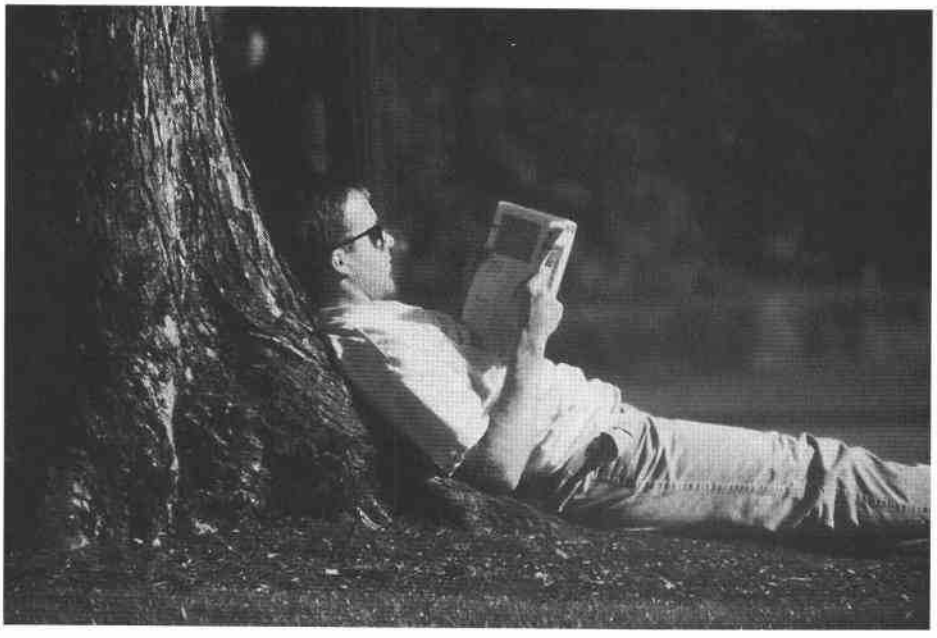
**ED 553. LEARNING THEORIES (3).** In-depth study of the major families that describe the learning process; Gagne', Bruner, Piaget, Skinner, Bandura; how learning is related to teaching and how learning theory affects the teaching process. Information theories and learning, memory, learning models, transfer and problem solving and motivation and learning are the major concepts covered in this course.

**ED 554. THE DYNAMIC CURRICULUM (3).** The student will learn to develop, plan and implement curriculum as well as evaluate major curricular reform documents, assessment as the role it plays in curriculum development.

**ED 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 discipline in the elementary school are integrated and can plan and teach an integrated lesson.

**ED 556. STRATEGIES: LANGUAGE ARTS (3).** Role of language arts in elementary school. Objectives: research findings; the teaching of spelling, writing, and speaking-listening skills; new instructional materials and programs; testing and evaluation. PREREQ: classroom teaching experience or consent of instructor.

**ED 557. STRATEGIES: MATHEMATICS (3).** For experienced teachers and principals interested in designing new or improving existing mathematics curricula; learning theory, research, and instructional programs with classroom organization and modes of learning; emphasis on design curriculum foundations, theory, and construction rather than on content and materials. PREREQ: successful elementary teaching experience or consent of instructor.



**ED 558. STRATEGIES: SOCIAL SCIENCES (3).** Analyzes structure of several social science disciplines; research literature pertaining to social studies instruction. PREREQ: classroom teaching experience or consent of instructor.

**ED 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. PREREQ: classroom teaching experience of consent of instructor.

**ED 560. RESEARCH IN LEARNING (3).** This course 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 psycholomotor development. PREREQ: Elementary M.A.T. only.

**ED 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.

**ED 563. INTRODUCTION TO EDUCATIONAL MEASUREMENT (3).** Scales and scaling techniques, methods of analysis, statistics for understanding standardized and informal testing. Construction and administration of criterion referenced tests, teacher-made tests and standardized tests commonly used in the public schools.

**ED 565. APPLIED RESEARCH IN EDUCATION (3).** The student will identify a statement of classroom research related to teaching, develop a research plan, and monitor the research throughout the academic year in a classroom setting. PREREQ: Elementary M.A.T. only.

**ED 567. LEADERSHIP DEVELOPMENT AND HUMAN RELATIONS (3).** Adult education and basic career expectations in community based education. Understanding and development of leadership roles in this area of educational planning. PREREQ: ED 530 or ED 568.

**ED 568. EDUCATION AND TRAINING FOR ADULTS (3).** Overview of the nature, extent, and significance of adult education and training; historical development in the U.S. and abroad; the nature of adult groups, institutions, agencies, and programs; the literature of adult education and training.

**ED 570. THEORETICAL FOUNDATIONS OF ESL/EFL (3).** An examination of the nature of languages and language acquisition for constructing an integrated theoretical rationale for teaching English to adults in societal contexts where English is the lingua franca (ESL) as well as where English is taught primarily in formal school settings without the support of the society at large (EFL); analysis of the body of literature dealing with a) second language acquisition, b) issues and approaches in the teaching of communicative competence and c) the relevance of basic principles to actual practice in teaching-learning contexts.

**ED 571. METHODS AND MATERIALS IN ESL/EFL (3).** An analysis of current methods, curricular paradigms and materials in teaching English to adults in English as a second and foreign language contexts; course empathizes the importance of establishing congruency between/among the students cultural background and his/her language and academic needs.

**ED 572. CURRICULUM AND MATERIALS IN DEVELOPMENTAL EDUCATION (3).** Study of current materials, methods, and curricula models in developmental education as used in post secondary education setting.

**ED 573. PRINCIPLES AND PRACTICES IN DEVELOPMENTAL EDUCATION (3).** Analysis of various philosophical and practical aspects surrounding developmental education; current practices of the field conducted both through first hand on site observation and though examination of current literature.

**ED 574. 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.

**ED 575. EDUCATIONAL FINANCE (3).** Finance, budgeting and accounting sources on revenue; defferal, 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.

**ED 578. ADULT DEVELOPMENT (3).** Social scientific literature contributing to a better understanding of human development during the adult years. PREREQ: ED 568.

**ED 579. HUMAN GROWTH AND DEVELOPMENT (3).** Development patterns of growth from childhood though adolescence. Muscular activity, perception, intelligence, cognitive growth, formal and informal language development and cultural context and their implications for the learning environment.

**ED 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 life-long activity. PREREQ: Elementary M.A.T. only.

**ED 586. DIAGNOSTIC TECHNIQUES IN DEVELOPMENTAL EDUCATION (3).** Lecture-discussion and laboratory use of standardized test; construction and use of informal measures for estimating reading achievement. Differential instruction for elementary, secondary and college. PREREQ: ED 573.

**ED 589. CHILDREN'S BOOKS IN ELEMENTARY SCHOOL (3).** This course is designed to assist students to recognize the various genres of children's literature and to evaluate examples of each genre. Focus is to enable students to incorporate children's books of all kinds into the curriculum, especially language arts and reading.

**ED 593. READING AND WRITING IN THE MIDDLE AND SECONDARY SCHOOL (3).** Reading and writing methods which 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.

**ED 596. TECHNOLOGY FOR TEACHERS (3).** Examines technology and its application in education and the work place. Instructional tools including computers, CD-ROM, laserdisk, satellite communications, telecommunications, video, and multi-media will be examined. Explores technology as a social endeavor and the need to evaluate technology effectively.

**ED 597. SOCIO-CULTURAL AND LINGUISTIC FACTORS IN STUDENT SUCCESS (3).** Identification of factors such as socioeconomic status, minority/ethnic group identification, language background and learning modalities as they relate to academic and effective development; flexible teaching strategies that are socioculturally and individually appropriate.

**ED 598. THE EDUCATIONALLY DIVERSE LEARNER (3).** Covers the learning disabled learner, at-risk student, language diverse student; assessment and instructional strategies for instructional implementation.

**ED 599. CROSS CULTURAL COMMUNICATIONS (3).** An examination of individual and cultural values, preceptions, and assumptions regarding the foreign born, refugees, American minorities, and undocumented persons existing within society and schools; development of communication skills for negotiating at the individual, group, and institutional and cross-cultural level.

**ED 601. RESEARCH (1-16).** PREREQ: Departmental approval required.

**ED 602. INDEPENDENT STUDY (1-16).** PREREQ: Departmental approval required.

**ED 603. THESIS (1-16).** PREREQ: Departmental approval required.

**ED 605. READING AND CONFERENCE (1-16).** PREREQ: Departmental approval required.

**ED 606. READING AND CONFERENCE (1-16).** PREREQ: Departmental approval required.

**ED 607. SEMINAR (1-16).** PREREQ: Departmental approval required.

**ED 608. WORKSHOP (1-16).**

**ED 609. PRACTICUM CLINICAL EXPERIENCE (1-16).**

**ED 610. INTERNSHIP (1-15).**

**ED 611. HISTORY OF EDUCATIONAL THOUGHT (3).** Intellectual and social history and development of American Education. Common Schools movement; rural/urban, inner city education; curriculum reform; efficiency desegregation, pluralism.

**ED 612. RESEARCH DESIGN AND TECHNIQUES IN EDUCATION I, II (3).** Qualitative and Quantitative research design for the social sciences; case study research design, and ethnographic research design as well as historical research methods. Data gathering sampling techniques, models and concepts for research design by application to field and laboratory studies. May be taken for two quarters.

**ED 615. CURRICULUM CONSTRUCTION (3).** An analysis of curriculum structure, pattern organization used to build teaching and learning environments; covers scope, sequence, continuity and integration of curriculum design in the classroom. PREREQ: ED 522, ED 524.

**ED 621. SELECTED TOPICS IN EDUCATION (3).** May be repeated for eighteen (18) credits.

**ED 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. PREREQ: Community college teaching/administrative experience.

**Upper Division Courses**

**ED 802. INDEPENDENT STUDY (1-3).**

**ED 805. READING AND CONFERENCE (1-16).**

**ED 806. PROJECTS (1-3).**

**ED 807. SEMINAR (1-3).**

**ED 808. WORKSHOP (1-3).**

## ■ COUNSELOR EDUCATION PROGRAMS

### Graduate Major

**Counseling (M.S., Ph.D.)**

The M.S. degree in Counseling leads to Basic, Initial, Continuing and Standard 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 school-realted agencies and programs.

School counselor licensing can be obtained in one of two ways: Track-I and Track-II. Track I preparation requires prior public school teaching experience and specific course work in the counselor program. Track-II preparation is available for persons without teacher license or experiences and requires completion of the M.S. degree including specific school-based course work in addition to the state requirements for school counselor preparation. Track-II students must present evidence of a passing score on the CBEST or Praxis PPST as part of their application materials.

The OSU masters degree in counselor education prepares school counselors to support the Oregon Educational Act for the 21st Century. the program is designed to recognize the developmental levels of students with continuing professional development as an integral part of the program.

The doctoral program 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.

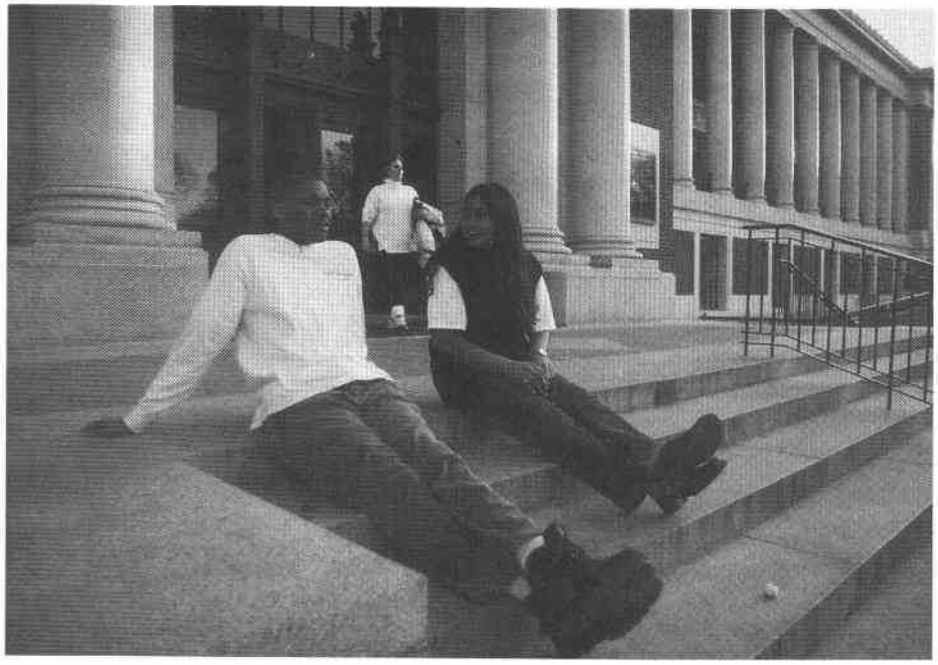
Counselor Education Programs are accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP) and by the National Council for Accreditation of Teacher Education (NCATE) at the M.S. level in Schools and Community Counseling. The Ph.D. is accredited by CACREP in Counseling Education and Supervision.

**Admission to the M.S. Program**

Admission to the program is by application to the Graduate School and to the Counselor Education Program. The minimal prerequisite is a bachelor's degree. Persons holding a master's degree may apply for non-degree status or a second master's. 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 to begin with Summer Session.

**Admission to the Ph.D. Program**

It is expected that individuals entering the Ph.D. program will have completed a master's degree in Counseling which 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. In addition, the counselor education faculty expects a background in abnormal psychology, family counseling, and chemical dependency counseling. 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 three years of post-master's experience as a counselor. Preference will be given to National Certified Counselors (NCCs) and /or state Licensed Professional Counselors (LPCs). 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 Office of the Assistant Director. Included in the application will be demonstrated evidence of counseling competence through submission on an audio- or video-taped counseling session. A personal interview is also a final step in the application process. Applications received prior to the second Friday of February will be given preference.

Admission is by cohort to begin each fall quarter.

**Requirements for the Ph.D.**
A minimum of 150 credits is required beyond the baccalaureate degree. The program includes thesis (36 credits), internship (13 credits), and 66 credits in specialty areas, including participation in the five core doctoral seminars (see program requirements for Ph.D. with a major in Education). Doctoral students can meet the majority of their residency and course requirements in two years of full-time study.

## COURSES

**COUN 501. RESEARCH (1-16).**

**COUN 502. INDEPENDENT STUDY (1-16).**

**COUN 503. THESIS (1-16).**

**COUN 505. READING AND CONFERENCE (1-3).**

**COUN 506. SPECIAL PROJECTS (1-3).**

**COUN 507. SEMINAR (1-3).**

**COUN 508. WORKSHOP (1-3).**

**COUN 509. PRACTICUM IN COUNSELING (3-6).** Designed to develop competencies in basic skills, facilitative dimensions, and counseling process. Self critique, peer critique, and supervisor critique of video taped 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. PREREQ: Admission to program.

**COUN 510. COUNSELING INTERNSHIP (1-15).** The internship is the culminating field experience of the M.S. 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. Students are expected to function per the expectations of other full-time employees and counseling staff at the internship site. Internships are graded on a pass/no pass credit basis only. A pass requires at least B level work. PREREQ: Six credits of COUN 509 and core program sequence.

**COUN 511. 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. PREREQ: Admission to Track II program.

**COUN 512. CLASSROOM INSTRUCTION FOR COUNSELORS (3).** 75 hours of supervised instruction in a public school setting. PREREQ: COUN 511.

**COUN 525. 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.

**COUN 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 which affect normal and non-normal development. Relationship of understanding human development to the counseling profession.

**COUN 532. SOCIAL AND CULTURAL PERSPECTIVES IN COUNSELING (3).** Social and cultural factors effecting counseling. Includes studies of change, ethnic groups, sub-cultures, changing roles of women, sexism, urban and rural societies, population patterns, cultural mores, use of leisure time, and differing life patterns. PREREQ: Admission to program.

**COUN 541. THE COUNSELING PROFESSION (3).** This course 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. PREREQ: Admission to program.

**COUN 542. THE COUNSELING RELATIONSHIP I (1).** Focus in this experiential class is on the counselor as a person. The importance of the self and knowing ones personal strengths and weaknesses as a counselor is stressed. The importance of giving the receiving feedback is also focused upon. PREREQ: Admission to program.

**COUN 543. THE COUNSELING RELATIONSHIP II (1).** Understanding the self as counselor in the work setting is emphasized. Development and identification of ones personal style of management assists the counselor in maintaining effective work relationships. Conflict resolution strategies are presented. Emphasis is also placed on the development of the counselor as a change agent. PREREQ: COUN 542.

**COUN 544. THE COUNSELING RELATIONSHIP III (1).** This course centers on development and maintenance of the counselor as a professional in the field. The importance of professional organizations, continuing education, skill enhancement, supervision, and maintaining self while working as a counselor are covered. Ways to avoid burn-out through stress reduction techniques are also emphasized. PREREQ: COUN 542.

**COUN 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. PREREQ: Admission to program.

**COUN 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. PREREQ: COUN 551.

**COUN 553. THEORY AND TECHNIQUES OF COUNSELING III (3).** Advanced study of counseling theories and techniques. Special emphasis is placed on alternative counseling strategies and counseling special populations. Students develop a personal counseling position paper. PREREQ: COUN 552.

**COUN 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. PREREQ: Basic statistics course.

**COUN 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.

**COUN 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. PREREQ: Admission to the program.

**COUN 572. ADVANCED GROUP COUNSELING PROCEDURES (3).** Theory and practice of group counseling in a variety of settings. Assessment, intervention, and observation skills are emphasized. The course will include didactic and experiential components pertinent to group facilitation and leadership. PREREQ: COUN 571.

**COUN 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.

**COUN 580. SELECTED TOPICS IN COUNSELING (1-3).** Current developments in the field of counseling, including such topics as: substance abuse, person abuse, eating disorders, chronic illness. May be repeated with different topics for a maximum of nine credits. PREREQ: Admission to program. Graded P/N.

**COUN 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 sub-cultures. Relevant assessment instruments and current literature, methods and outcome studies. PREREQ: Permission of instructor.

**COUN 583. DEATH, DYING AND GRIEVING (3).** Development of counseling approaches and skills in helping individuals cope with loss. Theoretical, philosophical and practical aspects of death education and counseling are explored. Emphasis is placed on the importance of self-knowledge as a counselor for the grieving. PREREQ: Permission of instructor.

**COUN 591. SEXUAL COUNSELING (3).** Sexual self-understanding related to the helping professional. Acceptance and comfort in sexual issues in counselor-client relationship. Specific tools will be employed; variety of treatment modalities are presented. This course is not intended to train sexual therapists. PREREQ: Admission to program or permission of instructor.

**COUN 601. RESEARCH (1-16).**

**COUN 602. INDEPENDENT STUDY (1-16).**

**COUN 603. DISSERTATION (1-16).**

**COUN 605. READING AND CONFERENCE (1-16).**

**COUN 606. PROJECTS (1-16).**

**COUN 607. SEMINAR (1-16).**

**COUN 608. WORKSHOP (1-16).**

**COUN 609. 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. and supervisor.

**COUN 610. INTERNSHIP IN COUNSELING (1-12).** Designed to provide experiences in development of teaching and supervision skills in preparation as a counselor educator and supervisor.

**COUN 621. ADVANCED TOPICS IN COUNSELING (3).** Advanced critical study of theory and research related to specific topics of counseling and counselor education. May be repeated for fifteen (15) credits.

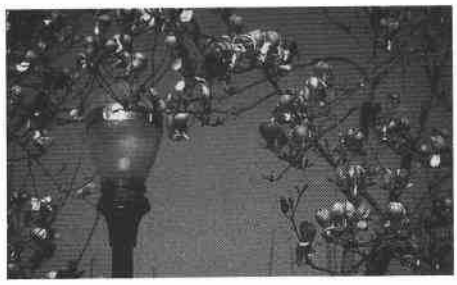
**COUN 696. COUNSELOR EDUCATION (3).** Experience and training to develop effective counselor educators, trainers, and supervisors. Primarily for counselor education and supervision training at the doctoral level, but open to advanced students in related helping professions. Emphasis on investigation of research in the field of counseling, theoretical considerations, planning strategies, programming and evaluation of effectiveness. PREREQ: Documented background in counselor training (or related profession), including equivalent of 30 credits and a minimum of two years of counseling experience.

**COUN 697. COUNSELOR SUPERVISION (3).** Practical experience for counseling professionals who have responsibility 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. PREREQ: Admission to doctoral program.

**COUN 698. 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. PREREQ: Admission to doctoral program.

**Upper Division Courses**

**COUN 808. WORKSHOP (1-3).**



## ■ PROFESSIONAL TECHNICAL EDUCATION

### Undergraduate Major

#### Technology Education (B.S.)

The B.S. in Technology Education prepares middle-level and high school technology education teachers for a fifth year teacher preparation program; community college technical instructors, and trainers for business and industry. Lower division course work may be completed at an Oregon community college or the Oregon Institute of Technology. Technical coursework must be completed at an Oregon Community College or OIT. Completion of the program prepares students to apply for entry into either the Master of Education (Ed.M.), M.S. in Education, or Master of Arts in Teaching (M.A.T.) program.

To graduate with a B.S. degree in Technology Education, a student must complete 192 credits of course work as follows:

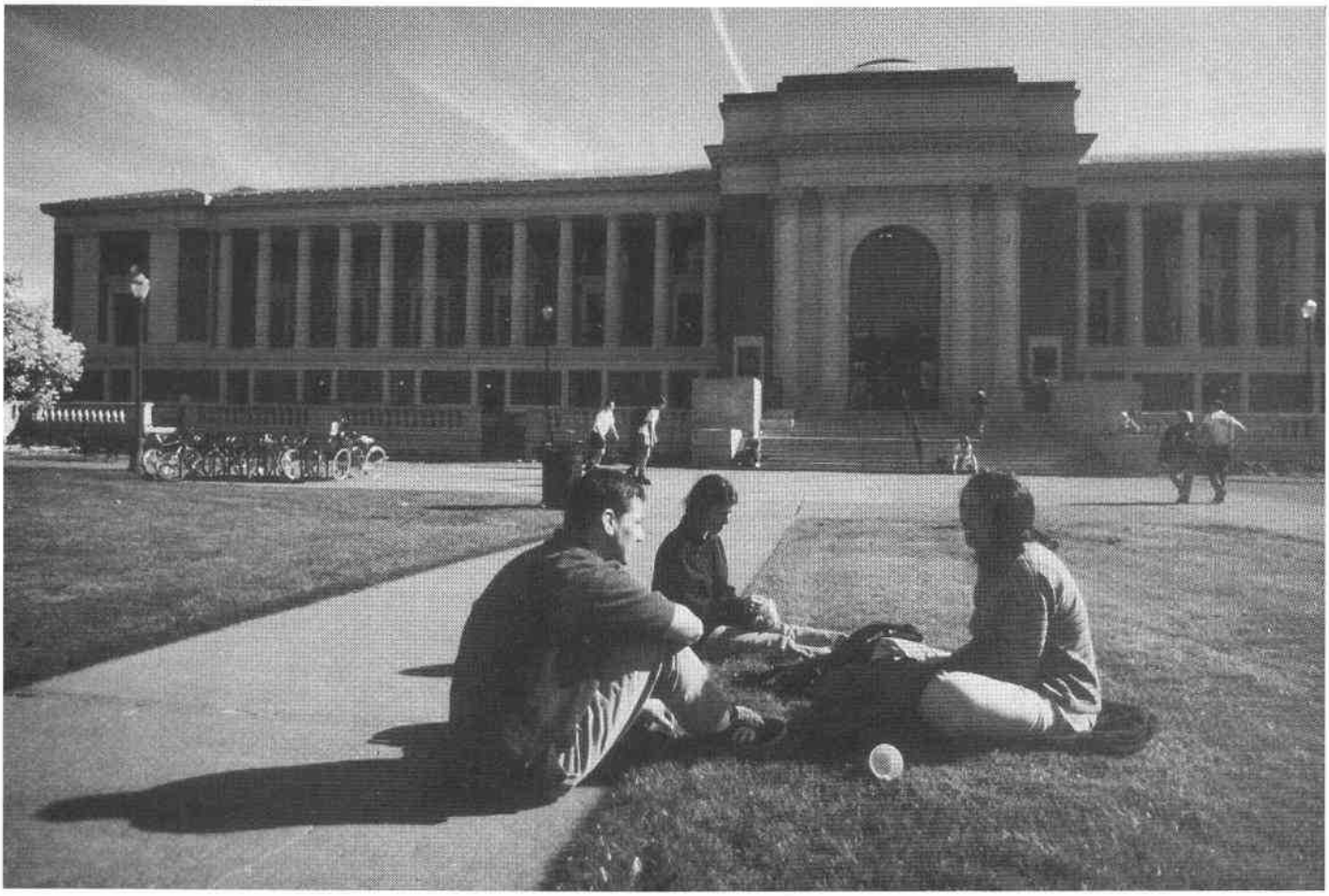
**Baccalaureate Core (48)**

**College of Liberal Arts (58)**

ANTH 202. Comparative Culture (3)
ANTH 380. Cultures in Conflict (3)
COMM 111. Public Speaking (3)
COMM 114. Argument and Disclosure (3)
ECON 213, ECON 214. Principles of Economics (3, 3)
PHL 205. Ethics (4)
PSY 201, PSY 202. General Psychology (3,3)
SOC 204. Introduction to Sociology (3)
SOC 205. Institutions and Social Change (3)
WR 121. English Composition (3)
WR 327. Technical Writing (3)
Literature and Arts (3)
Cultural diversity in addition to ANTH 202 (3)
*Social science and humanities electives: 12 credits of upper-division course work from:*
COMM 322. Small Group Problem Solving (3)
ECON 436. Labor Economics (4)
ECON 457. Industrial Organization (4)
PS 331. State Government and Politics (3)
PSY 360. Social Psychology (3)
PSY 496. Occupational Psychology (3)
SOC 437. Minority Groups and Issues (3)
SOC 456. Science and Technology in Social Context (3)

**College of Science (53)**

CS 101. Computers: Applications and Implications (4)
BI 201, BI 202. Introductory Biology (4,4)



PH 201, PH 202. General Physics (5,5)
BI 333. Environmental Problem Solving (3)
HSTS 420. History of Technology (3)
HSTS 421. Technology and Change (3)
MTH 111. College Algebra (4)
MTH 245. Mathematics for Management, Life and Social Science (4)
ST 351. Introduction to Statistical Methods (4)
*Science electives: 12 credits of upper division course work from:*
- MTH 105. Introduction to Contemporary Mathematics (3)
- BI 301. Human Impacts on Ecosystems (3)
- BI 370. General Ecology (3)
- HSTS 413. History of Science (3)
- HSTS 416. Science and the Emergence of Modern Society (3)
- HSTS 417. History of Medicine (3)
- PH 313. Energy Alternatives (3)
- ST 352. Introduction to Statistical Methods (4)

**College of Health and Human Performance (3)**
HHP 231. Lifetime Fitness for Health (3)

**School of Education (15)**
ED 406. Projects (3)
ED 407. Seminar (6)
ED 415. Structure and Dynamics of Professional Technical Education (3)
ED 416. Research & Exp. in Professional Technical Education (3)
Nine credits of upper division course work in education
ED 435. Education in Technology (3)

**FOOTNOTES**

*Baccalaureate Core Course

^Writing Intensive Course (WIC)

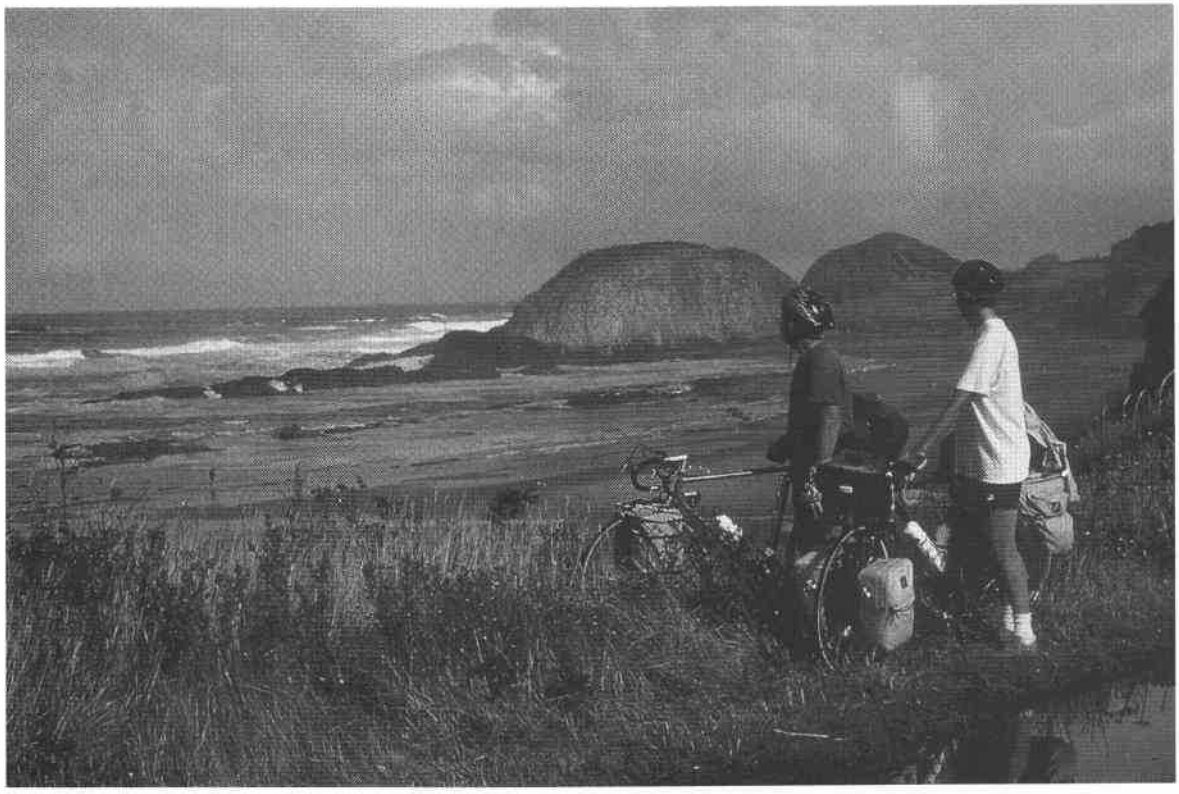
[1]May be counted only once toward graduation requirements.

[2]May not be repeat of BA courses listed above.

[3]Course opened only to students admitted to professional majors in Apparel, Interiors, Housing and Merchandising, or in other majors requiring this course.

[4]Course may not be counted as a part of the requirement for a graduate major in the department.

[5]Courses in school administration which may be transferred to the administrative certification programs at the University of Oregon, Portland State University and Lewis and Clark College. Other courses may also be accepted by these institutions with the approval of the program adviser.



*The College of Oceanic and Atmospheric Sciences has a three-fold mission: to increase the world's store of knowledge about the oceans and atmosphere through research which furthers national atmospheric and oceanic endeavors; to transmit this knowledge to future scientists by educating students for careers in oceanography, atmospheric science, geophysics, and related fields; and to extend this information on the atmosphere, the marine environment and its natural resources to the people of the state and nation to aid in the wise development and management of the oceans and atmosphere.*

Since its inception in 1959 as a department, oceanography at Oregon State University has grown to a college with a faculty of 97 scientists, all leaders in their research areas. In 1992, the Department of Atmospheric Sciences was merged with the college to form the College of Oceanic and Atmospheric Sciences (COAS). The college is now Oregon's principal source of expert knowledge about the atmosphere and the ocean, especially the northeast Pacific which has long been the focus of major research efforts by OSU oceanographers. It conducts the only comprehensive oceanographic and atmospheric research programs in Oregon. Today, research activities of the college extend throughout the world, and to all oceans. Its advanced degree graduates hold oceanographic positions in the United States and many countries, as well as leadership positions in the private sector. Students from around the United States and from other countries are enrolled in the four graduate programs of the college. By Fall of 1997, 841 advanced degrees in oceanography had been awarded at OSU. COAS is a member of the Joint Oceanographic Institutions (JOI Inc.), which represents the ten major oceanography schools in the U.S. In fiscal year 1996-97, the college received more than $20 million in support from research grants and contracts. In 1991, it was selected by NASA as a data analysis site for its Earth Observation System (EOS) project, part of the U.S. Global Change Research Program. In 1995, the National Research Council in its Research Doctorate Programs U.S. report, ranked OSU's graduate program in Oceanography 5th in the U.S.

**Faculty**

*Professors* Abbott, Allen, Bennett, Chelton, Coakley, Cowles, Dalrymple, deSzoeke, Dillon, Duncan, Esbensen, Good, Holman, Horton (Fisheries & Wildlife), Huyer, Klinkhammer, Komar, Levine, Mahrt, McDougal (Civil Engineering), C. Miller, R. Miller, Mix, Moum, Nelson, Pisias, Prahl, B. Sherr, E. Sherr, Shifrin☆, Simoneit, Strub, Trehu, Unsworth, Wheeler, Zaneveld; *Associate Professors* Barnes, Barth, Chen, Christie, Collier, Egbert☆, Falkner, Fisk, Freilich, Kosro☆, Levy☆, Lillie (Geosciences), Nableek, Nielsen, Pillsbury☆, Richman, Samelson, Vong, Walsh☆, Zolotov☆; *Assistant Professors* Goldfinger, Graham☆, Letelier☆, Matano☆, McManus☆, Skyllingstad☆, Smyth☆, Torres☆; *Research Associates* Bogucki, Boyd, Bruno, Dale, Desiderio, Erofeev, Gan, Hogan, Li, MacDonald, Newberger, Ngodock, Pegau, Petrenko, Pierce, Scott, Slinn, Spitz, Springer, Sun, Wijesekera

**Adjunct Appointments**

AuYong (HMSC), Baptista (Oregon Graduate Institute of Science & Technology), Cramer (OSU), deYoung (OSU), Frenkel (OSU), Hildreth (UO), Hixon (OSU), Jacobson (UO), Kimerling (OSU), Kolbe (OSU), Langdon (OSU), Lunch (OSU), Markle (OSU), Mate (OSU), Matzke (OSU), Morrissey (OSU), Peterson (NOAA), Rettig (OSU), Sampson (OSU), C. Smith (OSU), Sylvia (OSU), Wright (OSU), Yeats (OSU).

**Courtesy Appointments**

Beach (ONR), Biebe (CAEC), Bottom (OR Dept. of Wildlife). E. Carey (OSU), Davis (NMFS), Drake (OSU), Eisel (GeoFurshungsZen), Embley (NOAA), Fox (NOAA), Garono (Earth Design Con.), Glooschenko, Grover (HMSC), Hammond (NOAA), Hart (OSU), Lowry (OSU), Lupton (NOAA), Markham (Arch Cape), Marra (Shorelands Solutions), Measures (U. Hawaii) Naldi (U. Parma), Olla (NMFS), Peterson (OSU), Rumrill (UO), Sigleo (EPA), Teiser, Weber (BGR-Germany), West (U.Washington), Wolfe (OSU), Woodhouse (Southampton Ocean.Centre), Young (EPA)

## Undergraduate Minor

**Oceanography**

## Graduate Majors

**Atmospheric Sciences (M.A., M.S., Ph.D.)**

*Graduate Areas of Concentration*

Air-Sea Interaction
Atmospheric Chemistry and Pollution
Atmospheric Radiation and Remote Sensing
Global Climate Dynamics
Large-Scale Dynamics and Planetary Atmospheres
Turbulence and Convection
Statistical and Applied MeteorologyGeophysics (M.A., M.S., Ph.D.)

**Marine Resource Management (M.A., M.S.)**

**Oceanography (M.A., M.S., Ph.D.)**

*Graduate Areas of Concentration*

Biological Oceanography
Chemical Oceanography
Geological Oceanography
Interdisciplinary Oceanography
Physical Oceanography

## TEACHING AND RESEARCH

The teaching and research programs within the college are highly interdisciplinary. They emphasize the interdependence of biological, chemical, physical, geological, and geophysical processes within and under the sea, and their interactions with atmospheric processes. The faculty of the college comprises groups of scientists representing each of the basic disciplines involved in the study of the sea and atmosphere. The interdisciplinary and informal character of the college promotes the rapid exchange of ideas often necessary for the solution of research or management problems. Graduate students are essential participants in carrying out the research programs of the college.

104 Oceanography Administration Building
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Corvallis, OR
97331-5503
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**ADMINISTRATION**

**G. BRENT DALRYMPLE**
*Dean*

**TIMOTHY COWLES**
*Associate Dean*

**IRMA DELSON**
*Assistant Director Student Services*

**JUDITH VERGUN**
*Director, NAMS Program*

**JAMES W. GOOD**
*Director, MRM Program*

**FREDERICK JONES**
*Marine Superintendent*

Footnote for this section on page 303.

## Undergraduate Offerings

Undergraduate offerings include courses at the 100, 200, 300, and 400 level. Although no oceanography or atmospheric science undergraduate major is available, there are sufficient offerings to provide interesting courses to motivated undergraduate students. Most employment in oceanography, atmospheric sciences and geophysics requires a graduate degree. Students planning on graduate study in the college are advised to complete a baccalaureate degree in a basic natural science, mathematics, or engineering. The college provides undergraduates with the opportunity to become acquainted with the fields offered through undergraduate-level courses in oceanography and atmospheric sciences taught by leading scientists.

Undergraduates interested in the marine sciences can complete a minor in oceanography 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 or Engineering. The minor also provides a broad environmental science 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 Oceanic and Athmospheric Sciences Student Services Office.

## Oceanography Minor (27)

OC 331. Introduction to Oceanography (3)
OC 332. Coastal Oceanography or
OC 333. Oceanic Research Frontiers (3)
OC 430. Principles of Physical Oceanography (4) or OC 433. Coastal and Estuarine Oceanography (3) or Coastal and Estuarine
OC 440. Intro to Biological Oceanography (3)
OC 450. Chemical Oceanography (3)
OC 460. Geological Oceanography (3)
Sedimentary Processes (3)
OC 401. Research Projects or OC 405. Reading and Conference or OC 499. Special Topics in Oceanography (3)
MRM 414. Ocean Resources Management (3) or MRM 415. Coastal Resources Management (3)
*One of the following:*
Additional course in Oceanography or Marine Resource Management (3) or ATS 210. Introduction to the Atmospheric Sciences (3)
Z 351. Marine Ecology (3) or FW 431. Dynamics of Marine Biol Res (4)
GPH 463. Intro Solid Earth Geophysics or other approved course (3)

## Degree Programs

Although the college provides some undergraduate courses, it offers graduate degrees only. Programs leading to the Master of Science (M.S.), Master of Arts (M.A.), and Doctor of Philosophy (Ph.D.) degrees are available in atmospheric sciences, geophysics, and in biological, chemical, geological, interdisciplinary, and physical oceanography. In addition, the college offers a master's degree in marine resource management.

## Job Opportunities

Graduate study in the college prepares students for research, teaching, and management positions in academic, industrial, and governmental organizations. Branches of the federal government employing atmospheric scientists, geophysicists, marine resource managers, and oceanographers include the Navy, the Coast Guard, the Department of the Interior, the National Oceanic and Atmospheric Administration, the Department of Energy, the Army Corps of Engineers, and the Environmental Protection Agency.

The main U.S. research effort in oceanography, atmospheric science, and geophysics is centered around federal agency programs or federally funded programs. Most of the research in these fields, conducted in universities is supported by federal grants and contracts. There are career opportunities in marine and atmospheric education and research in many colleges and universities, especially at those institutions in the coastal and Great Lakes states. Opportunities for oceanographic and atmospheric research careers are also found in private enterprise, especially in businesses involved with the use of marine and coastal resources and in which climate and weather are important influences. In addition, graduates have also gone on to successful careers in creative, entreprenurial enterprises, law and medical schools, and teaching K-12.

## Admission 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. Marine Resource Management applicants must also have a bachelor's degree, but the major may be in the social or political sciences, economics, business administration, the natural sciences, 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. One year each of undergraduate course work in physics, chemistry, and calculus. Qualified applicants deficient in these prerequisites may be admitted conditionally.
4. Graduate Record Examination (GRE) scores (general). Subject GRE recommended.
5. Three letters of recommendation.
6. A score of 550 or higher on the TOEFL for applicants from countries where English is not the official language. Atmospheric Science applicants must score at least 600 on the TOEFL.

Students may apply for admission any term. February 1 is the deadline to apply for Fall admission. Early application is recommended.

## Program Recognition

The Western Interstate Commission for Higher Education (WICHE) has selected the Biological, Chemical, Geological, Interdisciplinary and Physical Oceanography M.A., M.S. and Ph.D. programs as well as the Marine Resource Management master's program as unique or specialized graduate programs it coordinates in the Northwest. Residents of Alaska, Arizona, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, North Dakota, Utah, Washington, and Wyoming, who major in these programs, qualify to pay resident tuition rates at OSU.

## Program Requirements

Oceanography and Marine Resource Management students are required to take prescribed core courses in each of the following fields: biological, chemical, geological, and physical oceanography. Geophysics students are normally required to take one or more courses in physical and geological oceanography in addition to their geophysics courses. Atmospheric sciences students are required to take core courses in atmospheric radiation, dynamics and cloud physics.

Students in Oceanography, Atmospheric Sciences, and Geophysics usually minor in some other field of science, mathematics, statistics, or engineering. Marine Resource Management students have multidisciplinary programs and are not required to declare a minor.

## Master's Programs

All students 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. Marine Resource Management graduate programs have 60 credits of course work and 6 credits of internship.

A two-hour, final oral examination is required for completion of the master's program.

## Marine Resource Management Program

This master's degree program is designed to prepare students for direct entry into careers in resource management. The program, which is usually completed within two years, typically consists of courses in oceanography, economics, fisheries, and business administration. Courses may also be taken in the Colleges of Engineering, Agriculture, Science, and Liberal Arts. Each program is adjusted to the needs of the

individual. Students complete an internship, project report, or thesis. Applicants must meet the general admission requirements of the college.

## Doctor of Philosophy Program

In all graduate programs in the college, the content of Ph.D. 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. There are no fixed requirements on the number of course credits to be taken; each program corresponds to the needs of the individual candidate. 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 Ph.D. program.

## Oceanography Graduate Minors

Master's candidates who wish to minor in Oceanography must take one course in physical oceanography and from 8 to 15 credits of other Oceanography courses.

Ph.D. candidates who wish to minor in oceanography must take the core oceanography courses. If oceanography is the first minor, the program should include a total of approximately 30 credits of oceanography.

## Research Vessel

The college's major research vessel, the *R/V Wecoma*, is based at the Hatfield Marine Science Center in Newport, 50 miles (90 kilometers) from the Corvallis campus. The ship, which came into service in early 1976, is 185 feet long (56.4 meters) and has space for 18 scientists. It is especially designed for oceanographic research and is used mainly for deep ocean work.

## Computing Resources

The Environmental Computing Center (ECC) was completed in 1993 to house the College's computing resources. For high performance computing the ECC provides several supercomputer class machines including an IBM SP-2 (8 nodes, 2.5 GB memory, 20 GB disk) Thinking Machine CM-5 (2 GB memory, 25 GB disk), a Silicon Graphic Power Challenge (500 memory, 120 GB disk) and a high speed cluster of IBM RS/6000 Workstations (1 GB memory, 16 GB disk). For file/application service, three Sun 690's, Sparc Center 2000 and a Sparc Center 1000 with 100 GB's of application and data storage. A digital media lab contains a variety of computers including a UNIX workstation, an Intel CPU-based PC and a high performance Macintosh. High quality black-and-white and color printers and a CD-ROM mastering and etching device for production of CD-ROMs are also located in the digital media lab. A visualization lab contains state-of-the-art computing and video equipment for producing data visualizations and complete video presentations of research projects.

An extensive installed network, connecting computing equipment within the College, is linked externally for electronic communications and remote computing. In the College's local network domain, twelve buildings are connected together via optical fiber cabling so that sharing of information and utilization of college computing resources can be maximized. There are over 100 UNIX workstations and 150 PCs and Macintoshes connected to this College network, along with laser printers and plotters. From this local network domain, the College is connected to the OSU campus network which in turn is connected to the global network of the Internet, where vast computing resources (e.g., NCSA, NCAAR, UCSD) can be accessed and over which world-wide electronic communication is possible. Computing facilities for students include three student computing labs, providing over 25 UNIX, PC and Mac platforms where scientific and productivity software applications can be used and where students can log onto the College network and onto the Internet.

## Courses

Many of the courses in the college are offered every other year. Consult the *Schedule of Classes* or the college student services office for current offerings.

### ■ OCEANOGRAPHY

#### Lower Division 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. Lec/lab. CROSSLISTED as GEO 103. (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 on different topics for credit.

#### Upper Division and Graduate Courses

**OC 331. INTRODUCTION TO OCEANOGRAPHY (3).** A comprehensive survey of oceanography as interdisciplinary marine science. Plate tectonics and the origin of ocean basin geological features, geochemistry and the origin of sea water. Marine sediments and minerals. Chemical and physical properties of sea water. Climate and air-sea interactions; El Nino events. Oceanic circulation, waves and tides; processes and causes. Oceanography from space. Coastal and estuarine processes. Biotic communities and adaptations in open ocean, deep sea, and bottom environments. Biological processes in the sea: marine production and oceanic food webs; controlling factors. Oceanic fisheries and their limits. Offered every quarter.

**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 environment problems; pathways that pollutants take through the coastal ecosystem. Offered annually.

**OC 333. OCEANIC RESEARCH FRONTIERS (3).** An introduction to oceanographic research today. Current and developing concepts, techniques, and questions in geological, physical, chemical, and biological oceanography, presented by researchers. Topics include formation of the planet, the ocean, and the ocean basins; sea floor geologic and geochemical processes; oceanic interaction with global climate; satellite observations; microbial and large scale biological processes. Brief overview introduces each lecture. Video format, with classroom, live broadcast, and tape-delayed viewing options. PREREQ: OC 331 recommended. Offered annually.

**OC 401. RESEARCH PROJECTS (1-4).** Field and laboratory research in oceanography for undergraduates, resulting in a written report. Consent and approval of research problem by supervising faculty required before registration.

**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. Consent and topic approval by supervising faculty 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.

**OC 499. SPECIAL TOPICS IN OCEANOGRAPHY (1-4).** Subjects of current interest in oceanography, not covered in depth in other courses. For upper-division undergraduates. May be repeated on different topics for credit. PREREQ: Varies with current topic. Graded P/N.

**OC 501. RESEARCH (1-16).** Original research work that will not be part of the data used in a thesis. Consent of supervising faculty required. Graded P/N.

**OC 503. THESIS (1-16).** Thesis research and writing.

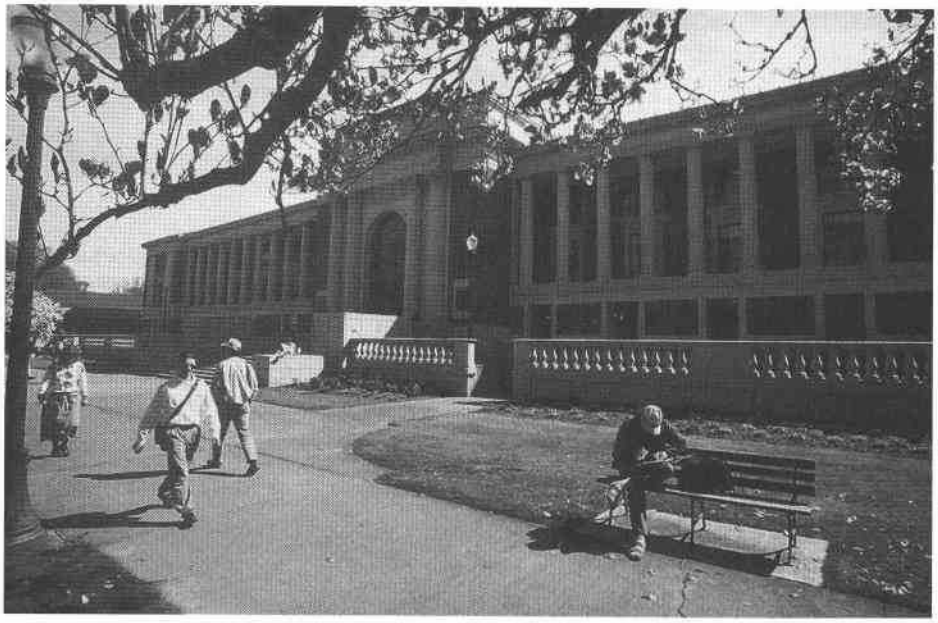
**OC 505. READING AND CONFERENCE (1-16).** Independent reading and library research on specialized topics in oceanography, guided by discussions with supervising faculty. A written report may be required. Consent and topic approval required before registration.

**OC 506. PROJECTS (1-16).**

**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.

**OC 508. WORKSHOP (1-16).** Section 1: Computer Applications Workshop (1). Introduction to the computing systems, networks, and software applications available to students in the College of Oceanic and Atmospheric Sciences. Emphasis is placed on basic computing skills, specific hardware and applications required by students for COAS courses and research.

**OC 599. SPECIAL TOPICS IN OCEANOGRAPHY (1-4).** Subjects of current interest in oceanography, not covered in depth in other courses. May be repeated on different topics for credit. PREREQ: Varies with current topic. Graded P/N.



**OC 601. RESEARCH (1-16).** Original research work that will not be part of the data used in a thesis. Consent of supervising faculty required. Graded P/N.

**OC 603. THESIS (1-16).** Thesis research and writing.

**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. Consent and topic approval required before registration.

**OC 606. PROJECTS (1-16).**

**OC 607. 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.

**OC 608. WORKSHOP (1-16).** Section 1: Computer Applications Workshop (1). Introduction to the computing systems, networks, and software applications available to students in the College of Oceanic and Atmospheric Sciences. Emphasis is placed on basic computing skills, specific hardware and applications required by students for COAS courses and research.

## ■ BIOLOGICAL OCEANOGRAPHY

### Upper Division and Graduate Courses

**OC 440/OC 540. 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 441/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. PREREQ: An ecology course, invertebrate zoology, or OC 440/OC 540. Offered alternate years.

**OC 641. BIOLOGICAL OCEANOGRAPHY LABORATORY (3).** Laboratory and field experience with techniques for the determination of standing stocks of planktonic organisms, rate measurements, and analyses of physiological adaptations to oceanic environmental variables. PREREQ: OC 440/OC 540 or consent of instructor. Offered alternate years.

**OC 642. MARINE NEKTON (3).** Ecology, behavior, and special adaptations of swimming marine animals, including fishes, invertebrate nekton, and marine mammals. Topics include locomotion, respiration, feeding, reproduction, sensory biology, schooling, seasonal migration and navigation, diel vertical migration, patterns of distribution and abundance, population dynamics, and community organization. PREREQ: OC 440/OC 540 or equivalent. Offered alternate years.

**OC 644. MARINE PHYTOPLANKTON ECOLOGY (4).** Ecology of the 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. PREREQ: OC 440/OC 540 or two years of biology. Offered alternate years.

**OC 645. MARINE PHYTOPLANKTON PHYSIOLOGY (4).** Life processes of plankton algae: energy-capturing processes, mineral nutrition, flotation mechanisms, cell division. Evaluation of experimental procedures; problems of existence in the open ocean; artificial production of maximum yields. PREREQ; OC 644. Offered alternate years.

**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 PREREQ: OC 430/OC 530 and OC 440/OC 540 or consent of instructor. Offered alternate years.

**OC 647. MARINE MICROBIAL PROCESSES (4).** Roles of procaryotic 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. PREREQ: Two years of biology, OC 440/OC 550, or consent of instructor. Offered alternate years.

**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 on different topics for credit.

## ■ CHEMICAL OCEANOGRAPHY

### Upper Division and Graduate Courses

**OC 450/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 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. PREREQ: One year of college-level general chemistry. Offered annually.

**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. PREREQ: OC 450/OC 550. Offered alternate years.

**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. PREREQ: OC 450/OC 550 or consent of instructor. Offered alternate years.

**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 radioisotopic techniques to oceanic circulation and mixing, paleoceanography, sediment geochronology, archeometry, and marine pollution. PREREQ: One year of college-level general chemistry. OC 450/OC 550 desirable. Offered alternate years.

**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. PREREQ: OC 450/OC 550. Offered alternate years.

**OC 655. ADVANCED AQUATIC CHEMISTRY (3).** This course ivolves low temperature thermodynamics and selective kinetic treatments primarily of the inorganic chemistry of natural waters. To the extent data bases exist for them, organic ligands and surface active groups are also considered. Techniques for predicting the speciation and reactions of dissolved and solid phases in aqueous systems with the assistance of existing computer code, to a range of natural waters including rain, lakes, rivers, groundwater, and oceans. Comparison of observations with the model results are used to demonstrate the utility of the thermodynamic/pseudo kinetic approach. The principal goals for the course are to provide familiarity with the range of chemical properties that characterize natural waters and to generate sufficient proficiency with the available computer programs so that students can apply them as a tool in their own research. PREREQ: Physical chemistry or course in chemical thermodynamics.

**OC 656. MARINE ORGANIC GEOCHEMISTRY (3).** Models for the formation and decomposition of simple and macromolecular organic matter in waters and sediments of the marine environment. Chemotaxonomic methods to distinguish sources of sedimentary organic matter and to identify the processes that influence the transfer and preservation of organic matter in the geological record. PREREQ: CH 332 or CH 336 and OC 450/OC 550. Offered alternate years.

**OC 658. PETROLEUM GEOCHEMISTRY (3).** Introduction to the nature of organic carbon in the geological record. The composition, formation and migration of petroleum and its maturation (including biomarkers) in terms of diagenesis, catagenesis and metamorphism by geothermal and hydrothermal processes. Source rocks, reservoirs, and alteration. Oil-to-oil, oil-to-source rock and other correlations, prospect evaluation and basin modeling. A brief overview of production and refining of oil and other fossil fuels. PREREQ: One year college-level organic chemistry. Offered alternate years.

**OC 659. SPECIAL TOPICS IN CHEMICAL OCEANOGRAPHY (1-4).** Special topics of current interest in chemical oceanography not covered in detail by other courses. May be repeated on different topics for credit.

## ■ GEOLOGICAL OCEANOGRAPHY

### Upper Division and Graduate Courses

**OC 460/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. PREREQ: One year each of physics and chemistry or science background. Offered annually.

**OC 464/OC 564. COASTAL SEDIMENTARY PROCESSES (3).** Nearshore ocean processes including tides, sea-level variations, waves, currents, sediment transport, and the resulting beach morphology; coastal erosion problems and management issues.

**OC 528. MICROPROBE ANALYSIS (3).** Theory and application of electron microprobe analysis to problems in geology, engineering, chemistry, physics, and biology. CROSSLISTED as GEO 528.

**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. PREREQ: OC 560 or OC 662, or consent of instructor. Offered alternate years.

**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. PREREQ: One year each of physics, calculus, and geology. Offered annually.

**OC 662. PHYSICAL, CHEMICAL AND BIOLOGICAL SEDIMENTATION IN THE OCEAN (3).** Fundamentals of transport, chemical reactions and biological processes in sediment formation; including fluid flow and drag, threshold and sedimentary bed forms, sources, facies and budgets of sediments, early diagenetic reactions, marine microfossil stratigraphy and paleoceanographic interpretations. Offered annually.

**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. Offered alternate years.

**OC 664. LITTORAL PROCESSES AND SEDIMENTATION (3).** Nearshore environmental processes including an examination of real waves (wave theories and their application, refraction, diffraction, reflection, and breaking); generation of longshore and rip currents, mechanics of sediment transport on beaches, and features of recent sediments. PREREQ: General physics; integral and differential calculus. Offered alternate years.

**OC 665. ANALYSIS OF GEOLOGIC DATA BASES (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. PREREQ: One year of statistics and one year of computer science. Offered alternate years.

**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. THERMODYNAMICS IN MARINE GEOLOGY (3).** Quantitative application of thermodynamics to problems of igneous and metamorphic geology and hydrothermal solutions. The principles of energy, enthalpy, entropy, and activity in solids, liquids, and gases. Equilibrium processes related to melting, crystallization, mineral chemistry, distribution of trace elements between phases, geothermometers, and geobarometers. PREREQ: Physical chemistry or theoretical petrology. Offered alternate years.

**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 on different topics for credit.

## ■ PHYSICAL OCEANOGRAPHY

### Upper Division and Graduate Courses

**OC 430/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. PREREQ: One year each of college physics and college calculus. Offered annually.

**OC 433/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. Estuary classification and circulation patterns; shallow-water processes and beach morphology. PREREQ: One year of college physics, one year of calculus. Offered alternate years.

**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. PREREQ: One year of college physics; mathematics through differential equations and vector calculus. Offered annually.

**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. PREREQ: OC 670. Offered annually.

**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. PREREQ: OC 670 and OC 671. Offered annually.

**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. PREREQ: OC 430/OC 530 or OC 670, or ATS 415/ ATS 515. Offered annually.

**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. PREREQ: 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. PREREQ: OC 670, MTH 625, MTH 626 or equivalent, and a working knowledge of FORTRAN. Offered alternate years.

**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. PREREQ: Strong background in linear algebra and advanced calculus, geophysical fluid dynamics, numerical modeling of ocean circulation. Offered alternate years.

**OC 678. SATELLITE OCEANOGRAPHY (3).** 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. PREREQ: MTH 252, PH 212 or equivalent. Offered alternate years.

**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 on different topics for credit.

**OC 680. STABILITY OF GEOPHYSICAL FLUID FLOWS (4).** Baroclinic instability—linear and nonlinear stability problems; models of Eady and Charney. Instability of parallel shear flow—linear inviscid theory; Rayleigh's theorem; nonlinear contour dynamics; effects of stratification; Taylor-Goldstein equation. Thermal instability—the linear Rayleigh-Bernard problem; nonlinear models; the Lorenz equations, chaos and strange attractors. Geostrophic turbulence—resonant Rossby wave interactions; energy and entrophy. Instability of nonparallel flow-Arnold's criteria. PREREQ; OC 670. Offered alternate years.

**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. PREREQ; OC 670. Offered alternate years.

**OC 682. OCEANOGRAPHIC & ATMOSPHERIC DATA ANALYSIS I: BASIC TECHNIQUES (4).** Theory of classical and modern time series analysis techniques with application to real oceanographic and atmospheric data. Topics include sampling errors, confidence tests, least squares analysis, Fourier analysis, sampling theory, autospectral analysis, cross spectral analysis and empirical orthogonal function analysis. PREREQ: MTH 252, MTH 341, ST 623 or equivalent, OC 508 or OC 608 and working knowledge of Fortran. Offered alternate years.

**OC 683. OCEANOGRAPHIC AND ATMOSPHERIC DATA ANALYSIS II: ADVANCED TECHNIQUES (3).** Theory and application of advanced data analysis techniques. Topics include advanced least squares, data filtering, advanced empirical orthogonal function analysis, objective analysis, and advanced spectral analysis. PREREQ; OC 682. Offered alternate years. CROSSLISTED as ATS 683.

## ■ GEOPHYSICS

### Upper Division and Graduate Courses

**GPH 463/GPH 563. GEOPHYSICS AND TECTONICS (4).** Geophysical observations as constraints on geologic interpretation. Field trip(s) required; transportation fee charged. PREREQ: MTH 251, PH 202 or PH 212 or equivalent. CROSSLISTED as GEO 463/GEO 563. Lec/lab.

**GPH 464/GPH 564. SEISMIC REFLECTION INTERPRETATION (4).** Use of seismic reflection data to interpret subsurface geology. For students with backgrounds in either geology or geophysics. Emphasis on the integration of reflection data with other types of geophysical and geological data to interpret the structure and stratigraphy of sedimentary basins and the gross structure of the earth's crust. Brief overview of wave propagation theory and acquisition and processing procedures. Laboratory exercises include computer modeling of reflection data and interpretation of profiles from a wide variety of tectonic settings. PREREQ: GEO 463/GEO 563, GPH 463/GPH 563. Offered annually. CROSSLISTED as GEO 464/GEO 564.

**GPH 501. RESEARCH (1-16).** Original research work that will not be part of the data used in a thesis. Graded P/N.

**GPH 503. THESIS (1-16).** Thesis research and writing.

**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. Consent and topic approval required before registration.

**GPH 507. SEMINAR (1-16).**

**GPH 601. RESEARCH (1-16).** Original research work that will not be part of the data used in a thesis. Graded P/N.

**GPH 603. THESIS (1-16).** Thesis research and writing.

**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. Consent and topic approval required before registration.

**GPH 607. SEMINAR (1-16).**

**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. Offered alternate years.

**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. PREREQ: Differential equations. Offered alternate years.

**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. PREREQ: GPH 630, differential equations, complex analysis. Offered alternate years.

**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. PREREQ: GPH 630. Offered alternate years.

**GPH 640. THE EARTH'S GRAVITY FIELD (4).** Gravity field and gravity potential, earth ellipsoid; gravity measurements (sea, land, and space), reduction of gravity measurements; gravity anomalies, isostasy, deviations from isostatic equilibrium; internal constitution of the earth. PREREQ: Differential equations, two years of physics, one year of geology. Offered alternate years.

**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 mantel conductivity. PREREQ: Upper division EM course. Offered alternate years.

**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 remanent magnetism in rocks and the controlling physical and chemical processes; the origin of the Earth's magnetic field. PREREQ: Consent of instructor. Offered alternate years.

**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. PREREQ: Linear algebra. Consent of instructor. Offered alternate years.

**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. PREREQ: Consent of instructor. Offered alternate years.

**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. PREREQ: Consent of the instructor. Offered alternate years.

**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. Offered alternate years.

**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.

## ■ MARINE RESOURCE MANAGEMENT

### Upper Division and Graduate Courses

**MRM 414. OCEAN RESOURCES MANAGEMENT (3).** Science, technology, economics, and management of specific resources and uses of the oceans. Domestic and international laws, regulations, programs, and management regimes related to living and non-living marine resource utilization and protection. Offshore petroleum; energy; metals; minerals; freshwater; waste disposal; marine mammals and fisheries; medicines; recreation; transportation; and international law of the sea. Relevant resource management concepts, strategies and tools. Offered alternate years.

**MRM 415/MRM 515. COASTAL RESOURCES MANAGEMENT (3).** Laws, policies and programs governing the use and protection of ocean and coastal renewable and nonrenewable resources. Issues covered include: coastal wetlands management, shoreline development and erosion control, coastal effects of offshore energy and mineral development, innovative management and planning approaches, emerging institutional and resource conflicts and coastal management programs in other countries. Offered alternate years.

**MRM 501. RESEARCH (1-16).** Graded P/N.

**MRM 503. THESIS (1-16).**

**MRM 505. READING AND CONFERENCE (1-16).**

**MRM 506. PROJECTS (1-16).**

**MRM 507. SEMINAR (1-16).**

**MRM 508. WORKSHOP (1-16).**

**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. For marine resource management majors only.

**MRM 514. OCEAN RESOURCES MANAGEMENT (3).** Science, technology, economics, and management of specific resources and uses of the oceans. Domestic and international laws, regulations, programs, and management regimes related to living and non-living marine resource utilization and protection. Offshore petroleum; energy; metals; minerals; freshwater; waste disposal; marine mammals and fisheries; medicines; recreation; transportation; and international law of the sea. Relevant resource management concepts, strategies and tools.

**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 on different topics for credit.

## ■ ATMOSPHERIC SCIENCES

### Lower Division 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.

### Upper Division and Graduate Courses

**ATS 401. RESEARCH (1-16).**

**ATS 403. THESIS (1-16).**

**ATS 405. READING AND CONFERENCE (1-16).**

**ATS 406. PROJECTS (1-16).**

**ATS 407. SEMINAR (1).** One-credit sections, graded P/N.

**ATS 411/ATS 511. THERMODYNAMICS AND CLOUD MICROPHYSICS (4).** Thermodynamic processes in the atmosphere, and an introduction to cloud microphysics. PREREQ: MTH 254, PH 213.

**ATS 412/ATS 512. 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. PREREQ: MTH 256, PH 213, MTH 254. Offered annually.

**ATS 413/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. PREREQ: MTH 254, PH 213 and CH 221.

**ATS 415/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. PREREQ: MTH 256, PH 213.

**ATS 416/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; symetric instability; internal gravity waves and mountain waves; differentially heated circulations including sea breezes. Slope flows and urban circulations. PREREQ: ATS 415/ATS 515 or equivalent.

**ATS 420/ATS 520. PRINCIPLES OF ATMOSPHERIC SCIENCE (4).** Essential principles and observations of the atmosphere. Atmospheric composition and structure; hydrostatics and thermodynamics. Radiative processes; energy transfer and energy balances in the atmosphere. Cloud and aerosol processes; atmospheric storm systems. Atmospheric dynamics and the general circulation of the atmosphere. PREREQ: One year of college physics and college calculus.

**ATS 446/ATS 546. GEOPHYSICAL BOUNDARY LAYERS (3).** Descriptive introduction to atmospheric and oceanic boundary layers, Reynolds averaging, approximate equations of motion, tensor budget equations for higher moments, turbulence energy equation, similarity theory of the surface layer and boundary layer, closure schemes, convective mixed layer, stable boundary layer; air-sea interaction and land surface processes. PREREQ: ATS 416/ATS 516 or equivalent. Offered alternate years.

**ATS 475/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. PREREQ: MTH 254, PH 213. Offered alternate years.

**ATS 501. RESEARCH (1-16).**

**ATS 503. THESIS (1-16).**

**ATS 505. READING AND CONFERENCE (1-16).**

**ATS 506. PROJECTS (1-16).**

**ATS 507. SEMINAR (1).** One-credit sections, graded P/N.

**ATS 590. SELECTED TOPICS (1-4).** Maximum of 12 credits may be used in a graduate program.

**ATS 601. RESEARCH (1-16).**

**ATS 603. THESIS (1-16).**

**ATS 605. READING AND CONFERENCE (1-16).**

**ATS 606. PROJECTS (1-16).**

**ATS 607. SEMINAR (1).** One-credit sections, graded P/N.

**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. PREREQ: ATS 511,513. Offered alternate years.

**ATS 615. ATMOSPHERIC GENERAL CIRCULATION (3).** Description of the climatological annual cycle and seasonal-to-interannual vaiability. Analysis of planetary scale circulations. Maintenance of the general circulation, including analysis of the atmospheric energy cycle, the angular momentum budget and wave/mean-flow interaction. Theory of the zonally averaged circulation. PREREQ: ATS 415/515, or OC 671, or equivalent.

**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. PREREQ: MTH 254, PH 213.

**ATS 683. OCEANOGRAPHIC AND ATMOSPHERIC DATA ANALYSIS II: ADVANCED TECHNIQUES (3).** Theory and application of advanced data analysis techniques. Topics include advanced least squares, data filtering, advanced empirical orthogonal function analysis, advanced spectral analysis. PREREQ: OC 682. Offered alternate years. CROSSLISTED as OC 683.

**ATS 690. SELECTED TOPICS (1-16).** Maximum of 12 credits may be used in a graduate program.

**FOOTNOTE**

☆Senior research faculty

# College of Pharmacy

*The Oregon State University College of Pharmacy is a member of the American Association of Colleges of Pharmacy and is fully accredited by the American Council on Pharmaceutical Education.* Its objective is to contribute to the improvement of public health and welfare through dissemination, expansion, and application of knowledge. In so doing, the college provides an instructional program assuring academic and technical proficiency in the basic sciences and their pharmaceutical application.*

A petition 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 B.S. in 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 Veterans Administration. 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.

**Undergraduate Major**

**Pharmacy (B.S.)**
No students will be admitted after September 1998

**Undergraduate Minor**
Pharmacy

**Doctor of Pharmacy (Pharm.D.)**
Entry Level Pharm.D.
Four year program to begin September 1999
Post-B.S., Pharm.D.
Two-year program, open to Registered Pharmacists only

**Faculty:**
*Professors* Ayres, Block, Constantine, Gerwick, Mpitsos, Stennett, Strandberg, Weber; *Associate Professors* Bianco, Campbell, Christensen, DeLander, Haxby, Leid, Munar, Parrott, Vanderveen; *Assistant Professors* Earle, Franklin, Leid, McGuinness, Proteau, Raber, Rodriguez, Zabriskie; *Instructors* Conroy, Ellis, Kwong, Samuels, Zweber; *Professional Faculty* Chandler, Danielson, Ketchum, K. Madison

**Courtesy Faculty:**
*Professors* Magee, Poulsen, Simonsmeier, Stewart; *Associate Professors* Gatlin, Henry; *Assistant Professors* Anderson, Boyce, R. Brown, Chock, Collell, D. Colley, Cook, Comer, Corson, DeLander, Ditmer, Eldredge, Frear, LaFrance, Larson, Louie, Millar, Millard, Noonan, Regner, Sahli, Schnabel, Tabor, Taniguchi, Thonstad; *Senior Instructors* Chung, Collet, Egging, Heisel, Johnson, Miller, Myers, Nishimura; *Instructors* Acidera, Adams, Babal, K. Barton, T. Barton, D. Brown, Brownlee, Caday, Caldwell, Canton, Chrusoskie, C. Colley, Comer, Cunningham, J. Edwards, R. Edwards, Estoup, Freis, Gauen, Gerding, Gerke, Griffin, Gustafson, Hanley, Henderson, Hubert, Huckestein, Huey, Hyatt, Jackimiec, Kinard, Lee, Leid, Lemar, S.D. Logan, S.G. Logan, Mason, Matsuda, McCann, McGinley, McLeod, Mosier, Muilenburg, Natwick, Nye, Schlabs, Schnebly, Sheeley, Stockberg, Tanigawa, Thompson, Watkins, Webb, West, Whitaker, Williamson, Wilson, Wojciechowski, Woodson, Zwicker

**Preceptors:**
The College of Pharmacy utilizes practicing pharmacists and physicians as lecturers in the pharmacy practice teaching program, the institutional pharmacy program, pharmacy management, and graduate education. Current preceptors: Abei, Marty; Adams, Cathy, Adams, John; Alfatooni, Vafa; Allen, Kristine; Amstad, Carl; Anderson, Rodney; Anderson, Todd; Ater, Curt; Babal, Dess; Baker, Cathy; Balin, Cindy; Barton,Don; Barton,Tracy; Beck,Mike; Bell, Kaprice; Benz,Danielle; Bock,Lisa; Borger, Daphne; Bouvia, Dale; Bowman, Buzz; Breen, Kevin; Brinkhous, Dale; Brownlee, Darcy; Butcher, Bill; Caldwell, Donna; Carpenter, Curt; Carter, Karon; Charter, Andrew; Chrusoskie, Aaron, Church, Patty; Cocanower, Cindy; Collell, Karen; Colley, Colleen; Comer, W Frosty; Cooper, John; Crittenden, Walt; Cudahy, Chris; Day, Ron; Dearing, Angela; Dembsky, Barbara; Edwards, Darryl; Ehlers, Greg; Estoup, Mike; Parthing, Kate; Ferraro, Robert; Feyerharm, Jeff; Flack, James; Franlkin, Paul; Friesen, Gordon; Galvin, Clifford; Gerding, George; Gillespie, Derek; Goe, Susan; Grimes, Nancy; Haas, Milo; Hanley, Mike; Hanson, Mary Cal; Hata, Lon; Haxby, Dean; Heisel, Carl; Henderson, Jim; Hinkey, Nancy; Holeman, Eric, Huckestein, Lou Ann; Hurley, Derris; Johnston, Karen; Kajiyama,Kurt; Kenyon, Nick; Knoeferl, Alex; Krick, James; Krupicka, Marianne; Labberton, William;Land, Tim; Larson, Gary; Lee, Brian; Leid, Cassandra; Linares, Roberto; Loh, Tim;Lubischer, Anne, Marcus, Kris; Marshall, Ed; Marvio, Julie; Mason, Julie; Matsuda, Diana;Mays, Robin; McGinley, Chuck; McLeod, Richard; Medeiros, Wesley; Millar, Sue; Miller,Craig; Misterek, Belinda; Moll, David; Muilenburg, Norman; Murray, Michelle; Nakamura,Stephaoie; Neuberger, Pat; Newsom, Amanda; Nishimura, Elaine; Noonan-Hamsberger, Helen;Owens, Julie; Patrick, Mike; Perry, Dennis; Pierce, Ginger; Prince, Marvin; Ramsey, Tanya; Reasoner, Ann; Reher, Penny; Rhodes, Jim; Rimov, Kathy; Ring, Kathryn;Robbins, Jlm; Rose, Clifford; Saegaert, Gilbert; Sahli, Rick; Schade, Randall; Schmidt,Stephen; Schnabel, Joe; Schneider, Edwin; Schott, Kevin; Schulte, Steve; Sheeley, Nancy;Shirai, Gwen; Silbernagel, Rob; Stauffer, Cathy; Stockberger, Roxy; Stoner, Steve; Taniguchi, Ron; Thompson, Dennis; Thonstad, Ralph;

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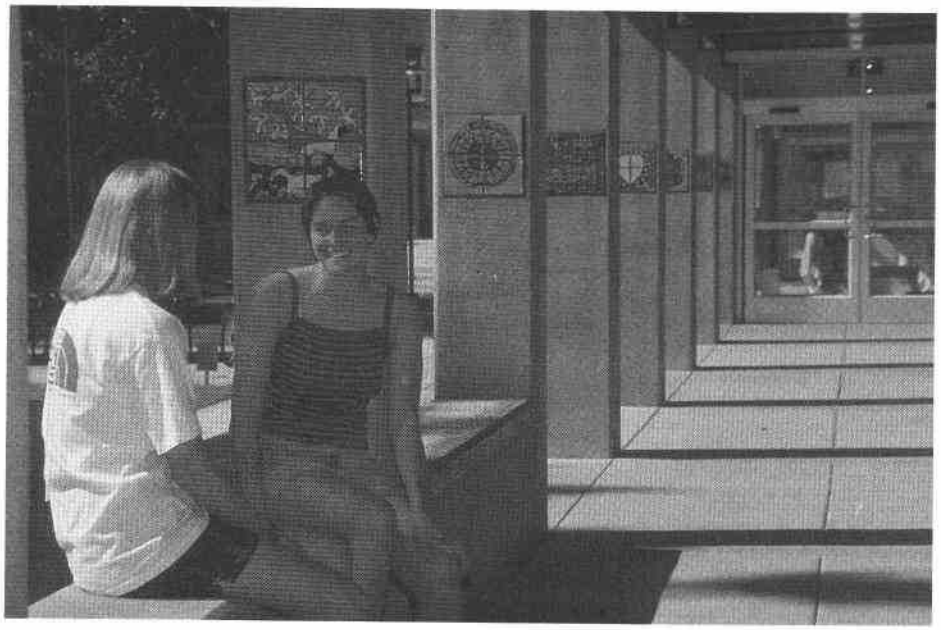
**ADMINISTRATION**

**GARY E. DELANDER**
*Assistant Dean for Academic Affairs*

**KEITH A. PARROTT**
*Assistant Dean for Student Affairs*

**RANDALL L. VANDERVEEN**
*Assistant Dean for Pharmacy Practice, OHSU*

Footnotes for this section on page 311.



Torrey, Ron; Tubb, J. Michael; Uetrecht, Robert; Vial, David; Wakuzawa, Benson; Watkins, Scott; Webb, Nora; West, Don; Whatley, George;Wick, Shauna; Williamson, Linda; Wojciechowski, Nancy; Woodson, Gary; Wride, Rick; Yan, Steven; Young, Betty; Zimmerman Steve: Zwicker. Dan

## PHARMACY INFORMATION

Professional pharmacy education is changing both in Oregon and through out the United States. After September 1998, no students will be admitted to the current B.S. program in pharmacy.

We will begin a new 4-year Doctor of Pharmacy (Pharm.D.) program in September 1999. To enter the Pharm.D. program, students must complete a required pre-pharmacy curriculum which will require approximately three years of college study. Completion of the pharmacy professional program requires an additional four years.

After completion of this 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, many graduates become licensed as pharmacists approximately three months after graduation from Oregon State University.

## THE PREPHARMACY PROGRAM

Required courses in the prepharmacy program may be taken at Oregon State University or any other accredited college or university. The prepharmacy program must be completed for the student to be considered for admission to 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.

If a high school graduate fulfills the requirements for admission to OSU, the graduate may be admitted to the prepharmacy program in the College of Pharmacy as a freshman. Four years of high school mathematics, English, history/social studies, and sciences, including chemistry, physics, and biology, and at least two years of a foreign language, as well as speech communication, are recommended.

Students from community colleges, other colleges and universities, or other colleges at OSU may transfer into the prepharmacy program at any time.

## THE PROFESSIONAL PHARMACY PROGRAM

Enrollment in the four-year professional program is limited. A student who has completed the prepharmacy requirements must apply directly to the College of Pharmacy for admission to the professional pharmacy program (contact OSU College of Pharmacy for application forms and other information). Students are admitted to the professional program for fall quarter only. Students who have completed the prepharmacy program at other institutions must also apply for admission to OSU (contact OSU Office of Admissions and Orientation).

Once admitted to the professional program, each student is assigned a faculty adviser. Students may register for only those courses for which they have completed the stated prerequisite courses. Exceptions are allowed only after approval by the college's Academic Requirements 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 Sciences University in Portland, Oregon. The fourth year will be off-campus at various pharmacy practice sites throughout the state of Oregon. Contact the college directly for additional information about the Pharm.D. curriculum.

The four-year professional pharmacy program provides a broad, scientifically-based education. Through appropriate selection of professional elective courses, a student may concentrate in such areas as community, clinical, geriatric, administrative, industrial pharmacy, or prepare for graduate study.

Pharmacy students are expected to develop a scholarly attitude toward the experimental basis of pharmacy. During the professional curriculum, students are required to complete advanced human anatomy and physiology laboratories. These laboratories include the use of human cadavers and live animals and are designed to complement other didactic courses in the curriculum. In all instances, the animals are humanely treated and anesthetized if the procedures are deemed painful; animals are humanely euthanized at the termination of the laboratory exercises.

The profession of pharmacy is experiencing profound changes in its practice and in its education for that practice. These changes include an increased orientation toward patient care in addition to the traditional study of pharmaceutical products. In recognition of these changes, the College of Pharmacy is developing broad changes in the curriculum for pharmacy students. There may be new courses and rearrangement of old courses. In the last professional year, students are assigned to off-campus practice sites where students are supervised by licensed pharmacists who are courtesy faculty members of the college. Practice sites are located primarily throughout Oregon, although some sites are outside of Oregon. Completion of practicum courses at these off-campus practice sites 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. Students must possess a valid Oregon pharmacy intern license to be eligible for placement in off-campus practicum courses.

To become licensed by the State of Oregon to practice pharmacy, an individual must meet at least three criteria: 1) Possess a baccalaureate or Pharm.D. degree in pharmacy from an accredited U.S. college of

pharmacy, 2) pass the Oregon Board of Pharmacy examination, and 3) complete the Oregon Board of Pharmacy internship requirements.

A criminal record or a criminal record involving illegal drugs *may* make graduation from the pharmacy program at Oregon State University and/or licensure by the Oregon Board of Pharmacy impossible.

## DOCTOR OF PHARMACY (PHARM.D.) TWO-YEAR PROGRAM

Oregon State University College of Pharmacy and the Oregon Health Sciences University School of Medicine jointly offer a two-year post-baccalaureate Doctor of Pharmacy (Pharm. D.) program. This program is open only to registered pharmacists. The curriculum for this post-baccalaureate professional program is divided into two components: nine months of didatic course work and 12 months of clinical clerkships will provide eight months of training in generalist areas followed by four months of tailored training in areas designed to meet specific career goals. During the clerkship experience, students will contribute to optimal patient care by applying the knowledge and skills learned in the didactic portion of the program.

## ACADEMIC REQUIREMENTS—B.S. PROGRAM

Pharmacy students must meet the current academic requirements of the University. In addition, the faculty of the college has adopted the requirements listed below to assure that all pharmacy students graduating from the OSU College of Pharmacy have the best possible educational background and preparation for future pharmacy practice careers.

- To be eligible for graduation and to enroll in off-campus, practicum courses (Externship and Clerkships), students:

a) Must complete all required core courses (pharmacy designators) with a grade point average of 2.00 or higher; b) May have no more than a total of two grades less than C- in required, core pharmacy courses and anatomy and physiology; c) May have no more than one grade less than C- in the following sequence of courses:

PHAR 317, 318, 319, and 420
PHAR 352, 353, and 354
PHAR 345, 351, and 449
PHAR 390, 491, 492, and 493
PHAR 423, 424, and 425
PHAR 450, 451, and 452
PHAR 453, 454, 455, and 456
PHAR 410 (externship) and clerkships
Z 430, 431, 432, 441, 442, and 443

- A course in which a grade of less than C- was earned may be repeated only once. A pharmacy course in which a grade greater than D+ was earned may not be repeated for the purpose of raising the pharmacy grade point average.
- Incompletes (I grades) in required core pharmacy courses which serve as prerequisites for other core courses must be removed within three weeks after the term begins.
- A student on Academic Probation or Deferred Suspension may not serve on any College of Pharmacy committee or as an officer of any college sponsored organization.
- Only students admitted to the professional pharmacy program may enroll in professional pharmacy courses for the purpose of accumulating credits toward a degree in pharmacy.
- It is the student's responsibility to avoid enrollment in, or to dis-enroll from, any course for which he or she lacks a required prerequisite and to be aware of his or her academic standing in the college.

## ACADEMIC STANDING

At the conclusion of each quarter, grade point averages are calculated and academic standing in the college is determined according to the criteria outlined below.

### Academic Warning

Students with a term or cumulative core pharmacy course GPA between 2.00 and 2.30 and/or receiving a grade less than C- in a term will be placed on Academic Warning.

### Academic Probation

Students with a term GPA less than 2.00 but with a cumulative core pharmacy GPA greater than 2.00 will be placed on Academic Probation. Students on Academic Probation *for a total of two terms while enrolled in the college are eligible for Suspension.*

Students who have a subsequent term GPA above a 2.00 (pharmacy course) will be removed from Academic Probation.

### Deferred Suspension

Students with a cumulative core pharmacy GPA of less than 2.00 will be placed on Deferred Suspension. *Students on Deferred Suspension are eligible for Suspension.* Their status in the college will be reviewed by the college's Academic Requirements Committee until they are removed from Deferred Suspension. Students on Deferred Suspension must meet with the Assistant Dean for Student Affairs to develop a program of study to improve their academic standing. These students may not be allowed to take any pharmacy courses.

Students who attain a cumulative core pharmacy GPA greater than 2.00 will be removed from Deferred Suspension.

### Suspension

Students who are on Deferred Suspension and have a subsequent term GPA of less than 2.00 will be Suspended from the college. Failure to make reasonable progress in the pharmacy curriculum may also result in Suspension. All student suspensions will be reviewed by the college's Academic Requirements Committee.

The Assistant Dean for Student Affairs and the college's Academic Requirements Committee are responsible for enforcement of the college's Academic Requirements. The committee and Assistant Dean have authority to develop guidelines for administration of these requirements.

The faculty reaffirms the policy that any student may petition the college's Academic Requirement Committee for deviation from these Academic Requirements.

## WITHDRAWAL

A student who leaves the college via withdrawal must contact the Assistant Dean for Student Affairs at least two weeks prior to the term for which the student wishes to re-enroll. Transcripts of all class work attempted after withdrawal must be provided.

## 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 13 cooperating states to obtain professional training not available in their home states.

Further information regarding the WICHE program may be obtained by writing to the state certifying officer or to the WICHE Professional Student Exchange Program, P.O. Drawer P, Boulder, Colorado 80302.

## PROGRAM ON GERONTOLOGY

Administered through the College of Home Economics and Education, the Program on Gerontology involves students and faculty from seven colleges and eleven departments throughout the University, including the College of Pharmacy. Through course work in these departments, the program offers a multidisciplinary perspective on aging and prepares students for careers in programs on aging, or for work with the elderly as a specialty within another professional area.

Students may earn a certificate in gerontology, graduate students an integrated minor. For further information, contact the director in the College of Home Economics and Education.

## LICENSURE

State law requires that a pharmacist be licensed to practice pharmacy in the State of Oregon. To become licensed in Oregon, a person must be at least 18 years of age; of good moral character; a graduate of an accredited school or college of pharmacy recognized by the Oregon Board of Pharmacy; complete internship requirements; and pass a national licensing examination administered by the Oregon Board of Pharmacy.

Internship requirements include approximately one year of pharmacist-supervised pharmacy practice experience. Specific

information regarding internship rules and regulations should be obtained from the Oregon Board of Pharmacy.

## BACCALAUREATE DEGREE PROGRAMS

The Bachelor of Science (B.S.) degree is awarded after completion of the five-year undergraduate program in pharmacy. A degree candidate must satisfy University requirements and have completed a total of 240 quarter credits. A grade point average of 2.00 (C) or higher in all professional pharmacy course work is required for graduation. No students will be admitted to this program after September 1998.

Academic performance is not the sole criterion for admission to and/or continuation in certain courses in the College of Pharmacy, such as externships and clerkships. In addition, the college may find it necessary to evaluate a person's background to determine his or her likelihood of maintaining standards of professional conduct and performance that are necessary in the pharmacy profession. An evaluation may take into consideration current performance as well as past experience and actions. A valid Oregon Intern license is required for enrollment in the externship and clerkships.

## PHARMACY MINOR

Students enrolled in other colleges at Oregon State University may earn a pharmacy minor by completing approximately 27-30 credit hours of pharmacy course work. The pharmacy minor is intended for students with a minimal science background. Contact the assistant Dean for Student Affairs for more specific information.

## GRADUATE STUDY

The College of Pharmacy offers Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees in pharmacy, with dissertation fields in biopharmaceutics, medicinal chemistry, natural products chemistry, pharmaceutics, pharmacokinetics, pharmacology, pharmacy socio-economics, and toxicology. The college participates in the M.A.I.S. program (see Graduate Catalog for more information). All advanced degrees are granted through the Graduate School. The College of Pharmacy can provide additional information about graduate study in pharmacy.

Candidates for admission to graduate study must hold a bachelor's degree. Acceptance is determined by the Graduate Studies and Research Committee of the College of Pharmacy. Advanced degree programs can be designed with faculty advice to meet the interests and objectives of the individual candidate.

## PROFESSIONAL ASSOCIATIONS

Students are encouraged to join various professional organizations. At OSU they may choose the following:

*Academy of Students of Pharmacy*—Open to all students in pharmacy; includes affiliation with the American Pharmaceutical Association and the Oregon State Pharmacists Association.

*Oregon Society of Health-System Pharmacists*—Open to all students in pharmacy; includes membership in the American Society of Health-System Pharmacists and the Oregon Society of Health-System Pharmacists.

*Rho Chi*—Membership in Beta chapter of Rho Chi, national pharmaceutical honor society, is based on high scholastic achievement.

*Lambda Kappa Sigma*—Membership in Rho chapter of this international pharmacy sorority is limited to qualified individuals who meet the scholastic requirements.

*Phi Delta Chi*—Membership in the Beta Iota chapter of this 100-year old national pharmacy fraternity is limited to qualified individuals who meet the scholastic requirements.

## SCHOLARSHIPS AND LOANS

Information about scholarships and loans is available from the College of Pharmacy Awards Committee and/or the University Financial Aid office.

## STUDY RESOURCE FEE

A Study Resource Fee, in addition to tuition, is charged to professional pharmacy students.

## CURRICULUM

Because pharmacy is a rapidly changing discipline, it is likely that curricular modifications will occur from time to time. Thus, the College of Pharmacy reserves the right to alter its curriculum in accordance with professional and institutional standards during the tenure of any given student.

### PREPHARMACY CURRICULUM FOR PHARM.D. PROGRAM

May be taken at any accredited college or university.

**First Year**

CH 221, CH 222, CH 223. General Chemistry or equivalent one-year sequence in freshman chemistry with laboratory for chemistry or science majors. Survey courses are unacceptable (15)
Writing I or equivalent (3)

**Second Year**

CH 334, CH 335, CH 336. Organic Chemistry or equivalent one-year sequence in basic organic chemistry for chemistry majors; must include one term of lab (CH 337). Survey course which includes biochemistry is unacceptable (11)
BI 211, BI 212, BI 213. Biological Science or equivalent one-year biology sequence for Life Science majors and pre-professional students (12)
MB 302, MB 303. Microbiology (Bacteriology) or equivalent microbiology/bacteriology lecture/lab course (5)

**Third Year**

BI 214. Cell and Molecular Biology (3)
PH 201, PH 202, PH 203. General College Physics with Lab (15)
Z 430. Principles of Physiology (4)
Z 431, Z 432. Vertebrate Physiology with emphasis on Mammals (3)

**First and/or Second Year**

*(distribution at student's discretion)*
MTH 241 or MTH 251. Calculus or equivalent, introductory calculus course (4)
Writing II (3)
Writing III or Speech (3)
EC 201. Principles of Economics (4)
PSY 201. Psychology (3)
Social science (6)
Electives: selected according to the student's interests. Students are encouraged to consider courses to meet the remaining university mandated baccalaureate core requirements
(It is advisable to have earned at least 120 credits to avoid needing to register for more than 18 credits per term during the professional curriculum.)

### PROFESSIONAL CURRICULUM-B.S.

**Junior Year**

Z 441, Z 442, Z 443. Anatomy (6)
Z 430, Z 431, Z 432. Physiology (12)
PHAR 352, PHAR 353, PHAR 354. Principles of Pharmacy Practice I,II,III (6)
PHAR 450, PHAR 451, PHAR 452. Biopharmaceutical Pharm (11)
PHAR 317. Pharmaceutical Tech A (3)
PHAR 318. Pharmaceutics Tech B (3)
PHAR 319. Pharmacokinetics (3)
PHAR 345. Pharmacy Socioeconomics (3)
PHAR 351. Pharmacy Law (3)
PHAR 390. Pathophysiology (3)
Total (53)

**Senior I Year**

PHAR 453. Drug Information (3)
PHAR 491, PHAR 492, PHAR 493. Pharmacology (15)
PHAR 420. Applied Pharmacokinetics (3)
PHAR 423, PHAR 424, PHAR 425. Med Chem (13)
PHAR 454, PHAR 455, PHAR 456. Therapeutics (15)
PHAR 449. Management (3)
Upper division baccalaureate core requirement (3)
Total (55)

**Senior II Year**

PHAR 410. Externship (18)
Clerkships (12)
Electives (13)
Upper division baccalaureate core requirement (3)
Total (46)

**Total 240 in five years**

## COURSES

### Lower Division Courses

**PHAR 201. PHARMACY ORIENTATION (2).** Career opportunities in pharmacy including community and institutional practice, government, and industry. Discussion of available educational pathways. Open to nonpharmacy students.

**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 nonpharmacy students.

**PHAR 215. CONSUMER DRUGS AND RELATED HEALTH ISSUES (2).** Provides the student with basic knowledge of the proper use of medications and other health products. Discussion of current health topics of interest and their treatment. For nonpharmacy majors.

### Upper Division Courses

**PHAR 318. PHARMACEUTICAL TECHNOLOGY II (3).** Physical pharmacy with emphasis on formulation requirements for drug dosage forms. PREREQ: PHAR 317.

**PHAR 319. PHARMACOKINETICS (3).** Pharmacokinetics and bioavailability of drugs in clinical care, including changing disease states. COREQ: PHAR 390. PREREQ: PHAR 318.

**PHAR 320. HEALTH CENTER PHARMACY EXPERIENCE (2).** A general introduction to the specialized practice of pharmacy at the Student Health Service. PREREQ: PHAR 319.

**PHAR 321. COSMETICS (3).** Application of physiology of the skin, hair and body to the development, production, and use of cosmetics. PREREQ: Pharmacy majors - PHAR 319; non-pharmacy majors - one year organic chemistry and one year biology.

**PHAR 324. THE U.S. PHARMACEUTICAL INDUSTRY (2).** Presents information on the pharmaceutical industry and its role in the U.S. health care system. PREREQ: PHAR 345. (Bacc Core Course)

**PHAR 325. THE HISTORY AND ETHICS OF PHARMACY (2).** The historical development of pharmacy and the ethical codes and behaviors which have governed pharmacy practice. Open to non-pharmacy majors. PREREQ: PHAR 351 for pharmacy majors.

**PHAR 330. PHARMACEUTICAL NATURAL PRODUCTS (2).** Medicinal agents derived from terrestrial and marine plants and animals, their identification, use, and abuse potential. PREREQ: Organic chemistry, biology.

**PHAR 351. PHARMACY LAW (3).** Federal, state, and local laws regulating pharmacy practice. PREREQ: WR 121.

**PHAR 390. PATHOPHYSIOLOGY (3).** The signs, symptoms, and altered physiologic function caused by common human diseases. COREQ: Z 432, Z 443.

**PHAR 401/PHAR 501. RESEARCH (1-16).** Department consent required.

**PHAR 403/PHAR 503. THESIS (1-16).** Department consent required.

**PHAR 405/PHAR 505. READING AND CONFERENCE (1-16).** Department consent required.

**PHAR 407/PHAR 507. SEMINAR (1-16).** One-credit section untitled graded P/N.

**PHAR 410. EXTERNSHIP (2-8).** Section 1: Clinical Skills Externship (2). Didactic and supervised clinical education in patient care emphasizing application of pharmaceutical and biomedical sciences to the collection of patient data, planning, and monitoring of drug therapy, monitoring inpatient outcomes, provision of drug information and patient education. PREREQ: PHAR 420, PHAR 425, PHAR 450, PHAR 493. Section 2: Ambulataory Care Externship (8). Supervised education in ambulatory care practice environments emphasizing the application of pharmaceutical care skills. PREREQ: Section 1. Section 3: Institutional Externship (8). Supervised experiential education in institutional pharmacy environments emphasizing the application of pharmaceutical care skills. PREREQ: Section 1. Graded P/N. Department approval required.

**PHAR 411. DRUG INFORMATION CLERKSHIP (8).** Supervised experiential education emphasizing the process of providing drug information services to health professionals. PREREQ: PHAR 410, Section 1, Clinical Skills Externship. Department approval required.

**PHAR 412. POISON CONTROL CLERKSHIP (8).** Application of pharmacology, toxicology, and communication principles to management and prevention of poisoning incidents. Taught in a four-week block. PREREQ: PHAR 493. Department approval required.

**PHAR 413. INVESTIGATIONAL DRUG SERVICES CLERKSHIP (8).** Supervised education in the application of basic knowledge and skills in pharmacy and communication to the drug development process through participation in investigational drug studies. PREREQ: PHAR 410, Section 1, Clinical Skills Externship; PHAR 410, Section 3, Institutional Externship. Departmental approval required.

**PHAR 414. PHARMACY ADMINISTRATION CLERKSHIP (8).** Supervised professional training emphasizing application of basic knowledge regarding administrative issues involved in drug distribution and provision of pharmaceutical care. May be repeated for credit. PREREQ: PHAR 410, Section 1, Clinical Skills Externship. Department approval required.

**PHAR 415. ADVANCED PHARMACY ADMINISTRATION CLERKSHIP (1-16). (1-16).** Supervised professional training in the administration of a multi-faceted pharmacy practice. Emphasizes the integration of basic knowledge regarding the provision of drugs and their distribution within management of physical, economic, and human resources, while maintaining quality patient care. PREREQ: PHAR 410, Section 1, Clinical Skills Externship; PHAR 410, Section 2, Ambulatory Care Externship; PHAR 410, Section 3, Institutional Externship. Department approval required.

**PHAR 416. PHARMACEUTICAL PRODUCTS CLERKSHIP (8).** Application of knowledge in chemistry and pharmaceutics to the preparation of sterile or specialized compounded products and proper methods of preparation. May be repeated for credit. PREREQ: PHAR 410, Section 1, Clinical Skills Externship and PHAR 410, Section 2, Ambulatory Care Externship or PHAR 410, Section 3, Institutional Externship. Department approval required.

**PHAR 417. INSTITUTIONAL CLINICAL CLERKSHIP (8).** Supervised continuing clinical experience in inpatient pharmacy practice with emphasis on providing pharmaceutical care. Practice in data gathering, problem solving therapy monitoring, and patient education with emphasis on developing in-depth understanding of a specific area of practice. May be repeated for credit. PREREQ: PHAR 410, Section 1, Clinical Skills Externship; PHAR 410, Section 3, Institutional Externship. Departmental approval required.

**PHAR 418. AMBULATORY CARE CLINICAL CLERKSHIP (8).** Supervised continuing clinical experience in ambulatory pharmacy practice with an emphasis on providing pharmaceutical care. Practice in data gathering, problem solving, therapy monitoring, and patient education with emphasis on developing in-depth understanding of a specific area of practice. May be repeated for credit. PREREQ: PHAR 410, Section 1, Clinical Skills Externship; PHAR 410, Section 2, Ambulatory Care Externship. Department approval required.

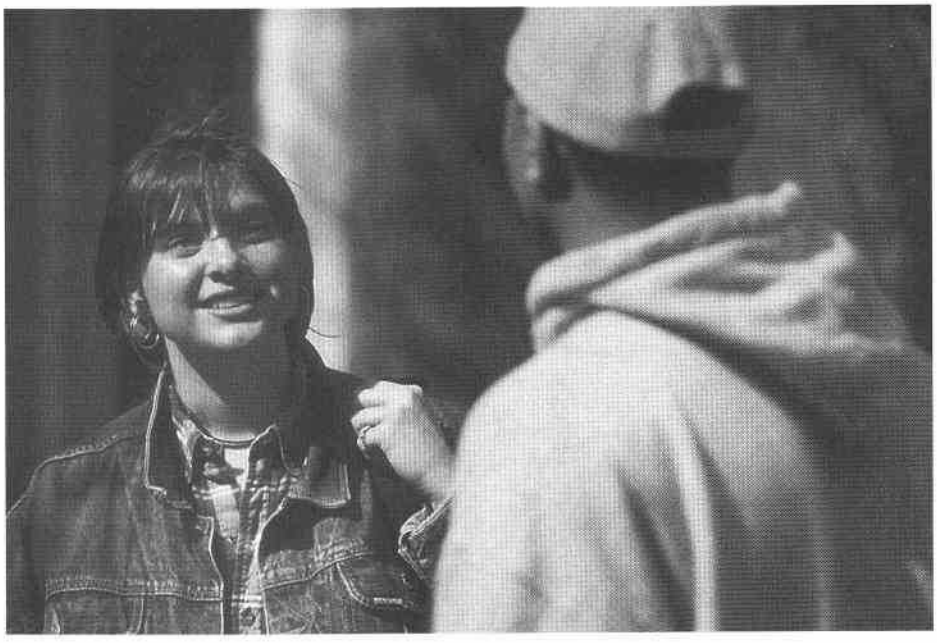
**PHAR 419. ADVANCED THERAPEUTICS CLERKSHIP (1-16).** Supervised advanced clinical education in appropriate practice environments, emphasizing the application of medical and pharmaceutical sciences in providing pharmaceutical care, evaluation of drug therapy, provision of drug information, administration of clinical services, and introduction to clinical research. PREREQ: PHAR 410, Section 1, Clinical Skills Externship; PHAR 410, Section 2, Ambulatory Care Externship or PHAR 410, Section 3, Institutional Externship and PHAR 417 or PHAR 418. Department approval required.

**PHAR 420. APPLIED PHARMACOKINETICS (3).** Application of biopharmaceutic and pharmacokinetic theory as seen in patient care environments. PREREQ: PHAR 319 COREQ: PHAR 425, PHAR 456, PHAR 493.

**PHAR 423. MEDICINAL CHEMISTRY I (5).** An introduction to the molecular basis of drug action, including the relationship between the chemical and physical properties of drugs and their action at cellular targets. The organic chemistry of biologically active molecules emphasizing drug discovery, design, and development, and drug metabolism. PREREQ: PHAR 452; COREQ: PHAR 454, PHAR 491.

**PHAR 424. MEDICINAL CHEMISTRY II (4).** Covers various classes of drugs used in pharmacy practice. Focus is on the molecular basis of drug action and the chemical and physical properties influencing the structure-activity relationships with a class of therapeutic agents. PREREQ: PHAR 423, PHAR 452, PHAR 454, PHAR 491; COREQ: PHAR 455, PHAR 492.

**PHAR 425. CHEMOTHERAPY OF INFECTIOUS DISEASES (5).** Chemical properties of antivirals, antifungals, parasiticides, and antibacterials. Pathophysiology and therapy of infectious disease. PREREQ: PHAR 424, PHAR 455, PHAR 492; COREQ: PHAR 456, PHAR 493.



**PHAR 432. ^WRITING IN THE PHARMACEUTICAL SCIENCES (2).** A writing intensive course emphasizing writing used in pharmacy. PREREQ: Admission to the professional program in pharmacy. Departmental approval required. (Writing Intensive Course)

**PHAR 443/PHAR 543. SELECTED TOPICS IN MEDICINAL CHEMISTRY (3).**

**PHAR 449. PHARMACY MANAGEMENT (3).** Management principles and factors affecting short- and long-term operation of institutional and community pharmacies. PREREQ: PHAR 345.

**PHAR 453. DRUG INFORMATION (0-3).** Students will learn to identify appropriate information resources and will systematically collect, arrange, and analyze information. PREREQ: PHAR 354; COREQ: PHAR 423, PHAR 454, PHAR 491.

**PHAR 454. THERAPEUTICS I (5).** Pathophysiology and drug therapy of common diseases. PREREQ: PHAR 319, PHAR 354, PHAR 390, PHAR 452; Z 432, Z 443. COREQ: PHAR 423, PHAR 453, PHAR 491.

**PHAR 455. THERAPEUTICS II (5).** Pathophysiology and drug therapy of common diseases. PREREQ: PHAR 454; COREQ: PHAR 424, PHAR 492.

**PHAR 456. THERAPEUTICS III (5).** Pathophysiology and drug therapy of common diseases. PREREQ: PHAR 455; COREQ: PHAR 425, PHAR 493.

**PHAR 457/PHAR 557. HEALTH CARE SYSTEMS (3).** The planning for pharmacy services coupled with an advanced analysis of the organization, delivery and financing of health care. PREREQ: PHAR 345.

**PHAR 458. INTRAVENOUS ADDITIVE SYSTEMS (2).** Design, development, and maintenance of intravenous additive programs. PREREQ: PHAR 319. COREQ: PHAR 450.

**PHAR 460. HOSPITAL PHARMACY (3).** Introduction to the practice of pharmacy in a hospital setting. PREREQ: PHAR 317.

**PHAR 471/PHAR 571. EXPERIMENTAL APPROACH TO BIOPHARMACEUTICS AND PHARMACOKINETICS (3).** Experimental protocol, rationale, and procedures in clinical pharmacokinetic, pharmacokinetic, and biopharmaceutical experiments. PREREQ: PHAR 470.

**PHAR 472/PHAR 572. APPLIED BIOPHARMACEUTICS AND PHARMACOKINETICS (3).** Application of biopharmaceutic and pharmacokinetic theory as seen in patient care environments. PREREQ: PHAR 470.

**PHAR 473/PHAR 573. CURRENT TOPICS IN PHARMACEUTICAL SCIENCES (1-3).** Critical evaluation of contemporary pharmaceutics and pharmacokinetics research articles. Graded P/N.

**PHAR 477. PHARMACOGNOSTICAL TECHNIQUES (3).** Laboratory course on current methodology employed in natural products chemistry. PREREQ: PHAR 323. Departmental consent required.

**PHAR 485. DRUG DESIGN (3).** Chemical and biochemical concepts and their application in the rational design of drugs and other biologically active molecules. PREREQ: PHAR 325 and senior standing in pharmacy, or senior standing in chemistry or a biological science.

**PHAR 491/PHAR 591. PHARMACOLOGY I (5).** Principles of pharmacology; molecular, cellular, and physiologic mechanisms of drug action; pharmacologic rationale for therapeutic and toxicologic treatment outcomes. PREREQ: Z 432, Z 443; PHAR 452. COREQ: PHAR 423, PHAR 454; or graduate standing.

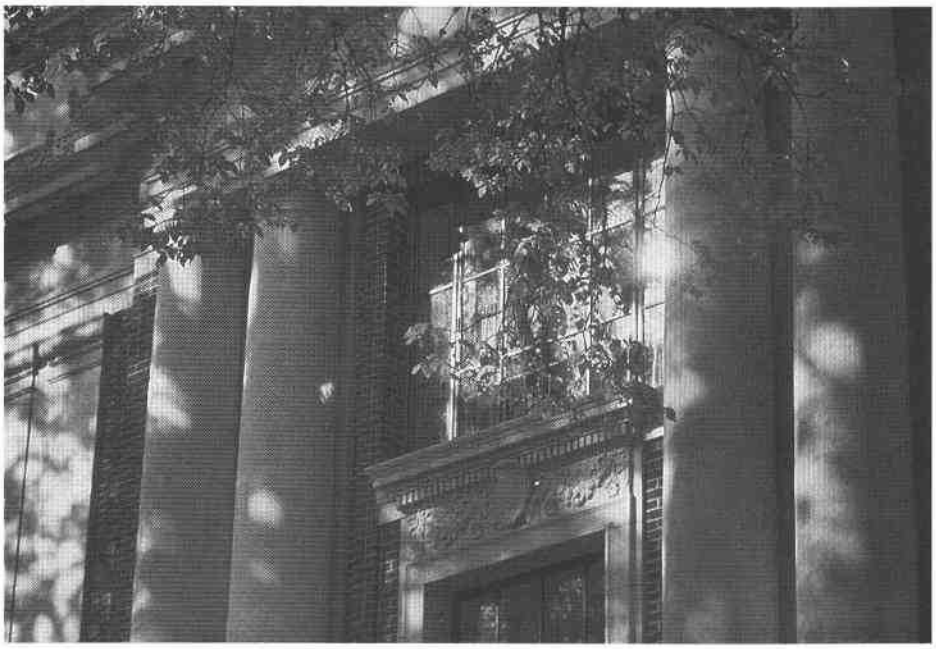
**PHAR 492/PHAR 592. PHARMACOLOGY II (5).** Principles of pharmacology; molecular, cellular, and physiologic mechanisms of drug action; pharmacologic rationale for therapeutic and toxicologic treatment outcomes. PREREQ: PHAR 491 or PHAR 591; COREQ: PHAR 424, PHAR 455; or graduate standing.

**PHAR 493/PHAR 593. PHARMACOLOGY III (5).** Principles of pharmacology; molecular, cellular, and physiologic mechanisms of drug action; pharmacologic rationale for therapeutic and toxicologic treatment outcomes. PREREQ: PHAR 492 or PHAR 592; COREQ: PHAR 425, PHAR 456; or graduate standing.

**PHAR 494. PHARMACOLOGY LABORATORY (1-3).** May be repeated for credit. PREREQ: PHAR 491. Department approval required.

**PHAR 495/PHAR 595. TARGET ORGAN TOXICOLOGY (4).** Principles of toxicology; tissue and organ responses to toxicant effect; acute and chronic toxicities of agents found in the home, industry, and the environment. PREREQ: PHAR 491 or equivalent.

**PHAR 496. PHARMACY RESEARCH CLERKSHIP (8).** Application of basic knowledge in pharmaceutical sciences to design, conduct, and analysis of laboratory investigations in biomedical research. May be repeated for credit. PREREQ: PHAR 410, Section 1, Clinical Skills Externship. Departmental approval required.



### Graduate Courses

**PHAR 510. NUCLEAR PHARMACY INTERNSHIP (12).** Supervised education conducted in a nuclear pharmacy and a nuclear medicine department. Ten 40-hour weeks. PREREQ: PHAR 442; CH 419; and consent. Department consent required.

**PHAR 524. MEDICINAL CHEMISTRY (3).** Theoretical bases of biological responses to applied agents; correlation of molecular structure with biological activity; natural and synthetic sources of medicinal agents. PREREQ: One year of organic chemistry and consent of instructor.

**PHAR 525. MEDICINAL CHEMISTRY (3).** Theoretical bases of biological responses to applied agents; correlation of molecular structure with biological activity; natural and synthetic sources of medicinal agents. PREREQ: One year of organic chemistry and consent of instructor.

**PHAR 536. PRODUCT DEVELOPMENT (3).** Current and novel dosage forms; product stability; therapeutic design. PREREQ: PHAR 319, PHAR 470.

**PHAR 540. NATURAL PRODUCTS I: MARINE (3).** Description of the natural products and their biological properties from the major phyla of marine life forms. PREREQ: Graduate or senior standing with CH 332, BB 452, or PHAR 451.

**PHAR 564. BIOCHEMICAL PHARMACOLOGY (3).** Advanced concepts and recent developments in biochemical pharmacology. Topics include receptor theory, receptor regulation, signal transduction, second messenger systems, and neurotransmitter pathways and functions. PREREQ: Consent of instructor. Offered alternate years.

**PHAR 577. PHARMACOGNOSTICAL TECHNIQUES (3).** Laboratory course on current methodology employed in natural products chemistry. PREREQ: PHAR 323.

**PHAR 580. PHARMACODYNAMIC AND PHARMACOKINETIC MODELING (3).** Evaluation of strengths and weaknesses of mathematical models relative to pharmacodynamic and pharmacokinetic data. PREREQ: PHAR 470.

**PHAR 585. DRUG DESIGN (3).** Chemical and biochemical concepts and their application in the rational design of drugs and other biologically active molecules. PREREQ: PHAR 425 and senior standing in pharmacy, or senior standing in chemistry or a biological science.

**PHAR 601. RESEARCH (1-16).**

**PHAR 603. THESIS (1-16).**

**PHAR 605. READING AND CONFERENCE (1-16).**

**PHAR 606. PROJECTS (1-16).**

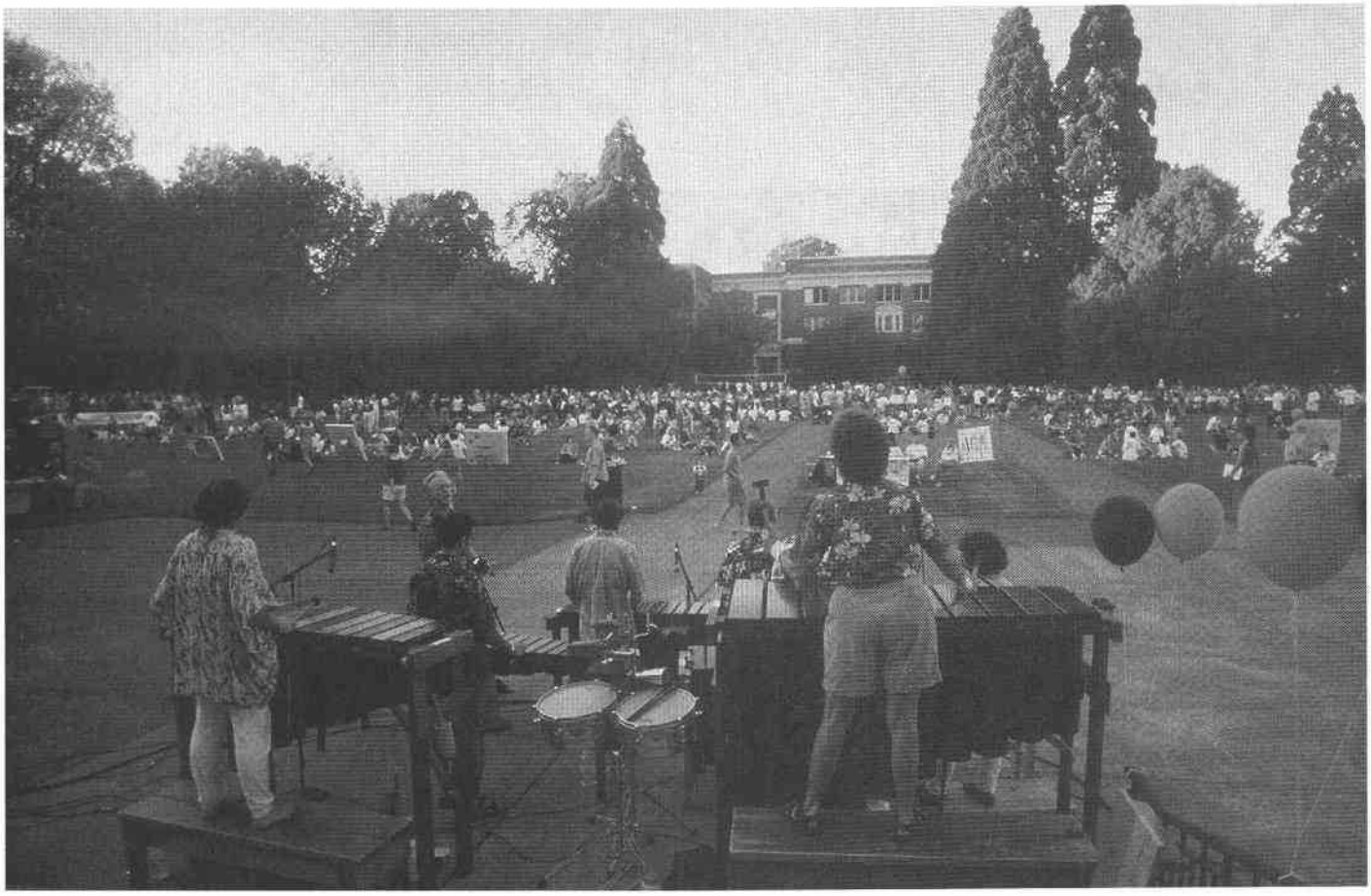
### Upper Division Courses

**PHAR 707. CLINICAL PHARMACY SEMINAR (1).** PREREQ: Admission to the Pharm.D. program. Graded P/N.

**PHAR 711,PHAR 712,PHAR 713. PROFESSIONAL ISSUES (1,1,1).** Career opportunities in clinical pharmacy practice, contemporary issues facing pharmacy and the health care system, and formats for pharmacy practice oral presentation. PREREQ: First-year standing in the Pharm.D. program.

**PHAR 721. PRINCIPLES OF CLINICAL PHARMACY I (3).** Basic physical assessment, history taking, evaluation of clinical laboratory values and selected diagnostic procedures; basics of clinical data collection; principles of triage. PREREQ: Admission to the Pharm.D. program; PHAR 454-456 or equivalent.

**PHAR 722. PRINCIPLES OF CLINICAL PHARMACY II/ PATIENT ASSESSMENT (3).** Basic physical assessment, history taking, evaluation of clinical laboratory values and selected diagnostic procedures, basics of clinical data collection, principles of triage. PREREQ: PHAR 721.



**PHAR 723,PHAR 724,PHAR 725. PRINCIPLES OF CLINICAL PHARMACY III: DRUG THERAPY MANAGEMENT (2,2,2).** Development and application of skills in therapeutic plan development, drug regimen review, patient monitoring, and documentation of clinical activities. PREREQ: PHAR 722.

**PHAR 730,PHAR 731,PHAR 732. ANATOMY AND PATHOLOGY (4,4,4).** The gross and microscopic anatomy of the human body is reviewed by major system. The gross and microscopic pathology of the human body is studied with an emphasis pathology of common diseases and drug-induced disease. PREREQ: Admission to the Pharm.D. program.

**PHAR 734,PHAR 735,PHAR 736. PATHOPHYSIOLOGY AND THERAPEUTICS I (10,10,10).** The pathophysiologic basis of disease and drug therapy management. PREREQ: First-year standing in the Pharm.D. program.

**PHAR 737. CLINICAL PHARMACOKINETICS (4).** Application of pharmacokinetics concepts to optimize drug therapy in actual patients. PREREQ: Admission to the Pharm.D. program.

**PHAR 739. 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. PREREQ: First-year standing in the Pharm.D program.

**PHAR 740,PHAR 741,PHAR 742. PHARMACOECONOMICS (3,3,3).** The influence of health care socioeconomics in the provision of traditional and non-traditional pharmacy services. Emphasis will be placed on economic evaluation methods and study design. PREREQ: Admission to the Pharm.D. program.

**PHAR 743,PHAR 744,PHAR 745. DRUG POLICY-OUTCOMES III (1,1,1).** (See PHAR 741 for description)

**PHAR 750. TRANSITIONAL CLERKSHIP (2).**

**PHAR 751. LONGITUDINAL AMBULATORY CARE (1).** Supervised advanced professional education in an ambulatory setting. Emphasis will be on providing advanced clinical pharmacy services to a select group of patients and health care providers over a period of one year. PREREQ: Second-year standing in the Pharm.D. program. May be repeated for credit. Graded P/N.

**PHAR 760. ADULT GENERAL INTERNAL MEDICINE CLERKSHIP (8).** Supervised advanced professional education in appropriate internal medicine practice environments emphasizing the application of biomedical and pharmaceutical sciences to patient care. PREREQ: Second-year standing in the Pharm.D. program. May be repeated for credit. Graded P/N.

**PHAR 770. INTERNAL MEDICINE SPECIALTY ROTATIONS CLERKSHIP (8).** Supervised clincal pharmacy experience in various patient care settings within internal medicine. Specialties include geriatrics, pediatrics, infectious diseases, and drug information. PREREQ: Second-year standing in the Pharm.D. program. May be repeated for credit. Graded P/N.

**PHAR 775. DRUG INFORMATION CLERKSHIP (8).** Students will learn to identify appropriate information resources and will systematically collect, arrange, and analyze pertinent information related to a particular patient or drug problem. Written and oral communication skills will be emphasized. PREREQ: Second-year standing in the Pharm.D. program.

**PHAR 780. AMBULATORY PRIMARY CARE CLERKSHIP (8).** Supervised advanced professional education in appropriate ambulatory primary care practice environments emphasizing the application of biomedical and pharmaceutical sciences to patient care. Graded P/N. PREREQ: Second-year standing in the Pharm.D. program. May be repeated.

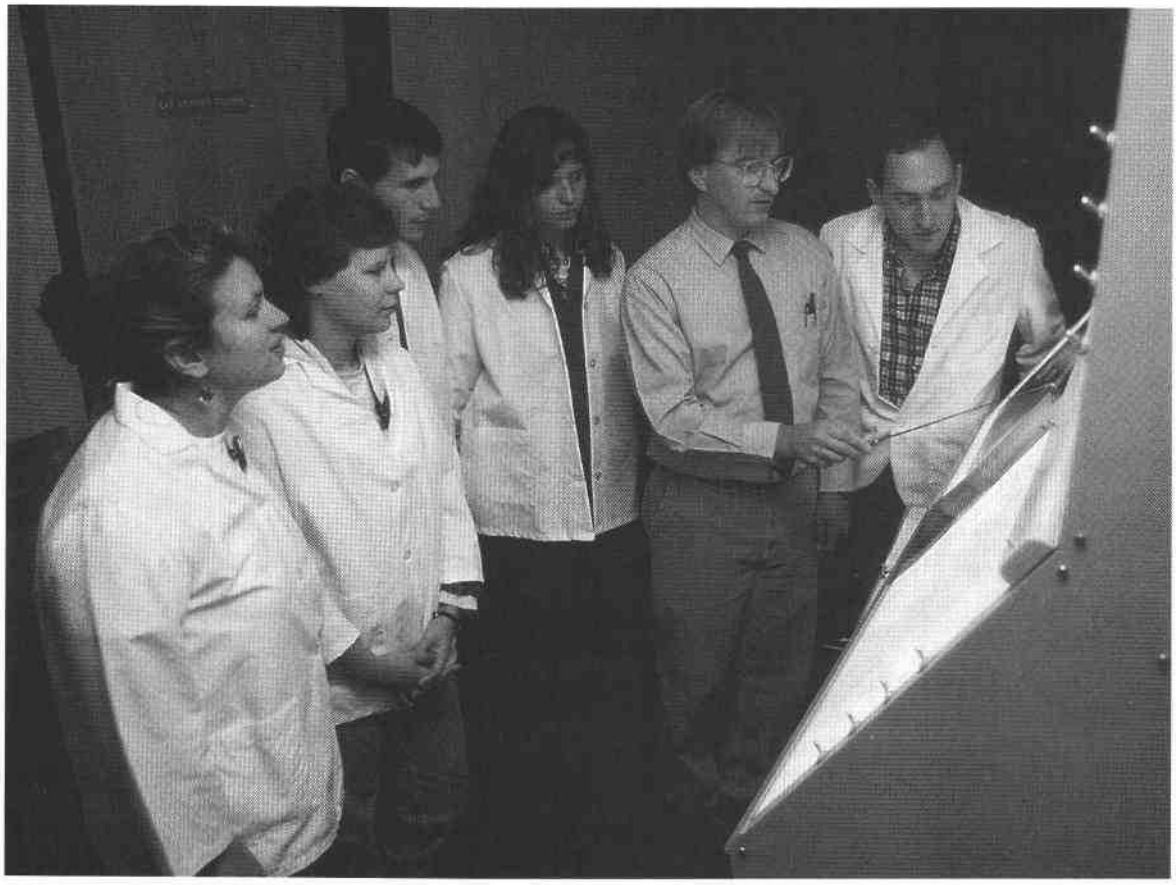
**PHAR 790. ELECTIVE CLERKSHIPS (8).** Supervised clinical pharmacy experience in various patient care and non-patient care settings. Settings include but are not limited to: neonatology, psychiatry, cardiology, oncology, transplant, critical care, nutrition, neurology, nephrology, managed care, surgery, pharmacoeconomics, pharmacy administration, research medical information, and teaching. PREREQ: Second-year standing in the Pharm.D. program. May be repeated for credit. Graded P/N.

## FOOTNOTES

^Writing Intensive Course (WIC)

[1]PHAR 432 (Writing Intensive Course) must be taken during last three years.

* 311 West Superior Street, Suite 512, Chicago, IL 60610, 312/664-3575, 800/533-3606; FAX, 312/664-4652



*The College of Veterinary Medicine at Oregon State University was established in 1975 with three major areas of responsibility—teaching, research, and public service.*

**Graduate Majors**

**Comparative Veterinary Medicine (Ph.D.)**
*Graduate Areas of Concentration*
Laboratory Animal Medicine
Microbiology
Pathology
Toxicology

**Veterinary Medicine (D.V.M.)**
**Veterinary Science (M.S.)**
*Graduate Areas of Concentration*
Clinical Sciences
Laboratory Animal Medicine
Microbiology
Parasitology
Pathology
Toxicology

**Faculty**
*Professors* Blythe, Craig, Engel, Hutton, Koller, Matsumoto, Pearson, Riebold, Scott, A. Smith, Snyder, Ticer, Watrous, Wilson; *Associate Professors* Crisman, Hamir, Hansen, Hedstrom, Heidel, Huber, Kaneps, Mattson, Pasquini, B. Smith, Timm; *Assistant Professors* Adams, Brendemuehl, Cebra, Gerros, Hall, Mattoon, Parker, Tornquist, Van Saun, Whitler; *Instructors* Bates

## TEACHING

The college's professional education program began in 1979. Each year, 28 residents of Oregon and eight non-resident students are selected to enter the OSU College of Veterinary Medicine. The 36 Oregon-sponsored students take their first year of professional study at OSU, then transfer to Washington State University for their second and part of their third year of study. At the end of March in their third year, they transfer back to OSU to finish the third year of instruction and to take their final year of study. Completion of the professional program leads to the Doctor of Veterinary Medicine (D.V.M.) degree.

This unique approach to veterinary education has been accomplished through a formal arrangement with the College of Veterinary Medicine at Washington State University, Pullman, and the University of Idaho, Moscow.

OSU's College of Veterinary Medicine is fully accredited by the Council on Education of the American Veterinary Medical Association.

Comprehensive research training is provided through graduate programs leading to the M.S. degree or the Ph.D. degree in comparative veterinary medicine.

## RESEARCH

Biomedical research and research training are conducted by the college in cooperation with the OSU Agricultural Experiment Station, and the Environmental Health Sciences Center. This research is of economic and public health significance because it aims to develop new information to improve the health of animals and people.

The college emphasizes research on diseases of food and fiber animals and on problems of present and potential concern to Oregon's valuable livestock and poultry industries. The college also shares a regional and national responsibility for providing information to assist in the control of animal diseases. Diseases of terrestrial wildlife, aquatic, and companion animals are also studied because of their importance in food production, recreation, and companionship.

The research program is a multidisciplinary effort, bringing together faculty expertise in pathology, bacteriology, virology, biophysics, biochemistry, immunology, physiology, anatomy, neurosciences, toxicology, clinical veterinary medicine, and other disciplines.

Advice from livestock and poultry producers, practicing veterinarians, producer and commodity groups, the Oregon Department of Agriculture, and others helps establish research priorities.

Faculty research and service activities are described in this catalog under the Extension Service, the Agricultural Experiment Station and the Environmental Health Sciences Center.

## PUBLIC SERVICE

The service programs focus on the prevention, treatment, and control of animal diseases. The college assists veterinary practitioners, animal owners, and the general public through the Veterinary Diagnostic Laboratory, the Veterinary Teaching Hospital, and the Veterinary Extension programs.

The diagnostic laboratory accepts animals and specimens for examination and analysis. It is equipped with diagnostic and analytical facilities for microbiological, chemical, toxicological, and pathological examinations. Clinical pathology services are available for both referring veterinarians and clinicians in the Veterinary Teaching Hospital.

The Veterinary Teaching Hospital is designed and equipped for diagnosis and medical and surgical treatment of 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. Radiology, anesthesiology, pharmacy, intensive care, and other services are available to support the hospital functions.

The diagnostic laboratory and the teaching hospital serve as laboratories where students examine all aspects of disease, including history, clinical signs, diagnosis, treatments, and prognosis.

The Veterinary Extension program carries the results of research to animal owners and Oregon's practicing veterinarians through meetings, conferences, publications, and personal consultations with extension veterinarians and research scientists, teachers, clinicians, and diagnosticians within the school.

200 Magruder Hall
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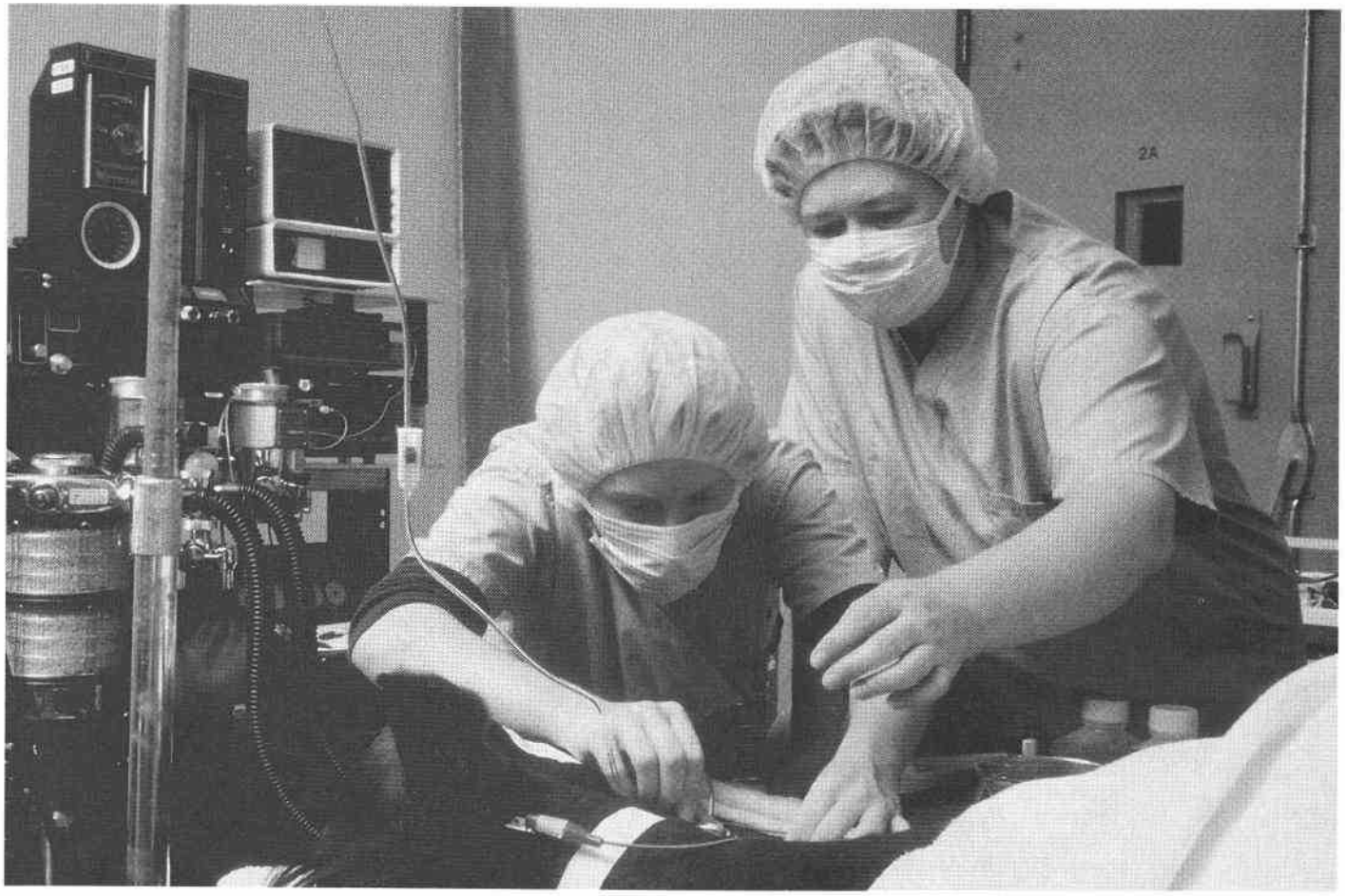
Corvallis, OR
97331-4801
(541) 737-2098

**ADMINISTRATION**

**ROBERT C. WILSON**
*Dean*

**LINDA L. BLYTHE**
*Associate Dean*

Footnotes for this section on page 317.



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 good. Nearly 70 percent of the professionally active veterinarians in the United States are engaged in private practice. Some practices are limited to particular groups 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, governmental, and industrial situations. A relatively new and expanding area is laboratory animal medicine, in which veterinarians are often employed by medical schools, large health-related research organizations, or universities.

## Admission to the Professional Program

Applicants for admission to the College of Veterinary Medicine should have at least 90 acceptable quarter credits from an accredited college or university. The credits must include courses that will meet the requirements for a bachelor's degree at the student's undergraduate institution as well as electives in the student's areas of interest. Included in the 90 credits are courses in written communication, the arts and humanities, and the social sciences. Also included are 50 credits of physical and biological sciences, with courses in chemistry, including organic and biochemistry; mathematics, through college-level algebra; genetics; physics; and zoology or general biology. Completion of the Graduate Record Examination is also required. In addition to the academic requirements, it is required that the applicant has experience working with animals and an understanding of the veterinary profession.

### Applications

Students seeking to enter the four-year professional veterinary medical education program must complete a Veterinary Medical College Application Service (VMCAS) application form. The VMCAS office, in Oakland, California, will be responsible for receiving completed application forms, evaluation forms, and transcripts. VMCAS will also collect the application fee. The application must be received in the VMCAS office postmarked no later than November 1 preceding the Fall Term in which the applicant wishes to enroll.

VMCAS application forms are available after July 15 from the Office of the Dean, College of Veterinary Medicine, Oregon State University, 200 Magruder Hall, Corvallis, OR 97331-4801.

All preveterinary requirements must be fulfilled or scheduled for completion by the end of the spring term of the year in which the applicant seeks to be admitted. A list of courses in progress at the time of filing the application or scheduled for completion by the end of the spring term must accompany the applications and transcripts.

Admission to the College of Veterinary Medicine is on a competitive and selective basis. Scholastic performance, aptitude, and personal development are given consideration in the selection of candidates. Consideration of admission to the College of Veterinary Medicine is administered equally without regard to race, color, creed, sex, national origin, disability, or age. Admission is granted annually at the beginning of the fall quarter only.

In considering applicants for admission to the College of Veterinary Medicine, preference is given to qualified Oregon residents for 28 positions. Qualified residents certified and financed by the Western Interstate Commission for Higher Education (WICHE) contract states (see below) or non-residents are eligible for 8 additional positions. To be considered an Oregon applicant, the student must be an Oregon resident by September 1 preceding the fall term in which the applicant wishes to enroll.

All candidates are given written notification of acceptance or denial as soon as possible after the admissions committee has reached its final decision. Such notification is generally given by April 15. Sometimes, however, decisions on applications are delayed until grades in the more advanced courses are made available to the committee. Acknowledgment of notification of acceptance should be made promptly in writing by the successful applicant. Unsuccessful applicants who wish to be considered for the following year must resubmit an application.

When an applicant is offered and accepts admission to the College of Veterinary Medicine, the admitted student must pay a deposit of $50 no later than two weeks following notice of acceptance to reserve a place in the entering class.

#### Applications from WICHE Students

The College of Veterinary Medicine at Oregon State University, the College of Veterinary Medicine at Washington State University, and the Faculty of Veterinary Medicine at the University of Idaho have entered into a regional educational program with Alaska, Arizona, Hawaii, Montana, Nevada, New Mexico, North Dakota, Utah, and Wyoming. Under the terms of this contract, a certified student admitted from one of these states is sponsored financially by his or her home state and is subject to the same fees as the Oregon, Washington, and Idaho resident students.

Students from these contract states must apply to their home state for certification in addition to making application to the Veterinary Medical College Application Service (VMCAS). Additional information regarding regional veterinary education may be obtained from: The Executive Director, Western Interstate Commission for Higher Education, P.O. Drawer P, Boulder, Colorado 80302.

#### Readmission

Any student who voluntarily withdraws from the College of Veterinary Medicine or who is dropped for cause must make written application for consideration for reinstatement to the college.

## Veterinary Student Expenses

Oregon resident students registered in the College of Veterinary Medicine will pay tuition and fees of approximately $3,165 per term. Students from the contract states will pay the same fees as Oregon resident students. Non-residents student fees currently are $6,173 per term.

Veterinary students must provide their own special clothing as well as the dissection, surgical, and diagnostic instruments stipulated by the faculty.

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 as well as lodging and food. All other expenses, such as residence hall and living expenses, are the same as for students in other schools of the University, except for the expenses of the moves students must make to Washington State University for their second and the first half of their third year of study and back to Oregon State University for the final portion of the curriculum.

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.

## 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 deemed painful; animals are humanely euthanized at the termination of most of the laboratory exercises.

During the clinical years, animals are used in laboratory exercises in the teaching of basic surgical skills and medical procedures. In all instances, the animals are anesthetized. Strict protocol is enforced regarding the animals' well-being in exercises requiring post-operative recovery. Participation in these clinical exercises is mandatory for all students.

During the fourth year of the veterinary curriculum, students are assigned on a rotational basis to the various divisions and services engaged in the operation of the veterinary hospital. Emergency services are offered to the public on a 24-hour basis, seven days a week.

Student assignments in the clinical blocks are time-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.

## Graduation Requirements

A total of 220 quarter credits is required for graduation. To be awarded the degree of Doctor of Veterinary Medicine, 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, and have a bachelor's degree.

## Curriculum

Typical Preveterinary Curriculum at Oregon State University (see baccalaureate core requirements for details on skills, perspectives, and synthesis). Oregon State University courses that will meet the preveterinary academic requirements:

Skills (15)
Perspectives (30)
Synthesis (6)
Physical and Biological Sciences
CH 121, CH 122, CH 123. General Chemistry or CH 221, CH 222, CH 223 (15)
CH 331, CH 332, CH 337. Organic Chem (10)
MTH 111 and MTH 112. Mathematics (8)
PH 201. General Physics (5)
BI 211, BI 212, BI 213. Biology (12)
BB 350 or BB 450 and BB 451. Biochem (4-7)
BI 311 or ANS 378. Genetics (4)
Electives (directed toward major)

### Professional Curriculum D.V.M. Degree

#### First Year
#### Fall (17)

(at Oregon State University)
VM 709. Veterinary Medicine Orientation (1)
VM 711. Veterinary Gross Anatomy (4)
VM 714. Veterinary Microscopic Anatomy (5)
VM 717. Physiology (5)
VM 738. Intro to Animal Care (2)

#### Winter (19)

(at Oregon State University)
VM 712. Veterinary Gross Anatomy (4)
VM 715. Veterinary Microscopic Anatomy (3)
VM 716. Veterinary Neurosciences (4)
VM 718. Veterinary Physiology (5)
VM 723. Applied Nutrition (3)

#### Spring (19)

(at Oregon State University)
VM 713. Veterinary Gross Anatomy (4)
VM 719. Veterinary Physiology (4)
VM 720. Immunology (5)
VM 721. Veterinary Pathology (6)

#### Second Year
#### Semester I (20 semester credits)

(at Washington State University)
VM 535P. Virology (3)
VM 536P. Bacteriology (4)
VM 546P. Pathology II (6)
VM 589P. Laboratory Diagnosis (3)
VM 522P. Pharm/Tox I (4)

#### Semester II (20 semester credits)

(at Washington State University)
VM 543P. Public Health (2)
VM 537P. Parasitology (4)
VM 587P. Anesthe/Prin of Surg. (3)
VM 551P. Small Animal Medicine I (4)
VM 588P. Radiology (3)
VM 523P. Pharm/Tox II (4)

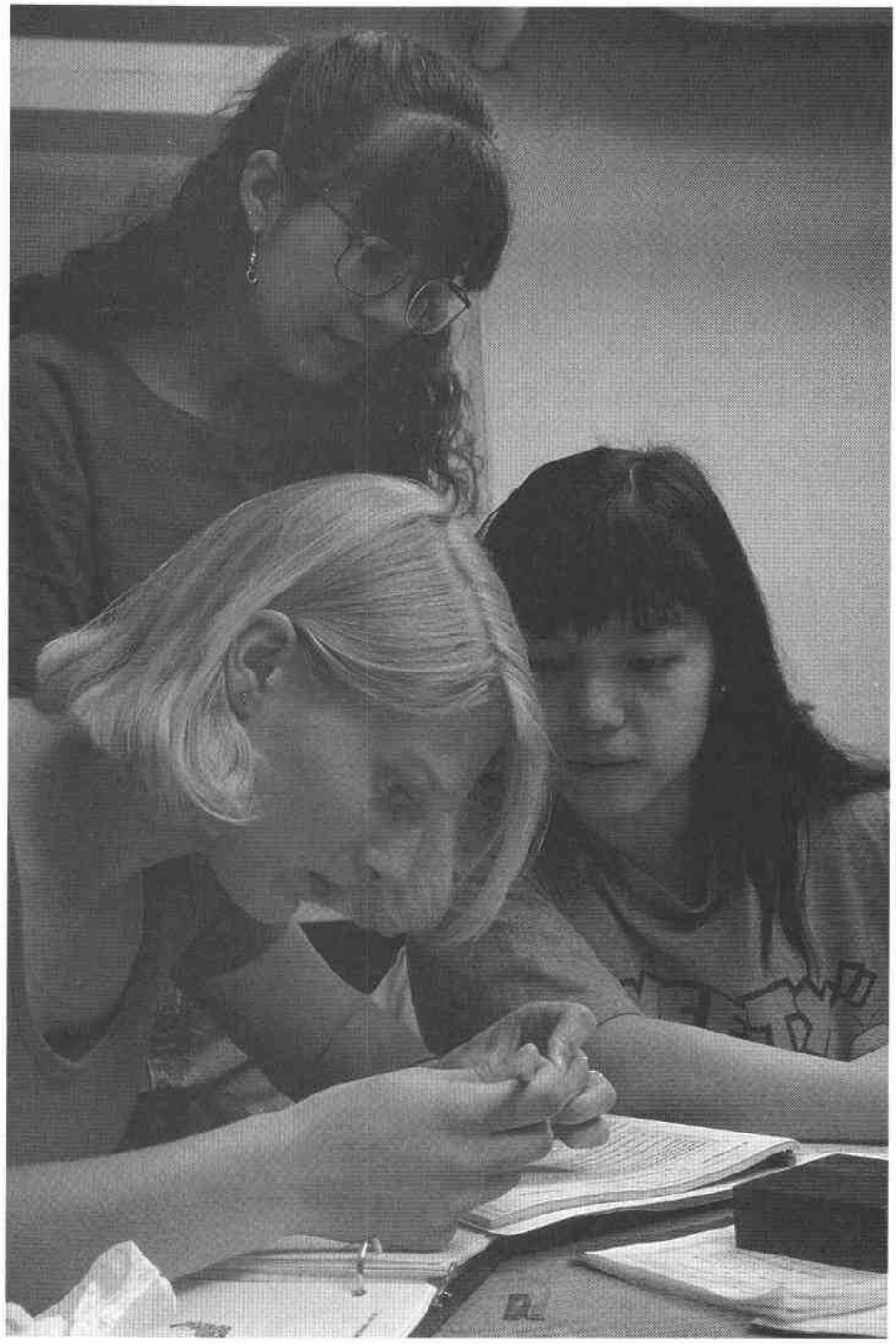
**Third Year**
**Term I (17 semester credits)**
(at Washington State University)
VM 585P. Epidemiology (2)
VM 552P. Small Animal Medicine II (5)
VM 553P. Small Animal Surgery (3)
VM 554P. Small Animal Surgery Lab I (1) or
VM 555P. Small Animal Surgery Lab II (1)
VM 569P. Large Animal Medicine I (6)

**Term II (8 semester credits)**
Block system (4 weeks/block)
(at Washington State University)
VM 562. Small Animal Medicine (4)
VM 567. Small Animal Surgery (4)

**Term III (25 quarter credits)**
(at Oregon State University)
VM 722. Large Animal Medicine II (8)
VM 724. Large Animal Surgery (3)
VM 726. Theriogenology (6)
VM 728. Special Animal Medicine (4)
VM 733. Special Veterinary Surgery (3)
VM 775. Veterinary Professionalism (1)

**Fourth Year**
Block system (4 weeks/block)
(at Oregon State University)
Required blocks
VM 732. Clinical Medicine I (6)
VM 734. Clinical Surgery I (6)
VM 735. Rural Veterinary Practice I (6)
VM 736. Clinical Service I (6)
VM 737. LA Anesthesiology (1)
VM 780. Preceptorship I (1)
VM 780. Preceptorship II (1)

**Elective blocks (11 weeks required)**
VM 752. Clinical Medicine II (6)
VM 754. Clinical Surgery II (6)
VM 755. Rural Veterinary Practice II (6)
VM 756. Clinical Service II (6)
VM 757. Topics: Small Animal Surg (6)
VM 758. Cattle Production Medicine (3)
VM 772. Sheep & Goat Medicine & Surgery (3)
VM 773. Avian Medicine (6)
VM 774. Laboratory Animal Medicine (6)
VM 775. Practice Management (1)
VM 776. Exotic Animal Medicine (6)
VM 777. Thoracic Radiology (2)
VM 778. Abdominal Radiology (2)
VM 779. Skeletal Radiology (2)
VM 781. Adv Clinical Path (1), Section 3
VM 781. Adv Lameness in Equine (3), Section 4
VM 781. Llama Medicine & Surgery (3), Section 5
VM 781. Small Animal Med (6), Section 6
VM 781. Applied Ruminant Nutrition (1), Section 7
VM 781. Applied Equine Nutrition (1), Section 8
VM 781. Clinical & Diag Toxicology (3), Section 11
VM 781. Pet Birds (1), Section 13
VM 781. SA & LA Practice Mgmt (1), Section 15
VM 781. SA Ultrasound (1), Section 17
VM 781. Pediatric Surg in Equine (1), Section 18
VM 781. LA Ophthalmology (1), Section 19
VM 781. Sheep/Goat Medicine & Surgery (3), Section 20
VM 781. Canine Sports Medicine (1), Section 21
VM 782. Emergency Care
VM 790. Food Animal Medicine/Caldwell (6), Section 5
VM 790 Small Animal Private Practice (6), Section 10
VM 790. Radiology (3), Section 12
VM 790. Anesthesiology (3), Section 13



VM 790. Special Studies (6), Section 20
VM 790. Clin/Lab Diagnosis (3), Section 21
VM 790. Dairy Herd Health (3), Section 23
VM 790. LA GI Surgery (1), Section 26
VM 790. Neonatal Med Care (1), Section 27

**Vacation blocks (12 weeks)**

## COURSES

### Lower Division Courses

**VM 110. PREVETERINARY MEDICINE (1).** Introduction to the professions role in society. Graded P/N.

### Upper Division Courses

**VM 451/VM 551. AVIAN DISEASES (3).** The pathology of viral, bacterial, genetic, nutritional, and mycotic avian diseases; programs for control. PREREQ: Consent of instructor. Offered odd numbered years. CROSSLISTED as ANS 451/551.

### Graduate Courses

**VM 501. RESEARCH (1-16).** Graded P/N.

**VM 503. THESIS (1-12).**

**VM 505. READING AND CONFERENCE (1-16).** Graded P/N.

**VM 507. SEMINAR (1).** Graded P/N.

**VM 517. VETERINARY PHYSIOLOGY (5).** Physiology of body fluids, muscles, membranes, intermediary metabolism, and cardiovascular system, and metabolism. PREREQ: One year of inorganic chemistry, including a lab; one upper division course in biochemistry; one term physics; one year sequence in general biologic sciences or equivalent. Consent of instructor.

**VM 518. VETERINARY PHYSIOLOGY (5).** Physiology of gastrointestinal, endocrine and reproductive systems. PREREQ: VM 517.

**VM 519. VETERINARY PHYSIOLOGY (4).** Physiology of respiratory and renal systems and acid-base balance. PREREQ: VM 518

**VM 601. RESEARCH (1-16).** Graded P/N.

**VM 603. THESIS (1-16).**

**VM 605. READING AND CONFERENCE (1-16).**

**VM 606. PROJECTS (1-16).** Graded P/N.

**VM 607. SEMINAR (1-16).** One-credit section; VM 607 sec 1. Graded P/N.

**VM 611,VM 612,VM 613. VETERINARY GROSS ANATOMY (4,4,4).** Systematic and topographic study and dissection of the dog, cat, horse, ruminant, pig and chicken. PREREQ: One year of inorganic chemistry, including a lab; one upper-division course in biochemistry; one term of physics; one year sequence in general biologic sciences or equivalent. Must be taken in sequence.

**VM 614,VM 615. VETERINARY MICROSCOPIC ANATOMY (5,5).** Structure and development of cells, tissues, organs, and organ systems of animals. PREREQ: 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.

**VM 620. VETERINARY IMMUNOLOGY (5).** Clinical and diagnostic aspects of immunological mechanisms, serological reactions, hypersensitivity, allergy, and disorders of the immune system. PREREQ: One upper-division course in biochemistry; one year of physics; one-year sequence in general biologic sciences or equivalent.

**VM 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. PREREQ: 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.

**VM 622. PATHOLOGY LABORATORY (2).** Laboratory instruction to complement VM 511. PREREQ: VM 611 or concurrent enrollment; one quarter of micrscopic anatomy.

**VM 651. SELECTED TOPICS IN VETERINARY MEDICINE (3).** Topics vary; check Schedule of Classes for particular topics. PREREQ: Graduate standing; consent of instructor.

### Upper Division Courses

**VM 701. RESEARCH (1-16).**

**VM 705. READING AND CONFERENCE (1-16).**

**VM 706. PROJECTS (1-16).**

**VM 709. VETERINARY MEDICINE ORIENTATION (1).** An overview of veterinary medicine with emphasis on historical development, current veterinary medical issues, employment opportunities, and professionalism. PREREQ: First-year standing in veterinary medicine. Graded P/N.

**VM 711,VM 712,VM 713. VETERINARY GROSS ANATOMY (4,4,4).** Systematic and topographic study and dissection of the dog, cat, horse, ruminant, pig, and chicken. PREREQ: First-year standing in veterinary medicine. Must be taken in sequence.

**VM 714,VM 715. VETERINARY MICROSCOPIC ANATOMY (5,5).** Structure and development of cells, tissues, organs, and organ systems of animals. PREREQ: First-year standing in veterinary medicine.

**VM 716. VETERINARY NEUROSCIENCES (4).** Structural and functional relationships of the nervous system and organs of special sense with emphasis on general clinical application. PREREQ: First-year standing in veterinary medicine.

**VM 717,VM 718,VM 719. VETERINARY PHYSIOLOGY (5,5,5).** Physiology of body fluids, excretion, respiration, acid-base balance, blood, muscle, bone, cardiovascular system, digestion, metabolism, endocrine system, reproduction, and lactation. PREREQ: First-year standing in veterinary medicine. Must be taken in sequence.

**VM 720. VETERINARY IMMUNOLOGY (5).** Clinical and diagnostic aspects of immunological mechanisms, serological reactions, hypersensitivity, allergy, and disorders of the immune system. PREREQ: First-year standing in veterinary medicine.

**VM 721. VETERINARY PATHOLOGY (6).** 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. PREREQ: First-year standing in veterinary medicine.

**VM 722. LARGE ANIMAL MEDICINE II (8).** Diagnosis and treatment of large animal diseases. PREREQ: Third-year standing in veterinary medicine.

**VM 723. APPLIED NUTRITION (3).** Nutritional concepts related to animal medicine. PREREQ: First-year standing in veterinary medicine.

**VM 724. LARGE ANIMAL SURGERY (3).** Large animal surgical techniques and procedures. PREREQ: Third-year standing in veterinary medicine.

**VM 726. THERIOGENOLOGY (6).** Diagnosis, symptomatology, and treatment of reproductive disorders. PREREQ: Third-year standing in veterinary medicine.

**VM 728. SPECIAL ANIMAL MEDICINE (4).** Diagnosis, treatment, and management of special animals, including the common laboratory animals. PREREQ: Third-year standing in veterinary medicine.

**VM 732. CLINICAL MEDICINE I (6).** Clinical medicine training in diseases of food animals and horses; clinic rounds and diagnostic procedures. PREREQ: Fourth-year standing in veterinary medicine.

**VM 733. SPECIAL VETERINARY SURGERY (3).** Selected surgical techniques and procedures as related to food animals and horses. PREREQ: Third-year standing in veterinary medicine.

**VM 734. CLINICAL SURGERY I (6).** Clinical surgery, treatment, and care of food animals and horses; clinic rounds; training in surgery, lameness, and diagnostic procedures. PREREQ: Fourth-year standing in veterinary medicine.

**VM 735. RURAL VETERINARY PRACTICE I (6).** Rural practice training in diseases of food animals and horses. PREREQ: Fourth-year standing in veterinary medicine.

**VM 736. CLINICAL SERVICE I (6).** Clinical experience in radiology, clinical pathology, microbiology, and necropsy. PREREQ: Fourth-year standing in veterinary medicine.

**VM 737. LARGE ANIMAL ANESTHESIOLOGY (1).** A one-week clinical rotation in large animal anesthesiology including selection of anesthetic techniques and anesthetic management and supportive therapy of clinical cases. PREREQ: Fourth-year standing in veterinary medicine.

**VM 738. INTRODUCTION TO ANIMAL CARE (2).** Feeding, housing, breeding and marketing systems related to animal care. PREREQ: First-year standing in veterinary medicine. Graded P/N.

**VM 752. CLINICAL MEDICINE II (6).** Additional clinical medicine training. PREREQ: VM 732. Graded P/N.

**VM 754. CLINICAL SURGERY II (6).** Additional clinical surgery training. PREREQ: VM 734. Graded P/N.

**VM 755. RURAL VETERINARY PRACTICE II (6).** 1 Additional rural practice training. PREREQ: VM 735. Graded P/N.

**VM 756. CLINICAL SERVICE II (6).** Advanced clinical experience in radiology, clinical pathology, microbiology, or necropsy. PREREQ: VM 736. Graded P/N.

**VM 757. SMALL ANIMAL SURGERY AND MEDICINE TOPICS (6).** Small animal medicine and surgical techniques and procedures. PREREQ: Fourth-year standing in veterinary medicine. Graded P/N.

**VM 758. APPLIED BEEF PRODUCTION MEDICINE (1).** A two-week course emphasizing health and economic decisions. Topics include heifer development, sire selection, cow/calf management, facilities, forage/nutrition economics/records, backgrounding, pre-conditioning, and feedlot. PREREQ: Fourth-year standing in veterinary medicine, VM 735 or instructor permission. Graded P/N.

**VM 771. HERD HEALTH AND PREVENTIVE MEDICINE (6).** Preventive medicine; environmental, housing, nutrition, management, and agribusiness practices related to farm animals. PREREQ: Fourth-year standing in veterinary medicine. Graded P/N.

**VM 772. SHEEP AND GOAT MEDICINE AND SURGERY (1-6).** Clinical experience related to diseases of sheep and goats. PREREQ: Fourth-year standing in veterinary medicine. Graded P/N.

**VM 773. AVIAN MEDICINE (6).** Clinical experience related to diseases of poultry. PREREQ: Fourth-year standing in veterinary medicine. Graded P/N.

**VM 774. LABORATORY ANIMAL MEDICINE (6).** Clinical experience related to diagnosis, treatment, and management of laboratory animals. PREREQ: Fourth-year standing in veterinary medicine. Graded P/N.

**VM 775. VETERINARY PROFESSIONALISM (1).** Ethical, legal, regulatory, and attitudinal aspects of professional conduct in veterinary medicine. PREREQ: Third-year standing in veterinary medicine. Graded P/N.

**VM 776. EXOTIC ANIMAL MEDICINE (6).** Veterinary, surgical, and medical experiences related to diagnosis, treatment, and management of fish, wildlife, aquatic, and zoo animals. PREREQ: Fourth-year standing in veterinary medicine.

**VM 777. THORACIC RADIOLOGY (3).** A one-week course with emphasis on small animals. Lecture and radiographic case evaluation. Emphasis on medical reasoning and decision-making relating to radiographic diagnosis. PREREQ: Fourth-year standing in veterinary medicine. Graded P/N.

**VM 778. ABDOMINAL RADIOLOGY (3).** A one-week course with emphasis on small animals. Lecture and radiographic case evaluation. Emphasis on medical reasoning and decision-making relating to radiographic diagnosis. PREREQ: Fourth-year standing in veterinary medicine. Graded P/N.

**VM 779. MUSCULOSKELETAL RADIOLOGY (3).** A one-week course in small and large animal skeletal radiology. Lecture and radiographic case evaluation. Emphasis on medical reasoning and decision-making. PREREQ: Fourth-year standing in veterinary medicine. Graded P/N.

**VM 780. VETERINARY MEDICAL PRECEPTORSHIP (1-16).** Theory of practice of veterinary medicine in a non-university situation. PREREQ: Fourth-year standing in veterinary medicine. Graded P/N.

**VM 781. SEMINAR IN VETERINARY MEDICINE (1-16).** Seminars and case discussions on selected topics by students, staff, and others. Graded P/N.

**VM 790. CLINICAL EXPERIENCE (1-16).** One-to-four week periods. Graded P/N. Section 1: Large Animal Clinical Experience/Topics (1-16). PREREQ: Fourth-year standing in veterinary medicine. Graded P/N. Section 2: Small Animal Clinical Experience/Topics (1-16). PREREQ: Fourth-year standing in veterinary medicine. Graded P/N. Section 3: Mixed Animal Clinical Experience/Topics (1-16). PREREQ: Fourth year standing in veterinary medicine. Graded P/N. Section 4: Small Animal Private Practice (1-6). PREREQ: Fourth-year standing in veterinary medicine. Graded P/N. Section 5: Special Studies (1-16). PREREQ: Fourth-year standing in veterinary medicine. Graded P/N.

**FOOTNOTE**

[1]Four week period.

*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 Air Force 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 non-military 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 is called the Department of Air Force 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 students' 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 $150 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. AFROTE students may be eligible to participate in the Civil Air patrol Squadron, which offers a flight orientation program. This program enables participating cadets to receive up to eight hours of flight training at reduced cost. Civil Air Patrol also offers a "solo encampment" that enables cadets to pursue additional flight training over spring break.

### 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.

## AIR FORCE STUDIES

Col. Samuel Snider, Commander
308 McAlexander Fieldhouse
Oregon State University
Corvallis, OR 97331-4903
(541) 737-3291

**Faculty**

*Professor* Col. Snider; *Associate Professors* Maj. Loch, Maj. Allen, Capt. Tighe-Smith; *Instructors* MSgt. Danner, SSgt. Swafford

**Minor**

**Air Force Studies**

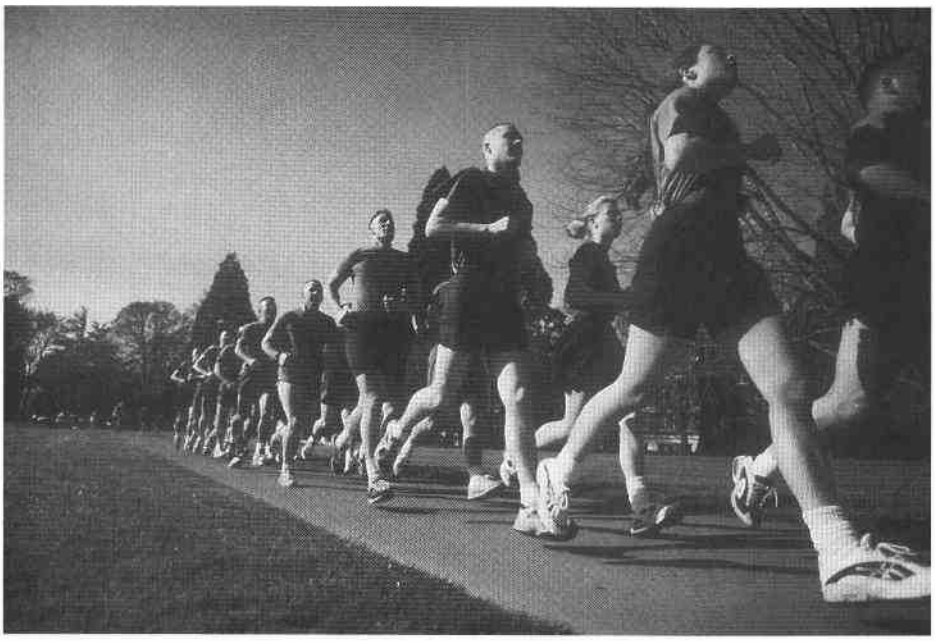
The mission of Air Force ROTC is to provide professional preparation for future Air Force officers. The Department of Air Force Studies offers students, in virtually all academic areas, the opportunity to qualify for a commission in the United States Air Force while simultaneously completing University undergraduate or graduate degree requirements.

Today's Air Force is a highly technologically advanced branch of the military forces. Whether a student's interest lies in flying the most advanced aircraft in the world or in the development of state-of-the-art technology, the Air Force can offer exciting and challenging opportunities to those who qualify. Graduates go on active duty in career fields where they can apply their education.

Additionally, they assume advanced leadership and management responsibilities not normally found in civilian entry level positions. The Air Force ROTC approach to education encourages inquiry, analysis, critical thinking, imagination, judgment, and individual participation, on the part of each student. Air Force studies courses are open to all University students.

### Minor (27)

The Department of Air Force Studies offers a minor which is open to any OSU student. The minor is designed to give students a broad exposure to the concepts of aerospace



power, leadership and management, and general military studies.

**Required Courses**

AS 311, AS 312, AS 313. Air Force Leadership and Management (9)
AS 411, AS 412, AS 413. National Security Forces in Contemporary American Society (9)

**Elective Courses**

*At least 9 credits from the following:*
AS 211, AS 212, AS 213. The Development of Air Power (2 each) OR AS 306. Field Training (6)
AS 320. Leadership Lab (1) (maximum of 3 credits)
AS 420. Leadership Lab (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 (4)
HST 317. Why War? A Historical Perspective (4)
HST 440, HST 441. History of Russia (4 each)
HST 464, HST 465. American Diplomatic History (4 each)
HST 466. United States-Latin American Relations (4)
MS 211. Effective Team Building (2)
MS 212. American Military History (2)
MS 213. Fundamentals of Military Operations (2)
NS 321. Evolution of the Art of War, Modern Basic Strategy and Tactics (3)
NS 322. Art of War from Alexander to the Present (3)
PAX 201. Study of Peace and the Causes of Conflict (3)
PHL 205. Ethics (4)
PHL 445. World Views, Values, and Contemporary Global Issues (3)
PS 204. Intro to Comparative Politics (4)
PS 205. Intro to International Relations (4)
PS 340. Eastern & Central European Politics (4)
PS 342, PS 343. Soviet and Post Soviet Political System (4 each)
PS 344. Latin American Politics (4)
PS 345. Politics of Developing Nations (4)
PS 456. Asian Government and Politics (4)
PS 451. American Foreign Policy (4)
PS 452. Alternative International Futures (4)
PS 453. Soviet and Post Soviet Foreign Policy (4)
PS 454. International Law and Organizations (4)
PSY 462. Interpersonal Relations and Small Group Processes (3)
SOC 324. Groups and Organizations (3)

## PROGRAMS

Two Air Force ROTC programs are available. Students who qualify may elect to pursue either of these programs.

**Four-Year Program**

The four-year program consists of the General Military Course: six quarters of lower division Air Force Studies classes, including a laboratory each term, and the Professional Officer Course: six quarters of upper division Air Force Studies classes, including a laboratory each term. Four-year cadets attend four weeks of 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 Air Force Studies to waive all or part of the General Military Course (freshman and sophomore years) for students enrolled in the four-year AFROTC program.

Students may enter the freshman class at the start of the fall, winter, or spring term. Sophomore students may enter at the start of the fall term and take the freshman 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**

This program provides an opportunity for students who did not select the four-year ROTC program. Entry is on a competitive basis. Application should be made early during fall term of the students sophomore year. Selectees attend mandatory six-week summer field training (AS 306) prior to their junior year of college. Applicants must have two years remaining in college after the six-week field training. This may be undergraduate or graduate work or a combination. The curriculum includes AS 306 (six-week field training); six quarters of upper division Air Force 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. Scholarship students incur a commitment at the beginning of their sophomore year. Upon accepting their commission, pilots incur an obligation of eight years after completion of pilot training; navigators incur a six-year obligation after initial training and all others agree to serve for four years following commissioning.

## SCHOLARSHIPS

Scholarships are available for qualified students. High school students interested in applying should consult their high school counselors in their junior year or early in their senior year. University students in the four-year AFROTC program can compete for scholarships twice per year on the basis of grade-point average, Air Force Officer Qualifying Test scores, Scholastic Aptitude Test scores, and a personal interview. Special scholarship programs are also available to students of certain minority backgrounds or who are majoring in critical demand areas deemed necessary by the Air Force. Students receiving scholarships must be able to complete the Air Force ROTC program, receive degree, and be commissioned prior to age 27 (30 for veterans) Each scholarship covers the cost of tuition, laboratory fees, incidental expenses, $432/year for textbooks, and a $150/month subsidy.

For students who are not selected for any other scholarship program, the Air Force offers $2,000 per year for tuition and textbooks plus a $150/month for expenses to students in *any academic major* during their junior & senior years. To qualify for this scholarship, the student must:

- be a full-time student at OSU
- not be older than 27 upon graduation (waiverable for students with prior military service).
- maintain a 2.35 term GPA

As in the other scholarship programs, students must enroll in the AFROTC program and agree to accept an Air Force

officer commission and service commitment upon graduation.

For details on both programs, contact the AFROTC Detachment, McAlexander Fieldhouse Room 300, (541) 737-6284. For more information, see the Scholarship section in the front of this catalog.

## Allowances, Uniforms, Textbooks

Students enrolled in the Professional Officer Course are paid a $150 monthly stipend. Uniforms and textbooks for both the General Military Course and Professional Military Course are provided by the Air Force.

## Standards

Cadets must be U.S. citizens of sound physical condition and high moral character. Before graduation, nonscholarship cadets must complete a 3-credit course in mathematical reasoning.

Nonscholarship cadets must receive a field training allocation prior to age 30 to be commissioned as Air Force officers. Cadets designated to attend flight training must receive their commission prior to age 26½ (27½ for veterans)

## 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 the fully-funded Air Force Institute of Technology programs.

Special provisions are available for medical, law, and meteorology students. For further information, contact the AFROTC Detachment, McAlexander Fieldhouse Room 300, or call (541) 737-6284.

## Field Training

Under either Air Force ROTC program, only one summer field training session is required. The two-year program requires six weeks of field training; the four-year program requires four weeks. Students are paid varying amounts for each of these training periods. This pay is in addition to travel pay to and from the field training location.

## Courses

### Lower Division Courses

**AS 111. THE AIR FORCE TODAY (1).** This course deals with the Air Force in the contemporary world through a study of the total force structure, strategic offensive and defensive forces, general purpose forces, and aerospace support forces.

**AS 120. LEADERSHIP LABORATORY (1).** Cadets learn officership, leadership, drill and ceremony, and customs and courtesies. Taken concurrently with AS 111, AS 112 and AS 113.

**AS 211/AS 212/AS 213. THE DEVELOPMENT OF AIR POWER (2).** This course is a study of air power from balloons and dirigibles through the jet age; a historical review of air power employment in military and non-military operations in support of national objectives; a study of changes in the nature of military conflict; and a look at the evolution of air power concepts and doctrine.

**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. Taken concurrently with AS 211, AS 212 and AS 213.

**AS 280. PREPROFESSIONAL OFFICER COURSE (1).** Air Force ROTC Leadership Laboratory participation for students who have completed the Air Force General Military Course sequence that are not eligible for immediate entry into the Air Force Professional Officer Course. Instruction is conducted within the framework of an organized cadet corps. Leadership laboratory is a study of Air Force customs and courtesies; drill and ceremonies; career opportunities in the Air Force; and the life and work of an Air Force junior officer. Students develop their leadership potential in a practical and supervised laboratory. PREREQ: Completion of AS 100 and AS 200 series.

### Upper Division Courses

**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. Permission of department head required.

**AS 306. FIELD TRAINING (6).** Six-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. Permission of department head required.

**AS 311/AS 312/AS 313. AIR FORCE LEADERSHIP AND MANAGEMENT (3).** An integrated management course emphasizing the concepts and skills required by the successful manager and leader. The curriculum includes individual motivational and behavioral processes, leadership, communication, and group dynamics, providing the foundation for the development of the junior officers professional skills (officership). Course material on the fundamentals of management emphasizes decision making, the use of analytic aids in planning, organizing, and controlling in a changing environment, as necessary professional concepts. Organizational and personal values (ethics), management of change, organizational power, politics, and managerial strategy and tactics are discussed within the context of the military organization courses must be taken in order.

**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. Taken concurrently with AS 311, AS 312 and AS 313. PREREQ: AS 304, AS 306.

**AS 351. AEROSPACE STUDIES (1).** Principles of flight, weather and navigation; flight computers; flight planning; aviation physiology, and Federal Aviation Regulations. Preparation for Air Force flight training and flying careers. PREREQ: AS 304 or AS 306. Department approval required.

**AS 405. READING AND CONFERENCE (1-16).** Supervised individual work. Department approval required.

**AS 411/AS 412/AS 413. NATIONAL SECURITY FORCES IN CONTEMPORARY AMERICAN SOCIETY (3).** This course is a study of US National Security Policy which examines the formulation, organization, and implementation of national security; context of national security; evolution of strategy policy; management of conflict; and civil-military interaction. It also includes blocks of instruction on regional studies the military profession, officership, and the military justice system. The course is designed to provide future Air Force officers with a background of United States National Security Policy so they can effectively function in today's Air Force. Must be taken in order.

**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. Taken concurrently with AS 411, AS 412 and AS 413. PREREQ: AS 304, AS 306.

# MILITARY SCIENCE

LTC Gregory L. Hightower, Commander
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**Faculty**

*Professor* Ltc. Hightower (Military Police); *Assistant Professors* Maj. Clem (Engineer) Maj. Lefiti (Armor) Cpt. Trossen (Aviation), Cpt Meredith (Field Artillery); *Instructors* Cpt Jaeger (Signal), Staff Sergeant Davis

**Minor**

**Military Science**

The Military Science 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 towards 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. Those interested in aviation careers have the opportunity to become officer pilots in fixed or rotary wing aircraft. Merit scholarship opportunities exist for students in any approved academic discipline, particularly in business, engineering, science, and social science. Uniforms and books are provided free of charge.

## Basic Program

The basic program is voluntary, 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 advance program prerequisites or accelerate their progress through previous military experience or by completing Summer Camp (MS 214), or Fundamentals of Military Science (MS 215).

No military obligation is incurred for participation in Basic Program classes, and students can decide whether they want to apply for the advanced program.

## 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 $150 per month subsistence allowance during the school year. During the six-week summer portion of the program, they receive room and board, travel expenses to and from the program location, and approximately $675 for the period involved. Veteran students enrolled in the ROTC program receive these amounts in addition to any other educational benefits.

The advanced summer program is normally attended between the cadet's junior and senior years. The University awards 6 credits for successful completion.

## SIMULTANEOUS MEMBERSHIP PROGRAM

Advanced Program ROTC students may also elect to join reserve or national guard units. As officer candidates, they receive pay and allowances from both ROTC and their assigned unit while, at the same time, gaining essential military knowledge prior to their commissioning. Students participating in this program can earn over $6,500 in two years.

## 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 three years active duty and five years reserve forces duty. ROTC scholarship students may be required to serve on active duty for four years, depending on the needs of the army at the time.

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.

## COURSES

### Lower Division Courses

**MS 111. MILITARY SCIENCE I: LEADERSHIP DEVELOPMENT (1).** Introduction to ROTC, and its relationship to the U.S. Army. Role of the army officer, including leadership and management fundamentals. Types of jobs available to army officers.

**MS 112. MILITARY SCIENCE I: MILITARY SKILLS (1).** Basic rifle marksmanship; military first aid; customs and traditions of the U.S. Army; unit organization and missions.

**MS 113. MILITARY SCIENCE I: LAND NAVIGATION (1).** How to read a topographic map and use a magnetic compass; includes practical exercises.

**MS 211. MILITARY SCIENCE II: EFFECTIVE TEAM BUILDING (2).** An examination of effective leadership. Development of interpersonal skills using practical exercises and case studies.

**MS 212. MILITARY SCIENCE II: AMERICAN MILITARY HISTORY (2).** History of the American soldier from 1775 to 1919; weaponry and tactics of the American Army. Use of battle analysis and wargaming 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.

**MS 214. BASIC SUMMER CAMP: CHALLENGE: (6).** Six weeks of leadership training at Fort Knox, Kentucky. Substitute for the first two years of the ROTC program. PREREQ: Meet minimum enrollment standards for the advanced ROTC program.

**MS 215. FUNDAMENTALS OF MILITARY SCIENCE (3).** Leadership and management fundamentals; role of the Army ROTC and the Army officer. Individual military skills and their incorporation into tactical operations at the squad level. Land navigation using map and compass. Instructor approval required.

### Upper Division Courses

**MS 311, MS 311, MS 313. MILITARY SCIENCE III: LEADERSHIP AND MANAGEMENT OF MILITARY (3,3,3).** ORGANIZATION Study of military leadership, management, and 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; applications of leadership concepts in offensive and defensive operations at the squad, platoon, and company level; and fundamentals of small-unit tactics/patrolling.

**MS 314. ADVANCED SUMMER CAMP: ADVENTURE (6).** Practical and theoretical instruction for six weeks at Fort Lewis, Washington. Practical leadership application and experience in a military environment. PREREQ: MS 311, MS 312, MS 313.

**MS 405. READING AND CONFERENCE (1-16).** Graded P/N.

**MS 311, MS 311, MS 413. MILITARY SCIENCE IV: PREPARATION FOR OFFICERSHIP (3,3,3).** 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.

# NAVAL SCIENCE

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**Faculty**

*Professor* Capt. Daniels; *Associate Professor* LtCol. Conway, Executive Officer; *Assistant Professors* Capt. Martineau (USMC), Lt. Hunkins (USN), Lt. Crowley (USN)); *Instructors* Chief Storekeeper West (USN), Chief Yeoman Biles (USN), GySgt Yoho (USMC)

**Minor**

**Naval Science**

## MINOR (27)

The Department of Naval Science offers a minor in which the student may choose between a Navy sequence and a Marine Corps sequence. A minimum of 27 credits is required for the minor with 20 credits of upper division courses required for the Navy sequence and 18 credits of upper division courses required for the Marine Corps sequence. Students may elect to have their minor designated on their transcript. Specific requirements are listed below:

### NAVAL SCIENCE MINOR CORE REQUIREMENTS (9)

NS 111. Introduction to Naval Science (3)
NS 112. U.S. Naval History (3)
NS 113. Seapower and Maritime Affairs (3)

### NAVY SEQUENCE (29)

**Naval Science Minor Core (9)**

NS 211. Introduction to Naval Engineering (3)
NS 212. Introduction to Auxiliary Naval Engineering (3)
NS 213. Leadership and Management I (3)
NS 311. Rules of the Road and Basic Piloting (4)
NS 312. Celestial and Electronic Navigation (4)
NS 313. Maneuvering Board and Naval Operations (3)
NS 411. Principles of Naval Weapons Systems (3)

NS 412. Leadership and Management II (3)
NS 413. Leadership and Management III(3)
NS 450. At Sea Training (6)

**MARINE CORPS SEQUENCE (27)**
**Naval Science Minor Core (9)**
NS 321. Evolution of Warfare I (3)
NS 322. Evolution of Warfare II (3)
NS 323. Marine Corps Option Summer Prep I (3)
NS 421. Amphibious Warfare (3)
NS 422. Doctrinal Principles (3)
NS 423. Marine Corps Option Summer Prep II (3)
NS 450. At Sea Training (6)

## NROTC Scholarships

The Navy offers, two-, three- and four-year scholarships leading to baccalaureate degrees. Students are selected through national competition, and recipients are appointed midshipman USNR by the Secretary of the Navy. Scholarship Midshipmen receive the financial benefits described below and attend summer cruises during the summers at the end of their freshman, sophomore, and junior years.

Students enrolled in the NROTC college program (described below) can apply for two and three year Navy or Marine Corps scholarships provided they have been active in the program for a minimum of one academic term and are in good academic standing with not less than a B (3.0) grade point average. Students additionally must receive a favorable recommendation from the Professor of Naval Science.

Sophomores not enrolled in the NROTC college program can compete nationally for two-year scholarships. Applicants must be in good academic standing with not less than a 2.50 grade point average. Applicants for a Navy (vice Marine Corps) Scholarship must in addition complete three terms of college calculus with a grade of C or better by the end of the sophomore year.

For all scholarship students, the Navy pays tuition, cost of textbooks, other fees of an instructional nature, and a subsistence allowance of $150 a month for each nine-month school year. Graduates will be commissioned as Ensign, U. S. Naval Reserve, or Second Lieutenant, U. S. Marine Corps Reserve, and are required to serve on active duty for four years. Applications for the scholarship program may be obtained from any NROTC unit or Navy-Marine Corps recruiting office.

## College Program

Students may apply to participate in the NROTC program. Applicants are selected by the Department of Naval Science at OSU and are then eligible to compete for two and three year scholarships. Additionally, after their sophomore year, College Program Midshipmen must apply and be selected for "advance standing" status. If selected for "advance standing" for their junior and senior years, selectees receive subsistence pay of $150 a month, uniforms, and pay during summer cruises. Graduates are offered commissions as Ensign, U. S. Naval Reserve, or Second Lieutenant, U. S. Marine Corps Reserve, and are required to serve on active duty for three years. College program students have the same professional opportunities after graduation as scholarship students to select careers in naval aviation, surface or submarine duty with a nuclear power option, or specialties within the Marine Corps.

Any university student may take Naval Science courses for credit. However, such students are classified as Naval Science students, and are not enrolled in the NROTC program.

## Requirements

NROTC candidates applying for any of the NROTC programs must: a) be a citizen of the United States or become a citizen before entering the advanced course; b) be accepted for admission or enrolled in the university; c) be at least 17 years of age upon enrollment and under 25 years (27 for College Program) on June 30 of the calendar year in which eligible for commissioning; d) be physically qualified in accordance with the standards established by the Department of the Navy; e) possess a satisfactory record of moral integrity and have potential officer characteristics; f) have no moral obligations or personal convictions preventing him or her 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. All midshipmen are required to take Naval Science courses each term enrolled. Additionally, 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.

## Courses

### Lower Division Courses

**NS 111, NS 111, NS 113. NAVAL SCIENCE I (3,3,3).** NS 111: Naval Organization and Administration; Organization of the Navy; the Navy as a career; responsibilities and commitments as an officer in the Navy or Marine Corps. NS 112: U.S. NAVAL HISTORY; U.S. Navy development from the birth of the naval service in 1775 to WWII. NS 113: SEA POWER AND MARITIME AFFAIRS; A comprehensive look at the broad principles, concepts, and elements of sea power with historical and modern applications to the United States and other world powers since WWII. PREREQ: NS 112.

**NS 211/NS 212/NS 213. NAVAL SCIENCE II (3).** NS 211: INTRODUCTION NAVAL ENGINEERING: Basic engineering systems theory and concepts, application in todays fleet; fleet hardware. NS 212: INTRODUCTION TO AUXILLIARY ENGINEERING.

### Upper Division Courses

**NS 311/NS 312/NS 313. NAVAL SCIENCE III (4).** NS 311: NAVIGATION: Piloting, dead reckoning, and rules of the nautical road. NS 312: NAVIGATION: Celestial and electronic navigation. NS 313: NAVAL OPERATIONS: Theory of shiphandling, communications, weather, fleet maneuvers, and relative movement problem solution. REC: To be taken in order.

**NS 111, NS 322. NAVAL SCIENCE III: MARINE CORPS OPTION (3,3).** Evolution of Art of War and Modern Basic Strategy and Tactics: Art of war from Alexander to present; principles of modern strategy and small unit tactics. For U.S. Marine Corps candidates. REC: To be taken in order.

**NS 323. NAVAL SCIENCE III: MARINE CORPS OPTION (3).** Preparation for officer candidates school and practical field exercises. For U.S. Marine Corps candidates. REC: To be taken in order.

**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. Prior Approval Required.

**NS 111, NS 111, NS 413. NAVAL SCIENCE IV (3,3,3).** NS 411: PRINCIPLES OF NAVAL WEAPONS SYSTEMS: Development and employment of Navy and Maritime Corps weapons systems. NS 412: LEADERSHIP AND MANAGEMENT II: Methods of effective leadership. NS 413: LEADERSHIP AND MANAGEMENT III: Junior officer administrative responsibilities with emphasis on moral and ethical values of Naval leaders. REC: To be taken in order.

**NS 111, NS 422. NAVAL SCIENCE IV: MARINE CORPS OPTION (3,3).** Amphibious Warfare and Administration: Theory of amphibious operations in World War II and Korean War; administration; leadership; and military justice. For U.S. Marine Corps candidates. REC: To be taken in order. Offered alternate years.

**NS 423. NAVAL SCIENCE IV: MARINE CORPS OPTION (3).** Preparation for the Marine Corps Officer Basic School, including practical field exercises. For U.S. Marine Corps candidates. REC: To be taken in order. Offered alternate years.

**NS 450. AT-SEA TRAINING (6).** Four-to six-week training cruise taken aboard naval ships or submarines as arranged by professor of naval science.

*Exciting and diverse educational opportunities are offered through the graduate programs of Oregon State University's 11 colleges which encompass over 70 major disciplines. A Land, Sea, and Space Grant University, OSU enrolls almost 3,000 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.

The information presented in this catalog concerning graduate programs, degree requirements, Graduate School rules and regulations, and specific department requirements has been condensed. Complete information is available in the *OSU Graduate Catalog* which is available from the Graduate School.

## ADVANCED DEGREES

The major academic fields in which advanced degrees are offered by Oregon State University and the types of degrees granted in these fields are listed below.

Adult Education—Ed.M.
Agricultural and Resource Economics—M.S., Ph.D.
Agricultural Education—M.S.
Agriculture—M.Agr.
Animal Science—M.S., Ph.D.
Apparel, Interiors, Housing, and Merchandising—M.A., M.S., Ph.D.
Applied Anthropology—M.A.
Atmospheric Sciences—M.A., M.S., Ph.D.
Biochemistry/Biophysics—M.A., M.S., Ph.D.
Bioresource Engineering—M.S., Ph.D.
Botany and Plant Pathology—M.A., M.S., Ph.D.
Business Administration—M.B.A.
Chemical Engineering—M.S., Ph.D.
Chemistry—M.A., M.S., Ph.D.
Civil Engineering—M.S., Ph.D.
College Student Services Administration—Ed.M., M.S.
Comparative Veterinary Medicine—Ph.D.
Computer Science—M.A., M.S., Ph.D.
Counseling—M.S., Ph.D.
Crop Science—M.S., Ph.D.
Economics—M.A., M.S., Ph.D.
Education—Ed.M., M.S., Ed.D., Ph.D.
Electrical and Computer Engineering—M.S., Ph.D.
English—M.A.
Entomology—M.A., M.S., Ph.D.
Environmental Health Management—M.S.
Environmental Sciences—M.A., M.S., Ph.D.
Family Resource Management—M.S., Ph.D.
Fisheries Science—M.S., Ph.D.
Food Science and Technology—M.S., Ph.D.
Forest Engineering—M.F., M.S., Ph.D.
Forest Products—M.F., M.S., Ph.D.
Forest Resources—M.F., M.S., Ph.D.
Forest Science—M.F., M.S., Ph.D.
Genetics—M.A., M.S., Ph.D.
Geography—M.A., M.S., Ph.D.
Geology—M.A., M.S., Ph.D.
Geophysics—M.A., M.S., Ph.D.
Health and Safety Administration—M.S.
Health Education—M.S.
History of Science—M.A., M.S., Ph.D.
Home Economics—M.S.
Horticulture—M.S., Ph.D.
Human Development and Family Studies—M.S., Ph.D.
Human Performance—M.S., Ph.D.
Industrial Engineering—M.S., Ph.D.
Interdisciplinary Studies—M.A.I.S.
Manufacturing Engineering—M.Eng.
Marine Resource Management—M.A., M.S.
Materials Science—M.S.
Mathematics—M.A., M.S., Ph.D.
Mathematics Education—M.A., M.S., Ph.D.
Mechanical Engineering—M.S., Ph.D.
Microbiology—M.A., M.S., Ph.D.
Molecular and Cellular Biology—Ph.D.
Movement Studies in Disability—M.S.
Nuclear Engineering—M.S., Ph.D.
Nutrition and Food Management—M.S., Ph.D.
Ocean Engineering—M.Oc.E.
Oceanography—M.A., M.S., Ph.D.
Pharmacy—M.S., Ph.D.
Physics—M.A., M.S., Ph.D.
Plant Physiology—M.S., Ph.D.
Poultry Science—M.S., Ph.D.
Public Health—M.P.H., M.S., Ph.D.
Radiation Health Physics—M.A., M.S.
Rangeland Resources—M.S., Ph.D.
Science Education—M.A., M.S., Ph.D.
Scientific and Technical Communication—M.A., M.S.
Soil Science—M.S., Ph.D.
Statistics—M.A., M.S., Ph.D.
Teaching—M.A.T.
Toxicology—M.S., Ph.D.
Veterinary Science—M.S.
Wildlife Science—M.S., Ph.D.
Zoology—M.A., M.S., Ph.D.

## MINORS

Any of the majors listed above also may be taken as minor fields of study as part of a student's graduate study program. In addition, the following graduate minors are offered:

Agricultural Chemistry
Anthropology
Art
Community College Education
Community Health
Earth Information Science and Technology
Foreign Languages and Literatures
Gerontology
History
International Agricultural Development
Music
Philosophy

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**ADMINISTRATION**

**THOMAS J. MARESH**
*Dean*

**JOHN C. RINGLE**
*Associate Dean*

**MARY S. PRUCHA**
*Coordinator of Graduate Services*

**JANET K. MORANDI**
*Assistant to the Dean*

Political Science
Psychology
Sociology
Speech Communication
Water Resources
Women Studies
Note: Any of the above graduate majors and/or graduate minors may be utilized as one or possibly two of the three fields required for a Master of Arts in Interdisciplinary Studies (MAIS) degree.

## General Regulations

### Admission

A student desiring to enter the Graduate School at Oregon State University will provide the Office of Admissions and Orientation: (a) admission forms; (b) photocopies of transcripts of all previous college or university work, undergraduate and graduate. (If admitted, official transcripts from these institutions must be received by the Office of Admissions and Orientation prior to the start of the first term of enrollment.); (c) a letter indicating the student's objectives and the special fields of interest, and (d) a nonrefundable $50 application fee. A third copy of the application form must be sent directly to the major department, along with copies of transcripts, a copy of the letter of interest, and three letters of reference. MAIS applicants must send a copy of their applications to each of the three departments in which they intend to integrate their graduate work. All applicants should contact their major department(s) for any special requirements such as GRE scores. To be considered for admission to the Graduate School, an applicant must have a 4-year baccalaureate degree from an accredited college or university, as well as a scholastic record, background, and other evidence that indicate the ability to do satisfactory graduate work. Normally, this is a combined GPA of 3.00 on the last 90 credits of graded undergraduate work plus all work completed thereafter. The Office of Admissions and Orientation will determine whether the general conditions for admission have been met. The major department(s) indicated by the student will examine the material submitted to determine adequacy of scholastic background and to decide whether departmental facilities are adequate for the student's expressed aims.

#### Test of English Proficiency

The Test of English as a Foreign Language (TOEFL) is required of all international applicants whose native language is not English. The minimum acceptable TOEFL score is 550. If all other admission requirements are met, conditional admission may be granted if an applicant has a TOEFL score of at least 500. Refer to International Student Admissions in the *Graduate Catalog* for complete details.

### Admission Status

Students may be admitted to the Graduate School under the following categories:

#### Advanced Degree Students (Regular Graduate Students)

These students have been accepted by the University and by a major department to work toward an advanced degree.

#### Conditionally Admitted Graduate Students

Students who have not met the formal University admission requirements but whose accomplishments have convinced the University's Graduate Admissions Committee and their major departments they have potential for success as advanced degree candidates may be admitted conditionally.

#### 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 admitted provisionally.

#### Tentatively Admitted Graduate Students

Students who have met all of the University and departmental standards for formal admission, but have not yet provided official transcripts and/or TOEFL scores, may be admitted tentatively.

Credit will be allowed for graduate courses students have completed acceptably while registered as conditional, provisional, or tentative students.

If they fail to complete satisfactorily these terms of admission, they will be dismissed from the Graduate School.

#### Non-degree Graduate Students

The non-degree graduate student category may be used by those holding a baccalaureate degree who do not wish to pursue an advanced degree.

#### Reclassification of Postbaccalaureate and Non-degree Graduate Students

A postbaccalaureate or non-degree graduate student may be considered for status as a regular graduate student under one of the following provisions, depending upon prior academic records:

a. If the student would have been eligible for graduate admission at the time of entering as a postbaccalaureate or a non-degree graduate student, he or she is eligible for admission consideration at any time.

b. If the student, prior to entering as a postbaccalaureate or non-degree graduate student, had been denied graduate admission, or would have been ineligible for graduate admission as determined *a posteriori* by the Graduate Admissions committee, the post-baccalaureate or non-degree graduate student must: 1) complete 24 credits each with a grade of B (3.00) or better, or 2) 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-hour rule) to 3.00 or better before the student is *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. Lower division undergraduate courses may not be used. All courses should be carefully selected in consultation with an academic adviser from the graduate field into which the student desires admission.

The completion of 24 credits with a grade of B (3.00) or better in each course does *not* guarantee graduate admission.

Reclassification decisions employ the same procedures and requirements as those for admission. All requests for reclassification are initiated in the Office of Admissions and Orientation.

### Dismissal from Graduate School

Advanced degree (including conditional, provisional, and tentative) students are expected to make satisfactory progress toward a specific academic objective including maintaining a satisfactory GPA (3.00 or greater), meeting departmental requirements, and participating in a creative activity such as a thesis.

If the major department requests that the student be terminated from its program, he or she 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 Regulations may serve as grounds for dismissal from the Graduate School.

### Grievance Procedures

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.

### Reenrollment

Graduate students who withdraw from the Graduate School must apply for readmission if they wish to re-enter after an absence of more than two terms. Students who re-enter prior to that time need not apply for readmission. Readmittance back into a graduate program is not guaranteed.

### Requirements and Options

#### Reserving Credits

Credit for graduate courses taken in excess of the requirements for a baccalaureate degree may be reserved by undergraduate and postbaccalaureate students for possible use in a graduate program. A maximum of 15 graduate credits may be reserved. Baccalaureate degree holders who are admitted to postbaccalaureate status may reserve not more than 6 graduate credits per term to apply in a graduate program. A request for reservation of credit *must* be

made prior to the end of the term in which the student completes baccalaureate requirements.

#### Registration Requirements

Full-time status as a graduate student is defined by the Oregon State System of Higher Education 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.

Degree-seeking students must enroll for a minimum of three credits in any quarter in which they are using University space, facilities, or faculty time. This includes such activities as holding program meetings, taking departmental written examinations, and having preliminary oral examinations. Registration solely for the purpose of taking the final oral exam for the master's or doctoral degree is not required.

Full-time status (i.e., a minimum of 9 credits per term) may be necessary to qualify for purposes of veterans' benefits, visa requirements, and financial aid.

#### Registration Requirements for Graduate Assistants

As a condition of their academic appointments, graduate teaching and research assistants are required to register for three credits above the minimum full-time load (i.e., a minimum of 12 credits) each term of the appointment during the academic year. During Summer Session, minimum registration for graduate assistants is 9 credits. Audit registrations and enrollment in Continuing Higher Education and other self-support programs may not be used to satisfy enrollment requirements for graduate assistant tuition remission.

Maximum registration for graduate teaching and research assistants is determined by the assistant's appointment level, otherwise known as FTE (full time equivalency). Assistants whose appointments range between .15 and .29 FTE may register for a maximum of 15 credits per term. Those whose appointments range between .30 and .50 FTE may register for no more than 12 credits per term.

#### Grade Requirement

A grade-point average of 3.00 (a B average) is required for all courses taken as a graduate student and for courses included in the graduate program. Grades below C (2.00) are not accepted on a graduate program.

Graduate students may elect to take courses on the S-U basis only if those courses are not in their degree program or are not required for the removal of deficiencies.

#### 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 the award of a graduate degree. Upon completion of a graduate degree, the degree awarded and the graduate major are listed on the student's transcript.

#### Graduate Minor

A graduate minor is an academic area that clearly supports the major. On a master's or doctoral program, a minor may be (a) an academic area available only as a minor, (b) a different major, (c) the same major with a different area of concentration (d) an approved major at another institution in the Oregon State System of Higher Education, or (e) an integrated minor. An integrated minor consists of a series of cognate courses from outside the major area of concentration, with most of the courses being outside the major department.

#### Graduate Areas of Concentration

A graduate area of concentration is a subdivision of a major or minor in which a strong graduate program is available.

#### Dual Majors

For the M.A., M.S., Ed.M., M.F., or Ph.D. degree, a student may select two graduate major areas to pursue instead of the traditional single major.

## GRADUATE COURSES

#### 500-Level Courses

These courses are graduate courses offered primarily in support of 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 apply to reserve these courses for later use on 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 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 which may be applied toward a professional degree (e.g. DMV, PharmD). They make up the bulk of the course work for these professional degree programs. These courses are not considered graduate level courses, however, and may not be applied toward master's level or doctoral level (PhD or EdD) degree programs.

#### 800-Level Courses

These courses are in-service courses aimed at practicing professionals in the discipline. These courses have an in-service or re-training focus, and provide the professional 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 may not be applied to graduate level degree programs nor to professional degree programs.

#### 4XX/5XX Courses

Courses bearing dual-listed numbers (400-500) must provide students who are enrolled for 500-level credit with education and training that satisfies all of the following conditions:

1. The 5XX course must include graduate level work appropriate to the field (e.g., exams, papers, projects, problem sets, responsibility for lecturing or leading discussions, etc.);

b) students enrolled for the 5XX credit must present work that is significantly more rigorous in both depth of study and methodology than students enrolled for the 4XX credit; and

c) when making qualitative evaluations of students, the instructor must hold students enrolled for the 5XX credit to a standard higher than those enrolled for 4XX credit.

#### Blanket Courses

Blanket-numbered courses (courses whose middle digit is zero) carrying graduate credit may be repeated to the maximum as indicated below.

A maximum of 6 credits of blanket numbers other than thesis, or research in lieu of thesis for nonthesis degrees, may be used on the minimum 45-credit master's degree program; 15 such credits, other than thesis, may be used 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 transferred courses will be considered as part of this maximum.

#### Meetings and Exam Schedules

Program meetings and preliminary and final examinations may be held during any period when school is in session.

#### Petitions

A student who wishes to deviate from the normal Graduate School regulations and procedures may present his or her problem in a letter to the Graduate School, signed by the student and his or her major professor.

#### Diploma Application

Graduate students wishing a printed diploma must complete an application supplied by the Graduate School. This form should be submitted to the Graduate School prior to taking the final examination, indicating the term the student intends to graduate.

### GRADUATE FEES

Graduate students registered for 9 term credits of work or more pay tuition and fees in accordance with the schedule printed in the Fees and Deposits section of this catalog. Students holding teaching or research assistantships of .15 FTE or greater receive tuition remission but must pay fees. Graduate assistants must be enrolled for a minimum of 12 credits each term of their appointment to be eligible for their stipends and tuition waiver benefits. Tuition remission covers registration to a maximum of 16 credits. Enrollment beyond 16 credits constitutes an overload and will be assessed on a per credit basis. Graduate students registering for 3 to 8 credits of work pay the graduate part-time fee.

### RESOURCE FEES

Students admitted to the Master of Business Administration degree program and all Engineering graduate programs are assessed Resource Fees in addition to tuition.

### GRADUATE WORK BY FACULTY MEMBERS

It is the policy of the Oregon State System of Higher Education (OSSHE) that OSSHE faculty rank may not be held by an OSSHE graduate student. That is, one may not simultaneously be an OSSHE faculty member and an OSSHE graduate student. This is codified in the Oregon Administrative Rules (OAR 580-20-005) which identify faculty rank as including: instructor; senior instructor; research assistant; research associate; lecturer; assistant professor; associate professor; and professor. The policy 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 degree without prior approval from the Graduate Dean.

### GRADUATE APPOINTMENTS

*Graduate Teaching Assistantships* and *Graduate Research Assistantships* are awarded by academic departments to graduate students who have superior records in their undergraduate work. In order to hold an assistantship appointment, the person must be admitted as a regular or provisionally-admitted graduate student and be making satisfactory progress on an advanced degree. Graduate assistants must complete a minimum of 12 credits during each term of appointment. Persons interested in assistantships should write directly to the department concerned.

**Fellowships**, sponsored by the university, industry, foundations, and government agencies, are available to superior graduate students for graduate study in various departments at Oregon State University. These fellowships are awarded through the departments concerned, and application should be made by writing to the department. Fellows render no service to the institution, may carry 16 term credits, and pay full tuition, except as noted. See the *Graduate Catalog* for a list of fellowships.

## DEGREE PROGRAMS

### MASTER OF ARTS AND MASTER OF SCIENCE

#### Credit Requirement

All master's degrees require a minimum of 45 graduate credits including the thesis (6 to 12 credits) or research-in-lieu-of-thesis (3 to 6 credits) when required. Credits used in one master's program may not be used in an additional master's program. Approximately two-thirds of the work (30 credits) must be in the major and one-third (15 credits) in the minor.

#### 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 credits must appear on the master's degree program. (This does not include credits reserved as an undergraduate or postbaccalaureate student nor credits taken as a postbaccalaureate or non-degree student.)

#### Transfer Credit

A maximum of 15 quarter credits of graduate work accomplished at another accredited institution may be transferred, provided that: (a) the work fits into a logical program for the degree; (b) the transfer is approved by the student's committee, by the department, and by the Graduate School, and (c) a grade of B (3.00) or better has been earned.

#### Language Requirements

For the Master of Arts degree, the student must show proficiency in a foreign language equivalent to the level attained by the end of the second-year university course in the language with a grade of C (2.00) or better. There is no foreign language requirement for the Master of Arts in Interdisciplinary Studies degree. For all other master's degrees there is no foreign language requirement, unless a language is needed in the individual student's program.

#### Graduate Study Program

A regular master's degree student must file a study program with the Graduate School before the completion of 18 credits of graduate course work.

The program is developed under the guidance of the major and minor professors and signed by the major and minor professors and the chair of the academic unit before filing in the Graduate School office.

#### Time Limit

Students must complete all work for a master's degree within seven years, including transferred credits, course work, thesis (if required), and all examinations.

#### Thesis

An examination copy of the master's thesis must be presented to the Graduate School office at least one week prior to the final oral examination. Additional examination copies of the thesis are distributed by the student at this time to other members of the examining committee, including the Graduate Council Representative.

Within six weeks after the final oral, two unbound copies of the thesis for the library, including copies of the abstract, must be deposited in the Graduate School office. If these copies are submitted after the initial six-week period, the student may be subject to re-examination.

Full information concerning the prescribed style for thesis is given in the booklet, "Preparing a Thesis or Dissertation at Oregon State University: A Graduate Student's Guide," available in hard copy at the OSU Book Store and electronically on the Web at http://www.orst.edu/Dept/grad_school.

#### Final Examinations

Successful completion of a final oral examination is required for all Master of Science, Master of Arts, Master of Agriculture, Master of Arts in Interdisciplinary Studies, Master of Arts in Teaching, Master of Engineering, Master of Forestry, Master of Ocean Engineering, Master of Public Health, and Master of Education (thesis option only) degrees. The examination should be scheduled for two hours.

When a thesis is involved, about half the time should be devoted to the thesis and related areas. The examining committee consists of at least four members of the graduate faculty—two in the major field, one in the minor field, and a Graduate Council Representative. It is the student's responsibility to obtain his or her own Graduate Council Representative from a list provided by the Graduate School.

When no thesis is involved, the examining committee consists of three members of the graduate faculty—two in the major field and one in the minor field.

One dissenting vote is permitted for both thesis and non-thesis degrees. 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 scheduled in the Graduate School office at least one week prior to the date of the examination.

At the time of the final examination, the student must have completed or be registered concurrently in all courses required by the student's program. In addition, the student must have earned a 3.00 GPA in courses required by his or her graduate program and also must have maintained a 3.00 GPA for all courses taken at OSU as a graduate student.

## Other Master's Degrees

### Master of Agriculture

The Master of Agriculture degree requires a student to attain advanced knowledge and achievement integrated across three fields of study. Two of the three fields or concentrations must be from the College of Agricultural Sciences or closely related areas. The third concentration can be from any approved graduate major or minor. With appropriate justification, each of these three concentrations may contain integrated components.

A minimum of 45 credits is required for the degree with a minimum of 24 credits outside the major. The program of study will consist of a major concentration and two minor concentrations. The major 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 6 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 concentraton and requires the department head's signature. The student's committee will consist of a representative from the major and each minor concentration. 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

This 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 concentrations are different. At least one field must be selected from among the departments in the College of Liberal Arts. A minimum of 9 credits in each of the three fields of study is required; at least 12 credits must be taken in the College of Liberal Arts. No more than 21 credits (excluding thesis or research paper credits) will be taken in any field unless the total program exceeds 45 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 or research paper credits 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 final oral examination is required.

There are two options under the program:

*Thesis option:* The thesis must coordinate work in the three fields. The requirement is 6 to 9 credits of thesis. The thesis adviser must be a member of the graduate faculty authorized to direct theses.

*Research Paper option:* The research paper does not necessarily integrate work from the three fields, but typically investigates a subject in depth from one or possibly two of the three fields. The requirement is 4 to 7 credits, registered as research, reading and conference, or projects.

### Master of Arts in Teaching

The Master of Arts in Teaching (M.A.T.) is an intensive professional degree program intended to prepare teachers for careers in public school education. Students who successfully complete the M.A.T. are recommended for the Oregon basic teaching certificate 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 each year with their subject area cohort group and complete the program in one year. Teacher licensure is offered in the following areas: advanced mathematics education, biology education, chemistry education, elementary education, French education, German education, health education, integrated science education, language arts education (English), music education, physical education, physics education, professional technical education, and 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 M.A.T. includes a professional education concentration (three 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 nine graduate electives in the subject matter specialization (e.g., mathematics, physics, literature, etc.). Because the professional teacher education program is a two-part program, including the professional core and the M.A.T., future students may plan their programs as either five-year (with a nine-month M.A.T.) or as fifth year programs (with 12 months of graduate study including both the professional core and the M.A.T.).

The M.A.T. degree requires successful completion of a final oral examination.

### Master of Business Administration

The Master of Business Administration (MBA) degree is designed primarily for the individual holding an undergraduate or graduate degree in a non-business area, although someone with an undergraduate degree in business administration can find value added at the graduate level. The MBA Program is designed to produce generalists: individuals who can adapt to a variety of business situations and demands with appropriate courses of action. The Program involves a broad study of business administration, rather than intensive work in any one specialized area.

Students with an undergraduate degree in a non-business area can complete the Program five terms. Students with an undergraduate degree or minor in business can qualify for and complete the Program in four terms. The Program is available on a full-time and part-time basis; classes are scheduled during both day and evening hours. Entrance to the Program can occur in any term, provided Program minimum requirements and course pre-requisites are met. Required courses are offered only in certain terms; students must attend summer session to complete the Program.

The MBA degree requires no thesis. A final written examination is required.

### Master of Education

The Master of Education is a professional degree. For the degree, a minimum of 45 term credits in graduate courses must be completed; additional credits may be required. A minimum of 9 additional term credits in graduate courses is required for the master's degree in college student services administration (CSSA).

The Master of Education degree requires successful completion of a final written examination.

Options available under the Master of Education degree are outlined in the *Graduate Catalog.*

### Master of Engineering

The Master of Engineering 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 applied 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 is required.

The M.Eng. is a minimum 45-credit program. The examining committee consists of a minimum of three members of the graduate faculty in the engineering specialization. A final oral examination is required

The M.Eng. in Manufacturing Engineering is a joint degree program and the degree will be jointly awarded by Oregon State University and Portland State University.

### MASTER OF FORESTRY

The Master of Forestry degree is intended for potential administrators and professional forestry specialists in public and private organizations where persons of broad ability and broad technical education are needed. 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 fields, must be submitted. A final oral examination is required.

### MASTER OF OCEAN ENGINEERING

The civil, construction, and environmental engineering department offers a Master of Ocean Engineering degree to those students who complete a specially designed, rigorous core course of designated ocean engineering subjects. Other courses outside the core area are permitted. A thesis and final oral examination are required.

### MASTER OF PUBLIC HEALTH

The Master of Public Health (M.P.H.) 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 Sciences University, Oregon State University, and Portland State University.

The M.P.H. 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 will be able to 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 will be able to prepare themselves for a broad variety of careers depending upon their choice of specialty track.

The Master of Public Health is offered by Oregon State University with concentrations in public health promotion and education, gerontology, and health policy and management.

Students who are admitted to a track will be able to take core courses at any one of the participating universities and have them count as resident courses.

The M.P.H. program will consist of 15 credits of core courses serving as the minor, plus additional units of required and elective courses, an internship, and a thesis or non-thesis project depending upon the specific track. Programs will average 45 to 60 credits in length. A final oral examination is required.

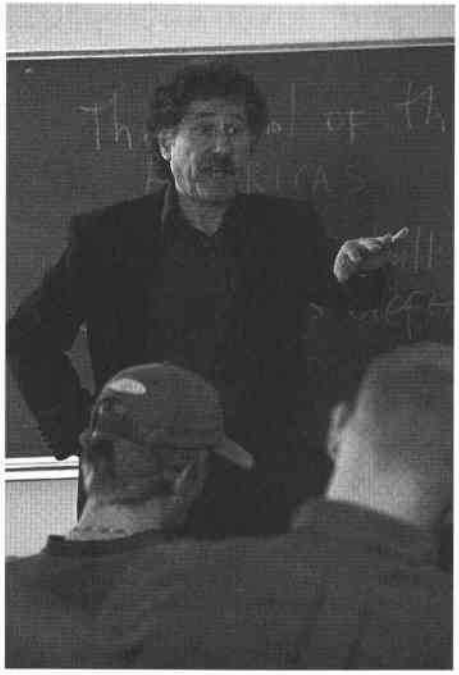
## DOCTOR OF PHILOSOPHY

#### General Requirements

The degree of Doctor of Philosophy 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. A minimum of one full-time academic year (at least 36 credits) should be devoted to the preparation of the thesis.

#### 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 equivalent of one full-time academic year of regular non-blanket course work (defined at 36 credits) must be included on a doctoral program. The program meeting is scheduled in the Graduate School one week in advance. (Students must be registered for a minimum of three credits for the term in which the program meeting is held.) No more than 15 credits of blanket-numbered courses, other than thesis, may be included in the minimum 108-credit doctoral program.



A regular graduate student who holds a master's degree must file a study program with the Graduate School 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 file a study program with the Graduate School by the end of the fifth quarter of enrollment as a doctoral student.

#### 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/term) on site at the Corvallis campus or at an off-campus site approved by the Graduate School. Adequate fulfillment of the residence requirement is determined by the Graduate School.

#### Language Requirements

The foreign language requirement is determined by the student's doctoral committee. Foreign language requirements must be completed before the oral preliminary examination.

#### Preliminary Examinations

The student working toward the doctorate must pass a comprehensive preliminary examination in his or her major and minor subjects. Students must be registered for a minimum of three credits for the term in which they undertake departmental written or oral preliminary examinations.

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 the 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 examination (questions and student answers) must be available to all members of the student's doctoral committee at least one week prior to the oral preliminary examination.

The purpose of the oral preliminary examination is to determine the student's understanding of his or her major and minor fields and to assess the student's capability for research. Advancement to candidacy is contingent on passing this preliminary examination. If more than one negative vote is recorded by the examination committee, the candidate will have failed the examination. Oral preliminary examinations must be scheduled in the Graduate School one week in advance.

At least one complete academic term must elapse between the time of the oral preliminary examination and final oral examination. 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.

For additional details concerning the preliminary examination, consult the *Graduate Catalog*.

#### Thesis

Every candidate for the degree of Doctor of Philosophy must submit a thesis embodying the results of research and giving evidence of originality and ability in independent investigation. The preparation of an acceptable dissertation will require at least one full-time academic year. The booklet "Preparing a Thesis or Dissertation at Oregon State University: a Graduate Student's Guide" is available in hard copy at the bookstore and electronically on Web (http://www.orst.edu/Dept/grad_school).

Regulations concerning the doctoral dissertation are the same as those for the master's degree with the following exceptions: An examination copy of the thesis must be presented to the Graduate School office at least two weeks prior to the final oral examination; within six weeks, two final copies of the thesis for the library and one extra copy of the abstract must be deposited unbound in the Graduate School office.

An abstract of the doctoral thesis of not more than 350 words will be published by University Microfilms in *Dissertation Abstracts*.

#### Final Examination

After completion or while concurrently registered for all work required by the program, the student must pass a final doctoral examination which may be written in part but must include an 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 his or her thesis and to 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.

## Doctor of Education

The Ed.D. 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, post secondary 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 Ed.D. program is designed to prepare educational leaders in community college education, college student services administration, teacher education, and training and development.

A master's 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 School 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 Ed.D. 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 Ed.D.: 1) a minimum of 108 credits beyond the baccalaureate degree, 2) completion of the same residence requirements as listed for the Ph.D. degree, 3) a dissertation of no less than 24 credits, 4) a mentored internship in an appropriate work setting for a minimum of 12 credits, 5) a minimum of 48 graduate credits in an area of specialty in Education, 6) completion of 24 credits of core seminars, and 7) completion of the core courses in research.

Procedures and requirements for preliminary and final examinations and thesis are similar to those of the Doctor of Philosophy degree.

## Concurrent Enrollment (Joint Campus Registration)

Oregon State University students paying full tuition may enroll for courses through other colleges and universities of the Oregon State System of Higher Education at no additional cost in the concurrent enrollment program.

Concurrent enrollment offers the OSU graduate student access to specialized instructional and research resources of other universities within the Oregon State System of Higher Education through a single matriculation and registration. OSU students follow the standard advising and registration procedures, registering for all courses at OSU irrespective of the campus on which the course is offered. The OSU Registrar's Office will record all credit earned on any campus program. Tuition and fees will be the same as if all courses were taken at Oregon State University. Students participating in this program are responsible for their own transportation.

Credits earned at another campus through concurrent enrollment are considered transfer credits. Consult the Registrar's Office for complete details and procedures.

## Joint Campus Program

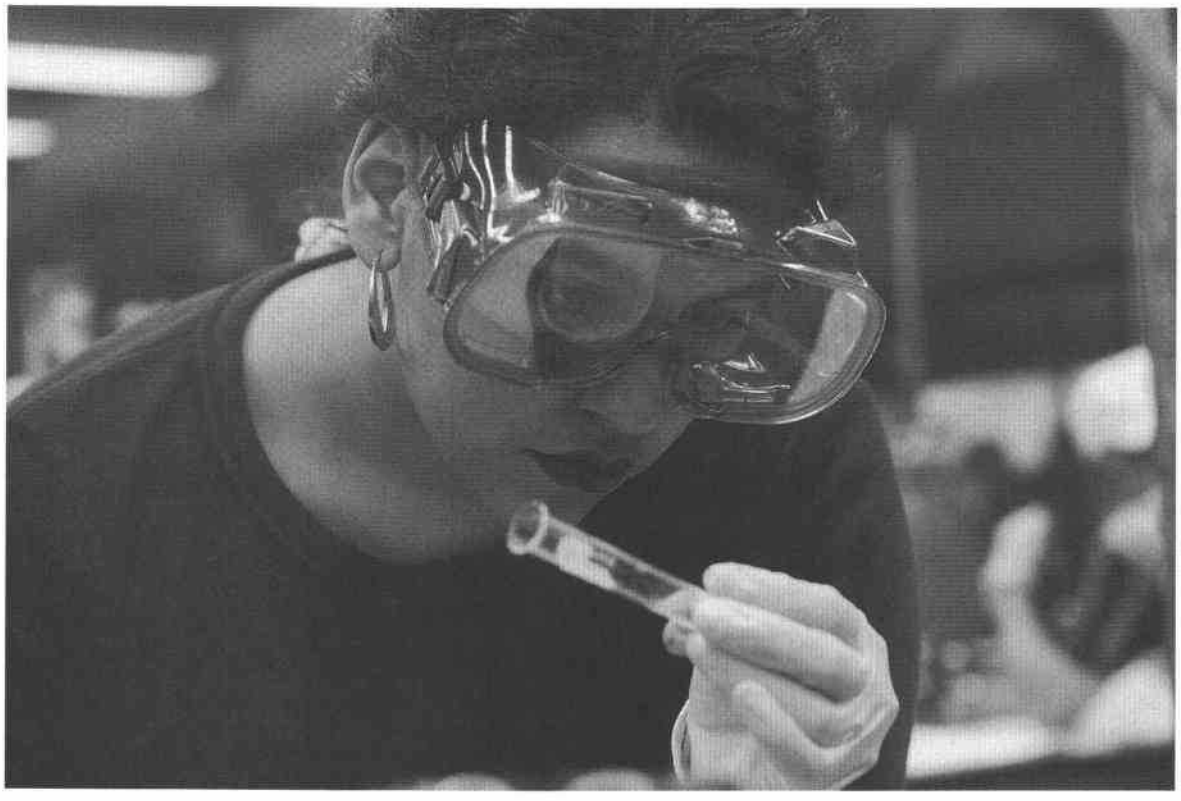
Some OSU graduate programs are joint-campus programs (e.g., Manufacturing Engineering, Master of Public Health). These programs are offered jointly by OSU and one or more of the other universities in the Oregon State System of Higher Education. Courses and facilities at all participating universities may be utilized on an individual student's program.

Students participating in a joint-campus program are admitted to one of the participating universities and this campus is considered their home university. Students enroll for courses on other campuses using concurrent enrollment. Credit earned on the other campuses is considered transfer credit unless special approval was granted when the joint-campus program was initiated.

## WICHE Regional Graduate Programs

The following degrees are offered under WICHE (Western Interstate Commission for Higher Education) regional graduate programs at OSU: M.A., M.S., Ph.D. in apparel, interiors, housing, and merchandising (Department of Apparel, Interiors, Housing, and Merchandising); Ph.D. in family resource management (Department of Human Development and Family Sciences); Ph.D. in nutrition and food management (Department of Nutrition and Food Management); Ph.D. in human development and family studies (Department of Human Development and Family Sciences); M.A., M.S. in marine resource management (College of Oceanic and Atmospheric Sciences); M.A., M.S., Ph.D. in oceanography (College of Oceanic and Atmospheric Sciences); M.A., M.S. in operations research (Department of Statistics); and M.S., Ph.D. in toxicology (Toxicology Program).

Students from Alaska, Arizona, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, North Dakota, South Dakota, Utah, Washington, and Wyoming who are accepted into these programs will be treated as resident students for tuition purposes. Information about the above programs may be obtained from the college, program, or department indicated, or by contacting the Graduate School.



*human knowledge and provision of technical and technological services to the commonwealth are recognized functions of institutions of higher education. Research to advance human knowledge is encouraged and assisted at Oregon State University by general and directed research funds and is conducted within departments, colleges, centers, and institutes as a part of normal academic activity.*

Research is supported by appropriations to experiment stations, institutes, and centers, as well as by grants from private and public agencies for institutional and individual projects. The General Research Fund (seed funding) is administered with the advice of the Research Council.

Separately organized research units include the following:

- Agricultural Experiment Station
- Engineering Experiment Station
- Environmental Remote Sensing Applications Laboratory
- Forest Research Laboratory
- Sea Grant College Program

**Research Centers**

- Center for Advanced Materials Research
- Center for Analysis of Environmental Change
- Center for Gene Research and Biotechnology
- Center for the Humanities
- Center for Salmon Disease Research
- Center for Study of the First Americans
- Environmental Health Sciences Center
- Integrated Plant Protection Center
- Laboratory Animal Resources
- Marine/Freshwater Biomedical Sciences Center
- Mark O. Hatfield Marine Science Center
- Oregon Productivity and Technology Center
- Radiation Center
- Survey Research Center
- Western Rural Development Center

**Research Institutes**

- Cooperative Institute for Marine Resources Studies
- Linus Pauling Institute
- Nuclear Science and Engineering Institute
- Nutrition Research Institute
- Transportation Research Institute
- Water Resources Research Institute

**Research Consortia**

- Consortium for International Development (CID)
- Inter-University Consortium for Political and Social Research
- University Corporation for Atmospheric Research (UCAR)
- Associated Western Universities, Inc.

The Vice Provost for research coordinates efforts of the various research organizations of the University. The vice provost encourages and assists faculty members in the development of research programs and in handling grant and contract applications; advises the president of the University regarding general progress of the institution's research programs; works to ensure maximum opportunity for the integration of graduate instruction and research; and maintains a technology transfer program for researchers who identify new devices and/or processes useful to the public. Special evaluations are made of patent ownership provisions to assure that the interests of the inventor, the University, and the state are best served. The vice provost also coordinates administration of grant and contract operations with the directors of business affairs and business services to aid the work of faculty and to ensure compliance with University, state, and federal regulations.

### GRANTS FROM RESEARCH OFFICE

The General Research Fund is primarily intended to provide "seed money" for developing new concepts and to support faculty research that is not supported by organized or directed programs of other research organizations on or off campus. Funds are allocated by the Dean of Research with the advice of the Research Council. Faculty members with the rank of instructor and above are eligible to apply for support from the fund. Application forms are available from the Research Office. Funds may be used for supplies, travel, equipment, and wages. Support will not be given to provide data for theses leading to advanced degrees, subject matter for a specific course, or information for use with administrative functions. Faculty summer and sabbatical leave salaries are not supported.

## AGRICULTURAL EXPERIMENT STATION

Thayne R. Dutson, *Director*
Michael J. Burke, *Associate Director;* L.J. Koong, *Associate Director;* Lavern J. Weber, *Associate Director;* Robert E. Witters, *Program Coordinator;* Bruce Sorte, *Business Officer*

The Oregon Agricultural Experiment Station was organized July 1, 1888, in accordance with the Hatch Act of 1887. It now includes a central station at Corvallis and ten branch stations in the major crop and climate areas of Oregon, assuring that its research program is close to the people and the needs of Oregon agriculture.

The station is the principal agricultural research agency in the state. Its mission is to conduct research and demonstrations in the agricultural, biological, social, and environmental sciences that contribute to the economic and social welfare of Oregon. The products of its research help to:

1) ensure a stable and productive agriculture through wise management and use of the soil, water, wildlife, and other natural resources of the state;
2) protect crops and animals from insects, diseases, and other hazards;
3) improve the efficiency of agricultural production by developing integrated system approaches to management;
4) develop new agricultural products and processes and enhance quality of the state's food products;
5) improve the marketing of Oregon's agricultural products;

**ADMINISTRATION**

**WILSON C. "TOBY" HAYES**
*Interim Vice Provost for Research*

**RICHARD A. SCANLAN**
*Dean of Research*

**MARY E. NUNN**
*Sponsored Programs Officer*

**WILLIAM H. HOSTETLER**
*Director, Technology Transfer*
*Advancement of*

6) promote community development and develop the ability of both rural and urban people to provide better housing, jobs, and services to people of the state;
7) improve the nutritional value and quality of food and protect the consumers of Oregon's food products;
8) protect and improve the environment and quality of living for residents of the state;
9) assist developing countries in agriculture to promote trade with the United States and alleviate world hunger.

The station conducts research in the following departments and colleges: agricultural and resource economics, agricultural chemistry, animal sciences, bioresource engineering, botany and plant pathology, crop and soil science, entomology, fisheries and wildlife, food science and technology, home economics, horticulture, microbiology, rangeland resources, statistics, and veterinary medicine. Research is supported in other units such as the Center for Gene Research and Biotechnology, the Environmental Health Sciences Center, and the Western Rural Development Center. The Central Oregon Agricultural Research Center (Madras and Powell Butte), Eastern Oregon Agricultural Research Center (Burns and Union), Klamath Experiment Station (Klamath Falls), Malheur Experiment Station (Ontario), Hermiston Agricultural Research & Extension Center (Hermiston), Mid-Columbia Agricultural Research & Extension Center (Hood River), North Willamette Research & Extension Center (Aurora), Columbia Basin Agricultural Research Center (Pendleton and Moro), Southern Oregon Ag. Research & Extension Center (Medford), and the Coastal Oregon Marine Experiment Station (Newport and Astoria) branch stations provide opportunity for basic and applied field research programs in important agricultural areas of Oregon.

The station collaborates with the OSU Extension Service, the College of Agricultural Sciences' instructional and international agriculture programs, the U.S. Department of Agriculture, the U.S. Department of Interior, the U.S. Department of Commerce, and other federal and state agencies on research programs of interest to the state, the Pacific Northwest, the nation, and other countries.

## Center for Advanced Materials Research

Arthur W. Sleight, *Director*

The Center for Advanced Materials Research has been established to strengthen research and education in the properties, synthesis, and understanding of new materials, with special emphasis on materials of importance to Oregon's economy. It is an interdisciplinary program spanning nine departments in the Colleges of Engineering, Forestry, and Science. These are Chemical Engineering, Civil Engineering, Electrical and Computer Engineering, Mechanical Engineering, Nuclear Engineering, Forest Products, Chemistry, Mathematics, and Physics.

A degree of Master of Science in Materials Science provides for graduate training in materials science. Typically, this degree is pursued in parallel with studies in one of the departments that participate in the center.

Areas of research interest in the center are ceramics, composite materials (both natural and engineered), electronic materials, magnetic materials and superconductivity, metallurgy, optical materials, transportation materials, nuclear materials, polymers, surface science, analysis of materials, and theory. These efforts are interdisciplinary, and activity in one of these research areas may involve collaborative research between scientists in different departments.

## Center for Gene Research and Biotechnology

Russel H. Meints, *Director*

The Center for Gene Research and Biotechnology was established in 1983 to strengthen University research and teaching programs that are concerned with the structure, organization, and expression of genetic material, and to promote multidisciplinary basic research projects which will apply this basic information to problems of practical importance.

The Center consists of active research scientists who use the techniques of molecular biology, tissue culture and monoclonal antibodies as well as protein and nucleic acid biochemistry in pursuit of their varied interests. Included are all the basic biological disciplines and the applied sciences of agriculture, forestry, veterinary medicine, food science, pharmacy, and marine science. Examples of specific research areas include cell, tissue, and embryo culture; isolation and characterization of genes; molecular mechanisms of bacterial and viral disease of plants and animals; nitrogen fixation, hormonal control of growth and development; molecular control of gene expression; micropropagation and regeneration of plants; development of vaccines; tissue culture, molecular and genetic techniques applied to plant and animal breeding programs. A Central Service Laboratory which now includes equipment and technical expertise for peptide sequencing, peptide synthesis, oligonucleotide synthesis, DNA sequencing, and computer-assisted analysis of protein and nucleic acid sequences, is available for faculty and students with active research programs in these areas.

Approximately 80 faculty members are associated with the center and represent academic departments and colleges from throughout the campus. The center is an organizational unit under the vice provost for research and international studies. Various activities are coordinated by the director in consultation with two advisory groups; one composed of scientists actively engaged in research, the other of administrators from the main academic units and the Agricultural Experiment Station.

### The Center for the Humanities

Peter J. Copek, *Director*

The Center for the Humanities, established in 1984, is primarily concerned with the advancement of interdisciplinary humanities research. The center consists of visiting scholars as well as OSU resident fellows engaged in collaborative and individual research, and coordinates much of its activity around an annual theme. Themes are recommended by an Advisory Board composed of faculty from throughout the campus. The center also hosts or co-sponsors research conferences, seminars, film and lecture series, and numerous public programs. In addition, it maintains an undergradute certificate program in Twentieth Century Studies which was developed during the early years of activity. The center's fundamental concern is the improvement of the quality of humanities research and teaching at OSU. It is located just off campus in Autzen House, 811 S.W. Jefferson Avenue.

### Center for Analysis of Environmental Change

M. H. Unsworth, Ph.D., *Director*

The mission of the Center for Analysis of Environmental Change (CAEC), which was established in 1991, is to serve as a catalyst for multidisciplinary research on the causes and consequences of environmental change, and to provide opportunities for learning and discussion about complex environmental issues.

The Center achieves its mission by activities on three themes. First, facilitating new research collaboration. Environmental research in the university increasingly involves multidisciplinary collaboration that crosses departmental and college boundaries. Principal roles for the Center are therefore to facilitate cross-college interaction that enhances faculty awareness of new research opportunities, to stimulate new research collaboration, and to increase awareness of research facilities on campus.

Second, the Center helps OSU researchers to interact with external organizations. Results from OSU environmental research are often of great interest to state and federal agencies, industry and the general public, but research publications and presentations are often inappropriate methods of communication to these audiences. The Center aims to assist OSU researchers in presenting their results in socially- and policy-relevant ways, and in synthesizing and interpreting information on complex environmental issues. In this way, the Center acts as an interface between researchers and external 'consumers' of knowledge, increasing the visibility of OSU environmental research, and enhancing opportunities for faculty to advise on environmental issues.

Finally, the Center organizes meetings, discussions and workshops about complex environmental issues. These serve several purposes: they help OSU researchers to maintain awareness of emerging research opportunities, and to keep abreast with the latest research techniques; they showcase OSU interdisciplinary environmental research strengths, and they act as a focal point for discussion of cutting-edge environmental research. The meetings typically address complex emerging multidisciplinary environmental issues, to complement specific themes already well represented at the departmental level.

### Center for Salmon Disease Research

The faculty of Oregon State University have been in the forefront of salmon disease research for over 30 years, beginning with the pioneering efforts of Dr. John L. Fryer, OSU Distinguished Professor of the Department of Microbiology. During this time, faculty members engaged in salmonid disease research has increased and currently numbers twelve in four colleges. Investigators have trained many of the nation's professional fish pathologists and fish health researchers, have developed vaccines and diagnostic tests that are routinely used for cultured and wild stocks of fish, and have provided a wealth of knowledge on the pathogenic mechanisms and epidemiology of most of the serious salmonid diseases of the U.S. and the world. The Center for Salmon Disease Research (CSDR) was established in 1994 as a multidisciplinary unit to recognize this group as a Research and Educational Center within Oregon State University and the Oregon State System of Higher Education. Center investigators consist of faculty selected primarily from the College of Agricultural Sciences and the College of Science, with the involvement of several faculty from the College of Pharmacy, the College of Veterinary Medicine, and other units or institutions as appropriate.

The CSDR seeks to resolve disease problems which present a threat to the salmonid species of the Pacific Northwest, the nation, and the world. A central function of the Center is to promote and assist the salmonid disease research of Center investigators.

### Center for Study of the First Americans

Rob Bonnichsen, *Director*
Alice Hall, *Office Manager*

The mission of the Center for Study of the First Americans is the promotion of interdisciplinary scholarly dialogue and research, and the stimulation of public interest on the peopling of the Americas. Toward these goals, the Center provides leadership and coordination to scholars worldwide; creates and implements programs of study and research involving the physical, biological, and cultural sciences; and disseminates the product of the synergism through public education programs reaching a broad range of groups, from local school children to international scholars.

The Center is working toward establishing a program in First American Studies. For more information, write to the Center for Study of the First Americans, 355 Weniger Hall, or call (541) 737-4595.

### Consortium for International Development (CID)

Jack Van deWa0ter, Thayne Dutson, *Trustees*

The Consortium for International Development (CID) is a nonprofit corporation of 12 publicly supported universities located in the western region of the United States. CID's member institutions are the University of Arizona; California State Polytechnic University, Pomona; Colorado State University; the University of Hawaii, Manoa; the University of Idaho; University of Montana; New Mexico State University; Oregon State University; Texas Tech University; Utah State University; Washington State University; and the University of Wyoming.

CID's objectives are to encourage and facilitate the involvement of member universities and their faculties in international activities; to provide support for international project planning, implementation, and evaluation; and to assist the member universities' efforts to share their expertise with developing countries. The CID system provides a network through which interested faculty and staff at the member universities can interact with international donor agencies and host countries. It provides a means for each university to enhance its effectiveness in teaching, research, and public service through participation in international development activities.

## Pond Dynamics/Aquaculture Collaborative Research Support Program (CRSP)

Hillary S. Egna, *Director*

The Pond Dynamics/Aquaculture CRSP is one of a family of international agricultural research programs that are headquartered at US Land Grant Universities. CRSPs were initiated under Title XII legislation enacted by the US Congress. They are partially supported by the US Agency for International Development and through the participating US and host country institutions. Research conducted by these programs helps farmers improve their incomes and alleviate hunger without depleting the natural resource base on which they depend for food, fuel, fibre, and shelter. CRSPs work with international agricultural research centers, private industry, and non-governmental organizations in the U.S. and abroad.

Oregon State University is the lead institution for the Pond Dynamics/Aquaculture CRSP, which administers research and development activities for six institutions overseas and ten U.S. universities (five of which formerly participated in CIFAD, the Consortium for International Fisheries and Aquaculture Development). Present research locations include Thailand, Peru, Kenya, Guatemala, the Philippines, Honduras, and the United States; former sites included Panama, Indonesia, Egypt, and Rwanda. Since 1982, the Pond Dynamics/Aquaculture CRSP has focused on improving the efficiency of aquaculture systems through a unique collaborative process that brings together researchers from the U.S. and host countries to solve constraints in the generation and adoption of aquaculture technologies.

The three main research areas currently pursued by Oregon State University researchers in the CRSP are aquaculture systems modelling—in the Bioresource Engineering Department—and fish reproduction and aquatic ecology—in the Department of Fisheries and Wildlife. Other research has been conducted in fish physiology, women in development, and soils. New OSU research support projects include Education Development and Information Management—in the Office of International R&D—and Data Base Management, in the Bioresource Engineering Department.
http:www.orst.edu/dept/crsp/homepage.html

## Cooperative Institute for Marine Resources Studies

Lavern Weber, *Director*

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 and 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 has members from the Pacific Marine Environmental Laboratory in Seattle, the National Marine Fisheries Service and a number of departments at OSU. Headquarters are at the Hatfield Marine Science Center in Newport.

The broad goal of the Cooperative Institute for Marine Resource Studies is to coordinate marine research among OSU and other institutions. 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.

## Engineering Experiment Station

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:

a. To serve the industries, utilities, professional engineers, public departments, and engineering teachers by making investigations of significance and interest to them.
b. To stimulate and elevate engineering education by developing the research spirit in faculty and students.
c. 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 is an integral part of the College of Engineering. All staff members and laboratory facilities are available for the investigative work of the station. The associate dean of engineering is the director of the Engineering Experiment Station and guides the operation of the station to conform with state and institutional policies.

All research work is carried out by regular departmental engineering faculty and their graduate students. On-going projects are financed by grants and contracts from outside sponsors. It is, therefore, not possible to respond to requests which require research or investigations for which funding is not provided. General areas of research emphasis are listed below, by department.

*Chemical Engineering*—Biotechnology control, chemical reactor engineering, environmental engineering, heat transfer, high temperature materials, mass transfer, polymers, thermodynamics.

*Civil Engineering*—Environmental engineering, geotechnical engineering, ocean engineering, structural engineering, transportation engineering, water resources.

*Computer Science*—Parallel computing, software engineering and systems, artificial intelligence, programming languages.

*Electrical and Computer Engineering*—Solid state electronics, materials engineering, computer engineering, systems engineering, energy systems.

*Industrial Engineering*—Productivity, simulation modeling, expert systems, computer integrated manufacturing systems and robotics, artificial intelligence, human factors.

*Mechanical Engineering*—Design and manufacturing, concurrent engineering, computer aided design, expert systems, robotics, wind power generation, materials science, heat transfer, energy systems, combustion, fluid mechanics.

*Nuclear Engineering*—Nuclear reactor thermal hydraulics, space reactor system design, fusion, nuclear waste management, radioactive material, transportation of radioactive materials, reactor operations, management and safety, radiation instrumentation.

## Environmental Health Sciences Center

William M. Baird, *Director*

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-Provost for Research and International Programs it provides resources for coordination and stimulation of interdisciplinary basic research and training related to 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 agricultural chemistry, chemistry, biochemistry and biophysics, toxicology, molecular 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 M.S./Ph.D. interdisciplinary graduate Toxicology Program as well as being faculty for the ongoing predoctoral and postdoctoral training program supported by the National Institute of Environmental Health Sciences 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 on request.

## Environmental Remote Sensing Applications Laboratory

William J. Ripple, *Director*

Coincident with the launch of the first Landsat satellite in 1972, the National Aeronautics and Space Administration provided funding to Oregon State University for the establishment of the Environmental Remote Sensing Applications Laboratory. NASA and OSU jointly agreed that this campus would be one of a select group of universities to conduct research in the rapidly developing field of remote sensing. Since that beginning, ERSAL scientists, graduate students, colleagues at Oregon State University, and colleagues in state and federal agencies have conducted a variety of programs that integrate remote sensing and related technologies in geographic information systems (GIS). ERSAL is located in the Department of Forest Resources within the College of Forestry at Oregon State University.

"Remote sensing" refers to the acquisition, processing, analysis, and interpretation of reflected and emitted radiation from targets of interest, usually features on the surface of the earth: plants, soil, minerals, water, etc. At ERSAL, data acquired from detectors mounted in satellites, aircraft, and field instruments are used to study the spectral properties of vegetation-soil systems. Information regarding these properties is then used to develop techniques for detecting, classifying, mapping, and quantifying vegetation cover and the condition of vegetation. Examples of research topics include landscape ecology, remote sensing of forest fires, forest structure, forest landscape patterns, wildlife habitat, aspen ecology, and ecosystem analysis.

With combined funding from federal, state agencies and private sources, the ERSAL research program develops and applies remote sensing and GIS technology for the study of forest lands and related natural resource problems.

## Forest Research Laboratory

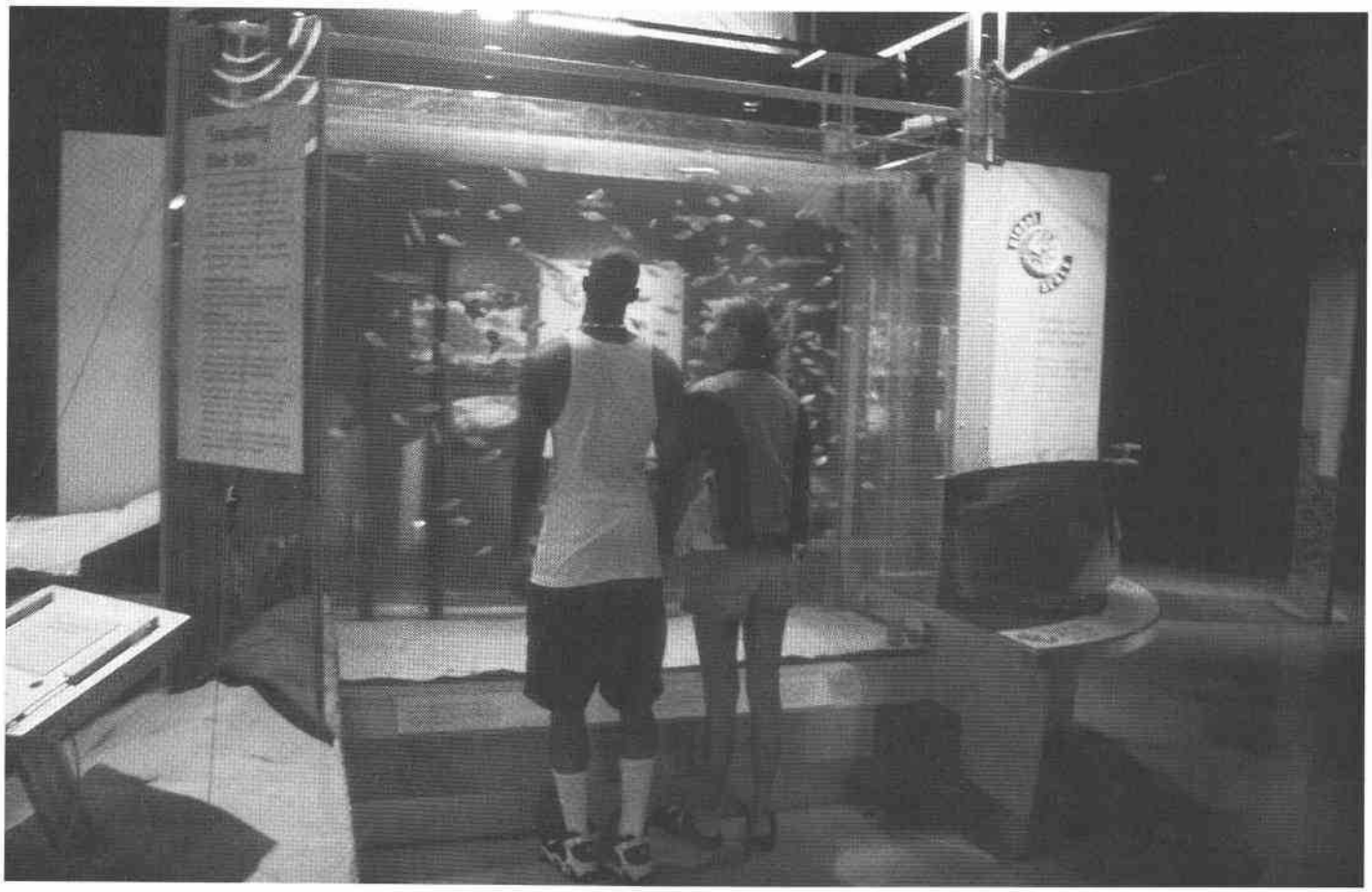
George W. Brown, *Dean, Director*

The Forest Research Laboratory is Oregon's forestry research agency; 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 wood products plants throughout Oregon.

Activities are organized within five program areas which draw upon faculty expertise in the College of Forestry's Departments of Forest Engineering, Forest Products, Forest Science, and Forest Resources; and, with jointly appointed faculty in the Departments of Botany and Plant Pathology, Entomology, Fisheries and Wildlife, and Soil Science. Research program areas are forest regeneration; forest ecology, culture, and productivity; protecting forests and watersheds; evaluating forest uses and practices; and wood processing and products performance. Interdisciplinary teamwork is characteristic of many of the research projects. The program supports research of graduate students in forest genetics, economics, physiology, biometrics, hydrology, entomology, pathology, forest soils, forest engineering, recreation, forest policy, silviculture, ecology, and wood science.

This laboratory's program is designed to provide information enabling wiser public and private decisions concerning the management and use of Oregon's forest resources and the operation of the state's wood-using industries. As a result of this research, Oregon's forests produce more forest products, water, forage, fish, wildlife, and recreation; wood is harvested and used more efficiently; forests are used more intensively and effectively; employment, production, and profitability in dependent industries are strengthened; and assistance is provided in maintaining a quality environment for Oregonians.

The Forest Research Laboratory, the Corvallis Forestry Sciences Laboratory of the U.S. Forest Service, and related research conducted elsewhere on campus combine to form the largest concentration of forest science research in North America.



## INTEGRATED PLANT PROTECTION CENTER

Marcas Kogan, *Director*

The Integrated Plant Protection Center (IPPC) was established in 1991 to expand the programmatic scope and geographic range of activities of the former International Plant Protection Center that was chartered by Oregon State University in 1969. The new IPPC focuses primarily on the development and implementation of integrated pest management programs and in promoting modern pesticide management activities in the state of Oregon. While stressing domestic activities, IPPC will continue to develop, foster, and support effective pest and pesticide management programs in developing countries. IPPC is supported by the Oregon State University Extension Service, the Agricultural Experiment Station, and operates in cooperation with the Office of International Research and Development.

The Center is recognized as one of the leading information clearinghouses for weed research and control technology and for small pesticide application equipment. IPPC serves as an extensive specialized source of information on plant protection. IPPC maintains a document collection that is particularly strong in weed science. The collection has been recently expanded to include entomological and general IPM literature with the incorporation of over 10,000 documents that were part of the library of the Consortium for International Crop Protection, formerly at the University of Maryland. The combined collections represent a valuable informational resource bank on integrated pest management. IPPC supports the activities of IPMNet, a computerized system for IPM information dissemination through the Internet. DIR (Directory of IPM Resources), developed of IPPC in colleboration with CICP and the National IPM Netowkr, organizes and provides direct access to IPM information on over 2,000 sites on the world wide web <http://www.ippc.orst.edu/cicp/>. IPMNet News, a monthly electronic newsletter, is produced at IPPC and posted in the web.

IPPC has assumed the role of coordinating unit for pesticide related issues within the Cooperative Extension Service. An office of pesticide coordinator was established, and the Pesticide Applicator Certification training program is under the umbrella of IPPC. In addition, the Center promotes interdisciplinary research and training in integrated pest management on a worldwide basis with emphasis on alternative, non-chemical control methods, including biological control, host plant resistance, and cultural methods. The Center coordinates its activities with several departments in the Colleges of Agricultural Sciences, Forestry, and Science; and it links with other state and federal government agencies, international agencies under the aegis of the United Nations, private foundations, the family of international agricultural research centers and several foreign national research and education institutions. The Center's internationally experienced staff, drawn from several departments at OSU, is supported by an independent administrative infrastructure.

## INTER-UNIVERSITY CONSORTIUM FOR POLITICAL AND SOCIAL RESEARCH (ICPSR) DATA PROJECT

Karyle Butcher, *Director*, The Valley Library

As the world's largest data archive, ICPSR acquires, processes, and distributes data. Holdings are housed at the University of Michigan and contain over 30,000 machine-readable files.

Oregon State University is among the 350 colleges and universities worldwide that are members of ICPSR. Membership entitles the OSU community to all data sets in the archive at no charge, access to variable searches through the World Wide Web, and reduced fees to attend the Summer Program in Quantitative Methods.

Funding for the ICPSR Data Project is provided by the Library. The Project supports the annual membership fee and the part-time services of the ICPSR Research Consultant who provides assistance in conducting variable searches, ordering data sets, and downloading data.

### Laboratory Animal Resources

Barbara Smith, DVM, PhD, Dipl.ACVS, *Director*

Laboratory Animal Resources, is a University-wide service organization. The office is housed in the Laboratory Animal Resources Center. This organization has been charged with the care and humane treatment of all warm- blooded laboratory animals used in research and teaching. Technicians at the center service facilities in eight different buildings on campus. In addition, the following services are provided: procurement and quarantine of all warm-blooded laboratory animals; constant health monitoring of animals and personnel; and consultation with investigators on animal care, experimental design, special procedures, and beneficial animal models.

### Mark O. Hatfield Marine Science Center (Newport, Oregon)

Lavern J. Weber, *Director*

The Marine Science Center is located on a 49-acre site in Newport adjacent to Yaquina Bay and one mile from the Pacific Ocean. The facility is operated by the University to serve the general public, the staff of OSU, sister institutions, and cooperating state and federal agencies. The University encourages all workers in the marine sciences whose research, instruction, or extension activities require a coastal site to use the center facilities.

Main buildings provide 200,000 square feet of office, library, classroom, and fresh and salt water laboratory space and include a public auditorium and aquarium. Buildings include the Marine Science Center, Oregon Department of Fish and Wildlife Marine Region Headquarters, the Newport Aquaculture Laboratory and Research Support Facility of the National Marine Fisheries Service, Environmental Protection Agency, U.S. Fish and Wildlife Service, Guin Library, and ship support facilities of the College of Oceanography. Dock areas serve the OSU ship Wecoma. There are housing and self-service kitchen facilities for up to 82 students and visiting staff members.

Research projects currently involve more than 280 staff members from the Colleges of Agricultural Sciences, Oceanography, Pharmacy, and Science; the Extension Service; the U.S. Environmental Protection Agency; the National Marine Fisheries Service; the Ocean Environment Research Division of NOAA; the Cooperative Institute for Marine Resource Studies; the Oregon Department of Fish and Wildlife, and the Coastal Oregon Productivity Enhancement (COPE) program. The instruction program focuses on aquaculture and marine biological aspects of tidal, estuarine, and nearshore marine environments, subjects for which the center's location provides a natural laboratory. Extension work concentrates on programs of interest to the general public and to the coastal fishing industry. Much of the research and extension work of the OSU Sea Grant College Program is conducted at the center.

The public area has more than 280,000 visitors annually, including about 8,000 elementary and high school students. The area has undergone extensive renovation. Interactive exhibitry, computer simulations, videos and aquariums focus on marine research conducted at OSU. The theme, "Searching for Patterns in a Complex World," connects research topics from global perspectives down through the microscopic level. Educational programs such as Seatauqua for adults and Sea School programs for students are offered year-round. Potential users of center facilities are invited to write to the director, outlining their needs.

### Marine/Freshwater Biomedical Center

George S. Bailey, *Director*

The Marine/Freshwater Biomedical Sciences Center has as its mission the development and use of aquatic models, principally the rainbow trout, to investigate environmental problems of human health concern. As recognized by the National Institutes of Health, fish are sensitive, low-cost, comparative vertebrate models that reduce dependence on mammalian species for health-related research. The Center was established initially in 1985 through core support from the National Institute of Environmental Health Sciences, and was formally established as a research Center of Excellence through the State Board of Higher Education in 1989.

Center research has historically focused on cancer and its modulation by dietary environmental factors. Attention has been given to the basic mechanisms and causes of cancer, and to naturally occurring dietary factors capable of preventing or inhibiting the cancer process. Center investigators have also used fish models for the study of aging, immune function, environmental pollution, and stress response. A new focus of the center involves research on the chemistry of marine toxins and nerve gasses and their neurotoxicology in fish models. A multidisciplinary team of senior investigators and students from three colleges at OSU provides expertise in pharmacology, biochemistry, molecular genetics, chemistry, and pathology in a collaborative environment. The center's work on the interactions between environmental agents, diet, and cancer, including the possibility of dietary chemoprevention, supports the research, teaching, and extension mission of OSU as a Land Grant university.

To support these functions, the Center provides research funds for pilot studies leading to research grant applications, supports a schedule of seminars and visiting consultants, provides guidance in program development through annual external program review by invited experts, and supports a trout hatchery/histopathology research core facility that is unique worldwide.

### Nuclear Science and Engineering Institute

Brian Dodd, *Director*

Established in 1966, this institute coordinates curricular matters in nuclear science and engineering at the graduate and undergraduate levels. It also implements fellowship programs, graduate training programs, short-course programs, research programs, and seminar programs that are not managed by individual departments and are interdisciplinary in nature.

### Nutrition Research Institute

Phil Whanger, *Chairperson*

Established in 1965, this institute recognizes that provision of an nutritious food supply is a major continuing problem for humanity, and that various disciplines at Oregon State University are uniquely positioned to deal with it. The institute is dedicated to the advancement of knowledge of nutrition and its effective application in the improvement of human health and welfare. The institute has been designed to be complementary to and not competitive with existing administrative units. As such, its broad objectives are the encouragement, stimulation, facilitation, and coordination of research in various areas practiced in relevant departments and colleges of the University.

The institute welcomes applications for membership from campus scientists having a major interest in nutrition. Associate membership is available to graduate students and post-doctorals having similar interests. It operates through a chairperson and nutrition advisory group.

Activities include sponsorship of visiting lectureships and organization of seminars, symposia and workshops. The institute holds an annual meeting near the end of each academic year at which it recognizes outstanding research contributions in nutrition through an award.

## Linus Pauling Institute

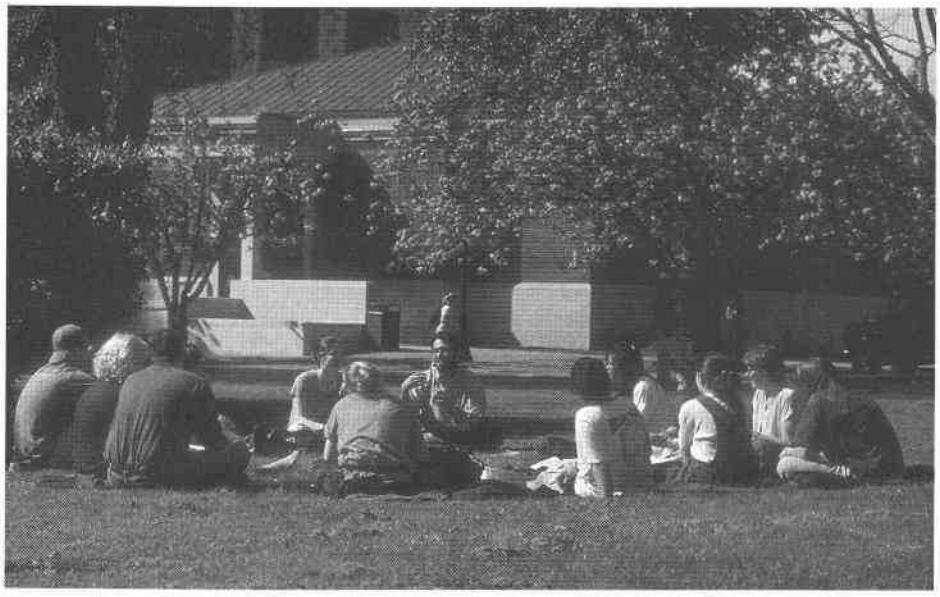
Balz Frei, *Director*

In 1996, the Linus Pauling Institute (LPI) was established at Oregon State University as a living memorial to Linus Pauling, an alumnus (1922) of OSU. Linus Pauling who died in 1994 at the age of 93, was a world-renowned scientist, humanitarian, educator, and health proponent. He is the only recipient of two unshared Nobel Prizes (Chemistry in 1954, Peace in 1962). The mission of the Institute is to engage in interdisciplinary efforts to elucidate the molecular mechanisms and physiological effects of micronutrients of food, including vitamins and phytochemicals. The Linus Pauling Institute continues the pioneering efforts of Linus Pauling in orthomolecular medicine; an area of medicine devoted to restoring the optimal concentrations and functions at the molecular level of the substances (e.g. vitamins) normally present in the body. The major aspects of the mission and research of the Linus Pauling Institute is basic and applied research of the application of nutritional factors to health promotion by intervention and disease prevention. Areas of research interests include mechanisms and treatment of cardiovascular disease, cancer, aging, immune dysfunction, infectious diseases, and diseases caused by exposure to toxins. The Linus Pauling Institute provides financial support for the Linus Pauling Endowed Chair held by the director, research activities, student training, pilot projects, sponsorship of meetings, and community outreach. The Linus Pauling Institute is located on the fifth floor of Weniger Hall.

## Radiation Center

Brian Dodd, *Director*

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-II research nuclear reactor (licensed to operate at 1,100 kilowatts when running at a steady power level and at 3,000 megawatts in the pulsing mode); a cobalt-60 gamma irradiator; a number of gamma radiation spectrometers and associated germanium detectors; a neutron radiography facility capable of taking still or very high speed radiographs; 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 animal and 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, neutron diffraction, 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 all law enforcement agencies.

## Sea Grant College Program

Robert E. Malouf, *Director*

Oregon Sea Grant takes an integrated approach to addressing the problems and opportunities of Oregon's marine resources. Oregon Sea Grant's three related primary activities—research, education, and extension services—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 fields. They include coastal natural hazards; ocean productivity and fisheries; biotechnology; seafood; fish and shellfish disease control; and law and public policy analysis. Oregon Sea Grant has been an innovator in promoting cooperative Pacific regional research and development. The program also provides professional, technical, and public education, as well as Extension services through the Extension Sea Grant program. In addition, Sea Grant administration provides support for OSU graduate students to study important marine and coastal problems and to participate in research administration.

Oregon Sea Grant Communications offers publication and other media support for program participants. The communications specialists operate from within Sea Grant administration and cooperate with other information offices at Oregon State University. Sea Grant Communications also prepares news releases and radio programming as part of a broader effort to inform the public about marine resource issues.

Multidisciplinary and interdisciplinary in operation, the Oregon Sea Grant program involves faculty and students in the Colleges of Liberal Arts, Science, Agricultural Sciences, Engineering, Oceanic and Atmospheric Sciences, and Pharmacy. Participants in the program also include the University of Oregon and Linfield College.

Oregon Sea Grant also maintains close relationships with several research facilities on the Oregon coast, among them the OSU Mark O. Hatfield Marine Science Center in

Newport and the Seafood Laboratory in Astoria.

The users of Oregon's marine resources are key contributors to the program. An advisory council of marine industry and coastal community leaders provides external review of program emphasis and progress.

### Survey Research Center

Virginia Lesser, *Director*

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.

### Transportation Research Institute

James R. Lundy, *Director*

The Transportation Research Institute (TRI) was established in 1962 to enhance research and interaction within the University and to serve as a link with other universities, industry, and government on transportation-related issues. The institute conducts a variety of research efforts, including traditional single-disciplinary and multidisciplinary research, and also serves as a clearinghouse and central source of transportation-related information.

The institute encourages faculty interaction from the Colleges of Engineering, Forestry, Agricultural Sciences, Oceanography, Business, Science, and Liberal Arts. The major areas of activity include transportation system economics, policy, and regulation; geotechnical engineering and highway materials testing; transportation systems planning, traffic operations, and safety; low-volume road design, construction, and maintenance; transportation for resource development; rural transportation; sociopolitical and behavioral factors; transportation for persons with disabilities; and environmental and energy factors. An advisory committee of professionals familiar with the transportation issues and problems in the Northwest provides guidance to the TRI faculty.

Extensive facilities are available to institute members and students. These include computerized literature search capabilities, an electronic computing center, and a complete soils and materials testing laboratory. The laboratory houses closed-loop servo-controlled test systems, as well as a walk-in cold room for testing frozen soils. Also available are complete hydrology and hydraulic labs for drainage and hydraulic studies and 14,000 acres of timberland reserved for teaching and research, available through the College of Forestry.

### University Corporation for Atmospheric Research (UCAR)

Richard A. Scanlan, Jeffrey R. Barnes, *OSU Member Representatives*

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 which 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.

### Water Resources Research Institute

Kenneth J. Williamson, *Director*

The Water Resources Research Institute was established in 1960 to foster, encourage, and facilitate research and education related to quantity and quality of water available for beneficial uses. The institute is administered under the Dean of Research with an executive committee of the deans of the Colleges of Agricultural Sciences, Engineering, and Forestry. Membership includes all faculty members in higher education in Oregon who are engaged in water resources research and teaching, currently about 200 persons in more than 40 departments in 12 universities and colleges in Oregon. The institute assists in organizing multidisciplinary groups of University personnel for research and technology transfer on water management concerns in Oregon.

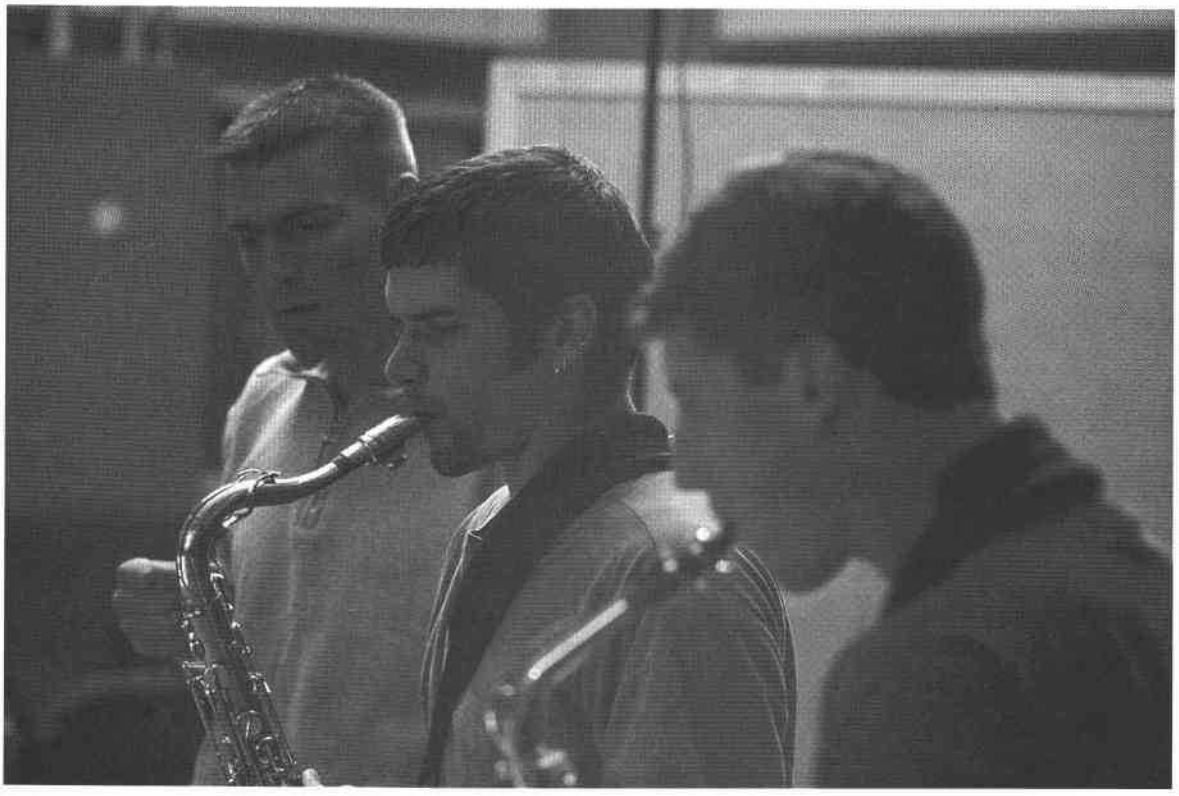
Extensive facilities available to institute members and students include forested watershed lands, streams with a wide range of characteristics, branch agricultural equipment stations, field measuring equipment, soils laboratories, experimental water and waste treatment facilities, freshwater science laboratories, experimental streams, a hydraulics laboratory, and a radiation center. Research projects are conducted in the areas of water supply and quality, planning and management, systems analysis, legal and institutional complexities, and water uses and use impacts. Research assistantships and fellowships are available through many of the member departments.

The institute works closely with state and federal agencies in its research and information transfer programs. Seminars are sponsored during fall term to address water issues. Research reports are given wide distribution through the institute's information dissemination program. Workshops are organized on topics of current interest.

### Western Rural Development Center

Russell C. Youmans, *Director*

The Center is funded from federal and grant sources. The mission of the WRDC is to strengthen rural families, communities, and businesses by facilitating collaborative socio-economic research and extension through higher education institutions in the western region. It is one of four in the nation focusing on applied social science research and education programs with impact on quality of rural life. Proposals for funding are submitted by states in the region for support to extend research or education programs into a regional context.



## 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.

### PRESIDENTS EMERITUS

**Byrne, John Vincent** 1960, 1984 President Emeritus & Prof Emeritus Oceanic & Atmospheric Sciences

**MacVicar, Robert William** 1970 President Emeritus & Prof Emeritus Chemistry

### VICE PRESIDENTS/VICE PROVOSTS EMERITUS

**Keller, George H.** 1975 Vice Provost Emeritus for Research, & Int'l Programs, Prof Emeritus Oceanic & Atmospheric Sciences

**Popovich, Milosh** 1947 Vice President Emeritus for Administration, Prof Emeritus Mechanical Engineering

**Trow, Jo Anne J.** 1965 Vice Provost Emeritus for Student Affairs, Prof Emeritus Education

### DEANS EMERITUS

**Burgess, Fredrick J.** 1953 Dean Emeritus Engineering, Prof Emeritus Civil Engineering

**Briskey, Ernest Joseph** 1979 Dean Emeritus Agriculture, Prof Emeritus Food Science & Technology

**Calvin, Lyle David** 1953 Dean Emeritus Graduate School, Prof Emeritus Statistics

**Cooney, Wilbur Tarlton** 1937 Dean Emeritus Agriculture, Prof Emeritus Poultry Science

**Gilkey, Gordon Waverly** 1947 Dean Emeritus Liberal 1968 Prof Emeritus Russian

**Long, James Waldo** 1966 Dean Emeritus Health & Physical Education, Prof Emeritus Physical Education

**Maksud, Michael George** 1980 Dean Emeritus Health & Human Performance, Prof Emeritus Exercise & Sport Science

**Nicodemus, David Bowman** 1950 Dean of Faculty Emeritus, Prof Emeritus Physics

**Poling, Dan Williams** 1937 Dean Emeritus of Men & Prof Emeritus

**Stoltenberg, Carl Henry** 1966 Dean Emeritus Forestry, Prof Emeritus Forest Resources

**Tucker, Sylvia B.** 1975 Dean Emeritus Education, Prof Emeritus Education

**Wedman, E. Edward** 1971 Dean Emeritus Veterinary Medicine, Prof Emeritus Veterinary Medicine

**Wilkins, B. H.** 1961 Dean Emeritus College of Liberal Arts, Prof Emeritus Economics

**Williamson, Stanley E.** 1946 Dean Emeritus Education, Prof Emeritus Science Education

**Wilson, Charles O.** 1959 Dean Emeritus Pharmacy, Prof Emeritus Pharm Chem

### LIBERAL ARTS

**Adolf, Leonard Allen** 1955 Prof Emeritus History

**Andrick, Virginia** 1970 Asst Prof Emeritus Architecture

**Anton, Peter** 1956 Prof Emeritus Philosophy

**Beals, Kenneth Louis** 1970 Prof Emeritus Anthropology

**Bennett, Cleon Vernon** 1958 Prof Emeritus Speech Communication

**Borgir, Tharald** 1967 Prof Emeritus Music

**Bowman, Marian Y.** 1964 Prof Emeritus Art

**Brye, Joseph Chester** 1947 Prof Emeritus Music

**Burt, George Sherwin** 1966 Assoc Prof Emeritus Psychology

**Butts, Irene** 1947 Instr Emeritus English

**Cadart-Ricard, Odette** 1965 Prof Emeritus French

**Campbell, William Alexander** 1966 Prof Emeritus Music

**Carlson, Roy Werner** 1958 Assoc Prof Emeritus English

**Carlson, Theodore Harold** 1962 Assoc Prof Emeritus Journalism

**Castle, Emery N.** 1954 Prof Emeritus Economics

**Clarke, Ronald Orville** 1963 Prof Emeritus Philosophy

**Conkey, Harlan D.** 1969 Prof Emeritus Speech Comm

**Cormack, Charles William** 1963 Prof Emeritus Anthropology

**Crisp, Lloyd Earle** 1972 Prof Emeritus Speech Communication

**Crooks, William Ramsden** 1947 Prof Emeritus Psychology

**Crozier, William Kenneth, Jr.** 1966 Prof Emeritus Art

**Dale, Robert D.** 1965 Assoc Prof Emeritus Philosophy

**Dankleff, Richard Elden** 1963 Assoc Prof Emeritus English

**Davis, Wilbur Arthur** 1966 Prof Emeritus Anthropology

**DeDeurwaerder, Charles A.** 1967 Prof Emeritus Landscape Architecture

**Doler, Thurston Ermon** 1949 Prof Emeritus Speech Comm

**Dorn, Harold Clarence** 1965 Prof Emeritus Journalism

**Dost, Jeanne** 1973 Prof Emeritus & Dir Emeritus of Women Studies

**Doudoroff, Eve-Mary** 1960-61 1963 Asst Prof Emeritus French & German

**Ellis, Russell Eugene** 1949 Prof Emeritus Architecture

**Farness, Donald H. K.** 1963 Assoc Prof Emeritus Economics

**Ferran, Francisco Rene** 1965 Asst Prof Emeritus Spanish

**Foreman, Walter Cyril** 1948 Prof Emeritus English

**Fox, Dorothy B.** 1928 Assoc Prof Emeritus Art

**Fuquay, Robert Frank** 1953 Prof Emeritus Political Science

**Garrison, Chester Arthur** 1954 Prof Emeritus English

**Gilkey, Gordon W.** 1947 Prof Emeritus Art

**Groshong, James Willard** 1946, 1950 Prof Emeritus English

**Gunn, Paul** 1948 Prof Emeritus Art

**Harris, Charles N.** 1946 Prof Emeritus Speech Comm

**Harris, Frederick Philip** 1967 Prof Emeritus Philosophy

**Harris, Irwin Cecil** 1945 Director Emeritus Student Publications, Prof Emeritus Journalism

**Harter, Lafayette George Jr.** 1960 Prof Emeritus Economics

**Hovland, Clarence Warren** 1949 Prof Emeritus Religious Studies

**Jenne, William Charles** 1965 Assoc Prof Emeritus Sociology

**Jones, Robert** 1962 Asst Prof Emeritus English

**King, David Burnett** 1962 Prof Emeritus History

**King, Roger Edward** 1954 Professor Emeritus English

**Kraft, Walter Carl** 1950 Prof Emeritus German

**Larsen, Knud Sonderhede** 1969 Prof Emeritus Psychology

**Lawrence, Margaret Lucille** 1945 Asst Prof Emeritus English

**Leman, Nancy Farwell** 1971 Instr Emeritus English

**Levine, Gloria A.** 1960 Assoc Prof Emeritus Spanish

**Levine, Shepard** 1954 Prof Emeritus Art

**Lovell, Ronald Paul** 1971 Prof Emeritus English

**Ludwig, Martin James** 1949 Asst Prof Emeritus English

**Maclean, Doris G.** 1963 Asst Prof Emeritus Foreign Lang & Lit

**Madden, Theodore Martin** 1959 Assoc Prof Emeritus Psychology

**Maddox, Russell W., Jr.** 1950 Prof Emeritus Political Science

**Malueg, Sara Ellen** 1966 Assoc Dean Emeritus Liberal Arts & Prof Emeritus French

**Martel, Donald Joseph** 1947 Prof Emeritus Landscape Architecture

**Mason, Robert George** 1961 Prof Emeritus Sociology

**McClenaghan, William Andrew** 1949 Prof Emeritus Political Science

**McClintock, Thomas Coshow** 1959 Assoc Dean Emeritus Liberal Arts & Prof Emeritus History

**McFarland, Floyd Brant** 1964 Prof Emeritus Economics

**McGrath, Edward G.** 1965 Prof Emeritus Political Science

**McIlvenna, Don Edward** 1965 Assoc Prof Emeritus History

**Meehan, Margaret Elizabeth** 1970 Senior Instr Emeritus History

**Meehan, Thomas Richard** 1962 Prof Emeritus History

**Metzer, Stuart Miles** 1962 Assoc Director Emeritus Facilities Planning & Assoc Prof Emeritus Architecture

**Munro, Alan A.** 1962 Prof Emeritus Art

**Murphy, Thomas A.** 1963-66, 1968 Assoc Prof Emeritus Psychology

**Orzech, Ze'ev B.** 1957 Prof Emeritus Economics

**Padfield, Harland Irving** 1972 Prof Emeritus Anthropology

**Patterson, Kenneth Denton** 1958 Prof Emeritus Economics

**Philipp, Kurt David** 1963 Assoc Prof Emeritus History

**Phillips, Robert L.** 1957 Prof Emeritus Journalism

**Plambeck, Hans Heinrich** 1946 Prof Emeritus Sociology

**Potts, Willard Charles** 1959 Prof Emeritus English

**Ross, Richard Everett** 1970 Prof Emeritus Anthropology

**Rossbacher, Peter Georg** 1968 Prof Emeritus Russian

**Rudinsky, Norma Leigh** 1965 Sr Instr Emeritus English

**Sandgren, Nelson E.** 1948 Prof Emeritus Art

**Shaw, Francis Harding** 1955 Prof Emeritus History

**Shively, Stanley Edward** 1968 Assoc Prof Emeritus Sociology

**Simmons, Dale David** 1959-1963, 1966 Prof Emeritus Psychology

**Sjogren, Christine Oertel** 1960 Prof Emeritus German

**Solberg, Ingvald Ben** 1947 Assoc Prof Emeritus Landscape Arch

**Sorenson, Gary W.** 1970 Assoc Prof Emeritus Economics

**Sponenburgh, Mark R.** 1961 Prof Emeritus Art

**Stadsvold, Cyril V.** 1963 Assoc Prof Emeritus Art

**Starnes, Charles Edwin** 1976 Assoc Prof Emeritus Sociology

**Staver, Frederick Lee** 1957 Assoc Prof Emeritus English

**Taubman, Lisa Waite** 1956 Asst Prof Emeritus Psychology

**Taysom, Wayne P.** 1953 Prof Emeritus Art

**Tentchoff, Dorice M.** 1977 Asst Prof Emeritus Anthropology

**Towey, Richard Edward** 1962 Prof Emeritus Economics

**Trow, Clifford Wayne** 1965 Prof Emeritus History

**Vars, R. Charles, Jr.** 1966 Prof Emeritus Economics

**Verzasconi, Ray A.** 1967 Prof Emeritus Spanish

**Wallace, Allice L.** 1961 Asst Prof Emeritus Speech Comm

**Walls, Robert Boen** 1947 Prof Emeritus Music

**Warnath, Charles Frederick** 1961 Prof Emeritus Psychology

**Wax, Darold Duane** 1962 Prof Emeritus History

**Weaver, Roger Keys** 1962 Prof Emeritus English

**Wilkins, B. H.** 1961 Prof Emeritus Economics

**Willey, Dale Herbert** 1959 Asst Prof Emeritus English

**Wolfson, Murray** 1964 Prof Emeritus Economics

**Wong, Allen Quan** 1967 Prof Emeritus Art

**Wubben, Hubert Hollensteiner** 1963 Prof Emeritus History

**Yonker, Nicholas J.** 1962 Prof Emeritus Religious Studies

**Zwahlen, Fred Casper Jr.** 1950 Prof Emeritus Journalism

### SCIENCE

**Allen, Thomas C.** 1962 Prof Emeritus Botany & Plant Pathology

**Anderson, Arthur W.** 1953 Prof Emeritus Microbiology

**Anselone, Philip Marshall** 1964 Prof Emeritus Mathematics

**Arnold, Bradford Henry** 1947 Prof Emeritus Mathematics

**Baisted, Derek John** 1964 Prof Emeritus Biochemistry & Biophysics

**Ballantine, Charles S.** 1960 Prof Emeritus Mathematics

**Becker, Robert Richard** 1962 Prof Emeritus Biochemistry & Biophysics

**Bishop, Norman Ivan** 1963 Professor Emeritus Botany and Plant Pathology

**Boedtker, Olaf Alexander** 1963 Assoc Prof Emeritus Physics & Head Adviser Emeritus, Science

**Brady, James Joseph** 1937 Prof Emeritus Physics

**Brandt, William Henry** 1956 Assoc Prof Emeritus Botany

**Brunk, H. Daniel** 1969 Prof Emeritus Statistics

**Burch, David Stewart** 1958 Prof Emeritus Physics

**Calvin, Lyle David** 1953 Prof Emeritus Statistics

**Carter, David S.** 1961 Prof Emeritus Mathematics

**Chambers, Kenton L.** 1968 Prof Emeritus Botany

**Chilcote, William Wesley** 1950 Prof Emeritus Botany

**Conte, Frank Philip** 1961 Prof Emeritus Zoology

**Corden, Malcolm Ernest** 1958 Prof Emeritus Botany & Plant Pathology

**Cutler, Melvin** 1963 Prof Emeritus Physics

**Daniels, Malcolm** 1965 Prof Emeritus Chemistry

**Dawson, Peter Sanford** 1969 Prof Emeritus Zoology

**Deardorff, James W.** 1978 Prof Emeritus Atmospheric Sciences

**Decker, Fred W.** 1946 Assoc Prof Emeritus Atmospheric Sciences

**Denison, William Clark** 1966 Assoc Prof Emeritus Botany & Plant Pathology

**Drake, Charles Whitney** 1966 Prof Emeritus Physics

**Easterday, Harry Tyson** 1960 Prof Emeritus Physics

**Elliker, Paul Reuben** 1947 Prof Emeritus Microbiology

**Evans, Harold J.** 1961 Distinguished Professor Emeritus Plant Physiology & Director Emeritus Nitrogen Fixation Laboratory

**Faulkenberry, G. David** 1967 Prof Emeritus Statistics

**Field, Cyrus West** 1963 Prof Emeritus Geosciences

**Firey, William James** 1961 Prof Emeritus Mathematics

**Fontana, Peter Robert** 1967 Prof Emeritus Physics

**Fredericks, William J.** 1962 Prof Emeritus Chemistry

**Freeman, Peter Kent** 1968 Prof Emeritus Chemistry

**Frenkel, Robert Edgar** 1965 Prof Emeritus Geography

**Freund, Harry** 1947 Prof Emeritus Chemistry

**Fryer, John L.** 1963 Distinguished Professor Emeritus Microbiology

**Gleicher, Gerald Jay** 1966 Prof Emeritus Chemistry

**Godard, Russell Holcomb** 1950 Asst Prof Emeritus Mathematics

**Hawkes, Stephen James** 1968 Prof Emeritus Chemistry

**Hedberg, Kenneth Wayne** 1956 Prof Emeritus Chemistry

**Hewson, Wendell** 1968 Prof Emeritus Atmospheric Sciences

**Hisaw, Frederick Lee Jr.** 1958 Assoc Prof Emeritus Zoology

**Jensen, Harold James** 1950 Prof Emeritus Botany & Plant Pathology

**Jensen, James Herbert** 1961 Prof Emeritus Botany & Plant Pathology

**Jensen, John Granville** 1946 Prof Emeritus Geography

**Johnson, W. Curtis** 1968 Prof Emeritus Biochemistry & Biophysics

**Johnston, La Rea Dennis** 1959 Sr Instr Emeritus Botany & Plant Pathology

**Kaplan, Edward Lynn** 1961 Prof Emeritus Mathematics

**Krueger, Hugo Martin** 1948 Prof Emeritus Zoology

**Lattin, John Daniel** 1955 Prof Emeritus Entomology

**Lonseth, Arvid T.** 1948 Prof Emeritus Mathematics

**Loomis, Walter David** 1953 Prof Emeritus Biochemistry & Biophysics

**Lyford, John Higgins, Jr.** 1966 Assoc Prof Emeritus Biology

**MacDonald, Donald Laurie** 1962 Prof Emeritus Biochemistry & Biophysics

**MacVicar, Robert William** 1970 Prof Emeritus Chemistry

**Madsen, Victor Arviel** 1963 Prof Emeritus Physics

**Marvell, Elliot N.** 1958 Prof Emeritus Chemistry

**McIntire, Charles David** 1964 Prof Emeritus Botany & Plant Pathology

**Moore, Larry Wallace** 1969 Prof Emeritus Botany & Plant Pathology

**Moore, Thomas Carrol** 1963 Prof Emeritus Botany & Plant Pathology

**Morita, Richard Y.** 1962 Prof Emeritus Microbiology

**Morris, Robert James Jr.**1965 Assoc Prof Emeritus Geosciences

**Muckleston, Keith Way**1964 Prof Emeritus Geosciences

**Musser, Gary Loren** 1972 Prof Emeritus Mathematics

**Narasimhan, Mysore N.L.** 1966 Prof Emeritus Mathematics

**Newberger, Stuart M.** 1969 Assoc Prof Emeritus Mathematics

**Newburgh, Robert Warren** 1953 Prof Emeritus Biochemistry

**Nicodemus, David Bowman** 1950 Prof Emeritus Physics

**Northam, Ray** 1966 Prof Emeritus Geography

**Oles, Keith Floyd** 1961 Prof Emeritus Geosciences

**Overholser, Donald L.** 1965 Sr Instr Emeritus Microbiology

**Overton, Walter Scott** 1965 Prof Emeritus Statistics

**Owczarzak, Alfred** 1955 Assoc Prof Emeritus Zoology

**Pease, James Robert** 1973 Prof Emeritus Geosciences

**Peterson, Roger C.** 1965 Prof Emeritus Statistics

**Piepmeier, Edward Harman** 1966 Prof Emeritus Chemistry

**Pierce, Donald Alan** 1966 Prof Emeritus Statistics

**Poole, Albert Roberts** 1946 Prof Emeritus Mathematics

**Powelson, Robert Loran** 1956 Prof Emeritus Botany & Plant Pathology

**Pritchard, Austin Wyatt** 1953 Prof Emeritus Zoology

**Reed, Donald James** 1962 OSU Distinguished Prof Emeritus Biochemistry & Biophysics

**Richardson, Daryl Garnet**1973 Prof Emeritus Horticulture

**Roth, Lewis Franklin** 1940 Prof Emeritus Botany

**Russell, Sterling Arthur**1963 Sr Instr Emeritus Botany & Plant Pathology

**Sandine, William E.** 1958 OSU Distinguished Professor Emeritus Microbiology

**Schecter, Larry** 1955 Prof Emeritus Physics

**Schmitt, Roman A.** 1966 Prof Emeritus Chemistry

**Scott, Allen B.** 1941 Prof Emeritus Chemistry

**Shoemaker, Clara Brink** 1970 Prof Emeritus Chemistry

**Smith, John Wolfgang** 1964 Prof Emeritus Mathematics

**Smith, Kennan Tayler** 1968 Prof Emeritus Mathematics

**Spencer, James Brookes** 1963 Assoc Prof Emeritus General Science

**Stalley, Robert Delmer** 1956 Prof Emeritus Mathematics

**Storm, Robert Macleod** 1948 Prof Emeritus Zoology

**Swenson, Leonard Wayne** 1968 Prof Emeritus Physics

**Taubeneck, William H.** 1955 Prof Emeritus Geology

**Terriere, Leone C.** 1950 Prof Emeritus Entomology

**Thomas, David Reginald** 1967 Prof Emeritus Statistics

**Thomas, Thomas Darrah** 1971OSU Distinguished Prof Emeritus Chemistry

**Van Holde, Kensal Edward** 1967 Distinguished Prof Emeritus Biochemistry & Biophysics

**VanDyke, Henry**1963 Prof Emeritus General Science

**Wang, Chi H.**1950 Prof Emeritus Chemistry, Nuclear Engineering & Director Emeritus Radiation Center

**Williams, Max Bullock**1941 Prof Emeritus Chemistry

**Willis, David Lee** 1962 Prof Emeritus Radiation Biology & General Science

**Yeats, Robert S** 1977 Prof Emeritus Geosciences

**Yoke, John Thomas** 1964 Prof Emeritus Chemistry

**Young, Roy A.** 1948 Prof Emeritus Plant Pathology

### AGRICULTURAL SCIENCES & EXTENSION SERVICES

**Adair, John** 1953 Sr Instr Emeritus Animal Sciences

**Adams, David Gordon** 1972 Prof Emeritus Horticulture

**Adams, Frank William** 1953 Asst Prof Emeritus Agricultural Chemistry

**Adams, Holyoke P.** 1971 Prof Emeritus Animal Sciences

**Allyn, Margaret Marie** 1954 Asst Prof Emeritus Extension

**Andersen, Wilbert Lowell** 1956 Assoc Prof Emeritus Extension Ed

**Anderson, Nelson Christian** 1946 Prof Emeritus Extension

**Anderson, Norman Herbert** 1962 Prof Emeritus Entomology

**Anderson, Roberta Frasier** 1959 Prof Emeritus Extension

**Anglemier, Allen F.** 1956 Prof Emeritus Food Science & Technology

**Apple, Spencer Butler Jr.** 1950 Prof Emeritus Horticulture

**Appleby, Arnold Pierce** 1959 Prof Emeritus Crop & Soil Science

**Arscott, George H.** 1953 Prof Emeritus Poultry Science

**Baggett, James Ronald** 1956 Prof Emeritus Horticulture

**Bailey, Leeds Crim** 1941 Assoc Prof Emeritus Extension

**Baron, Lloyd Carol** 1945-46 1957 Prof Emeritus Extension

**Becker, Manning Henry** 1948 Prof Emeritus Ag & Res Economics

**Bedell, Thomas** 1966-70, 1973 Prof Emeritus Extension

**Bernier, Paul E.** 1947 Prof Emeritus Poultry Science

**Berry, Donald Wilson** 1954 Prof Emeritus Extension

**Besse, Ralph Stephen Jr.** 1963 Prof Emeritus Int'l Agriculture

**Binder, Julius Floyd** 1952 Assoc Prof Emeritus Extension

**Black, Harold Mayfield** 1949 Prof Emeritus Extension

**Blanch, Grant Etherington** 1945 Prof Emeritus Ag & Res Economics

**Bluhm, Wilbur L.** 1957 Prof Emeritus Extension

**Bolton, Floyd E.** 1967 Assoc Prof Emeritus Crop Science

**Bodyfelt, Floyd Walter** 1964 Prof Emeritus Food Science & Technology

**Boersma, Larry** 1960O SU Distinguished Prof Emeritus Crop & Soil Science

**Bolton, Floyd E.**1967 Assoc Prof Emeritus Crop Science

**Bond, Carl Eldon** 1949 Prof Emeritus Fisheries & Wildlife

**Bonham, Earl Edward** 1955 Assoc Prof Emeritus Extension

**Booster, Dean Emerson** 1956 Prof Emeritus Ag Engineering

**Breese, Wilbur Paul** 1953 Prof Emeritus Fisheries & Wildlife

**Brewer, Donald Haden** 1957 Prof Emeritus Crop Science

**Briskey, Ernest Joseph** 1979 Prof Emeritus Food Science & Technology

**Brooks, Royal Harvard** 1967 Prof Emeritus Ag Engineering

**Brown, Dorothy Furtick** 1955 Prof Emeritus Extension Home Economics

**Brown, Joy Brougher** 1962 Asst Prof Emeritus Extension

**Brown, Kenneth Neil** 1963 Prof Emeritus Extension

**Brown, William Galen** 1955 Prof Emeritus Ag & Res Economics

**Burkhart, Betty Jane** 1963 Assoc Prof Emeritus Extension

**Burkhart, David James** 1961 Prof Emeritus Extension

**Burkhart, Harry Ray** 1972 Asst Prof Emeritus Animal Sciences

**Burr, James Almon** 1951-52 1960 Prof Emeritus Extension

**Burrill, Larry Clyde** 1962 Assoc Prof Emeritus Extension

**Bussard, Marie Harris** 1957 Prof Emeritus Extension

**Cain, Robert F.** 1956 Prof Emeritus Food Science & Technology

**Calhoun, Wheeler Jr.** 1948 Assoc Prof Emeritus Agronomy

**Calvert, Leonard J.** 1961-65 1969 Assoc Prof Emeritus Ag Communications

**Cameron, H. Ronald** 1955 Prof Emeritus Plant Pathology

**Cannon, Lynn Elton** 1963 Prof Emeritus Extension

**Capizzi, Joseph** 1955-63 1965 Prof Emeritus Extension Entomology

**Carter, George Edward** 1960 Assoc Prof Emeritus Agronomy

**Carter, W. Gibson** 1980 Assoc Prof Emeritus Extension

**Cate, Rufus** 1945 Prof Emeritus Extension

**Cheney, Horace Bellatti** 1952 Prof Emeritus Soil Science

**Chilcote, William Wesley** 1953 Prof Emeritus Crop Physiology

**Ching, Te May T.** 1956 Prof Emeritus Crop Science

**Christensen, Dorothy Jean** 1967 Assoc Prof Emeritus Extension

**Christensen, Leno Virgil** 1957 Assoc Prof Emeritus Ag Education

**Church, D.C.** 1956 Prof Emeritus Animal Sciences

**Clark, Elsie K.** 1960 Assoc Prof Emeritus Extension

**Clark, Harry Edwin** 1951 Prof Emeritus Extension

**Claypool, Donald W.** 1964 Asst Prof Emeritus Animal Sciences

**Compton, Oliver Cecil** 1948 Prof Emeritus Horticulture

**Conklin, Frank Sidney** 1968 Prof Emeritus Ag & Resource Economics

**Conner, Helen Dwelle** 1963 Prof Emeritus Extension

**Cook, Clive Winston** 1944 Asst Prof Emeritus Extension

**Coolican, Patricia** 1978 Prof Emeritus Extension Home Economics

**Cooney, Wilbur Tarlton** 1937 Prof Emeritus Poultry Science

**Cox, Joseph Rew** 1945-50 1957 Director Emeritus Extension & Prof Emeritus Extension

**Crabtree, Garvin Dudley** 1958 Prof Emeritus Horticulture

**Craig, Richard P.** 1974 Assoc Prof Emeritus Extension

**Crawford, David** 1958 Prof Emeritus Food Science & Technology

**Crowell, Hamblin Howes** 1946 Prof Emeritus Entomology

**Danielson, Harold Rodger** 1968 Sr Instr Emeritus Crop & Soil Science

**Davidson, Tom P.** 1950 Asst Prof Emeritus Extension

**Davis, John Rowland** 1971 Prof Emeritus Ag Engineering

**Dawson, Murray** 1958 Prof Emeritus Soil Sci

**Day, Paul Edward** 1972 Assoc Prof Emeritus Extension

**Dost, Frank N.** 1975 Prof Emeritus Extension

**Doudoroff, Peter** 1953 Prof Emeritus Fisheries & Wildlife

**Duncan, Andrew Adrian** 1958 Prof Emeritus Horticulture

**Edwards, John Allan** 1961 Prof Emeritus Ag & Res Economics

**Eisgruber, Ludwig Maria** 1973 Prof Emeritus Ag & Resource Economics

**England, David C.** 1955 Prof Emeritus Animal Sciences

**Fang, Sheng Chung** 1948 Prof Emeritus Chemistry, Ag Chemistry

**Farrell, William King** 1942 Prof Emeritus Extension

**Fendall, Roger K.** 1968 Prof Emeritus Crop & Soil Science

**Fischer, C.M.** 1947 Prof Emeritus Extension

**Fisher, Ermina Jane** 1952 Prof Emeritus Extension

**Fitch, Luther Aaron** 1960 Prof Emeritus Extension

**Foster, Lee Russell** 1947 Prof Emeritus Extension

**Frakes, Rodney** 1960 Prof Emeritus Agronomy

**Freed, Virgil Haven** 1943 Prof Emeritus Ag Chemistry

**Friedemann, Dale Herbert** 1966 Prof Emeritus Extension

**Frischknecht, Wilford Dean** 1956 Prof Emeritus Extension

**Frizzell, John Kitchner** 1955 Prof Emeritus Extension

**Funk, Evelyn** 1958 Assoc Prof Emeritus Extension Home Economics

**Gardner, Ernest Hugh** 1966 Prof Emeritus Soil Science

**Garren, Ralph Jr.** 1950 Prof Emeritus Horticulture

**Gavin, Charles Gerald** 1955 Assoc Prof Emeritus Extension

**Goering, Lois A.** 1988 Asst Prof Emeritus Extension

**Goetz, Norman** 1959 Prof Emeritus Agronomy Ext Program

**Grabe, Don Frederick** 1968 Prof Emeritus Crop & Soil Science

**Grimes, John Keith** 1942-44, 1953 Asst Prof Emeritus Extension

**Groder, Roland** 1950 Prof Emeritus Extension & Ag Res Economics

**Gross, Alvin Eugene** 1935 Prof Emeritus Agronomy

**Gross, Louis Henry** 1943 Prof Emeritus Extension

**Gurton, John Reginald** 1948 Assoc Prof Emeritus Extension

**Hagelstein, Fred** 1958 Prof Emeritus Extension

**Hagen, Ivan John** 1969 Sr Instr Emeritus Extension

**Hall, Frances Ann** 1930-58, 1961 Assoc Prof Emeritus Extension

**Hall, James Dane** 1963 Prof Emeritus Fisheries & Wildlife

**Hamilton, Margaret Elizabeth** 1957 Professor Emeritus Extension

**Hansen, Elmer** 1935 Prof Emeritus Horticulture

**Hansen, Herbert E.** 1974 Assoc Prof Emeritus Bioresource Engineering

**Hansen, Hugh J.** 1974 Prof Emeritus Extension

**Hansen, Neils John** 1943 Prof Emeritus Extension

**Hardin, Edward E.** 1957 Assoc Prof Emeritus Crop Science

**Harper, James A.** 1942 Prof Emeritus Poultry Science

**Hart, Ralph Daniel** 1969 Prof Emeritus Extension

**Harward, Moyle E.** 1955 Prof Emeritus Soil Science

**Helfer, Donald** 1963 Prof Emeritus Poultry Science

**Henderson, Robert Wesley** 1938-41, 1946 Prof Emeritus Crop Science

**Hickerson, Hugh** 1959 Prof Emeritus Extension

**Hilty, Ivy Elizabeth** 1959 Asst Prof Emeritus Extension

**Hoecker, F. Dale** 1946-58 1963 Asst Prof Emeritus Extension

**Hoffman, Elbert Neil** 1942 Assoc Prof Emeritus Agronomy

**Holleman, Kendrick A.** 1984 Prof Emeritus Animal Sciences

**Holthouse, Mary** 1965 Asst Prof Emeritus Extension

**Huber, James Russell** 1947 Prof Emeritus Extension

**Isley, Arleigh Gentry** 1969 Assoc Prof Emeritus Extension

**Jacobson, Robert Warren** 1967 Prof Emeritus Extension

**Jendrezejewski, Walter John** 1938 Assoc Prof Emeritus Extension

**Jensen, Louisa A.** 1938 Prof Emeritus Agronomy

**Johnston, Alberta B.** 1963 Prof Emeritus Extension

**Johnston, Richard Stanley** 1966 Prof Emeritus Agricultural & Resource Economics

**Kennick, Walter H.** 1956 Prof Emeritus Animal Science

**Kerr, Harold Edward** 1960 Prof Emeritus Extension

**Kifer, Paul E.** 1973 Prof Emeritus Food Science, Int'l Research & Development

**Kiigemagi, Ulo** 1954 Sr Instr Emeritus Ag Chemistry

**Killingsworth, Kenneth** 1969 Prof Emeritus Extension

**Kirk, Dale Earl** 1942 Prof Emeritus Ag Engineering

**Klein, Glenn Arthur** 1952 Prof Emeritus Extension Education

**Koepsell, Paul Arthur** 1969 Prof Emeritus Extension

**Koester, Ardis Williams** 1974 Prof Emeritus Extn Home Economics & Apparel, Interiors, Housing, & Merchandising.

**Krantz, Gerald W.** 1955 Prof Emeritus Entomology

**Kuhn, Lee Wallace** 1946 Prof Emeritus Fisheries & Wildlife

**Landers, John Herbert Jr.** 1950 Prof Emeritus Extension

**Langmo, Reuben Donald** 1948 Assoc Prof Emeritus Ag & Res Economics

**Lannan, James E., Jr.** 1969 Prof Emeritus Fisheries & Wildlife

**Law, Duncan** 1944 Prof Emeritus Food Science & Technology

**Leach, Charles Morley** 1950 Prof Emeritus Plant Pathology

**Lee, Sylvia C.** 1952 Prof Emeritus Extension

**Lee, William O.** 1956 Prof Emeritus Crop Science

**Leffel, John A.** 1962 Prof Emeritus Extension

**Lesuer, Mary L.** 1965 Prof Emeritus Extension

**Libbey, Leonard Morton** 1961 Prof Emeritus Food Science & Technology

**Likens, Sam T.** 1951 Prof Emeritus Ag Chemistry

**Lombard, Porter Bronson** 1963 Prof Emeritus Horticulture

**Lund, Steve** 1975 Prof Emeritus Agronomy

**Lundbom, Dorthy B.** 1966 Asst Prof Emeritus Extension

**Lunner, Marilyn Jeanne** 1968 Assoc Prof Emeritus Extension

**Mack, Harry John** 1955 Prof Emeritus Horticulture

**Marks, Stephen** 1956 Assoc Prof Emeritus Extension, Ag & Res Economics

**Marsh, Robert Kendall** 1956 Asst Prof Emeritus Extension

**Martin, Lloyd W.** 1967 Prof Emeritus Horticulture

**Massie, John William** 1956 Assoc Prof Emeritus Extension

**Matson, Walter Edward** 1965 Prof Emeritus Ag Engineering Extension

**Maxwell, Darrell Clifford** 1952-60 1963 Prof Emeritus Extension

**McCarty, Raymond Gerald** 1953 Assoc Prof Emeritus Extension

**McGuire, William Saxon** 1956 Prof Emeritus Crop Science

**Mellenthin, Walter M.** 1950 Prof Emeritus Horticulture

**Mikesell, O. E.** 1934 Prof Emeritus Extension

**Miles, Stanley Donovan** 1966 Assoc Prof Emeritus Ag & Resource Economics

**Miller, Stanley Frank**1973 Prof Emeritus Ag & Resource Economics

**Milleville, Howard** 1969 Prof Emeritus Food Science & Technology

**Minnick, Kenneth Clayton** 1944 Assoc Prof Emeritus Extension

**Mitchell, Velma Roberta** 1958 Assoc Prof Emeritus Extension

**Montgomery, Marvin Leonard** 1954 Senior Instr Emeritus Ag Chemistry

**Moore, Bernard Jerry** 1970 Sr Instr Emeritus Plant Pathology

**Morrison, Betty J.** 1983 Assoc Prof Emeritus Extension

**Mosher, Wayne Delbert** 1948 Prof Emeritus Extension

**Moss, Dale Nelson** 1977 Prof Emeritus Crop & Soil Science

**Myers, H. Joe** 1948 Prof Emeritus Extension

**Nakaue, Harry Sadao**1975 Prof Emeritus Animal Sciences

**Nelson, E. M.** 1946 Assoc Prof Emeritus Extension

**Neugart, Zelma R.** 1955-63, 1977 Assoc Prof Emeritus Extension

**Newell, Ben Allen** 1944 Prof Emeritus Extension

**Novotny, Raymond E.** 1952 Prof Emeritus Extension

**Oester, Louis Milton** 1955 Prof Emeritus Extension

**Oldfield, James Edmund** 1949 Prof Emeritus Animal Nutrition

**Ottaway, George Hollis** 1941 Assoc Prof Emeritus Extension

**Parker, J. Roland** 1930 Assoc Prof Emeritus Extension

**Parsons, Jacque E.** 1965 Prof Emeritus Extension

**Passon, David Edward** 1960 Prof Emeritus Extension

**Paulsen, Lenore Maxine** 1969 Asst Prof Emeritus Extension

**Phipps, Wanda** 1971 Assoc Prof Emeritus Extension

**Pumphrey, Floyd Vance** 1957 Prof Emeritus Agronomy

**Rackham, Robert L.** 1971 Prof Emeritus Extension

**Raleigh, Robert J.** 1960 Prof Emeritus Eastern Oregon Ag Res Ctr

**Rasmussen, Donald Lewis** 1946 Prof Emeritus Extension

**Rauen, Paul** 1959 Prof Emeritus Extension

**Riggert, Craig Edwin** 1976 Assoc Prof Extension

**Roberts, Alfred Nathan** 1940 Prof Emeritus Horticulture

**Roberts, Warren Wayne** 1950-52. 1954 Prof Emeritus Extension

**Rodgers, Jefferson Belton** 1946 Prof Emeritus Ag Engineering

**Rohde, Charles R.** 1952 Prof Emeritus Columbia Basin Ag Res Ctr

**Ross, Charles Robert** 1946 Assoc Prof Emeritus Extension

**Ross, Jackson W.** 1961 Prof Emeritus Extension

**Rowe, Kenneth Eugene** 1964 Prof Emeritus Statistics

**Roy, Doris Mary** 1952 Assoc Prof Emeritus Extension

**Rudd, Oris Clark** 1955 Prof Emeritus Extension

**Rydrych, Donald J.** 1965 Prof Emeritus Crop & Soil Science

**Salisbury, Ralph William** 1949 Prof Emeritus Extension

**Sander, Gary** 1955 Asst Prof Emeritus Extension Forestry

**Saul, Molly Sylvester** 1962 Prof Emeritus Extension

**Sawer, Barbara J.** 1974 Prof Emeritus Extention

**Scales, Murle** 1947 Prof Emeritus Extension

**Scanlan, Richard Anthony**1964 Prof Emeritus Food Science & Technology

**Scheel, Jean Willard** 1946 Prof Emeritus Extension

**Schmall, Vicki Louise** 1975 Prof Emeritus Extension

**Schneider, Gary Lee** 1964 Prof Emeritus Extension

**Schneiter, George R.** 1955 Asst Prof Emeritus Extension

**Schroeder, Jane** 1952 Assoc Prof Emeritus Extension

**Schroeder, Walter Greiff** 1949 Prof Emeritus Extension

**Schultz, Harold William** 1953 Prof Emeritus Food Science & Technology

**Seat, Velma Maxwell** 1959 Prof Emeritus Ag & Res Economics

**Shannon, Elfred** 1945 Assoc Prof Emeritus Extension

**Shearer, Marvin Nobel** 1950 Prof Emeritus Ag Engineering

**Sheets, Willis Arden** 1959 Prof Emeritus Extension

**Shibley, Gloria Olson** 1965 Prof Emeritus Extension

**Shumway, Sallyann M** 1963 Assoc Prof Emeritus Extn Home Economics

**Simonson, Gerald H.** 1961 Prof Emeritus Agronomy

**Sinnhuber, Russell Otto** 1939 Prof Emeritus Food Science & Technology

**Skinner, Francis Asbury** 1946 Assoc Prof Emeritus Extension

**Slocombe, Edmond N.** 1986 Assoc Prof Emeritus Extension

**Smith, Frederick John** 1964 Prof Emeritus Ag & Resource Economics

**Smith, Orrin E** 1980 Director Emeritus OSU Extension Service/Assoc Dean Emeritus Ag Sciences/Prof Emeritus Horticulture

**Smith, Robert L.** 1982 Prof Emeritus Extension

**Smith, William Charles** 1951 Prof Emeritus Extension

**Stanger, Charles Earl, Jr.** 1973 Prof Emeritus Crop & Soil Science

**Stanger, Charles Earl Jr.** 1973 Prof Emeritus Malheur Co Experiement Station

**Stearling, Robert Howard** 1940-42, 1956 Prof Emeritus Extension

**Stebbins, Robert Lloyd** 1962 Prof Emeritus Extension

**Stephen, William Procuronoff** 1953 Prof Emeritus Entomology

**Stevely, Robert Hugh** 1954 Asst Prof Emeritus Extension

**Stevens, Joe Bruce** 1966 Prof Emeritus Ag & Resource Economics

**Stevenson, Elmer Clark** 1967 Assoc Dean Emeritus, Director Emeritus Resident Instruction, Prof Emeritus Horticulture

**Taskerud, Esther Adelia** 1947 Prof Emeritus Extension

**Thienes, John Ralph** 1952 Prof Emeritus Extension

**Thomas, Marion D.** 1937-45, 1947 Prof Emeritus Extension, Ag & Res Economics

**Thompson, John Gray** 1948 Prof Emeritus Extension

**Thompson, Maxine M.** 1964 Prof Emeritus Horticulture

**Thompson, Thomas W.** 1949 Prof Emeritus Extension

**Ticknor, Robert Lewis** 1959 Prof Emeritus Horticulture

**Tinsley, Ian James** 1957 Prof Emeritus Agricultural Chemistry

**Torbeck, Frances Watts** 1958 Assoc Prof Emeritus Extension

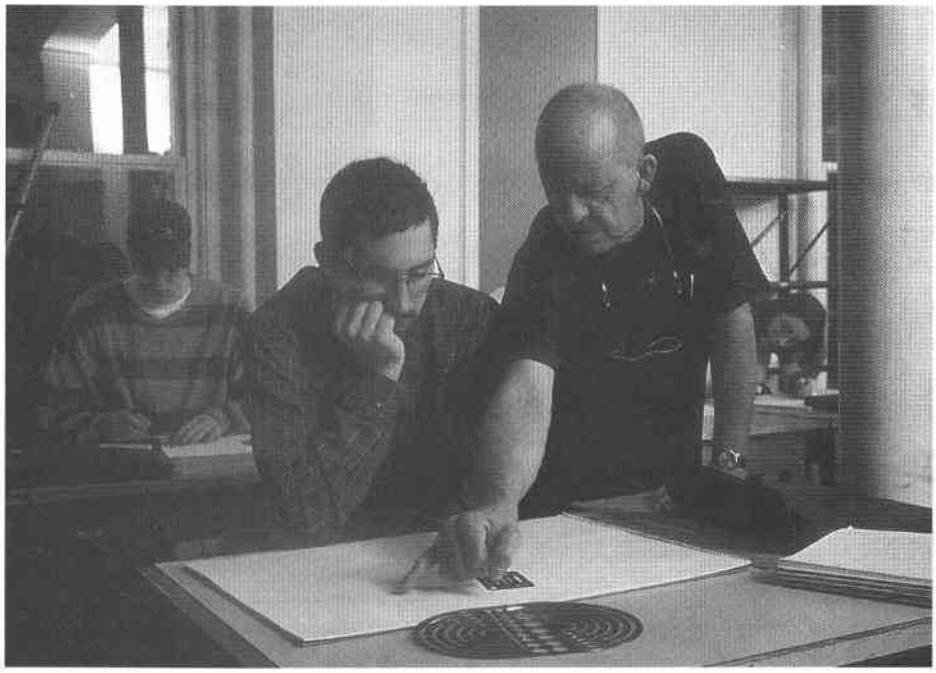
**Torvend, Palmer Stanley** 1939 Prof Emeritus Extension

**Tubb, Richard Arnold** 1975 Prof Emeritus Fisheries & Wildlife

**Turner, Harley A.**1974 Assoc Prof Emeritus Animal Sciences

**Vandehey, Norbert Joseph** 1959 Prof Emeritus Extension

**Varseveld, George W.** 1962 Assoc Prof Emeritus Food Science & Technology



**Verts, B. J.** 1965 Prof Emeritus Fisheries & Wildlife

**Volk, Veril Van** 1966 Prof Emeritus Crop & Soil Science

**Vomocil, James Arthur** 1967 Prof Emeritus Crop & Soil Science

**Von Borstel, Frank Jr.** 1948 Prof Emeritus Extension

**Wales, Joseph** 1959 Assoc Prof Emeritus Food Science & Technology

**Walrod, Dan Coin** 1948 Assoc Prof Emeritus Extension

**Warkentin, Benno P.** 1977 Prof Emeritus Crop & Soil Science

**Warren, Charles E.** 1953 Prof Emeritus Fisheries & Wildlife

**Watkinson, Lois A.** 1962 Prof Emeritus Extension

**Weiser, Conrad John** 1973 Prof Emeritus Horticulture

**Werth, Harold Eldon** 1949-51, 1956 Assoc Prof Emeritus Extension

**Westigard, Peter Hughes** 1962 Prof Emeritus Extention Entomology

**Weswig, Paul Henry** 1941 Prof Emeritus Ag Chemistry, Chemistry

**Weswood, Melvin Niel** 1960 Prof Emeritus Horticulture

**Wilcox, Bert Guy** 1962 Prof Emeritus Extension

**Wills, Clayton Stanley** 1959 Prof Emeritus Extension

**Winters, Eugene Philip** 1954 Prof Emeritus Extension

**Witt, James McAuley** 1966 Prof Emeritus Ag Chemistry

**Wolfe, John William** 1947 Prof Emeritus Ag Engineering

**Woodard, Ernest Steve** 1974 Prof Emeritus Extension

**Wright, Leroy C.** 1929 Assoc Prof Emeritus Extension

**Yang, Hoya Y.** 1943 Prof Emeritus Food Science & Technology

**Young, Marvin M.** 1958 Prof Emeritus Extension

**Youngberg, Chester Theodore** 1952 Prof Emeritus Soil Science

**Youngberg, Harold Wayne** 1960 Prof Emeritus Crop Science

**Yu, T. C.** 1956 Assoc Prof Emeritus Food Science & Technology

**Yungen, John Alfred** 1950 Prof Emeritus Agric Expt Station

**Zimmerman, Martin Joseph** 1950 Prof Emeritus Extension

**Zinn, Thomas G.** 1962 Prof Emeritus Extension

**Zundel, Afton** 1934-44, 1957 Prof Emeritus Extension

**Zwick, Robert W.** 1964 Assoc Prof Emeritus Entomology

### BUSINESS

**Abrassart, Arthur Eugene** 1966 Assoc Prof Emeritus Acctg, Finance & Info Mgmt

**Amano, Matthew M.** 1967 Prof Emeritus Mgmt & Marketing

**Beran, Kurt** 1975 Asst Prof Emeritus Business

**Browne, William Griest** 1968 Prof Emeritus Mgmt, Marketing, & Int'l Business

**Dane, Charles Wesley** 1957 Prof Emeritus Mgmt & Marketing

**Easton, Edison Ellsworth** 1951 Prof Emeritus Business Admin

**Gray, Clifford Frederick** 1961-2, 1965 Prof Emeritus Mgmt & Marketing

**Harrison, William L.**1974 Prof Emeritus Acctg, Finance & Info Mgmt

**Jones, Hilda Meius** 1947 Assoc Prof Emeritus Admin Mgmt

**Kemp, Patrick S.** 1974 Prof Emeritus Accounting

**Martin, George R.**1967 Assoc Prof Emeritus Accounting

**McCain, Robert Francis** 1969 Assoc Prof Emeritus Business Admin

**McFarlane, Dale Donald** 1965 Prof Emeritus Finance & Int'l Business

**Paschke, Paul Edward** 1969 Assoc Prof Emeritus Acctg, Finance & Info Mgmt

**Phillips, Mary Ellen** 1973 Assoc Prof Emeritus Acctg & Info Mgmt

**Rettig, Jack Louis** 1961 Prof Emeritus Business Admin

**Schary, Philip** 1986 Prof Emeritus Mgmt & Marketing

**Shirley, Robert Edwin** 1967 Assoc Prof Emeritus Business Admin

**Soule, B. Linn** 1967 Assoc Prof Emeritus Business Admin

**Stonehill, Arthur Ira** 1966 Prof Emeritus Finance

**Weiler, Jerome Conrad** 1961 Assoc Prof Emeritus Business Admin

**Wells, Patricia Ann** 1974 Prof Emeritus Business Admin

**Widicus, Wilbur Wilson** 1964 Prof Emeritus Finance & Int'l Business

**Winger, Fred Everett** 1947 Prof Emeritus Business Ed Office Admin

### ENGINEERING

**Alexander, Gerald Corwin** 1955 Assoc Prof Emeritus Electrical & Computer Engineering

**Amort, Donald Louis** 1959 Assoc Prof Emeritus Electrical & Computer Engineering

**Arthur, John Read** 1983 Professor Emeritus Electrical & Computer Engineering

**Bell, J. Richard** 1962 Prof Emeritus Civil Engineering

**Bella, David Andrew** 1967 Prof Emeritus Civil, Construction, & Environmental Engineering

**Boubel, Richard William** 1954 Prof Emeritus Mechanical Engineering

**Burgess, Fredrick J.** 1953 Prof Emeritus Civil Engineering

**Campbell, John Carl** 1948 Prof Emeritus Indust & Mfg Engineering

**Davis, Lorin Richard** 1969 Prof Emeritus Mechanical Engineering

**Frazier, Lloyd McDonald** 1947 Prof Emeritus Mechanical Engineering

**Garrard, James Lathrop** 1957 Prof Emeritus Industrial Engineering

**Gray, James Latimer** 1949 Prof Emeritus Industrial & Mfg Engineering

**Haith, Marvin R.** 1943 Prof Emeritus General Engineering

**Herzog, James Herman** 1967 Assoc Prof Emeritus Electrical & Computer Engineering

**Hicks, R. Gary** 1975 Prof Emeritus Civil, Construction, & Environmental Engineering

**Jensen, Leland Christian** 1955 Assoc Prof Emeritus Electrical & Computer Engineering

**Johnson, Arthur Guy** 1966 Director Emeritus Radiation Center, Prof Emeritus Nuclear Engineering

**Knudsen, James George** 1949-52 1953 Prof Emeritus Chemical Engineering

**LaBaun, George Bradford** 1958 Assoc Prof Emeritus Civil Engineering

**Larson, Milton Byrd** 1952 Prof Emeritus Mechanical Engineering

**Laursen, Harold I.** 1963 Professor Emeritus Civil Engineering

**Levenspiel, Octave** 1968 Prof Emeritus Chemical Engineering

**Looney, James Chester** 1957 Assoc Prof Emeritus Electrical & Computer Engineering

**Magnusson, Phillip Cooper** 1946 Prof Emeritus Electrical & Computer Engineering

**McClellan, Thomas John** 1945-46, 1948 Prof Emeritus Civil Engineering

**Mingle, John Glenn** 1960 Prof Emeritus Mechanical Engineering

**Mohler, Ronald Rutt** 1972 Prof Emeritus Electrical & Computer Engineering

**Nath, John Henry** 1970 Prof Emeritus Civil Engineering & Mechanical Engineering

**Northcraft, Martin Ellis** 1955 Assoc Prof Emeritus Civil Engineering

**Paasche, Olaf Gustav** 1946 Prof Emeritus Mechanical Engineering

**Peterson, John** 1964 Assoc Prof Emeritus Civil, Construction, & Environmental Engineering

**Phelps, Robert Elton** 1968 Assoc Prof Emeritus Civil Engineering

**Popovich, Milosh** 1947 Prof Emeritus Mechanical Engineering

**Pritchett, Harold Duane** 1957 Prof Emeritus Civil, Construction, & Environmental Engineering

**Ringle, John Clayton** 1966 Prof Emeritus Nuclear Engr & Assoc Dean Emeritus Graduate School

**Robinson, Alan Hadley** 1966 Prof Emeritus Nuclear Engineering

**Saugen, John Louis** 1964 Assoc Prof Emeritus Electrical & Computer Engineering

**Short, Robert Allen** 1966 Prof Emeritus Electrical & Computer Engineering

**Slotta, Larry Stewart** 1962 Prof Emeritus Civil Engineering

**Smith, Charles Edward** 1961 Prof Emeritus Mechanical Engineering

**Smith, Charles Edward** 1961 Prof Emeritus Mechanical Engineering

**Smith, Wesley Warren** 1947-48, 1956 Prof Emeritus Mechanical Engineering

**Staton, Warren Spencer** 1958 Assoc Prof Emeritus Civil Engineering

**Stone, Solon Allen** 1956 Assoc Dean Emeritus Engineering, Prof Emeritus Electrical & Computer Engineering

**Thornburgh, George Earl** 1952 Prof Emeritus Mechanical Engineering

**Wang, Chih** 1950 Director Emeritus Radiation Center, Prof Emeritus Chemistry, & Nuclear Engineering

**Weber, Leonard Joseph** 1954 Assoc Dean Emeritus Engineering, Prof Emeritus Electrical & Computer Engineering

**Welty, James Richard** 1958 Prof Emeritus Mechanical Engineering

**West, Thomas Moore** 1976 Prof Emeritus Emeritus Industrial & Mfg Engineering

**Wicks, Charles Edward** 1954 Prof Emeritus Chemical Engineering

**Wilson, Robert Elliot** 1957 Prof Emeritus Mechanical Engineering

### FORESTRY

**Atkinson, William A.** 1987 Prof Emeritus Forest Engr

**Bell, John Frederick** 1959 Prof Emeritus Forest Mgmt

**Bengtson, George W.** 1979 Prof Emeritus Forestry

**Bever, Dale Nestrund** 1961 Prof Emeritus Forest Mgmt

**Bublitz, Walter J.** 1966 Prof Emeritus Forest Products

**Ching, Kim K.** 1961 Prof Emeritus Forest Genetics

**Currier, Raymond Alan** 1961 Assoc Prof Emeritus Forest Products

**Ferrell, William Kreiter** 1956 Prof Emeritus Forest Mgmt

**Froehlich, Henry A.** 1970 Prof Emeritus Forest Engineering

**Graham, Robert D.** 1961 Prof Emeritus Forest Products

**Hermann, Richard Karl** 1961 Prof Emeritus Forest Resources

**Jemison, George Meredith** 1969 Prof Emeritus Forestry

**Kallander, Rudolph Martin** 1961 Prof Emeritus Forestry

**Kozlik, Charles James** 1961 Assoc Prof Emeritus Forest Products

**Kramer, Robert** 1959 Prof Emeritus Forest Products

**Krygier, James Theodore** 1954 Prof Emeritus Forestry

**Lavender, Denis Peter** 1961 Prof Emeritus Forest Physiology, Forest Science

**McKimmy, Milford D.** 1953 Prof Emeritus Forest Products

**McLaren, Earle Kenneth** 1963 Assoc Prof Emeritus Forest Engineering

**McMahon, Robert Ormond** 1966 Assoc Prof Emeritus Forest Products

**Miller, Donald James** 1961 Assoc Prof Emeritus Forest Products

**Milliken, Margaret** 1947 Assoc Prof Emeritus Forest Recreation Research

**O'Leary, John E.** 1949 Prof Emeritus Forest Engineering

**Paine, David Philip** 1962 Prof Emeritus Forest Mgmt

**Perry, David Anthon** 1977 Prof Emeritus Forest Science

**Robinson, Dan D.** 1944 Prof Emeritus Forest Mgmt

**Rowley, Marvin Lavern** 1973 Sr Instr Emeritus Forest Engineering

**Slezak, Edward John** 1961 Prof Emeritus Forest Recreation Research

**Stoltenberg, Carl Henry** 1966 Prof Emeritus Forest Resources

**Sutherland, Charles Fearn Jr.** 1959 Assoc Prof Emeritus Forest Resources

**VanVliet, Antone Cornelis** 1955 Prof Emeritus Forest Products

**Wheeler, William Perry** 1949 Prof Emeritus Forest Mgmt

**Wilson, Robert Lee** 1952 Assoc Prof Emeritus Forest Engineering

**Yoder, Ray** A. 1949 Prof Emeritus Forestry

**Zaerr, Joe B.** 1965 Prof Emeritus Forest Science

### HEALTH & HUMAN PERFORMANCE

**Anderson, Gordon Wilcox** 1962 Prof Emeritus Health

**Brust, Velda Jean** 1964 Assoc Prof Emeritus Phys Education

**Campbell, Donald Eugene** 1969 Prof Emeritus Phys Education

**Cramer, Richard P.** 1957 Assoc Prof Emeritus Exercise & Sport Science

**Dailey, Charles Henry Jr.** 1947 Prof Emeritus Phys Education

**Dickinson, R. Vern** 1968 Assoc Prof Emeritus Exercise & Sport Science

**Drlica, Karl Francis** 1950 Assoc Prof Emeritus Phys Education

**Ellis, John Kenneth** 1964 Prof Emeritus Health

**Hancock, Astrid F.** 1963 Asst Prof Emeritus Exercise & Sports Science

**Heath, Kathleen Frances** 1967 Assoc Prof Emeritus Exercise & Sport Science

**Houston, Robert J.** 1966 Assoc Prof Emeritus Public Health

**Ingram, Patricia C.** 1971 Asst Prof Emeritus Phys Education

**Irvin, Richard Fredrick** 1967 Assoc Prof Emeritus Exercise & Sport Science

**Lambert, Charlotte LaVerne** 1966 Prof Emeritus Phys Education

**Lawson, David Cadden** 1969 Assoc Prof Emeritus Public Health

**Maksud, Michael George** 1980 Prof Emeritus Exercise & Sport Science

**Martin, Don Bruce** 1966 Assoc Prof Emeritus Phys Education

**Masilionis, Genevieve Jeannette Ann** 1960 Assoc Prof Emeritus Phys Education

**Megale, Donald Manuell** 1958 Assoc Prof Emeritus Phys Education

**Moe, Harold William** 1935-42 1949 Assoc Prof Emeritus Phys Education

**O'Shea, John P.** 1962 Prof Emeritus Exercise & Sport Science

**Phelps, David Walton** 1965 Prof Emeritus Public Health

**Poling, Dow Peter** 1963 Assoc Prof Emeritus Exercise & Sport Science

**Pye-Petersen, Lois** 1960 Assoc Prof Emeritus Phys Education

**Smith, Margaret** 1977 Assoc Prof Emeritus Public Health

**Suttie, Sandra Jean** 1969 Assoc Prof Emeritus Exercise & Sport Science

**Tanselli, Gene Natale** 1962 Assoc Prof Emeritus Phys Education

**Thomas, Dale Oren** 1956 Prof Emeritus Phys Education

**Torpey, James Edward** 1971 Assoc Prof Emeritus Phys Education

**Weir, Erma Marion** 1945 Prof Emeritus Phys Education

### HOME ECONOMICS AND EDUCATION

**Ahrendt, Kenneth Martin** 1971 Assoc Prof Emeritus Education

**Anderson, Edwin LeRoy** 1970 Assoc Prof Emeritus Education

**Bailleaux, Muriel Woodring** 1946-50 1955 Senior Instr Emeritus Foods Nutrition

**Baker, Katherine Haskell Read** 1941 Prof Emeritus Human Development & Family Sciences

**Barte, Georgene Violette** 1959 Assoc Prof Emeritus Nutrition & Food Management

**Becker, Gerald Lester** 1968 Assoc Prof Emeritus Counseling Education

**Brennan, William James** 1966 Assoc Prof Emeritus Education

**Britton, Gwyneth Elaine** 1965 Prof Emeritus Education

**Bubl, Janet Laird** 1946-48 1959 1960 Asst Prof Emeritus Clothing, Textiles & Related Arts

**Carlin, Marian Cushing** 1954 Assoc Prof Emeritus Human Development & Family Sciences

**Charley, Helen Geneva** 1944 Prof Emeritus Foods Nutrition

**Clark, Glenn Edwin** 1968 Prof Emeritus Counseling Education

**Courtney, E. Wayne** 1972 Prof Emeritus Education

**Craven, Gene Francis** 1958 Assoc Prof Emeritus Math, Science, & Computer Science Education

**Cross, Frank Richard** 1969 Prof Emeritus Education

**East, Dorothy May** 1961 Assoc Prof Emeritus Foods & Nutrition

**Fielder, William Rodney** 1971 Prof Emeritus Education

**Fox, Fred W.** 1957 Prof Emeritus Science Education

**Fulmer, Winnifred Keil** 1938 Assoc Prof Emeritus Home Economics

**Gates, Ruth Elizabeth** 1969 Prof Emeritus Clothing, Textiles, & Related Arts

**Gathercoal, Forrest James** 1969 Prof Emeritus Education

**Glass, William Ray** 1956 Prof Emeritus Apparel, Interiors, Housing, & Merchandising

**Grant, Phyllis Emogene** 1949 Asst Prof Emeritus Clothing, Textiles, & Related Arts

**Gravatt, Arthur Eugene** 1962-64 1973 Prof Emeritus Human Development & Family Sciences

**Grieve, Mary Jane** 1968 Assoc Prof Emeritus Human Development & Family Sciences

**Grigsby, Tom Elvin** 1974 Prof Emeritus Education

**Hall, Jack Vernon** 1954 Prof Emeritus Elementary Education

**Harger, Virginia Frances** 1967 Prof Emeritus Institutional Management

**Harter, Charlotte T.** 1960 Assoc Prof Emeritus Human Development & Family Sciences

**Haselton, Shirley S.** 1968 Assoc Prof Emeritus Education

**Hlebichuk, Joseph F.** 1971 Assoc Prof Emeritus Education

**Hoeye, Wyman D.** 1968 Assoc Prof Emeritus Education

**House, Reese Milton** 1969 Prof Emeritus Education

**Johnson, Elizabeth Cox** 1950-60, 1965 Assoc Prof Emeritus Foods Nutrition

**Ledbetter, N. Marie** 1946 Assoc Prof Emeritus Clothing, Textiles, & Related Arts

**Lee, Sylvia Lucile** 1968 Prof Emeritus Home Economics Education

**Leeland, Albert Lewis** 1954 Prof Emeritus Elementary Education

**Leeland, Lucille Rees** 1955 Prof Emeritus Elementary Education

**Lemon, Berlan** 1959 Assoc Prof Emeritus Education

**Lumpkin, Margaret Catherine** 1948 Prof Emeritus Education

**Meeks, Anna Rugh** 1965 Prof Emeritus Education

**McBride, Marjorie** 1966 Prof Emeritus Education

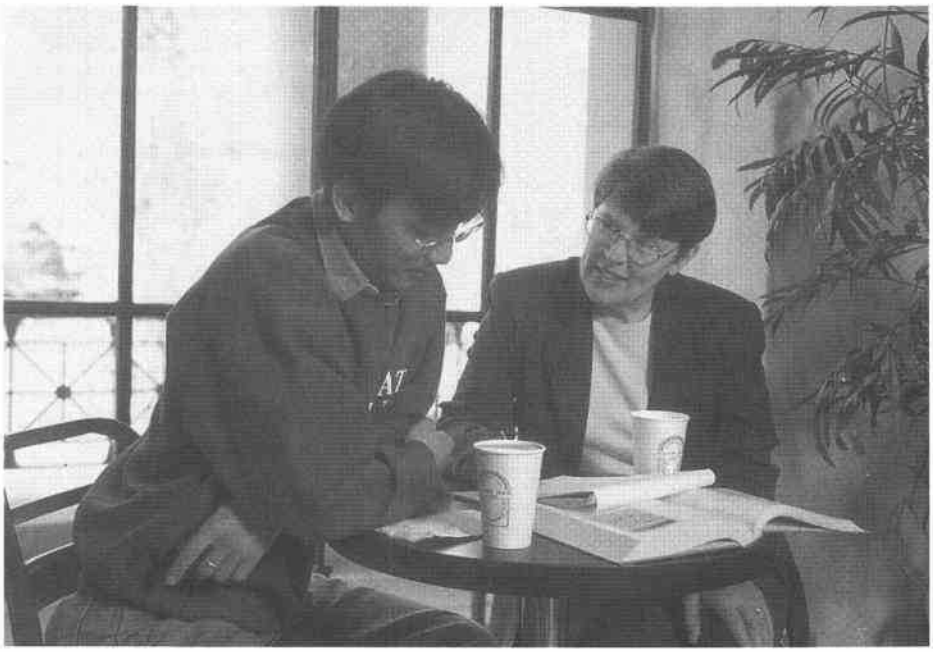
**Miller, Lorraine Theresa** 1966 Prof Emeritus Nutrition & Food Mgmt

**Mumaw, Catherine R.** 1987 Assoc Prof Emeritus Human Development & Family Sciences

**Nice, Karl Jacob** 1969 Asst Prof Emeritus Education

**Peters, Jean McLeod** 1958 Assoc Prof Emeritus Foods & Nutrition

**Petzel, Florence Eloise** 1954-61, 1967 Prof Emeritus Clothing, Textiles, & Related Arts



**Plants, Constance Patricia** 1960 Sr Instr Emeritus Home Economics

**Plonk, Martha Amanda** 1952 Prof Emeritus Human Development & Family Sciences

**Reichart, Robert R.** 1926 Professor Emeritus Education, Forestry

**Sherburne, James Wilson** 1938 Prof Emeritus Community Education

**Sinnard, Harriet King** 1934-36, 1940-42. 1963 Asst Prof Emeritus Human Development & Family Sciences

**Sisson, Carol** 1990 Assoc Prof Emeritus Education

**Smith, Earl Eugene** 1957 Prof Emeritus Industrial Education

**Sredl, Henry John** 1983 Prof Emeritus Education

**Staton, Maryanne** 1949-51; 1958-69; 1972 Prof Emeritus Human Development & Family Sciences

**Storvick, Clara A.** 1945 Prof Emeritus Foods Nutrition

**Strowbridge, Edwin David Jr.** 1964 Assoc Prof Emeritus Education

**Ten Pas, Henry Arnold** 1948 Prof Emeritus Education

**Trow, Jo Anne J.** 1965 Prof Emeritus Education

**Tucker, Sylvia B.** 1975 Prof Emeritus Education

**Van Horn, Edna Marjorie** 1939 Prof Emeritus Home Economics Administration

**Wells, Vera Lucille** 1948 Asst Prof Emeritus Clothing, Textiles, & Related Arts

**Williamson, Stanley E.** 1946 Prof Emeritus Science Education

**Wilson, Robert Claude** 1949 Asst Prof Emeritus Industrial Education

**Wood, Carvel W.** 1968 Prof Emeritus Education

**Woodburn, Margy Jeanette** 1969 Prof Emeritus Nutrition & Food Mgmt

**Yearick, Elisabeth Stelle** 1966 Prof Emeritus Foods Nutrition

### LIBRARY

**Brandt, Patricia E.** 1962 Prof Emeritus Library

**Brazee, Edward Brooks** 1964 Assoc Prof Emeritus Valley Library

**Chona, Habans Singh** 1966 Asst Prof Emeritus Library

**Euren, Florence Sarah** 1946-49 1957 Senior Instr Emeritus Library

**Franklin, Hugh Lockwood** 1978 Prof Emeritus Library

**George, Melvin R.** 1984 The Delpha & Donald Campbell Director of Libraries Emeritus and Prof Emeritus

**Ho, Phillip Wen-Jen** 1953 Assoc Prof Emeritus Library

**Horvath, Helen Scruggs** 1965 Assoc Prof Emeritus Library

**Kinch, Michael Paul** 1969 Prof Emeritus Valley Library

**Lawrence, Robert Elwood** 1974 Assoc Prof Emeritus Library

**Lomonte, Rose Marie** 1969 Assoc Prof Emeritus Library

**McDonald, Marguerita** 1962 Assoc Prof Emeritus Library

**Minnick, Miriam Sharp** 1957 Prof Emeritus Library

**Schacht, David Waldron** 1967 Assoc Prof Emeritus Library

**Shou, Stephens Tefen** 1952 Prof Emeritus Library

**Swanson, Stanley Stewart** 1962 Assoc Prof Emeritus Library

**Tingelstad, Gertrude Bernice** 1964 Asst Prof Emeritus Library

**Unger, Donald Ben** 1972 Asst Prof Emeritus Library

**Waldron, Rodney King** 1954 Prof Emeritus Library

**Webber, Nancy Ruth** 1971 Asst Prof Emeritus Library

### OCEANIC & ATMOPHERIC SCIENCES

**Byrne, John Vincent** 1960, 1984 Prof Emeritus Oceanic & Atmospheric Sciences

**Caldwell, Douglas Ray** 1968 Prof Emeritus Oceanic & Atmospheric Sciences

**Carey, Andrew Galbraith Jr.** 1961 Prof Emeritus Oceanography

**Couch, Richard William** 1966 Assoc Prof Emeritus Oceanography

**Dymond, Jack R.** 1969 Prof Emeritus Oceanic & Atmospheric Sciences

**Frolander, Herbert Farley** 1959 Prof Emeritus Oceanography

**Gates, W. Lawrence** 1976 Prof Emeritus Atmospheric Sciences

**Gonor, Jefferson John** 1964 Prof Emeritus Oceanic & Atmospheric Sciences

**Hedgpeth, Joel Walke** 1965 Prof Emeritus Oceanography, Marine Science Center

**Keller, George H.** 1975 Prof Emeritus Oceanic & Atmospheric Sciences

**Kulm, LaVerne Duane** 1964 Prof Emeritus Oceanic & Atmopheric Sciences

**Levi, Shaul** 1977 Prof Emeritus Oceanic & Atmospheric Sciences

**Mesecar, Roderick** 1963 Assoc Prof Emeritus Oceanography

**Morita, Richard Yukio** 1962 Prof Emeritus Oceanography

**Neal, Victor Thomas** 1964, 1966 Assoc Prof Emeritus Oceanography

**Neshyba, Stephen Joseph** 1965 Prof Emeritus Oceanography

**Pearcy, William Gordon** 1960 Prof Emeritus Oceanography

**Small, Lawrence Frederick** 1961 Prof Emeritus Oceanic & Atmospheric Sciences

**Smith, Robert Lloyd** 1962 Prof Emeritus Oceanic & Atmospheric Sciences

**Strong, Elizabeth** 1960 Asst Prof Emeritus Oceanography

### PHARMACY

**Doerge, Robert F.** 1960 Prof Emeritus Pharmaceutical Chemistry

**Fink, Gregory B.** 1964 Prof Emeritus Pharmacy

**Hermann, Freya Friederike** 1962 Assoc Prof Emeritus Pharmacy

**Larson, Robert E.** 1977 Prof Emeritus Pharmacology

**Lee, Eugene Carlton** 1962 Senior Instr Emeritus Pharmacognosy

**Ohvall, Richard A.** 1976 Prof Emeritus & Dean Emeritus College of Pharmacy

**Sager, Robert William** 1961 Prof Emeritus Pharmacy

Schultz, H. Wayne 1959 Assoc Prof Emeritus Pharmacy

Wilson, Charles O. 1959 Prof Emeritus Pharm Chemistry

### VETERINARY MEDICINE

Bone, Jesse Franklin 1950 Prof Emeritus Veterinary Medicine

Hutton, Norman E. 1977 Assoc Dean Emeritus & Prof Emeritus Veterinary Medicine

Patton, Nephi Monroe1972 Prof Emeritus Veterinary Medicine

### ADMINISTRATIVE, RESEARCH, & SERVICE UNITS

Bailey, Samuel Hall 1947 Prof Emeritus Dept of Information

Boice, Charles Allan 1966 Prof Emeritus Dept of Information

Boots, Donald S. 1977 Director Emeritus Student Health Center

Bowers, Waldo 1963 Assoc Prof Emeritus, Assoc Director Emeritus Admissions

Bryan, M. Edward 1972 Assoc Prof & Director Emeritus of Student Housing & Residence Programs

Bucy, David Alvin 1956 Prof Emeritus & Emeritus Director of Facilities Planning

Burris, Nedry Valentine 1968 Asst Prof Emeritus Business Affairs

Castle, Emery N. 1954 Prof & Chair Emeritus University Graduate Faculty of Economics

Dix, Russell G. 1964 Assoc Prof Emeritus Registrar's Office

Dunn, James Wesley 1963 Prof Emeritus Development Office

Durham, Marvin Lyle 1970 Assoc Prof Emeritus Int'l Education

Edwards, Louis Laird 1955 Director Emeritus Career, Planning & Placement, Assoc Prof Business Admin

Fitzgerald, Duane Stanley 1952 Asst Prof Emeritus Memorial Union

Foulke, Ted E. 1969 Prof Emeritus Student Health Center

France, Thomas 1969 Asst Prof Emeritus University Publications

Gates, Dillard Herbert 1962 Prof Emeritus Int'l Research & Development

Gibbs, Wallace Eugene 1958 Director Emeritus of Admissions, Registrar Emeritus

Giffin, John S. 1980 Prof Emeritus Student Health Center

Graham, Crawford Henderson 1961 Director Emeritus Alumni Relations & Assoc Prof Emeritus

Harris, Irwin Cecil 1945 Director Emeritus Student Publications, Prof Emeritus Journalism

Haun, James Franz 1964 Prof Emeritus Retention Services

Hutton, Norman E. 1977 Assoc Dean Emeritus & Prof Emeritus Veterinary Medicine

Jeffrey, Hugh Frank, Jr. 1950 Prof Emeritus (Director of Business Affairs)

Johnson, Wallace Earle 1956 Prof Emeritus & Director Emeritus of Information

Lillig, Everett Houston 1970 Director Emeritus Physical Plant

McBride, Marjorie 1966 Assoc Prof Emeritus Career Planning & Placement

Metzger, Stuart Miles 1962 Assoc Director Emeritus Facilities Planning & Assoc Prof Emeritus Architecture

Morray, Marjorie Kuh 1968 Asst Prof Emeritus English Language Institute

Munford, James Kenneth 1939-46, 1948 Director Emeritus Publications & OSU Press, Prof Emeritus Education

Orzech, Miriam W. 1965 Director Emeritus & Prof Emeritus Pre-College Programs Academic Affairs

Pahre, Richard E. 1956, Director Emeritus Financial Aid

Patton, Nephi 1972 Director Emeritus Lab Animal Resources

Peckham, Charles Wesley 1965 Asst Prof Emeritus & Director Emertius of Printing & Mailing Services

Poling, Dan Williams 1937 Prof Emeritus, Dean Emeritus of Men

Robinson, Diana Kay 1970 Assoc Prof Emeritus Admissions

Sanders, Raymond S. 1967 Prof Emeritus Student Health Center

Sanderson, Donald R. 1968 Assoc Prof Emeritus Student Activities

Shaw, Clayton Albert 1950-53, 1966 Asst Prof Emeritus (Asst Registrar)

Stephan, William Pershing 1968 Prof Emeritus Student Health Center

Suttie, Sandra Jean 1969 Assoc Prof Emeritus Exercise & Sport Science

Valenti, Paul Bartholomew 1949 Prof Emeritus Intercollegiate Athletics

Van Vliet, Antone Cornelis 1955 Director Emeritus Career, Planning, & Placement Center. Prof Emeritus

Waldron, Rodney King 1954 Director Emeritus of Libraries, Prof Emeritus

Watson, John Lowe 1947 Controller Emeritus, Prof Emeritus OSSHE

Wong, Sally 1973 Asst Prof Emeritus Counseling Center

Yates, Thomas Leyba 1963 Prof Emeritus Computer Center

## FACULTY

The date following the name indicates the year of first appointment to the OSU Faculty. More than one date indicates that there has been a break in service.

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; Instr-Instructor; Res Assoc-Research Associate; Sr Instr-Senior Instructor; Sr Faculty Res Asst-Senior Faculty Research Assistant; Faculty Res Asst-Faculty Research Assistant; Extn-Oregon State University Extension Service.

### A

Abbott, Mark R. 1988 Prof Oceanic & Atmospheric Sciences. BS UC-Berkeley 1974; PhD UC-Davis 1978

Acker, Steven A. 1991 Asst Prof Sr Res Forest Science. BS Oregon 1982 PhD Wisconsin-Madison 1988

Acock, Alan C. 1990 Prof Department Head Human Development & Family Sciences. BA East Washington 1966 MA Washington State 1968 PhD 1971

Adair, Nanci L. 1991 Faculty Res Asst Botany & Plant Pathology. BS Oregon State 1990

Adam, Michael D. 1994 Faculty Res Asst Forest Science. BS Wisconsin 1990 MS Kentucky 1992

Adams, Darius 1995 Prof Forest Resources. BS Humboldt State 1966 MFS Yale 1968 PhD UC-Berkeley 1972

Adams, Jennifer G. 1988 Asst Prof Veterinary Medicine. BS Furman 1976 DVM Georgia 1985

Adams, Paul William 1980 Prof Extn Watershed Mgmt Specialist Forest Engineering. BS Vermont 1975 MS Michigan 1978 PhD 1980

Adams, Richard Melvin 1981 Prof Agricultural & Resource Economics. BS UC-Davis 1968 MS 1971 PhD 1975

Adams, Wesley Thomas 1978 Prof Forest Science. BS Humboldt State 1968 MS North Carolina State Raleigh 1970 PhD UC-Davis 1974

Adamus, Paul 1997 Faculty Res Asst Fisheries & Wildlife. BS Maine 1972 MS Utah 1976

Ahearn, Kerry David 1978 Assoc Prof Honors College English. BA Stanford 1967 MA Ohio 1968 PhD 1974

Ahern, Kevin G. 1996 Instr Biochemistry & Biophysics. BS Oklahoma State 1976 MS 1981 PhD Oregon State 1986

Akyeampong, Ataa Asham 1986 Asst Prof Counselor & Instructional Coordinator Educational Opportunities. BA Washington 1969 MSW 1972 PhD Oregon State 1986

Albrecht, Steven 1993 Lecturer Chemistry. BA St. Olaf College 1961 PhD North Dakota State 1966

Aldrich, Markham Susan 1984 Assoc Prof Yamhill Co Extn Agent Crop & Soil Science. BS Pomona College 1969. BS Oregon State 1973 MA 1978

Alexander, Josephine 1995 Managing Editor OSU Press. BA Exeter Univ (England) 1965

AliNiazee, Mohammed Taskeen 1972 Prof Entomology. BS Agric AP Ag (Hyderabad India) 1966 PhD Cal Riverside 1970

Allen, John Sharer, Jr. 1973 Prof Oceanic & Atmospheric Sciences. BSE Princeton 1959 PhD 1968

**Allen, Marganne M.** 1966 Faculty Res Asst Forest Engineering. BS Oregon State 1992

**Almady, Leila A.** 1996 Asst Athletic Trainer Intercollegiate Athletics. BS UC-Fresno 1995

**Amberg, John W., Jr.** 1967 Sr Faculty Res Asst Laboratory Animal Resources. BS Oregon State 1967

**An, Haejung** 1991 Asst Prof Food Science & Technology. BS Seoul National Univ (Korea) 1981 MS Louisiana State 1984 PhD Florida 1989

**Anderson, Craig Hedges** 1980 Sr Instr Coordinator of Television Production Communication Media Center. BA San Jose State1978

**Anderson, David A.** 1994 Faculty Res Asst Fisheries & Wildlife. BA Miami Univ (Ohio) 1987

**Anderson, Sonia R.** 1968 Prof Biochemistry & Biophysics. BS Nebraska 1961 PhD Illinois 1964

**Anderson, Wayne C.** 1986 Prof Honors College English. BA Gonzaga 1977 MA Washington 1979 PhD 1982

**Andrews, Dawn M.** 1997 Faculty Res Asst Agricultural Chemistry. BS Portland State 1993 MS 1996

**Anekonda, Thimmappa S.** 1996 Asst Prof Sr Res Forest Science MS Univ of Ag Sciences Dharwad (India) 1983 PhD UC-Berkeley 1992

**Anemaet, Josephine C.** 1991 Asst Prof Valley Library. BA Arizona 1989 MA 1990 MA Oregon State 1995

**Arbogast, Brian L.** 1974 Sr Faculty Res Asst Agricultural Chemistry. BA Southern Oregon 1974

**Armstrong, Donald James** 1996 Prof Botany & Plant Pathology AB Marshall 1959 MA 1961 PhD Wisconsin 1967

**Arnold, Roy G.** 1987 Prof Provost & Executive Vice President Food Science & Technology. BS Nebraska 1962 MS Oregon State 1965 PhD 1967

**Arnold, Steven J.** 1997 Prof Department Chair Zoology. BA UC-Berkeley 1966 PhD Michigan 1972

**Arp, Daniel James** 1990 Prof Honors College Director Nitrogen Fixation Lab Botany & Plant Pathology. BS Nebraska 1976 PhD WisconsinMAdison 1980

**Arrington, Julie** 1988 Sr Faculty Res Asst Oceanic & Atmospheric Sciences. BS Oklahoma State 1980

**Arthur, Jeffrey Lee** 1977 Assoc Prof Statistics. BS Purdue 1973 MS 1975 PhD 1977

**Asbell, Ann Cecile** 1984 Instr Physical Activity Course Program Coordinator Exercise & Sports Science. BS Missouri 1974 MS Indiana 1979

**Ashkenas, Linda R.** 1979 Sr Faculty Res Asst Fisheries & Wildlife. BA Cornell 1976 MS Boston 1979

**Aune, Darrell** 1989 Coord Broadcast Operations Intercollegiate Athletics. BA Washington State 1965

**Aune, Patricia Elaine** 1989 Assoc Prof Multnomah Co Extn Agent Home Economics & Education. BA Cornell 1976 MS Boston 1979

**Austin, William E.** 1993 Faculty Res Asst Crop & Soil Science. BS Western Oregon 1978

**Averill, Jane E.** 1990 Instr English Language Institute. BA Kansas 1974 MA San Francisco State 1980

**Avery, Bonnie E.** 1981 Asst Prof Kerr Library. BA Washington 1970 MS 1980

**Axmaker, Stacey A.** 1997 Instr Health & Human Performance. BS Reed College 1991

**Ayres, James W.** 1970 Prof Pharmacy. BS Idaho State 1965 PhD Kansas 1970

**Ayres William Alan** 1972 Network Operations Manager Informaton Services. BS Seattle Univ 1968 MS Oregon State 1973

**Azarenko, Anita Nina** 1986 Prof Horticulture. BS Maryland 1981 MS 1983 PhD 1987

**Azevedo, Robert Steven** 1982 Faculty Res Asst Oceanic & Atmospheric Sciences. BS Oregon State 1982

**Azizian, Mohammad Farogh** 1993 Res Assoc Civil, Construction, & Environmental Engineering. BS Univ of Tehran (Iran) 1978 MS 1983 PhD Oregon State 1993

## B

**Baek, Dae Hyun** 1991 Asst Prof Honors College Economics. BA Seoul National Univ (Korea) 1981 MA Ohio State 1986 PhD 1990

**Baggott, John B.** 1984 Asst Prof Washington Co Extn Agent 4-H Youth Development Education. BS Michigan State 1975 MS 1980

**Baham, John Eustis** 1979 Assoc Prof Crop & Soil Science. BS Sonoma State 1975 PhD UC-Riverside 1980

**Bailes, Jack Clayton** 1972 Prof Acctg, Finance & Info Mgmt AB Stanford 1968 MBA Columbia 1970 PhD Washington 1973

**Bailey, George Samuel, Jr.** 1979 OSU Distinguished Prof Director Marine Freshwater Biomedical Center. BS USC 1965 PhD UC-Berkeley 1969

**Baird, William M.** 1997 Prof Director Environmental Health Sciences Center. BS Lehigh Univ 1966 PhD Wisconsin 1971

**Bakalinsky, Alan T.** 1989 Asst Prof Food Science & Technology. BS UC-Davis 1979 MS 1983 PhD 1989

**Baker, Robert Steven** 1969 Asst Prof Systems Analyst Valley Library. BS Oregon State 1964 MS 1972

**Bald, Joachim** 1995 Co-Director Int'l Internship Program MBA L'Omstotite d'Estudes Commerciales (France) 1986 MBA Univ of Dortmund (Germany) 19 Doctorate 1994

**Baldwin,. BArbara E.** 1965 Faculty Res Asst Editor Agricultural Communications. BA Evansville 1959

**Ball, Daniel A.** 1990 Assoc Prof Crop & Soil Science. BS Kansas State 1976 MS UC-Riverside 1980 PhD Wyoming 1988

**Balschweid, Mark A.** 1995 Instr General Agriculture. BS Oregon State 1987 MS 1991

**Balz,. BArbara S.** 1990 Registrar Registrar's Office. BA Alabama 1965 MS Indiana 1967

**Banducci, Susan A.** 1992 Asst Prof Political Science. BS Santa Clara Univ 1988 MA UC-Santa. BArbara 1989 PhD 1995

**Bandyopadhyay, Anirban** 1997 Res Assoc Post Doct Electrical & Computer Engr MT Univ of Calcutta (India) 1990 PhD 1996

**Banerjee, John K.** 1996 Asst Prof Catalog Librarian Valley Library. BA Illinois at Urbana-Champaign 1989 MA 1991 MS 1995

**Bannantine, John P.** 1997 Res Assoc Post Doct Microbiology MS Iowa State 1991 PhD 1995

**Barbour, Philip L.** 1991 Faculty Res Asst Mechanical Engineering. BS Oregon State 1985 MS 1991

**Barbour, Richmond Tyler** 1992 Asst Prof English. BA Stanford 1970 PhD UC-Berkeley 1990

**Barksdale, Brett** 1988 Faculty Res Asst Oceanic & Atmospheric Sciences. BS Harvey Mudd 1988

**Barnard, Andrew H.** 1996 Faculty Res Asst Oceanic & Atmospheric Sciences. BA South Carolina 1990 MA Oregon State 1994

**Barnes, David W.** 1984 Prof Biochemistry & Biophysics. BA Vanderbilt 1971 PhD 1977

**Barnes, Jeffrey** 1984 Assoc Prof Oceanic & Atmospheric Sciences. BS Iowa State 1975 MS Cal Tech 1977 PhD Washington 1983

**Barofsky, Douglas Fred** 1984 Prof Agricultural Chemistry. BS Washington State 1963 MS Penn State 1965 PhD 1967

**Barofsky, Elisabeth** 1985 Sr Faculty Res Asst Agricultural Chemistry. BS Chemie Schule Richter (Germany) 1964

**Barr, Tammy Lynn** 1995 Technology Consultant Information Services. BS Oregon State 1982

**Barth, John Alexander** 1987 Assoc Prof Sr Res Oceanic & Atmospheric Sciences. BA Colorado 1982 PhD MIT Woods Hole 1987

**Bartholomew, Jerri L.** 1994 Asst Prof Sr Res Microbiology. BS Penn State 1980 MS Oregon State 1985 PhD 1989

**Bartlett, Jasmine S.** 1997 Faculty Res Asst Oceanic & Atmospheric Sciences. BS Univ of Canterbury (England) 1992 MS Dalhousie Univ (England) 1996

**Bartlett, Jill** 1992 Faculty Res Asst Veterinary Medicine. BS Oregon State 1992

**Bassinette, John P.** 1995 Faculty Res Asst Crop & Soil Science. BS Cornell 1989 MS Idaho 1995

**Bates, Allison C.** 1973 Instr Veterinary Medicine. BS Oregon State 1974

**Bates, Jonathan D.** 1997 Res Assoc Eastern Oregon Ag Research Center - Burns. BS Cornell 1984 MS Oregon State 1989 PhD 1996

**Bauer, Michael E.** 1990 Assoc Prof Deschutes Co Extn Agent Horticulture. BS Western Michigan 1983 MS Idaho 1989

**Baxter, Brenda R.** 1995 Advisor College of Business. BA UC-Davis 1990 MS Cal State-Hayward 1992

**Bayley, Peter B.** 1994 Assoc Prof Fisheries & Wildlife. BS Leeds Univ (England) 1966 MS 1979 PhD Dalhousie Univ (Canada) 1982

**Bayne, Christopher Jeffrey** 1971 Prof Zoology. BS Wales 1963 PhD 1967

**Beach Gary L** 1988 Coordinator of Assessment & Academic Programs Academic Affairs. BS Portland State 1972 MS Oregon State 1982

**Beachley, Michael L.** 1976 Asst Prof Athletic's Compliance Officer Intercollegiate Athletics. BA San Francisco State 1970 MA 1971 PhD Denver 1976

**Beal, John F. II** 1994 Asst Prof Jefferson Co Extn Agent 4-H Youth Development Education. BS Wyoming 1989 MA Washington State 1991

**Beals, Eric Lee** 1978 Sr Faculty Res Asst Oceanic & Atmospheric Sciences. BA San Francisco State 1978

**Beary, Janet Kay** 1993 Nutritionist Student Health Center. BS Southwestern Adventist College 1981 MS Kansas State 1985 PhD Oregon State 1995

**Beatty, Bess** 1986 Assoc Prof Honors College History. BA Wake Forest Univ 1970 MA Florida State 1973 PhD 1976

**Beatty, Joseph John** 1979 Sr Instr Asst Chair Biology Program. BS Missouri at Columbia 1970 MA 1973 PhD Oregon State 1979

**Beck, William F.** 1982 Instr Industrial & Mfg Engineering. BA Wyoming 1960 MS Arizona State 1967 MBA Oregon State 1989

**Becker, Boris William** 1970 Prof Honors College Mgmt, Marketing & Int'l Business. BS UC-Berkeley 1962 MBA 1967 PhD 1970

**Beekman, George E.** 1980 Sr Instr Computer Science Engineering. BA Missouri 1969 MS Oregon 1972

**Beeson, Luana J.** 1994 Asst Prof Public Health. BS Western Oregon 1969 MS Oregon State 1988 PhD 1992

**Beilstein, Michael** 1978 Sr Faculty Res Asst Animal Sciences. BA Oregon State 1973

**Belair, Diane M.** 1994 Coordinator Academic Support Svcs Services for Disabled Students. BA Cal State-Sacramento 1983 MS Western Oregon 1990

**Bell, Anne S.** 1997 Development Planning Admin Development Office. BA Bennington College 1967

**Bell, Christopher A.** 1981 Prof Honors College Assoc Dean College of Engineering. BS Nottingham (England) 1972 PhD 1978

**Bell, Neil C.** 1992 Faculty Res Asst North Willamette Res & Extn Center. BS British Columbia 1990 MS Oregon State 1992

**Bella ,David Andrew** 1967 Prof Honors College Civil, Construction, & Environmental Engineering. BS Virginia Military Institute 1961 MS New York 1964 PhD 1967

**Bender, Randall C.** 1983 Faculty Res Asst Zoology. BS Texas Tech 1977

**Bennett, Andrew Fawcett** 1987 Prof Oceanic & Atmospheric Sciences. BS Western Australia 1967 MS Harvard 1968 PhD 1971

**Bentley-Townlin, Tracy Leigh** 1990 Director Services for Disabled Students. BS,BA New Mexico 1987 MEd Oregon State 1994

**Berger, Melinda D.** 1995 Faculty Res Asst Oceanic & Atmospheric Sciences. BS Oregon State 1994

**Bergeron, Jimmie D.** 1974 Assoc Prof Clatsop Co Extn Agent Fisheries & Wildlife. BS Bemidji State Univ 1963 MS Oregon State 1969

**Berglund, Albert J.** 1995 Network Support Specialist Information Services. BS Oregon State 1991

**Berkout, Vadym** D. 1995 Res Assoc Post Doct Agricultural Chemistry MS Moscow Inst of Physics & Technology 1983 PhD 1986

**Berry, Helen** 1988 Assoc Prof Marion Co Extn Agent Extn Home Economics. BS Oregon State 1975 MS Indiana State 1979

**Berry, Ralph Eugene** 1968 Prof Entomology. BS Colorado State 1963 MS 1965 PhD Kansas State 1968

**Beschta, Robert Lee** 1974 Prof Forest Engineering. BS Colorado State 1965 MS Utah State 1967

**Bianco, Theresa M.** 1990 Assoc Prof Pharmacy. BS SUNY-Buffalo 1984 Pharm.D. Texas at Austin & the Health Sciences Ctr San Antonio 1988

**Bierlmaier, Frederick A.** 1977 Faculty Res Asst Forest Science. BS Vermont 1974

**Bilsland, Douglas M.** 1980 Sr Faculty Res Asst Bioresource Engineering. BS Oregon State 1975

**Binney, Stephen Ellis** 1973 Prof Nuclear Engineering. BS Oregon State 1964 MS UC-Berkeley 1966 PhD 1970

**Birkes, David Spencer** 1974 Assoc Prof Statistics. BS Stanford 1964 MS Chicago 1966 PhD 1995

**Bishop ,Leslie J.** 1988 Instr English Language Institute. BS Missouri 1963 MEd Oregon State 1987

**Black, Daniel E.** 1994 Network Support Specialist Printing & Mailing Services. BA Washington State 1983

**Blaustein, Andrew R.** 1978 Prof Zoology. BA Southampton College 1971 MS Nevada Reno 1973 PhD Cal Santa. BArbara 1978

**Block, John H.** 1966 Prof Pharmacy. BS BPhr Washington State 1961 MS 1963 PhD Wisconsin 1966

**Bloome, Peter D.** 1997 Prof Associate Director Extension Administration. BS Illinois 1965 MS 1969 PhD 1970

**Bloomer, Sherman H.** 1995 Prof Chairperson Geosciences. BA Rice Univ 1976 PhD UC-Scripps 1982

**Bloomfield, Molly M.** 1992 High School Coordinator SMILE Program. BA Wellesley 1966 MA Stanford 1967

**Bloomfield, Stefan David** 1971 Prof Acctg, Finance & Info Mgmt BES Johns Hopkins 1966 MS Stanford 1968 PhD 1972

**Blouin, Michael** 1995 Asst Prof Zoology. BA Virginia 1982 MS Florida State 1986 PhD 1989

**Blythe, Linda L.** 1978 Prof Assoc Dean Veterinary Medicine. BS UC-Davis 1972 DVM 1864 PhD 1979

**Bodenroeder, Pamela K.** 1969 Sr Faculty Res Asst Survey Research Center. BA Oregon State 1969

**Boe, A. Bryan** 1986 Instr Extn Energy Program. BA Oregon 1970

**Boggess, William G.** 1995 Prof Department Head Agricultural & Resource Economics. BS Iowa State 1974 PhD 1979

**Bogley, William A.** 1990 Assoc Prof Mathematics. BA Dartmouth 1981 MS Oregon 1983 PhD 1987

**Bogucki, Darek** 1997 Res Assoc Oceanic & Atmospheric Sciences MS Gdansk Tech Univ (Poland) 1982 M.Sc Dalhousie Univ (Canada) 1991 PhD Southern California 1996

**Bohle, Mylen G.** 1989 Assoc Prof Crook Co Extn Agent Crop & Soil Science. BS Montana State 1975. BS 1979 MS Oregon State 1989

**Boileau, Arlene Fay** 1986 Instr Warm Springs Co Extn Coordinator 4-H Youth Development Education

**Bolman, Tiffany M.** 1997 Faculty Res Asst Microbiology. BS Oregon State 1967

**Bolte, John P.** 1987 Assoc Prof Bioresource Engineering. BS Florida 1979 MS 1983 PhD Auburn 1987

**Bondi, Michael Charles** 1978 Prof Clackamas Co Extn Agent Forest Science. BS Iowa State 1973 MS Canterbury (New Zealand) 1977

**Bonnichsen, Robson** 1991 Prof Director of Center for the Study of First Americans Anthropology. BA Idaho State 1965 PhD Alberta (Canada) 1974

**Bontrager, Robert M.** 1994 Assoc Director Enrollment Services. BA Goshen 1980 MC Arizona State 1983 EdD 1987

**Borden, Susan J.** 1983 Director SMILE Program. BA Iowa State 1960 MS Oregon State 1962

**Borg, Marcus J.** 1979 OSU Distinguished Prof Philosophy. BA Concordia 1964 Diploma Oxford 1966 PhD 1972

**Borman, Michael M.** 1994 Assoc Prof Rangeland Resources. BS Morehead State Univ 1973 MS Colorado State 1981 PhD Oregon State 1989

**Borsa, Paul A.** 1994 Asst Prof Exercise & Sport Science. BS Pittsburgh 1988 MS 1992 PhD 1994

**Bose, Bella** 1980 Prof Computer Science Engineering BE Madras 1973 ME Indian Institute of Science 1975 MS Southern Methodist 1979 PhD 1980

**Bothwell, Michelle K.** 1994 Asst Prof Bioresource Engineering. BS Purdue 1989 PhD Cornell 1994

**Bottero, Joseph Moshe** 1969 Sr Faculty Res Asst Oceanic & Atmospheric Sciences. BS Portland State 1962 MS Oregon State 1969

**Bottomley, Peter J.** 1979 Prof Microbiology. BS Liverpool (England) 1972 PhD Dundee (Scotland) 1975

**Boucot, Arthur James** 1969 OSU Distinguished Prof Zoology. BA Harvard 1948 MS 1949 PhD 1953

**Bowers, John N.** 1995 Asst Prof Art BFA Iowa 1981 MFA 1984

**Bowers, Steven C.** 1994 Instr Forestry Extension. BS Oregon 1977 MF Oregon State 1993

**Bowker, Judith K.** 1991 Asst Prof Speech Communication. BS Kansas MA 1973 PhD Oregon State 1989

**Bowman, Sally R.** 1994 Asst Prof Human Development & Family Sciences. BA Auburn 1973 MA 1976 PhD Oregon 1993

**Boyd, Timothy J.** 1993 Res Assoc Oceanic & Atmospheric Sciences. BA Carleton 1980 PhD UC-San Diego 1989

**Boyer, Charles David** 1993 Prof Department Head Horticulture. BS Eastern Oregon 1971 MS Penn State 1974 PhD 1976

**Boyle, James Reid** 1981 Prof Forest Resources. BS Iowa State 1962 MF Yale 1963 PhD 1967

**Bozanich, Patricia A.** 1992 Instr Extn Master Recycler Program Coordinator Engineering Extension. BS Portland State 1981

**Bradford, Charles S.** 1992 Faculty Res Asst Biochemistry & Biophysics. BA Delaware 1980 MS 1983

**Brady, Glassman Patti** 1988 Advisor & Asst to the Director Financial Aid. BS Delaware 1981 MEd Oregon State 1989

**Braker, Marjorie** 1979 Assoc Prof Extn Home Economics. BS Wisconsin Stout 1967. BS Wisconsin River Falls 1970

**Branch, Harrison** 1972 Prof Art BFA San Francisco Art Institute 1970 MFA Yale 1972

**Brandt, Jeanette Ann** 1973 Assoc Prof Apparel, Interiors, Housing & Merchandising. BS Washington State 1967 MS Oregon State 1972 PhD 1981

**Brandt, Jeanne Dawn** 1985 Assoc Prof Washington Co Extn Agent Home Economics & Education. BS Oregon State 1982 EdM 1984

**Brauner, David Ray** 1977 Assoc Prof Honors College Anthropology. BA Washington State 1969 MA 1972 PhD 1976

**Braunworth, William S., Jr.** 1986 Assoc Prof Extn Ag Program Leader (Interim). BS Colorado State 1975 MS 1977

**Brazier, Allan A.** 1996 Coordinator Extended Learning Program Continuing Higher Education. BA & BEd Saskatchewan 1970 MEd Oregon 1989

**Breen, Patrick Joseph** 1974 Prof Horticulture. BS College of St Thomas 1960 MS Minnesota 1963 PhD 1967

**Brett, Marcia Ann** 1982 Sr Faculty Res Asst Crop & Soil Science. BA Michigan 1968. BS Oregon State 1982

**Brewster, Bill Densmore** 1975 Sr Instr Crop & Soil Science. BS Oregon State 1970 MS 1972

**Brock, Mary A.** 1995 Network Support Specialist Information Services. BS Oregon State 1978

**Brock, Terry** 1997 Faculty Res Asst Agricultural Chemistry. BS Purdue 1992 MS Oregon State 1997

**Broderick, David Joseph** 1977 Faculty Res Asst Biochemistry & Biophysics. BS New Hampshire 1965 MS 1967 PhD Oregon State 1977

**Broderick, William Payson** 1986 Asst Prof Morrow Co Extn Agent 4-H Youth Development Education. BS Cal State-Fresno 1969 MA Norwich Univ 1992

**Brodie, Ann E.** 1975 Asst Prof Sr Res Animal Sciences. BS Purdue 1965 PhD UC-Berkeley 1970

**Brodie, John Douglas** 1975 Prof Forest Resources BFS Toronto 1961 MS Syracuse 1963 PhD UC-Berkeley 1971

**Brook, David M.** 1987 Instr Multnomah Co Extn Agent Engineering Extension. BA Southern Illinois 1968

**Brooke, Sandra L.** 1995 Instr World of Art Project Coordinator Art. BA Oregon State 1972 MS 1993

**Brookhyser, Evelyn Anne** 1966 Prof Lincoln Co Staff Chair Extn Home Economics. BS Stout State 1966 EdM Oregon State 1974

**Brooks, Raymond M.** 1997 Asst Prof College of Business MS Washington Univ 1990 PhD 1991

**Broome, Janice Marie** 1978 Asst Prof Multnomah Co Extn Agent 4-H Youth Development Education. BS Oregon State 1976 MPA Portland State 1986

**Brose, Elizabeth Louise** 1982 Development Officer College of Ag Sciences. BS Cal Poly San Luis Obispo 1972

**Brouwers, Mariette** 1985 Assoc Prof Counselor Counseling & Testing Center. BA Colorado 1975 MA Washington State 1984 PhD 1985

**Brower, Andrew V. Z.** 1997 Asst Prof Entomology. BA Yale 1985 MES 1987 PhD Cornell 1994

**Brown, Carol E.** 1978 Assoc Prof Honors College Acctg, Finance & Info Mgmt. BS Wisconsin 1972 MS Oregon 1977 PhD Oregon State 1989

**Brown, Clinton** 1970 Prof Art BFA Wisconsin Milwaukee 1965 MA Wyoming 1966 MFA USC 1968

**Brown, Daniel J.** 1974 Assoc Prof Mgmt, Marketing, & Int'l Business. BA Washington 1966 MBA Fresno State 1969 PhD Iowa 1974

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**Buccola, Steven Thomas** 1980 Prof Agricultural & Resource Economics. BA Saint Mary's College of California 1966 MS UC-Davis 1972 PhD 1976

**Buckhouse, John Chapple** 1975 Prof Rangeland Resources. BS UC-Davis 1966 MS Utah State 1968 PhD 1975

**Budd, Timothy Alan** 1986 Assoc Prof Computer Science Engineering. BA Western Washington 1976 MS Yale 1978 PhD 1980

**Buhler, Donald Raymond** 1967 Prof Agricultural Chemistry. BS Oregon State 1950 MS 1953 PhD 1956

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**Burgett, Dennis Michael** 1974 Prof Honors College Entomology. BS Edinboro State 1966 MS Cornell 1971 PhD 1973

**Burke, Mary E.** 1985 Sr Instr Honors College Microbiology. BA Blackburn College 1964 MS Iowa State 1966 PhD 1969

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**Bushnell, Dwight J.** 1976 Prof Mechanical Engineering. BS Utah 1967 MS 1968 PhD Brigham Young 1974

**Busler, Susan Lee** 1987 Assoc Prof Lane Co Extn Agent 4-H Youth Development Education. BS Kent State 1983 MPA Seattle 1986

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**Butler, David Allen** 1975 Prof Statistics. BS Oregon State 1969 MS Cornell 1970 MS Stanford 1975 PhD 1975

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**Cook, Thomas William** 1977 Assoc Prof Horticulture. BS Washington State 1972 MS Rhode Island 1975

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**Cornwell, Chris C.** 1997 Faculty Res Asst AGS North Willamette. BS Oregon State 1995

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**Counts, Sharon J.** 1997 Director of Development College of Business. BA Oregon 1969

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**Crane, Jimmie Merle** 1992 Sr Faculty Res Asst Crop & Soil Science. BS Idaho 1965

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**Cuenca, Richard H.** 1978 Prof Bioresource Engineering. BS Cal State- Polytechnic 1971 MS Cal State-Sacramento 1975 PhD UC-Davis 1978

**Cull, Paul** 1970 Prof Computer Science Engineering. BS Providence College 1965 PhD Chicago 1970

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**Cusack, Thomas J.** 1984 Prof Int'l Res & Development. BS London 1970 MS Guelph (Canada) 1972 PhD Oregon State 1977

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**Dawson, Patricia Ann** 1988 Assoc Prof Umatilla Co Extn Agent 4-H Youth Development Education. BS Idaho 1981 MA Norwich Univ 1992

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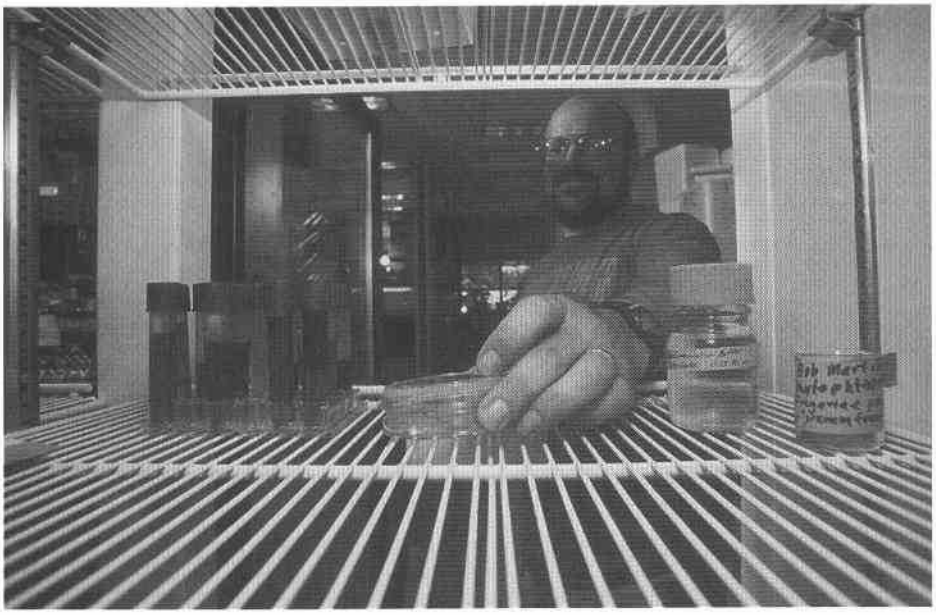

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**Derryberry, Douglas A.** 1984 Assoc Prof Honors College Psychology. BA Oregon 1978 MS 1981 PhD 1983

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**Higgins, Karen** 1992 Asst Prof Honors College Education. BS Oregon 1974 MA 1982 PhD 1991

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**Higley, Kathryn Ann** 1994 Asst Prof Nuclear Engineering. BA Reed College 1978 MS Colorado State 1992 PhD 1994

**Hilbert, Carey A.** 1996 Academic Advisor College of Health & Human Performance. BS Oregon 1992 MS Oregon State 1994

**Hilderbrand, Kenneth Step, Jr.** 1969 Assoc Prof Seafood Specialist. BS Oregon State 1962 MS 1964

**Hill, Hatsue Akimoto** 1978 Asst Prof Int'l Education

**Hill, Thomas W.** 1984 Sr Instr Superintendent of Farm Operations Animal Sciences. BS Cal Poly San Luis Obispo 1976 MS Oregon State 1990

**Hilton, Richard Judd** 1987 Faculty Res Asst Southern Oregon Exp Station. BA Pomona College 1981 MS UC-Davis 1987

**Hinman, Robert Charles** 1978 Assoc Prof Douglas Co Extn Agent Sea Grant Extension. BS Cal State-Chico 1965 MS Cornell 1967

**Hino, Jeffry Chester** 1984 Sr Instr Production Specialist Forestry Media Center. BS Arizona 1975 MS Oregon 1979

**Hiratsuka, Yuji** 1992 Asst Prof Art. BS Toyko Gakugei Univ 1978 MA New Mexico State 1987 MFA Indiana Univ 1990

**Histand, Phillip Claude** 1989 Asst Medical Director/Physicial Student Health Center. BA Goshen 1972 MD Northwestern 1976

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**Hoffman, Robert Lawrence, Jr.** 1983 Faculty Res Asst Fisheries & Wildlife. BS Oregon 1972. BS Oregon State 1982

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**Horowitz, Irwin A.** 1994 Prof Psychology. BS Brooklyn College 1961 MA 1963 PhD Michigan State 1966

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**Huber, Michael J.** 1986 Assoc Prof Veterinary Medicine. BS UC-Davis 1978 DVM 1980

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**Husband, William B.** 1985 Assoc Prof History. BA Texas Tech 1969 MA Cal State-Long Beach 1977 PhD Princeton 1984

**Huso, ManuelaM P.** 1987 Faculty Res Asst Geosciences. BA Whitman College 1978 MS Oregon 1984 MS Oregon State 1988

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**Huyer, Adriana** 1972 Prof Oceanic & Atmospheric Sciences. BS Toronto 1967 MS Oregon State 1971 PhD 1974

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**Johnson, Eugene** 1965 Sr Faculty Res Asst Agricultural Chemistry. BS Oregon State 1966

**Johnson, Kenneth Bjorn** 1988 Assoc Prof Botany & Plant Pathology. BS Minnesota 1979 MS Oregon State 1982 PhD Minnesota 1986

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**Johnson, Linda A.** 1991 Head Advisor College of Health & Human Performance. BS UC-San Bernardino 1985

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**Johnson, Rebecca Lynn** 1984 Assoc Prof Forest Resources. BA Wisconsin 1977 MS Michigan State 1979 PhD 1984

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**Katz, Jonathan G.** 1993 Assoc Prof Honors College History. BA Harvard 1975 PhD Princeton 1990

**Katzev, Aphra R.** 1994 Res Assoc Home Economics & Education. BA Stanford 1959 MA Univ of Calif 1961 PhD Oregon State 1994

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**Kaufman, Diane M.** 1988 Assoc Prof Extn Agent North Willamette Res & Extn Center Horticulture. BA Illinois 1969. BS 1982 MS 1985

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**Kellogg, Loren Dudley** 1978 Prof Forest Engineering. BS Humboldt State 1974 MF Oregon State 1976 PhD 1986

**Kelly, John E. Jr.** 1997 Faculty Res Asst Food Science & Technology. BS San Jose State 1985

**Kelly, Shaun F.** 1996 Faculty Res Asst Bioresource Engineering. BA Michigan State 1986 MS 1988

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**Kennedy, Alice Machelle** 1995 Program Coordinator Memorial Union. BS Oregon 1965 MAIS Oregon State 1995

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**Kennedy, Timothy Christopher** 1976 Prof Mechanical Engineering. BS SUNY-Buffalo 1968 MS Stanford 1969 PhD 1972

**Kenneke, Larry Jon** 1970 Prof Director, Int'l Res & Development Education. BS Northern Illinois 1961 MS 1965 EdD Oregon State 1968

**Kenney, John G.** 1992 Assoc Prof Electrical & Computer Engineering. BS Columbia 1984 MS Carnegie Mellon 1988 PhD Carnegie Mellon 1991

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**Kersey, Eugene R.** 1995 Assoc Director/Director of Major Gifts Development Office. BA Dartmouth 1963 MA Minnesota 1966 PhD 1972

**Kershaw, Nancy L.** 1984 Assoc Prof Tillamook Co Extn Agent Extn Home Economics. BS Oregon State 1978 MS Step F. Austin 1981

**Kesler, Linc** 1983 Assoc Prof English. BA Yale 1971 MA Toronto 1973 PhD 1981

**Keszler, Douglas A.** 1985 Prof Chemistry. BS Southwestern Oklahoma State 1979 PhD Northwestern 1984

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**Ketchum, James Scott** 1995 Faculty Res Asst Forest Science. BS Oregon State 1992 MS 1994

**Ketchum, Lynn Gerald** 1988 Assoc Prof Extn Educational Video Specialist Extension Communications. BA Arizona 1974 MED 1987

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**Khanna, Sunil** 1995 Asst Prof Anthropology. BS Univ of Delhi (India) 1982 MS 1984 PhD 1988 PhD Syracuse 1995

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**Kiem, Richard F.** 1996 Faculty Res Asst Forest Engineering. BS Mississippi State 1993 MS 1995

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**Killip, Scott C.** 1995 Information Technology Engineer Information Services. BS Grove City College 1986

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**King, Jonathan S.** 1980 Assoc Prof Honors College Mgmt, Marketing, & Int'l Business. BA Antioch 1965 MBA Washington 1975 PhD 1980

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**King, Wesley K.** 1997 Faculty Res Asst Fisheries & Wildlife. BS Ohio Univ 1994

**Kingsley, Kenneth K.** 1974 Assoc Prof Department Head Agricultural Communications. BA Kansas State 1964 MS 1973

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**Kiser, James** 1997 Instr Forest Engineering. BS Humboldt State 1982 MS Oregon State 1992

**Klein, Andrew Clifford** 1985 Prof Acting Dept Head Nuclear Engineering. BS Penn State 1977 MS Wisconsin 1979 PhD 1983

**Kleinsorge, Ilene K.** 1987 Assoc Prof Chair & MBA Director Acctg, Finance & Info Mgmt. BS Emporia State 1981 PhD Kansas 1988

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**Kloepper, John A.** 1995 Computer Support Asst College of Engineering. BA Franklin Pierce College 1989

**Knapp, Patricia A.** 1993 Asst Prof Speech Communication. BS Clarion Univ of Pennsylvania 1985 MA Emerson 1987 PhD Pittsburgh 1993

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**Knight, Randall William** 1984 Sr Faculty Res Asst Crop & Soil Science. BS Oregon State 1973

**Knothe, Carol Alicia** 1972 Assoc Prof Malheur Co Extn Agent 4-H Youth Development Education. BS Nebraska 1962 MHEc Oregon State 1971

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**Koenig, Harold F.** 1987 Assoc Prof Mgmt, Marketing, & Int'l Business. BA Rochester 1980 MBA Nebraska 1982 PhD 1988

**Kogan, Marcos** 1991 Prof Director Integrated Plant Protection Center. BS Universidade Rural do Rio de Janeiro (Brazil) 1961 PhD UC-Riverside 1969

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## L

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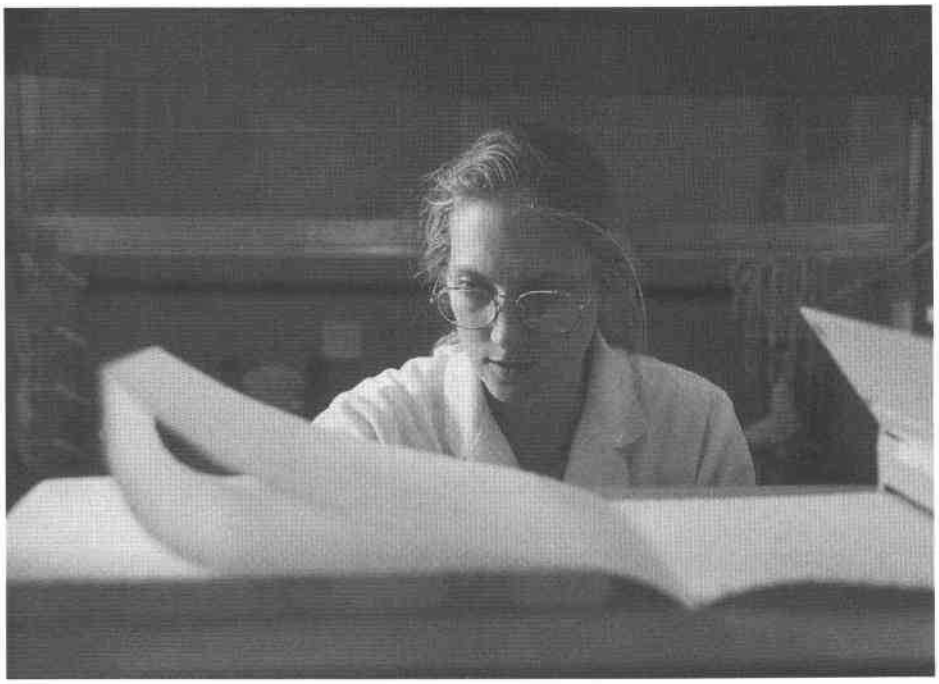

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**Lee, Il-Beom (Ben)** 1991 Assoc Prof Electrical & Computer Engineering BE SUNY 1984 PhD Pennsylvania State 1991

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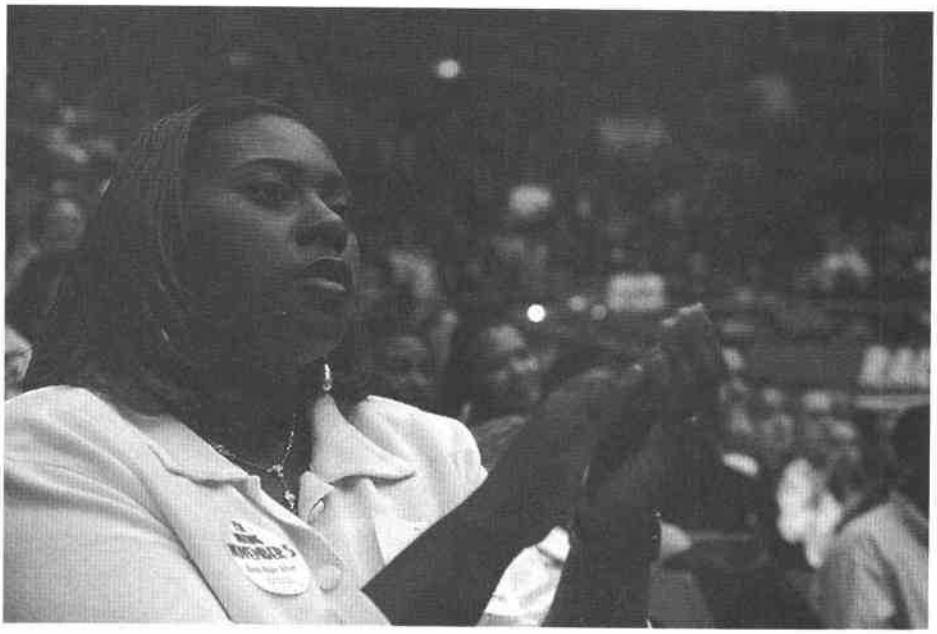

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**Schlax, Michael G.** 1988 Sr Faculty Res Asst Oceanic & Atmospheric Sciences. BS UC-Berkeley 1978 MS British Columbia 1984 MS Stanford 1986

**Schmidt, Thomas A.** 1993 Asst Prof Mathematics. BS New College of USF 1981 PhD Pennsylvania 1989

**Schmisseur, Wilson Edward** 1971 Assoc Prof Ag & Resource Economics. BS Illinois 1964 MS Purdue 1966 PhD 1973

**Schneider, Stuart T.** 1995 Product Testing Engineer College of Business. BS Oregon State 1993

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**Schori, Richard Miles** 1978 Prof Honors College Mathematics. BS Kenyon College 1960 MS Iowa 1962 PhD 1964

**Schowalter, Timothy Duane** 1981 Prof Entomology. BA Wichita State 1974 MS New Mexico State 1976 PhD Georgia 1979

**Schroeder, Warren Lee** 1967 Prof Senior Associate Athletic Director Civil, Construction, & Environmental Engineering. BSE Washington State 1962 MSCE 1963 PhD Colorado 1967

**Schrumpf,. BArry J.** 1972 Assoc Prof Seed Cert Asst Crop & Soil Science. BA Willamette 1966 MS Oregon State 1968 PhD 1975

**Schuler, Denton C.** 1996 Asst Football Coach Intercollegiate Athletics. BS Oregon 1969

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**Smith, Gerald A.** 1989 Assoc Prof Exercise & Sport Science. BS Walla Walla 1972 MS Illinois 1985 PhD Penn State 1989

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**Smith, Stephen T.** 1989 Associate Director Alumni Relations. BS Ohio State 1969 MA Ohio University 1983

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**Spiegelberg, Scott F.** 1990 Assoc Director for Public Relations/Beaver Club Direc Intercollegiate Athletics. BS Oregon State 1976

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**Spitsbergen, Jan Marie** 1995 Res Assoc Food Science & Technology. BS Michigan State 1976 DVM 1980 PhD Cornell 1986

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**Stennett, Douglass J.** 1974 Prof Pharmacy PharmD, UC-San Francisco 1970

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**Stephenson, Garry Owen** 1986 Assoc Prof Linn Co Extn Agent 4-H Youth Development Education. BA Arizona State 1977 MAIS Oregon State 1980 MAg 1988

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**Stevens, Billie K.** 1976 Assoc Prof Hood River Co Extn Chair Extn Home Economics. BS Idaho 1973 MEd Oregon State 1982

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**Stevens, Joe Bruce** 1966 Prof Agricultural & Resource Economics. BS Colorado State 1958 MS Purdue 1963 PhD Oregon State 1965

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**Stockwell, Virginia** 1997 Res Assoc Botany & Plant Pathology. BA Rutgers Univ 1979 MS Colorado State 1981 PhD 1984

**Stoffregen, Paul** 1993 Faculty Res Asst Oceanic & Atmospheric Sciences. BS Oregon State 1992

**Stoltz, Michael A.**1979 Prof Regional Director Extension Service Admin. BS Montana State 1962 MS Oregon State 1975

**Stone, Jeffrey Kyle** 1987 Asst Prof Sr Res Botany & Plant Pathology. BA Antioch 1976 PhD Oregon 1986

**Stonick, John T.** 1997 Asst Prof Electrical & Computer Engr. BS Virginia Polytechnic 1984 MS Pittsburgh 1985 PhD North Carolina State 1992

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**Stringham, Bennett** 1992 Instr Forest Engineering. BS Oregon State 1985 MF 1996

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**Sumner, Kent A.** 1995 Craft Center Manager Memorial Union. BA Western Oregon 1975 MA Idaho 1980

**Sunderland, Paul Lewis** 1987 Assoc Prof Multnomah Co Extn Staff Chair Ag Education & General Agriculture. BS Washington State 1973 MS Idaho 1980

**Sutton, Wendy C.** 1995 Faculty Res Asst Botany & Plant Pathology. BS Eastern Oregon 1993

**Suzuki, Warren Noboru** 1974 Assoc Prof Education. BS Illinois 1963 MEd 1964 EdD 1968

**Svenson, Sven E.** 1995 Asst Prof North Willamette Research & Extn Center. BS Cal State-Chico 1984 MS Tennessee 1986 PhD Texas A & M 1989

**Swafford, Duane F.** 1995 Instr Air Force Studies. BA George Fox 1980

**Swan, Patricia L.** 1978 Assoc Prof Polk Co Extn Agent Home Economics & Education. BA Michigan State 1958. BS Oregon State 1976 MA Michigan State 1985

**Swanson, Lloyd Vernon** 1971 Prof Interim Dept Head Animal Sciences. BS Minnesota 1960 MS 1967 PhD Michigan State 1970

**Swanson, Stephen P.** 1993 Newswriter News & Communication Services. BS Cal State-Pamona 1983

**Sward, Mary Ann** 1986 Asst Prof Extn Housing Specialist Apparel, Interiors, Housing & Merchandising. BS Nebraska 1976 MS Tennessee 1978

**Sylvia, Gilbert** 1988 Assoc Prof Agricultural & Resource Economics. BS Massachusetts 1973 MS Colorado State 1981 PhD Rhode Island 1989

**Symons, Richard E.** 1995 Faculty Res Asst Forest Science. BS Oregon State 1976

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**Taylor, Alan W.** 1997 Faculty Res Asst Agricultural Chemistry. BS Maryland 1972 MS 1977

**Taylor,. BArbara J.** 1991 Assoc Prof Zoology. BA Colorado 1974 PhD UC-San Diego 1988

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**Taylor, Edward Morgan** 1966 Prof Geosciences. BS Oregon State 1957 MS 1960 PhD Washington State 1967

**Taylor, Ellen B.** 1995 Asst Prof Psychologist Counseling & Testing Center. BA Stetson Univ 1983 MA Illinois at Urbana-Champaign 1987 PhD 1994

**Taylor, George H.** 1989 State Climatologist Oceanic & Atmospheric Sciences. BA UC-Santa. BArbara 1969 MS Utah 1975

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**Tesch, Steven D.** 1981 Prof Forest Science. BS Montana 1973 MS 1975 PhD 1981

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**Thomas, Claire Daines** 1992 Instr Statistics. BS Oregon State 1974 MBA Oregon 1977

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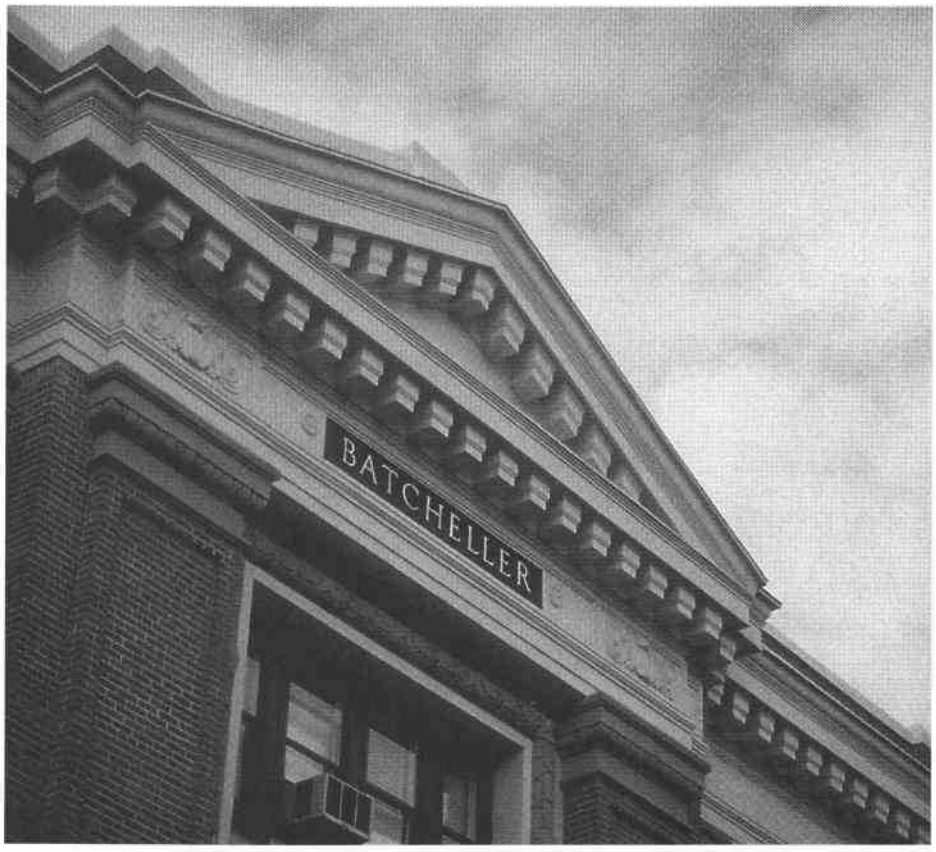
**Tiger, George Wayne** 1966 Jackson Co Extn Agent Horticulture. BS Oregon State 1966 MS Oregon 1977

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## V

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**Van Saun, Robert J.** 1992 Asst Prof Veterinary Medicine. BS Michigan State 1978 DVM 1982 MS 1988

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**Walker, Alexis JoAnne L.** 1986 Prof Petersen Endowed Chair in Gerontology and Family St Human Development & Family Sciences. BA Mercyhurst 1974 MS Purdue 1975 PhD Penn State 1979

**Walker, Gregg B.** 1987 Assoc Prof Chair/Director Peace Studies Speech Communication. BA/BS Minnesota 1974 MA Kansas 1982 PhD 1983

**Walker, Jeffrey R.** 1996 Instr Chemistry. BS Western Ontario 1986 PhD 1992

**Walker, Karen C.** 1986 Faculty Res Asst Veterinary Medicine. BS Oregon Inst of Tech 1975

**Walker, Kirk N.** 1994 Head Softball Coach Intercollegiate Athletics. BS UCLA 1988

**Walker, Stel Nathan** 1986 Asst Prof Mechanical Engineering. BS Oregon State 1970 PhD 1976

**Wallace, Alan Keith** 1984 Prof Interim Dept Head Electrical & Computer Engineering BEng Sheffield (England) 1963 PhD 1966

**Wallin, Lisa C.** 1996 Faculty Res Asst Veterinary Medicine. BS Oregon State 1995

**Walsh, Ian David** 1997 Assoc Prof Sr Res Oceanic & Atmospheric Sciences. BS Case Western Res Univ 1981 MS Oregon State 1986 PhD Texas A & M 1990

**Walstad, John Daniel** 1980 Prof Department Head Forest Resources. BS William & Mary 1966 MF Duke 1968 PhD Cornell 1971

**Wander, Rosemary** 1986 Assoc Prof Nutrition & Food Mgmt. BS Centenary (Louisiana) 1964 MS Ohio State 1968 PhD Georgia 1984

**Wang, Jun-Lan** 1970 Res Assoc Agricultural Chemistry. BS Normal (Taiwan) 1960. BA North Carolina Greensboro 1970 PhD Oregon State 1977

**Wannenmacher, Paul N.** 1996 Computer Network Support Chemical Engineering. BS Oregon State 1993

**Warburton, Christopher D.** 1995 Asst Prof Josephine Co Extn Agent 4-H Youth Development Education. BS Utah State 1992 MS 1994

**Ward, David T.** 1993 Assoc Prof Naval Science. BA Jacksonville Univ 1975 MA Naval Postgraduate School 1988

**Waring, Richard Harvey** 1963 OSU Distinguished Prof Forest Science. BS Minnesota 1957 MS 1959 PhD UC-Berkeley 1963

**Warner, Rebecca Lynn** 1990 Assoc Prof Department Chair Sociology. BA Portland State 1980 MA Washington State 1982 PhD 1985

**Warnes, William H.** 1986 Assoc Prof Mechanical Engineering. BA UC-San Diego 1979 MS Wisconsin-Madison 1981 MS 1983 PhD 1986

**Warren, William W., Jr.** 1991 Prof Physics. BS Stanford 1960 PhD Washington (St. Louis) 1965

**Warsinske, Robert John** 1996 Information Svcs/ Energy Mgmt Manager Facilities Services. BS Portland State 1983 MA Shippensburg Univ 1988

**Washburn, James L.** 1968 Sr Faculty Res Asst Civil, Construction, & Environmental Engineering. BS Oregon State 1968

**Washington, Leroy** 1996 Asst Men's. BAsketball Coach Intercollegiate Athletics. BS Montana 1988

**Wasil, Daniel A.** 1995 Director of Development for Thundering Seas College of Liberal Arts. BS San Diego State 1981

**Wasserman, Allen Lowell** 1965 Prof Physics. BS Carnegie Institute of Technology 1956 PhD Iowa State 1963

**Watkins, Patti Lou** 1993 Asst Prof Honors College Psychology. BA West Virginia 1980 MA Univ of the Pacific 1983 PhD Virginia Tech 1985

**Watrous, Barbara J.** 1981 Prof Veterinary Medicine. BS UC-Davis 1972 DVM 1974 Dipl ACVR

**Watson, Barney T., Jr.** 1976 Sr Instr Food Science & Technology. BA UC-Berkeley 1971 MS UC-Davis 1975

**Watson, Jairus H.** 1992 University Architect Facility Services. BA Oregon 1970

**Watson, Philip** 1984 Assoc Prof Chemistry. BA Oxford 1974 PhD British Columbia 1979

**Waymire, Edward C.** 1982 Prof Mathematics. BS Southern Illinois-Edwardsville 1971 MS Arizona 1972 PhD 1976

**Weber, Bruce Alan** 1974 Prof Honors College Ag & Resource Economics. BA Seattle Univ 1965 MS Wisconsin 1972 PhD 1973

**Weber, Dale William** 1976 Prof Animal Sciences. BS Iowa State 1952 MS 1970 PhD 1974

**Weber, Lavern John** 1969 Prof Director, Hatfield Marine Science Center Pharmacy. BA Pacific Lutheran 1958 MS Washington 1962 PhD 1964

**Weber, Mysti** 1992 Faculty Res Asst Oceanic & Atmospheric Sciences. BS Oregon State 1991

**Webster, Janet Gray** 1989 Asst Prof Library Head Hatfield Marine Science Center. BA Chicago 1975 MLS Columbia 1986

**Weeks, Herschel Paul** 1988 Asst Prof Ag Education & General Agriculture. BS Cal State-Chico 1976. BS Oregon State 1983 MS 1983 PhD Iowa State 1989

**Weideman, Jacob Andreas Cornelius** 1990 Assoc Prof Mathematics. BS Univ of Orange Free State 1978 MS 1980 PhD 1986

**Weikel, Jennifer M.** 1997 Faculty Res Asst Forest Science. BS Humboldt State 1993 MS Oregon State 1997

**Weinman, Richard Jay** 1967 Prof Speech Communication AB Indiana 1955 MFA Columbia 1956 PhD Indiana 1965

**Weis, Virginia** 1996 Asst Prof Zoology. BS Yale 1984 PhD Cal-Los Angeles 1990

**Weiser, Kent L.** 1996 Assoc Director Intercollegiate Athletics. BA Kansas 1981 MS 1992

**Weisshaar, Andreas** 1991 Asst Prof Electrical & Computer Engineering Vordiplom Universitat Stuttgart (Germany) 1981 MS Oregon State 1986 Diplom Ingenieur Universitat Stuttg PhD Oregon State 1991

**Welch, T. Patrick** 1994 Asst Prof Physics MS George Washington 1987 PhD Virginia 1991

**Weller, Brenna Best** 1980 Instr English. BA Oregon State 1978 MA Oregon 1979

**Wells, Gail** 1990 Natural Resources Communications Specialist College of Forestry. BA Western Oregon 1985

**Wells, Joseph T.** 1992 Head Wrestling Coach Intercollegiate Athletics. BS Iowa 1970

**Wendt, Nancy J.** 1990 Sr Instr Speech Communication. BS Cal State-Sacramento 1980 MA 1982

**Wernz, James G.** 1981 Faculty Res Asst Crop & Soil Science MS Oregon State 1966 PhD 1972

**Wess, Robert Victor** 1978 Assoc Prof English. BA Chicago 1963 MA 1966 PhD 1970

**West, H. Milton** 1980 Instr CAMP Director Educational Opportunities. BS Oregon State 1980

**West, James** N. 1996 Asst Football Coach Intercollegiate Athletics. BA Texas Southern Univ 1980

**West, Kenneth J.** 1994 Faculty Res Asst Forest Science. BS SUNY 1978 MS Oregon State 1990

**Westall, John** C. 1980 Prof Chemistry. BS North Carolina 1971 PhD MIT 1977

**Westlund, Robert** E. 1992 Sr Development Officer University Projects. BA UC-Santa. BArbara 1956

**Wetzel, Valerie J.** 1996 Director of Student Activities Memorial Union Activities. BA Albion College 1981 MS Wisconsin 1983 PhD Nebraska-Lincoln 1996

**Whalen, Joann** E. 1997 Res Assoc Post Doct Crop & Soil Science MS McGill Univ 1995 PhD Ohio State 1997

**Whanger, Philip Daniel** 1966 Prof Agricultural Chemistry. BS Berry College 1959 MS West Virginia 1961 PhD North Carolina State 1965

**Wheeler, George MacGregor** 1980 Assoc Prof Energy Extension Specialist Engineering Extension. BS MIT 1967 MS UC-Berkeley 1970 PhD 1972

**Wheeler, Linda Joyce** 1988 Sr Faculty Res Asst Biochemistry & Biophysics. BS Oregon State 1974

**Wheeler, Patricia A.** 1982 Prof Oceanic & Atmospheric Sciences. BA UC-Irvine 1971 MS 1974 PhD 1976

**Whipple, Margaret J.** 1989 Faculty Res Asst Microbiology. BA UC-San Diego 1973

**White, Anthony John** 1974 Multimedia Programmer Information Services. BA Pomona College 1963 MS US Int'l Univ 1970

**White, George** 1989 Instr Jackson Co Extn Agent Rangeland Resources. BS Cal State-Fresno 1981

**White, James David** 1971 OSU Distinguished Prof Chemistry. BA Cambridge 1959 MS British Columbia 1961 PhD MIT 1965

**White, Teresa J.** 1994 Faculty Res Asst Horticulture. BS Texas A & M 1986 MS 1991

**White, Timothy Peter** 1996 Prof Dean Health & Human Performance. BA Cal State-Fresno 1970 MS Cal State-Hayward 1972 PhD Berkeley 1977

**Whitler, William** 1992 Asst Prof Clinical Veterinary Medicine. BS Florida 1980 DVM 1985

**Whitney, John R.** 1990 Instr English Language Institute. BA Northern Arizona 1976 MA 1984

**Widrick, Jeffrey J.** 1997 Asst Prof Health & Human Performance. BS SUNY-Cortland 1980 MS Massachusetts 1990 PhD. BAll State 1992

**Wijesekera, Hemantha W.** 1995 Res Assoc Post Doct Oceanic & Atmospheric Sciences. BS Univ of Moratuwa (Sri Lanka) 1982 MS Oregon State 1986 PhD 1992

**Wijnberg, Kathelijne** M. 1996 Res Assoc Post Doct Oceanic & Atmospheric Sciences MS Utrecht Univ (The Netherlands) 1990 PhD 1995

**Wilcox, Anthony Robert** 1987 Assoc Prof Department Chair Exercise & Sport Science. BA Massachusetts 1973 PhD 1980

**Wilder, Brent** C. 1993 Beaver Club Membership Coordinator Intercollegiate Athletics. BS Oregon State 1988 MS 1991

**Wildman, Randall** C. 1985 Sr Faculty Res Asst Fisheries & Wildlife. BS Drake 1976 MS Wisconsin 1979

**Willard, Corwin** 1980 Sr Faculty Res Asst Biochemistry & Biophysics. BS New Mexico Inst of Mining & Technology 1971

**William, Ray D.** 1979 Prof Horticulture. BS Washington State 1968 MS Purdue 1971 PhD 1974

**Williams, Daniel P.** 1995 Asst Prof Exercise & Sport Science. BS Univ of Dayton 1986 MS Arizona 1989 PhD 1993

**Williams, David Edward** 1986 Prof Food Science & Technology. BA Reed College 1975 MS Oregon State 1981 PhD 1982

**Williams, John** 1986 Assoc Prof Wallowa Co Extn Staff Chair Rangeland Resources. BS Oregon State 1975 MS 1987

**Williams, Sandra L. Woods** 1984 Assoc Prof Faculty Associate for Extended Education Civil, Construction, & Environmental Engineering. BS Michigan State 1976 MS Washington 1980 PhD 1984

**Williams, Susan** M. 1993 Instr Microbiology. BS Loyala Marymount 1985

**Williams, Thomas** 1992 Faculty Res Asst Fisheries & Wildlife. BS Humboldt State 1985 MS Montana State 1990

**Williamson, Kenneth Jay** 1973 Prof Honors College Civil, Construction, & Environmental Engineering. BS Oregon State 1968 MS 1970 PhD Stanford 1973

**Willis, John Marcus** 1979 Marine Technician Superintendent Oceanic & Atmospheric Sciences. BS Colorado State 1977 MS Oregon State 1980

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**Wilson, Beverly** 1994 Asst Prof Honors College Psychology. BA Cal State-Fresno 1985 MA 1987 PhD Washington 1994

**Wilson, James Brian** 1973 Prof Forest Products. BS SUNY- Syracuse 1964 PhD 1971

**Wilson, June** 1991 Sr Faculty Res Asst Oceanic & Atmospheric Sciences MA Scotland 1977

**Wilson, Mark Virgil** 1983 Assoc Prof Botany & Plant Pathology. BA UC-Berkeley 1976 PhD Cornell 1982

**Wilson, Robert** C. 1996 Prof Dean Veterinary Medicine DVM Auburn Univ 1963 PhD Georgia 1974

**Wilson, Scott** E. T. 1996 Network Support Specialist Information Services. BA Western. BAptist College 1995

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**Winner, William** E. 1987 Prof Honors College Botany & Plant Pathology. BA Lewis & Clark 1970 MAT 1973 MA South Dakota 1974 PhD Calgary 1978

**Winograd, Kenneth** 1990 Assoc Prof Education. BA Rider College 1973 EdM Rutgers Univ 1973 EdD N. Colorado 1990

**Winsor, Martha H.** 1992 Faculty Res Asst Hatfield Marine Science Center. BS Brown Univ 1976 MS Oregon State 1987

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**Wirth, Donald Shelby** 1971 Assoc Prof Director Alumni Relations. BS Oregon State 1961

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**Wold, Richard R.** 1997 Asst Men's. BAsketball Coach Intercollegiate Athletics. BS Oregon State 1992

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**Wolpert, Thomas Joseph** 1988 Assoc Prof Botany & Plant Pathology. BS Nebraska 1973 MS Purdue 1979 PhD 1983

**Wondzell, Steve** 1996 Asst Prof Sr Res Forest Science. BS New Mexico State 1981 MS 1984 PhD Oregon State 1994

**Wong, Issac** 1996 Asst Prof Biochemistry & Biophysics. BA Harvard 1983 PhD Pennsylvania State 1990

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**Wood, Guy H.** 1987 Assoc Prof Spanish. BS Minnesota 1971 MA New York 1973 PhD Colorado 1984

**Wood, Terence Michael** 1985 Assoc Prof Exercise & Sport Science. BA British Columbia 1971 BPE 1976 MPE 1979 PhD Wisconsin 1984

**Woods, LaVerne Duane** 1976 Counselor & Recruiter Educational Opportunities

**Worona, Marc Andrew** 1993 Faculty Res Asst Forest Science. BS Penn State 1990 MS Oregon 1993

**Wright, David W.** 1975 Physician Student Health Center. BS Seattle Pacific 1968 MD UC-Davis 1972

**Wright, Dawn J.** 1995 Asst Prof Honors College Geosciences. BS Wheaton College 1983 MS Texas A & M 1986 PhD UC-Santa. BArbara 1994

**Wrolstad, Ronald Earl** 1965 Prof Food Science & Technology. BS Oregon State 1960 PhD UC-Davis 1964

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**Wykes, R. Thomas** 1984 Instr Deschutes Co Extn Interim Staff Chair Engineering Extension. BS Oregon State 1977. BS 1984

**Wysocki, Donald J.** 1985 Assoc Prof Crop & Soil Science. BS Wisconsin Stevens Point 1974 MS Washington State 1977

## Y

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**Yin, Xihou** 1997 Res Assoc Post Doct Chemistry. BS China Southwestern Ag Univ (Sichuan) 1983 MS Univ of Franche-comte & univ of Bourgogne (France) PhD Paris-Sud (France) 1996

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**Yoon, Elizabeth S.** 1997 Faculty Res Asst Pharmacy. BA Carleton 1991 MS Oregon State 1997

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**Youmans, Russell Clark** 1966 Prof Director Western Rural Development Center Ag & Resource Economics. BS Illinois 1958 MS Purdue 1962 PhD 1966

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**Young, John Aubrey** 1972 Prof Department Chair Anthropology. BA Macalester 1963 MA Hawaii 1965 PhD Stanford 1971

**Young, William Clyde III** 1978 Assoc Prof Crop & Soil Science. BS Western Illinois 1973 MS Oregon State 1980 PhD 1987

**Yu, L. Shiao-Ling** 1987 Assoc Prof Chinese. BA Caldwell 1958 MS Boston College 1961 MA Kansas 1977 PhD Wisconsin 1983

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**Yurdana, Matt** 1997 Instr Center for Writing & Learning. BA UC-Davis 1989 MFA Montana 1994 MA 1994

## Z

**Zabriskie, T. Mark** 1992 Asst Prof Pharmacy. BS Utah 1985 PhD 1989

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**Zimmerman, Anne H.** 1989 Faculty Res Asst Biochemistry & Biophysics. BS Oregon State 1983

**Zlatanova, Jordanka** 1991 Prof Sr Res Biochemistry & Biophysics Diploma Leningrad State Univ (USSR) 1968 PhD Bulgarian Academy of Sciences 1980

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**Zolotov, Ilia** 1993 Assoc Prof Visiting Oceanic & Atmospheric Sciences MS Leningrad Univ (Russia) 1960 PhD USSR Academic of Sciences 1970

**Zvibleman, Jana R.** 1996 Public Info Officer College of Science. BS Oregon State 1986

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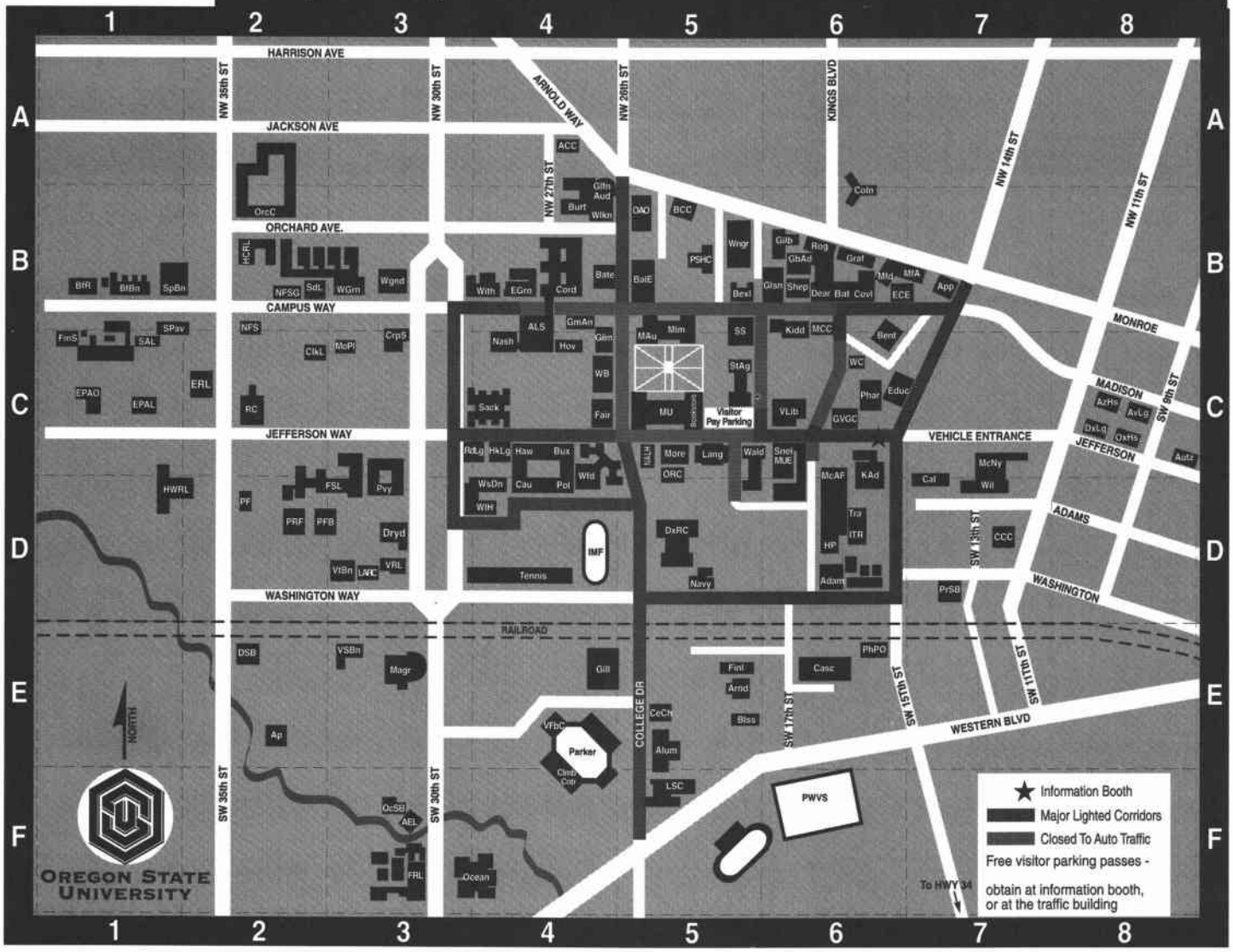
**Zwieniecki, Maciej** 1993 Res Assoc Post Doct Forest Science MS Warsaw Agricultural Univ 1987 PhD Oregon State 1995

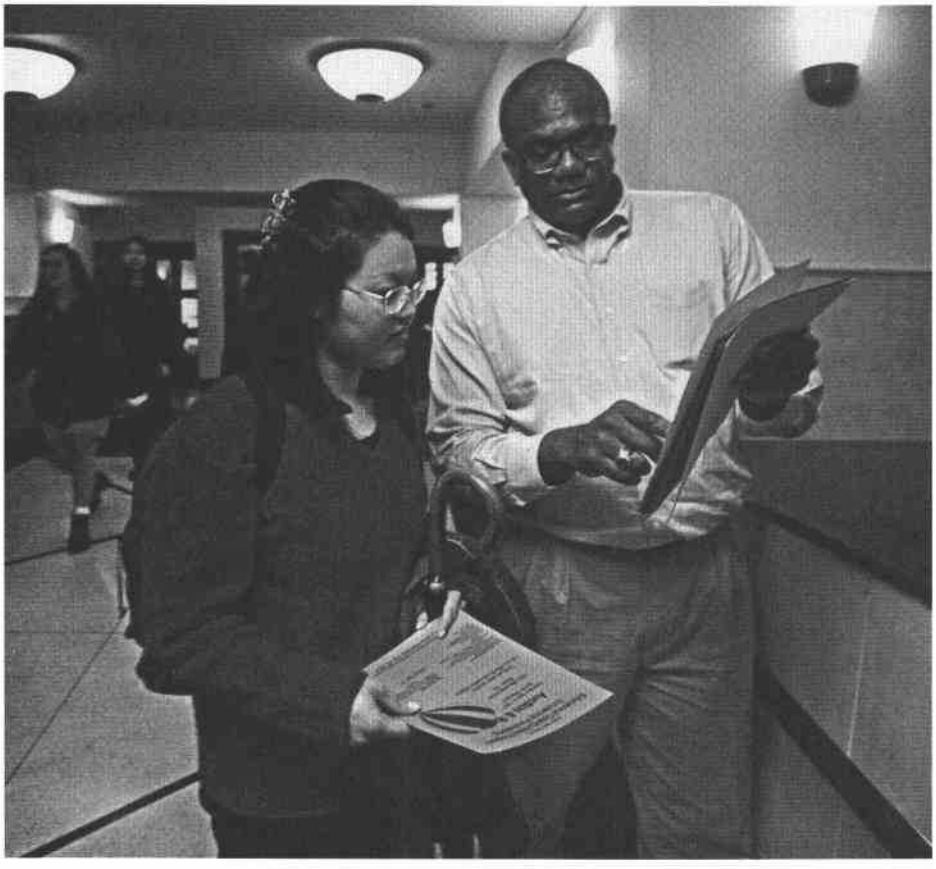
# Campus Map




| | | |
|---|---|---|
| Adams Hall | Adam | D6 |
| Aero Engineering | AEL | F3 |
| Agricultural and Life Science | ALS | B4 |
| Apiary (Bees) | Ap | E2 |
| Apperson | App | B7 |
| Arnold | Arnd | E5 |
| Asian Cultural Center | ACC | A4 |
| Autzen House | Autz | C8 |
| Avery Lodge | AvLg | C8 |
| Azalea Lodge | AzHs | C8 |
| Ballard Extension | BalE | B5 |
| Batcheller Hall | Bat | B6 |
| Bates Hall | Bate | B4 |
| Benton | Bent | C6 |
| Beef Barn | BfBn | B1 |
| Beef Research | BfR | B1 |
| Bexell | Bexl | B5 |
| Black Cultural Center | BCC | B5 |
| Bloss | Blss | E5 |
| Burt Hall | Burt | B4 |
| Buxton | Bux | C4 |
| Callahan | Cal | C7 |
| Cascade Hall | Casc | E6 |
| Cauthorn | Cau | D4 |
| Central Receiving & Delivery | PrSB | D7 |
| Centro Cultural César Chávez | CeCh | E5 |
| CH2M HILL Alumni Center | Alum | E5 |
| Child Care Center | CCC | D7 |
| Clark Laboratory | ClkL | C2 |
| Climbing Center | ClmbCntr | F4 |
| College Inn | CoIn | B6 |
| Cordley | Cord | B4 |
| Covell | Covl | B6 |
| Crop Science | CrpS | C3 |
| Dearborn | Dear | B6 |
| Dixon Lodge | DxLg | C8 |
| Dixon Recreation | DxRC | D5 |
| Dormitory Services Bldg. | DSB | E2 |
| Dryden Hall | Dryd | D3 |
| Education | Educ | C6 |
| Electrical Computer Engineering | ECE | B6 |
| EPA Environmental Research Lab | ERL | C2 |
| EPA Laboratory | EPAL | C1 |
| EPA Office | EPAO | C1 |
| Fairbanks | Fair | C4 |
| Farm Services | FmS | C1 |
| Finley | Finl | E5 |
| Forestry Research Lab | FRL | F3 |
| Forest Sciences Lab | FSL | D3 |
| Gilbert Addition | GbAd | B6 |
| Gilbert | Gilb | B6 |
| Gilfillan Auditorium | Glfn Aud | B4 |
| Gill Coliseum | Gill | E4 |
| Gilmore | Gilm | C4 |
| Gilmore Annex | GmAn | B4 |
| Gleeson | Glsn | B6 |
| Graf | Graf | B6 |
| Greenhouses East | EGrn | B4 |
| Greenhouse West | WGrn | B3 |
| Gladys Valley Gymnastics Center | GVGC | C6 |
| Hawley Hall | Haw | C4 |
| Heating Plant | HP | D6 |
| Heckart Lodge | HkLg | C4 |
| Hinsdale Wave Research Lab | HWRL | D1 |
| Hovland Hall | Hov | C4 |
| Indoor Target Range | ITR | D6 |
| Intramural Field | IMF | D4 |
| Kerr Administration Building | KAd | C6 |
| Kidder | Kidd | B6 |
| Lab Animal Resource Center | LARC | D3 |
| Langton Hall | Lang | C5 |
| Lasells Stewart Center | LSC | F5 |
| McAlexander Field House | McAF | C6 |
| McNary | McNy | C7 |
| Magruder Hall | Magr | E3 |
| Memorial Union | MU | C5 |
| Memorial Union East (Snell Hall) | MUE | C6 |
| Merryfield Annex | MfA | B7 |
| Merryfield | Mfd | B6 |
| Milam Auditorium | MAu | C5 |
| Milam | Mlm | B5 |
| Milne Computer Center | MCC | B6 |
| Moreland | More | C5 |
| Motor Pool | MoPl | C3 |
| Nash Hall | Nash | C4 |
| National Forage Seed Research Center | NFS | B2 |
| Greenhouse | NFSG | B2 |
| Native American Longhouse | NALH | C5 |
| Navy Armory | Navy | D5 |
| Ocean Administration Building | OAO | B5 |
| Oceanography | Ocean | F4 |
| Oceanography Staging | OcSB | F3 |
| Orchard Court Apartments | OrcC | B2 |
| Outdoor Recreation Center | ORC | C5 |
| Oxford House | OxHs | C8 |
| Parker Stadium | Parker | E4 |
| Patrick Wayne Valley Stadium | PWVS | F6 |
| Peavy | Pvy | D3 |
| Pharmacy Building | Phar | C6 |
| Physical Plant Office | PhPO | E6 |
| Plageman Student Health Center | PSHC | B5 |
| Poling Hall | Pol | D4 |
| Poultry Feeding | PFB | D2 |
| Poultry Research Facilities | PRF | D2 |
| Radiation Center | RC | C2 |
| Reed Lodge | RdLg | C4 |
| Rogers | Rog | B6 |
| Sackett | Sack | C4 |
| Seed Labs | SdL | B2 |
| Sheep Barn | SpBn | B1 |
| Shepard | Shep | B6 |
| Small Animal Lab | SAL | C1 |
| Snell Hall (MU East) | Snel | C6 |
| Social Sciences | SS | C5 |
| Stock Judging Pavilion | SPav | B1 |
| Strand Agriculture Hall | StAg | C5 |
| Tennis Courts | Tennis | D4 |
| Traffic Office | Tra | D6 |
| USDA-ARS Hort Crops Research Lab | HCRL | B2 |
| Valley Football Center | VFbC | E4 |
| The Valley Library | VLib | C6 |
| Veterinary Research Lab | VRL | D3 |
| Vet Dairy Barn | VtBn | D3 |
| Vet Sheep Barn | VSBn | E3 |
| Waldo | Wald | C5 |
| Weatherford | Wfd | C4 |
| Weniger | Wngr | B5 |
| West Dining Hall | WsDn | D4 |
| West International House | WIH | D4 |
| Wiegand | Wgnd | B3 |
| Wilson Hall | Wil | D7 |
| Wilkinson | Wlkn | B4 |
| Withycombe | With | B4 |
| Womens Building | WB | C4 |
| Womens Center | WC | C6 |

# Index



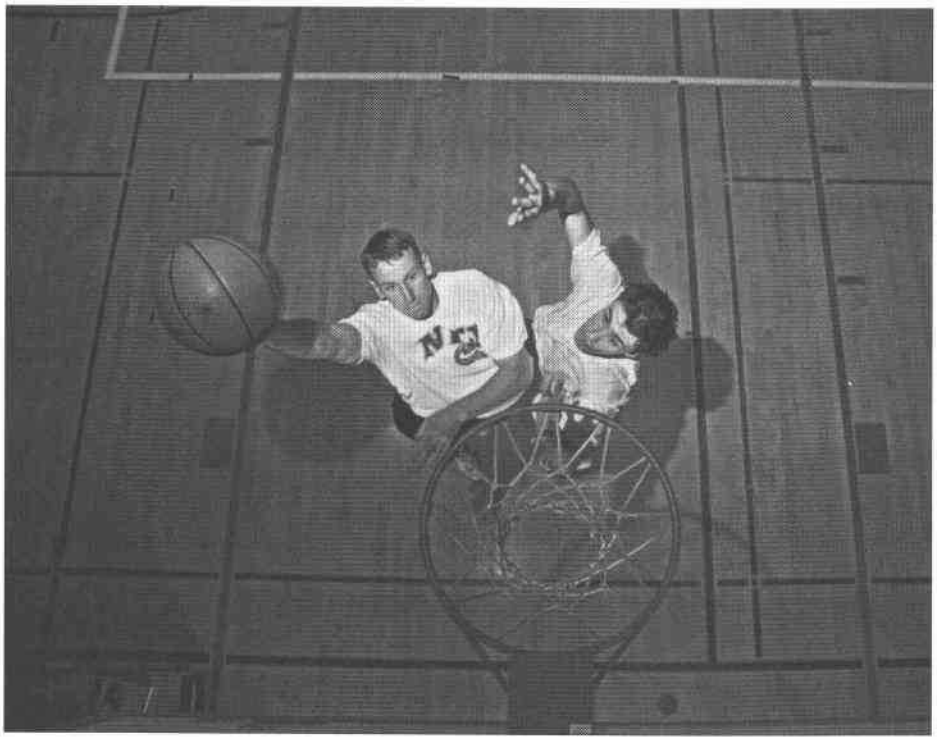


**D**



**E**





## J

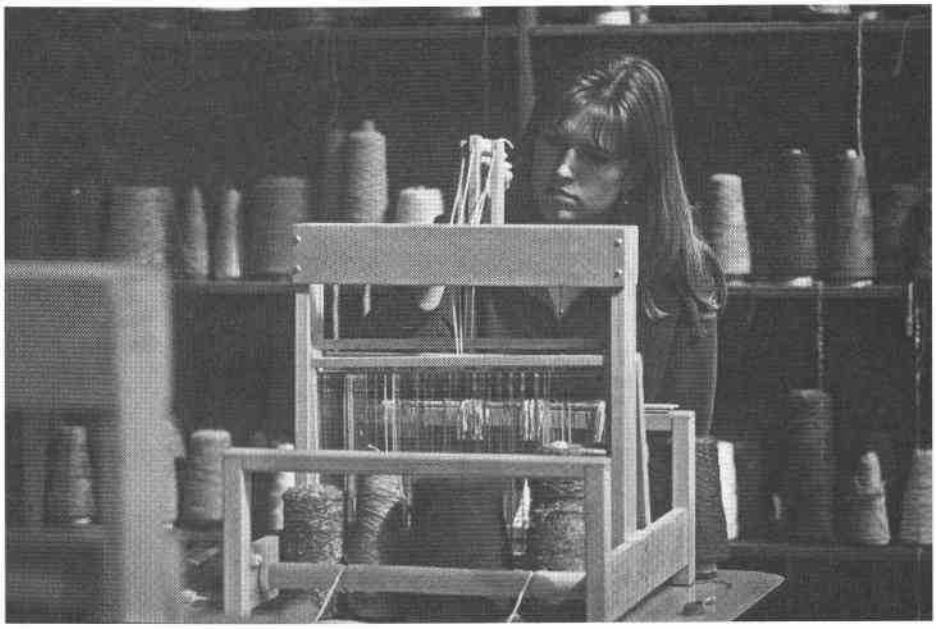


## L



## M



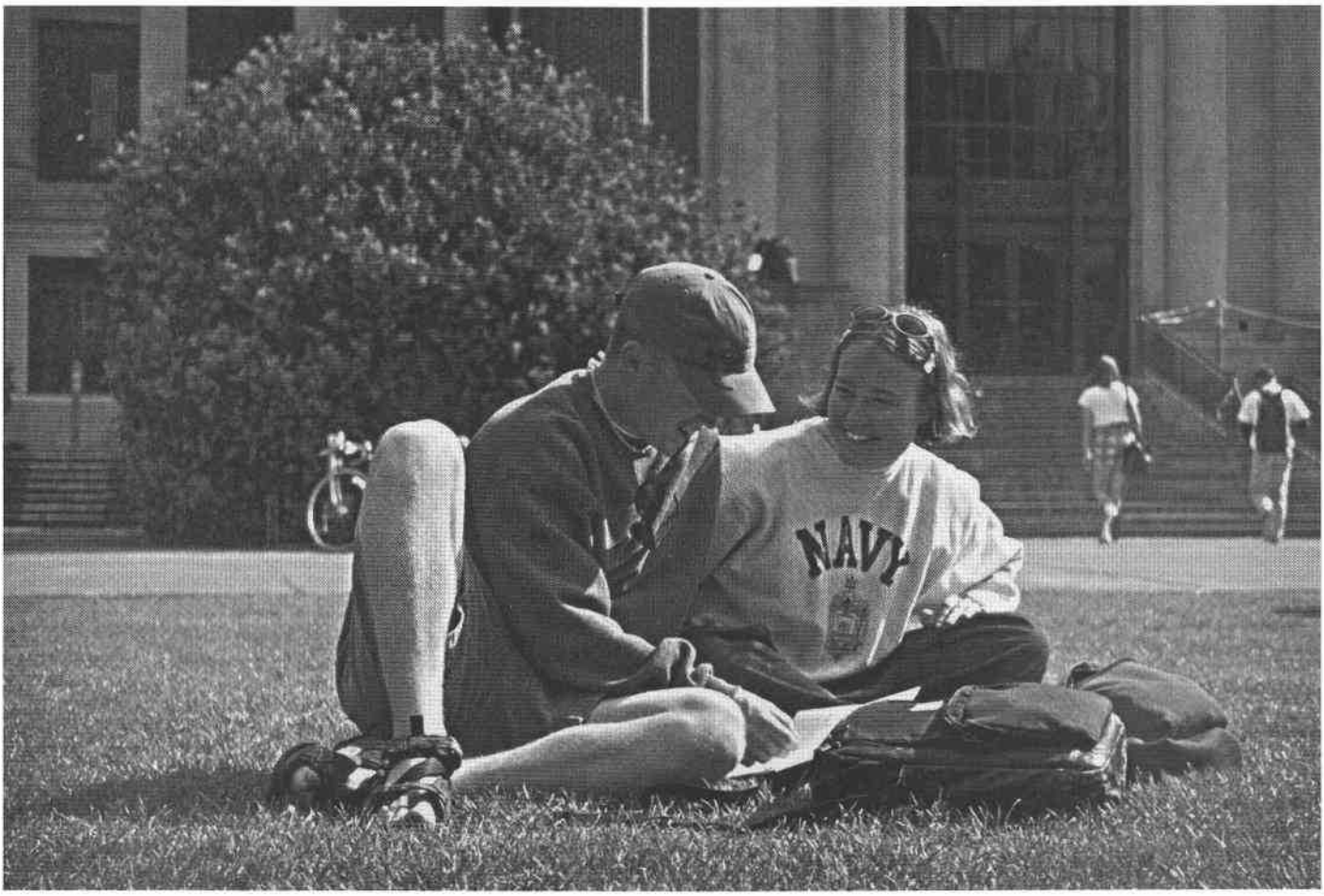




## N



## O




## U



## V



## W



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