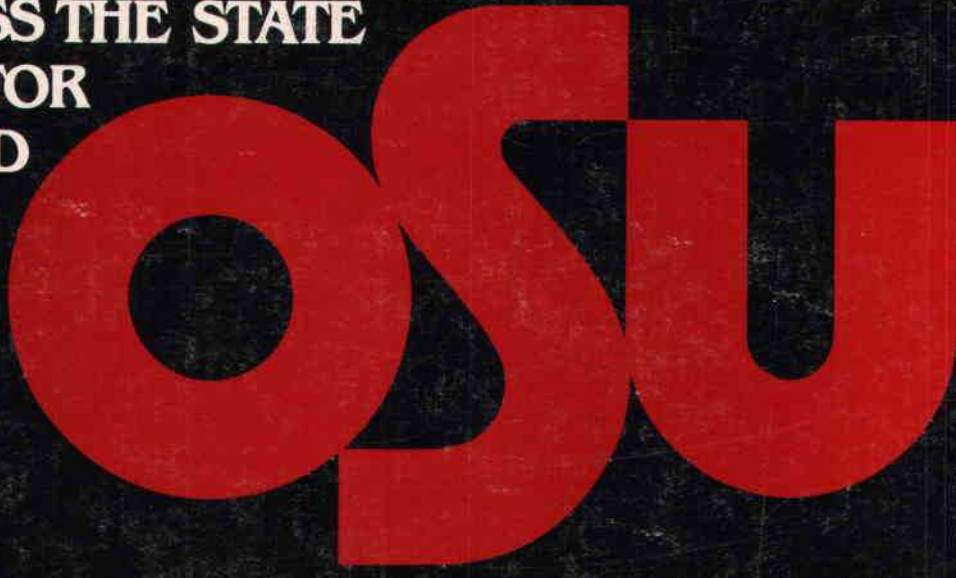
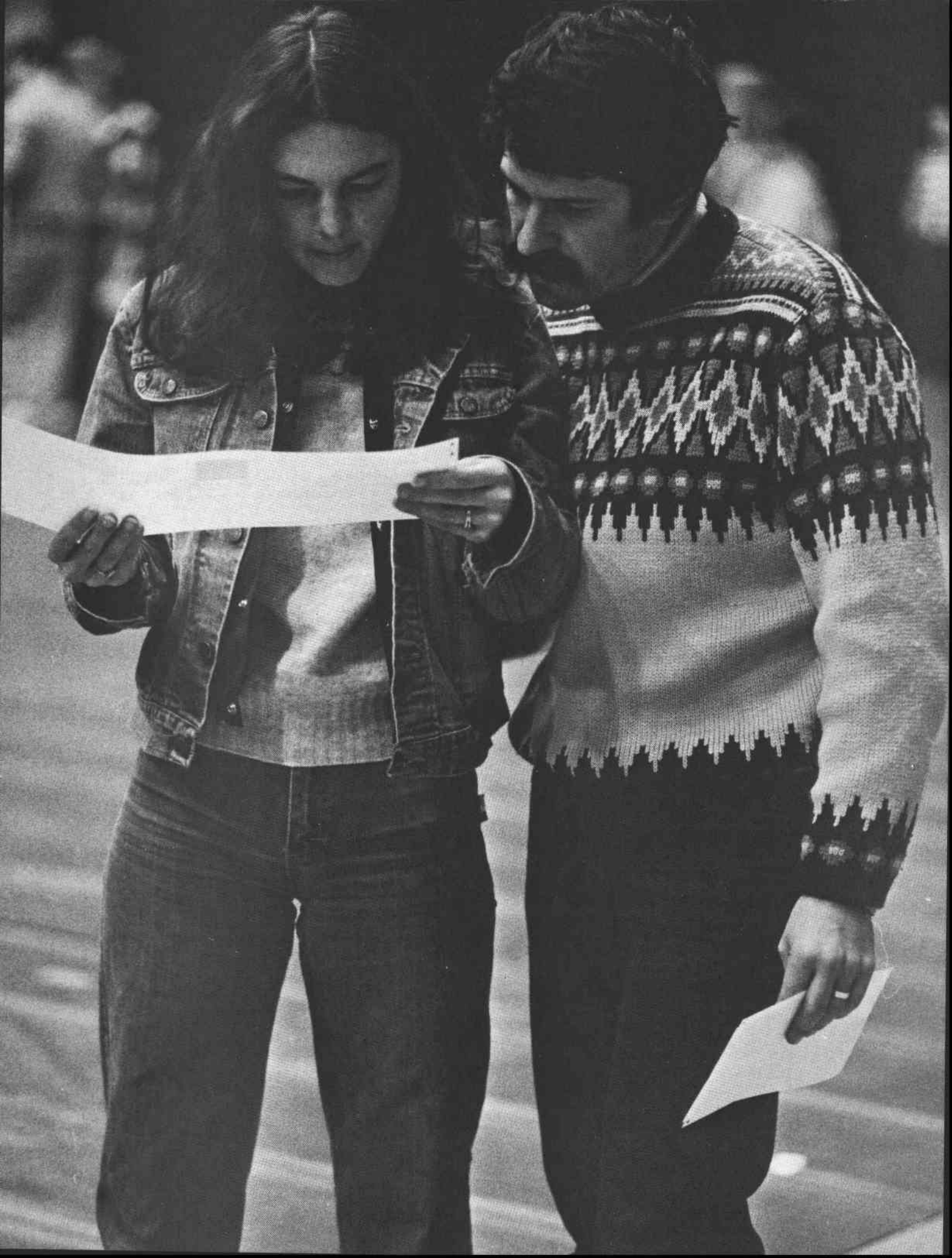
OREGON STATE UNIVERSITY BULLETIN
1982-83 GENERAL CATALOG

A CENTURY-OLD UNIVERSITY • A CENTER FOR STUDY AND RESEARCH AND PUBLIC SERVICE • A CAMPUS REACHING ACROSS THE STATE • A COMMUNITY FOR GROWING AND CREATING AND AWAKENING





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The 1982-83 *General Catalog* is a collection of information about Oregon State University, its academic programs and policies, facilities, and services. Although the catalog was as accurate as possible at the time of publication, circumstances during the 1982-83 academic year may alter some of the information on tuition and fees, courses, services, and other University concerns. The catalog does not constitute a contract between Oregon State University and its students or applicants for admission.

The catalog lists all courses approved on a permanent basis. (The OSU *Schedule of Classes*, available each year before fall term, also lists temporary—or "X"—courses, as well as the latest fee information.) All courses listed in this volume are offered only if there is adequate demand and if faculty and facilities are available to provide a qualified instructor and appropriate meeting place.

Admitted students receive a copy of the *General Catalog* when they first enroll. Copies may also be purchased for $3 from the OSU Book Store or the Registrar's Office. The *General Catalog* is published every June.

Other sources of information about Oregon State University include the *Graduate School Catalog*, available from the Graduate School Office; the *Summer Term Bulletin*, distributed by the Summer Term Office; and the *General Information Bulletin*, available through the Office of Admissions. All of these bulletins are free.

The address for all campus offices:

Oregon State University
Corvallis, Oregon 97331
Telephone (University information): 503-754-0123
Telephone (admission information): 503-754-4411

Affirmative Action

Oregon State University, in compliance with Titles VI and VII of the Civil Rights Act of 1964, Executive Order 11246, Title IX of the Education Amendments of 1972, and Section 504 of the Rehabilitation Act of 1973, does not discriminate on the basis of race, color, national origin, religion, sex, age, or handicap in any of its policies, procedures, or practices. This nondiscrimination policy covers admission and access to, and treatment and employment in, University programs and activities, including but not limited to academic admissions, financial aid, educational services, and employment. Inquiries regarding the University's equal opportunity policies may be directed to Pearl S. Gray (503) 754-3556.

Oregon State System of Higher Education

The Oregon State System of Higher Education, organized in 1932, provides educational opportunities to young people and adults throughout the state of Oregon. Member institutions are elements of an integrated system.

Opportunities for general education are distributed as widely as possible throughout the state, while specialized, professional, and technical programs are centered at specific institutions.

Members of the Oregon State System of Higher Education:

Eastern Oregon State College, La Grande

Oregon Institute of Technology, Klamath Falls

Oregon State University, Corvallis

Portland State University, Portland

Southern Oregon State College, Ashland

University of Oregon, Eugene

Oregon Health Sciences University (Schools of Dentistry, Medicine, and Nursing), Portland

Western Oregon State College, Monmouth

Through the chancellor's Office of Academic Affairs, special attention is given to providing leadership, coordination, and service to assure that a broad-based continuing education program is available through the several institutions.

An interinstitutional booklet, "It's Your Decision," lists fields of study at all state system institutions and gives other important information for prospective students. For a free copy, write "It's Your Decision," State Board of Higher Education, P. O. Box 3175, Eugene, Oregon 97403.

State Board of Higher Education

Members*	Term expires
Edward C. Harms, Jr., Springfield.. President and Chairman, Executive Committee	1985
Robert C. Ingalls, Corvallis ..... Vice-President and Member, Executive Committee	1984
Loren L. Wyss, Portland ..... Member, Executive Committee	1984
Lester E. Anderson, Eugene	1985
Alvin R. Batiste, Portland	1982
Jane H. Carpenter, Medford	1983
Harriett J. Flanagan, Ontario	1983
David M. Lomnicki, Portland ..... Student Member	1982
Louis B. Perry, Portland	1985
James C. Petersen, La Grande	1984
Marion T. Weatherford, Corvallis .. Student Member	1983

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E. Rex Krueger, Ph.D., Vice-Chancellor for Educational Systems

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Wilma Foster, M.A., Secretary of the Board

* The Oregon State System of Higher Education is governed by the Oregon State Board of Higher Education, whose members are appointed by the governor with confirmation by the state senate. Terms are four years for regular members and two years for student members. Terms expire June 30.

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Calendar

Fall term, 1982

New student orientation, advising
September 20-26, Monday-Sunday

Registration (all students)
September 23, Thursday

Schedule distribution
September 27, Monday

Classes and late registration begin
September 28, Tuesday

Latest day for registering, adding, or dropping courses
October 11, Monday

Latest day for paying fees
October 15, Friday

Latest day to withdraw from individual courses or change to and from S-U grading
October 29, Friday

Thanksgiving vacation
November 25-28, Thursday-Sunday

Preregistration (currently enrolled students)
December 7, Tuesday

Decentralized preregistration
December 8-10, Wednesday-Friday

Final week
December 13-18, Monday-Saturday

End of fall term
December 18, Saturday

Winter term, 1983

Schedule distribution
January 3, Monday a.m.

Registration (new students and others not eligible for preregistration)
January 3, Monday p.m..

Classes and late registration begin
January 4, Tuesday

Latest day for registering, adding, or dropping courses
January 17, Monday

Latest day for paying fees
January 21, Friday

Latest day to withdraw from individual courses or change to and from S-U grading
February 4, Friday

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March 8, Tuesday

Decentralized preregistration
March 9-11, Wednesday-Friday

Final week
March 14-19, Monday-Saturday

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March 19, Saturday

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Registration (new students and others not eligible for preregistration)
March 28, Monday p.m.

Classes and late registration begin
March 29, Tuesday

Latest day for registering, adding, or dropping courses
April 11, Monday

Latest day for paying fees
April 15, Friday

Latest day to withdraw from individual courses or change to and from S-U grading
April 29, Friday

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June 11, Saturday

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August 12, Friday

End of eleven-week courses
September 2, Friday

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New student orientation, advising
September 19-25, Monday-Sunday

Registration
September 22, Thursday

Classes begin
September 27, Tuesday

Thanksgiving vacation
November 24-27, Thursday-Sunday

End of fall term
December 17, Saturday

Any changes in the calendar will be announced in the *Schedule of Classes.*

September 1982

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

October 1982

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

November 1982

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

December 1982

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

January 1983

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

February 1983

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		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28					

March 1983

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

April 1983

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

May 1983

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

June 1983

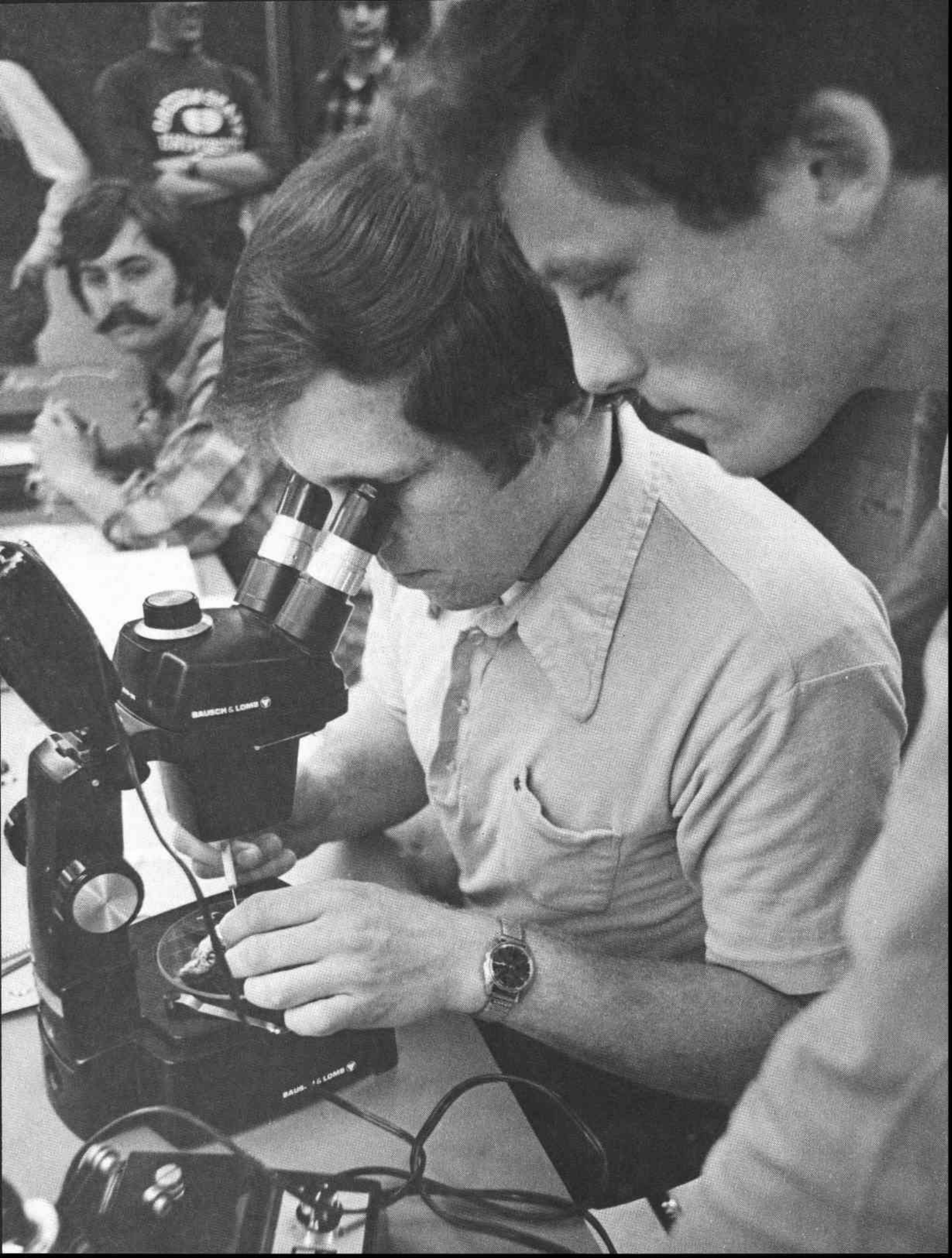
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

July 1983

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

August 1983

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			


BAUSCH & LOMB

GENERAL INFORMATION

The University Past and Present

Oregon State University provides diverse educational opportunities through the undergraduate and graduate programs of its twelve colleges and schools. The University is typified by a variety of academic choices which include studies in scientific, technological, and professional as well as liberal arts fields. A Land Grant and Sea Grant University with beginnings in the 1850s, Oregon State is now home for approximately 17,000 undergraduate and graduate students, representing 75 countries and every state in the nation. Beyond campus education, the University conducts extensive research programs, administers the Extension Service in all Oregon counties, and maintains branch agricultural stations at several locations throughout the state. Further research is done by the University at Yaquina Bay in Newport, where the OSU Marine Science Center is located. The main campus is in Corvallis.

History

Oregon State University started as an academy incorporated as Corvallis College in 1858. College-level study began about the time the Reverend W. A. Finley became president in 1865. By 1870, two men and one woman had fulfilled requirements for the baccalaureate degree and became the first graduates of a state-assisted college in the western United States.

Oregon as a state began its assistance to higher education on October 27, 1868, when it designated Corvallis College "the agricultural college of the State of Oregon." In taking this action the Legislative Assembly accepted the provisions of the First Morrill Act, which President Lincoln had signed on July 2, 1862. This act provided grants of land to be used by the states for the sole purpose of endowing, supporting, and maintaining publicly controlled colleges. Congress defined the purpose of the Land Grant institutions in these words: "The leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life." The Oregon Legislature directed that "all students sent under the provisions of this Act shall be instructed in all the arts, sciences, and other studies in accordance with the Act of Congress."

Another event makes the year 1868 especially significant. In August of that year Corvallis College was again incorporated, this time on a basis "not limited in duration but perpetual." This institution, maintained by the Methodist Episcopal Church, South, was partly state supported from 1868 until 1885, when the state assumed complete control.

Subsequent federal legislation—notably the Hatch Act of 1887, the Second Morrill Act of 1890, and the Smith-Lever Act of 1914—further provided for the teaching function of the institutions and for programs of research and Extension.

Corvallis College originally occupied a site on Fifth Street between Madison and Monroe. A 35-acre farm, part of the present campus, was purchased in 1870. The college moved to the present campus, occupying Benton Hall, a gift of the citizens of Benton County, in 1888.

The curriculum of Corvallis College, typical of the liberal arts colleges of the period, provided a classical course leading to the Bachelor of Arts degree and a scientific course leading to the Bachelor of Science degree. The curriculum began to expand under the impetus of the Land Grant act. Agriculture, largely conducted in the Department of Chemistry, was added in 1869. Four professorships (commerce, 1880; agriculture, 1883; household economy, 1889; and engineering, 1889) grew into departments and resulted in the establishment in 1908 of four professional schools: Agriculture, Commerce, Engineering, and Home Economics. Schools added later included Forestry, 1913; Mines, 1913; Pharmacy, 1917; Education, 1918; Basic Arts and Sciences, 1922; and Health and Physical Education, 1931. The first summer session was held in 1908. Extension work had its beginnings in 1889 when farmers' institutes were held at four places in the state.

In 1932, the 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 School of Business was established (first as a division) in 1943. The College of Liberal Arts was established (as the School of Humanities and Social Sciences) in 1959; the School of Oceanography in 1972. The School of Health and Physical Education was reinstated in 1974. In 1975 the School of Veterinary Medicine was established.

The first advanced degree (A.M.) was awarded in 1876. A committee on advanced degrees appointed in 1910 began to lay the foundations of the Graduate School. The first Ph.D. degrees were conferred in 1935. For development of research facilities, see the "Research" section of this catalog.

Presidents of the institution since its founding are W. A. Finley, 1865-72; B. L. Arnold, 1872-92; John M. Bloss, 1892-96; H. B. Miller, 1896-97; Thomas M. Gatch, 1897-1907; William Jasper Kerr, 1907-32; George Wilcox Peavy, 1934-40; Frank Llewellyn Ballard, 1940-41; Francois Archibald Gilfillan, 1941-42; August Leroy Strand, 1942-61; James Herbert Jensen, 1961-69; Roy Alton Young, 1969-70; Robert William MacVicar, 1970-.

The institution has been known as Corvallis College; as Oregon Agricultural College and State Agricultural College after the state took control in 1885; as Oregon State College from the 1920s; and by state law as Oregon State University since March 6, 1961.

Guidelines

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

Accordingly, Oregon State University accepts the charge of the 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 (1) personal development and enrichment, particularly through arts and letters; (2) responsible participation in a democratic society; (3) an understanding of the scientific methodology which has wrought a revolution in the ways of knowing and the extent and application of knowledge; and (4) an understanding of other cultures and natures as well as our own."

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

Output Goals

Output goals are defined in terms of (1) teaching and learning, (2) research and creative activity, and (3) Extension education and service.

Teaching and learning goals at Oregon State University are:

- To develop in students an understanding and appreciation of scholarship, scientific research, and creative endeavor.
- To assist students in developing their intellects to the maximum, as well as in developing their physical, social, moral, and aesthetic potentialities.
- To confront students with the experiences that will create an awareness of the relevant social, political, technological, and moral issues, and to provide them with the attitudes and skills necessary to evaluate consequences of decisions about these issues.
- To cultivate a life-long love of learning and enjoyment of the life of the mind.
- To assist students in developing objectivity about themselves and their beliefs, and hence to examine these beliefs critically.
- To encourage students to take responsibility for their own education; to learn their own learning process, to learn what they need to learn and how to communicate with others.
- To enlarge students' horizons by exposing them to the great ideas and great minds in all cultures and to avoid provincialism.
- To provide students with the skills, attitudes, contacts, and experiences which will maximize the likelihood of making an effective contribution toward the development of a more humane and democratic society, and permit them to pursue a useful career in this context.

Research and creative activity goals at OSU are:

- To encourage those activities that extend the frontiers of knowledge and provide outlets for the creativity of faculty and students.
- To encourage the use of research results in the solution of social, economic, and environmental problems.
- To encourage the communication of research methods and findings in the classroom.
- To encourage the exploration of the consequences stemming from the application of new knowledge and technology.

Extension education and service goals at OSU are:

- To further the concept of education as a life-long process by encouraging continued intellectual and professional development of the individual citizen.
- To assist groups of citizens in using the resources of the University for the solution of common problems.
- To provide cultural leadership through University-sponsored programs in the arts, public lectures by distinguished persons, and to serve as a center for the preservation of the cultural heritage.

Adaptation goals at OSU are:

- To provide appropriate procedures whereby the planning and evaluation of the University may proceed on a continuous basis.
- To provide for the periodic reappraisal of goals, missions, and objectives of the University and its component parts.
- To provide for a continuous two-way flow of information between the University and the larger community.
- To educate, to the utmost capacity, every student who meets the entrance requirements, but also to encourage the admission of students with high potential in terms of the specific strength and emphasis of the University.
- To recognize the special need of minority and disadvantaged students in this state and provide adequate funding and special assistance to them.
- To give attention to the needs of this region and the state of Oregon without neglecting national and international obligations and responsibilities.

The foregoing output goals are to be interpreted in the light of OSU's principal curricular and instructional obligations; namely, to offer:

- A sound program of general education at the undergraduate level.
- Effective baccalaureate degree programs in the arts and sciences and in the professional and technological schools for which OSU has been given sole or primary allocation by the board.
- Strong graduate programs in the sciences which undergird the professional and technological schools assigned to OSU, and in the professional and technological schools allocated OSU by the Oregon State Board of Higher Education.
- Extensive continuing education programs such as are generally characteristic of a Land Grant and Sea Grant university.

This statement of goals was adopted by the State Board of Higher Education in 1973 and will be reviewed by the board in the early 1980s.

Accreditation

Oregon State University is accredited by the Northwest Association of Schools and Colleges. The Departments of Chemistry and Chemical Engineering are approved by the American Chemical Society. The School of Business is accredited by the American Assembly of Collegiate Schools of Business. The School of Education is accredited by the National Council for Accreditation of Teacher Education for preparation of elementary and secondary teachers and guidance counselors. Eight curricula in the School of Engineering are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology; one curriculum is accredited by the American Council on Construction Education. The School of Forestry is accredited by the Society of American Foresters. The School of Home Economics is accredited by the Council for Professional Development of the American Home Economics Association. The School of Pharmacy is accredited by the American Council for Pharmaceutical Education, and the School of Veterinary Medicine by the American Veterinary Medical Council on Education.

Administration

As of January 1982

Principal Administrative Offices

President ..... Robert W. MacVicar, Ph.D.
Assistant to the President ..... Wilmer H. Post, M.B.A.
Assistant to the President ..... Robert Gutierrez, J.D.
Acting Vice-President for Administration ..... Theran D. Parsons, Ph.D.
Assistant to the Vice-President .... Jacquelyn T. Rudolph, M.B.A.
Acting Dean of Research ..... George H. Keller, Ph.D.
Dean of Graduate School ..... Lyle D. Calvin, Ph.D.
Vice-President for Student Services .... Robert W. Chick, Ed.D.
Dean of Faculty ..... David B. Nicodemus, Ph.D.
Dean of Undergraduate Studies ..... Judith L. Kuipers, Ph.D.

School, College, and Division Heads

Liberal Arts ..... Dean David J. King, Ph.D.
Science ..... Dean Thomas T. Sugihara, Ph.D.
Agriculture ..... Dean Ernest J. Briskey, Ph.D.
Business ..... Dean Earl E. Goddard, D.B.A.
Education ..... Dean Robert D. Barr, Ph.D.
Engineering ..... Dean Fredrick J. Burgess, M.S.
Forestry ..... Dean Carl H. Stoltenberg, Ph.D.
Health and Physical Education ..... Dean Michael G. Maksud, Ph.D.
Home Economics ..... Dean Betty E. Hawthorne, Ph.D.
Oceanography ..... Dean G. Ross Heath, Ph.D.
Pharmacy ..... Dean Richard A. Ohvall, Ph.D.
Veterinary Medicine ..... Dean E. Edward Wedman, D.V.M.
Aerospace Studies ..... Col. Donald J. Karpen, M.E.
Military Science ..... Lt. Col. Curtis W. Rosler, M.S.
Naval Science ..... Capt. James G. Williams, III, M.S.

Instructional Services

Admissions and Registrar ..... Wallace E. Gibbs, Ed.M. *Director and Registrar*
Classroom Television ..... Jon R. Root, Ph.D., *Director*
Continuing Education and Summer Term ..... R. Duane Andrews, Ph.D., *Director*
Curriculum Coordination .. Sandra J. Suttie, Ph.D., *Coordinator*
Educational Opportunities ..... Miriam W. Orzech, Ph.D. *Director*
Exploratory Studies Program ..... Morris L. LeMay, Ed.D., *Director*
Honors Program ..... Margaret E. Meehan, M.A., *Director*
Instructional Resources and Materials Center ..... Benjamin P. Purvis, Ph.D., *Director*
International Education ..... John G. Van de Water, Ph.D., *Director*
Libraries ..... Rodney K. Waldron, M.A., *Director*

Student Services

Career Counseling and Placement ..... Antone C. Van Vliet, Ph.D., *Director*
Counseling Center .... Morris L. LeMay, Ed.D., *Associate Dean*
Financial Aid ..... Richard E. Pahre, M.A., *Director*
General Student Services ..... Jo Anne Trow, Ph.D., *Associate Dean*
Housing ..... M. Edward Bryan, M.Ed., *Director*
Memorial Union .... George F. Stevens, M.Ed., *Associate Dean*
New Student Program ..... J. Franz Haun, Ed.D., *Director*
Student Health Service ..... Donald S. Boots, M.D., *Director*

General Institutional Services

Affirmative Action ..... Pearl S. Gray, M.A.T., *Director and Assistant to the President*
Alumni Relations ..... Donald S. Wirth, B.S., *Director*
Budgets ..... Allan R. Mathany, M.B.A., *Director*
Business Affairs ..... Hugh F. Jeffrey, B.S., *Director*
Computer Center ..... Thomas L. Yates, M.S., *Director*
Information Department .... Samuel H. Bailey, M.S., *Director*
Men's Intercollegiate Athletics .... Dee G. Andros, M.S., *Director*
Personnel Services ..... Gene Todd, B.S., *Director*
Physical Plant ..... Howard A. Wells, Jr., M.S.E., *Director*
Planning and Institutional Research ..... David A. Bucy, M.S., *Director*
Printing Department ..... Charles W. Peckham, B.S., *Director*
University Development ..... James W. Dunn, M.S., *Development Officer*
University Motor Pool ..... Cecil B. Barnett, M.S., *Director*
University Publications ..... Thomas H. Sanders, M.A., *Director*
Women's Intercollegiate Athletics ..... Sylvia L. Moore, Ph.D., *Director*

Location and Facilities

The heart of the Willamette Valley, Corvallis, is the home of Oregon State University. This city of 42,000 is located between the Cascade Mountains to the east and the forested Coast Range to the west, beyond which lie the headlands and scenic beaches of the Oregon coast. Portland is 85 miles north and Eugene 40 miles south. In addition to the University, businesses and a few light industries are the chief employers in Corvallis. City parks, the Corvallis Arts Center, and a fine public library offer only some of the varied cultural and recreational activities available in the city. The climate, generally cool and rainy in the winter and warm and sunny in summer, is tempered by the ocean, so there are few temperature and humidity extremes. Rainfall averages 37 inches anually.

The central campus in Corvallis contains about 75 major buildings surrounded by rolling green lawns, tall shade trees, and flowering shrubs. These buildings include classrooms, laboratories, offices, recreational facilities, the Memorial Union, the new Foundation Center, and Kerr Library.

On campus and in the near vicinity are a number of conveniently located housing options. These include residence halls, cooperative houses, sororities, fraternities, and apartments.

The 400-acre main campus has grown out of plans prepared by the eminent landscape architects John C. Olmstead (1908) and A. D. Taylor (1925, 1945). The current plan for campus development was initiated in 1962 by Louis A. DeMonte and Albert Wagner, University planning consultants, and approved by the State Board of Higher Education in 1964. Updated by Louis DeMonte and Earl Powell in 1976, the plan takes into consideration the nature and aims of the University, anticipated enrollment, density of land use, building location and heights, parking space, and the expanding role of the University in service to the state. This 1976 plan is being updated and coordinated with the comprehensive plan for the Corvallis area.

Present buildings, with dates of acquisition or original construction and later additions or major remodeling, are listed below.

Administrative Services (1971)
Aero Engineering Laboratory (1954)
Agricultural Hall (1909, 1911, 1913)
Agricultural Utilities (1909)
Apperson Hall (1898, 1920, 1950, 1963)
Arnold Dining Hall (1972)
Avery Lodge (1966)
Azalea House (1953)

Batcheller Hall (1913)
Beef Barn (1948)
Benton Hall (1888)
Bexell Hall (1922, 1958)
Bloss Hall (1972)
Buxton Hall (1962)

Callahan Hall (1964)
Cauthorn Hall (1957, 1963)
Chemical Engineering Building (1955)
Clark Laboratory (1967)
Coed Cottage (1926, purch. 1956)
College Inn (purch. 1975)
Computer Science Building (1919, 1924, 1951)
Cordley Hall (1957, 1967)
Covell Hall (1928, 1960)
Crop Science Building (1981)

Dairy Barn (1968)
Dearborn Hall (1949, 1974)
Dixon Lodge (1966)
Dixon Recreation Center (1976)
Dormitory Service Building (1961)
Dryden Hall (1927)

Education Hall (1902, 1940)
Environmental Fluid Dynamics Laboratory (1973)
Extension Hall (1921, 1951)

Fairbanks Hall (1892, 1936)
Farrier's School Building (1915, 1965)
Ferguson Hall (purch. 1941)
Finley Hall (1967)
Forest Research Laboratory (1961, 1968, 1970)
Forest Science Laboratory (1962, 1971)

Gilbert Hall (1939)
Gilbert Hall Addition (1980)
Gill Coliseum (1950)
Gilmore Hall (1912, 1939)
Graf Hall (1920)
Greenhouses (1928, 1951, 1954, 1957, 1964, 1966)

Hawley Hall (1959, 1963)
Heating Plant (1923, 1949, 1953, 1960, 1966, 1970)
Heckart Lodge (1954)
Horse Barn (1972)

Industrial Building (1947, 1958)

Kent House (purch. 1924)
Kerr Library (1963, 1972)
Kidder Hall (1918, 1941, 1966)

Lab Animal Resources Center (1976)
Langton Hall (1915, 1921, 1953)
Magruder Hall (1980)
Manchester Riding Arena (1972)
Marine Science Center at Newport (1965, 1970)
McAlexander Fieldhouse (1910, 1971)
McNary Dining Hall (1963)
McNary Hall (1963)
Memorial Union (1928, 1960)
Memorial Union East (1977)
Memorial Union East Gallery-Forum (1977)
Merryfield Hall (1909, 1972)
Milam Hall (1914, 1920, 1952)
Milne Computer Center (1969)
Mitchell Playhouse (1898, 1950)
Moreland Hall (1917, 1972)

Nash Hall (1970)
Naval ROTC Armory (1946, 1954, 1959)
Nuclear Reactor (1967)

Oceanography Buildings (1964, 1970, 1971, 1972, 1975)
Orchard Court Apartments (1961, 1963)
Orchard Street Nursery School (1939)
OSU Foundation Center (1981)
Oxford House (acq. 1965)

Park Terrace Nursery School (1918, purch. 1945)
Parker Stadium (1953, 1967, 1969)
Peavy Hall (1971)
Pharmacy Building (1924, 1966)
Physical Plant Office Building (1961)
Physical Plant Warehouse (1948, 1952)
Plageman Infirmary (1936, 1961)
Poling Hall (1957, 1963)

Radiation Center (1964, 1972)
Reed Lodge (1954)
Rogers Hall (1968)
Rosenfeld Laboratory (1972)

Sackett Hall (1947, 1963)
Shepard Hall (1908)
Snell Hall (1959)
Social Science Hall (1912, 1951)
Swine Barn (1965)

University Motor Pool Building (1954)

Veterinary Dairy Barn (1930)
Veterinary Diagnostic Laboratory (1952, 1961, 1972)
Veterinary Medical Isolation Laboratory (1974)
Veterinary Sheep Barn (1938, 1962)

Waldo Hall (1907, 1959)
Weatherford Dining Hall (1957)
Weatherford Hall (1928)
Weniger Hall (1959, 1961, 1966)
West Hall (1960)
West Dining Hall (1960)
Wiegand Hall (1951)
Wilkinson Hall (1973)
Wilson Hall (1964)
Withycombe Hall (1952)
Women's Building (1926)
Women's Center (1892)

In addition to the main campus, the state owns and leases many acres of forest and farm land which are used for instruction and research. The Marine Science Center in Newport is the main coastal facility for the University's Sea Grant, oceanography, and fisheries programs.

Alumni Association

The purpose of the alumni association is to promote the interests and ideals of Oregon State University. Anyone who has attended OSU is eligible for membership to this voluntary, dues-paying organization. The association publishes the *Oregon Stater* newspaper for all alumni, organizes alumni gatherings and class reunions, and maintains current address records of its members.

The alumni association is governed by a board of directors of 55 members representing various geographical districts, all degree-granting schools, the Golden Jubilee Association, and the student body. Officers and directors are elected annually at the spring term board meeting. Directors may serve two three-year terms.

1982-83 EXECUTIVE COMMITTEE

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C. Douglas McGregor '60, President, Salem
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Michael N. Wells '82, Corvallis

STAFF

Donald S. Wirth '61, Corvallis, Director of Alumni Relations
Tim D. Tolan '73, Corvallis, Associate Director of Alumni Relations

Oregon State University Foundation

The object of the Oregon State University Foundation, as stated in its articles of incorporation, is to aid and promote educational and charitable activities and purposes, and specifically, to solicit, acquire, receive, hold, manage, construct, use, maintain, lease, exchange, and dispose of all kinds of property, whether acquired absolutely or in trust, for the benefit of OSU. Substantial gifts have been received, and since its incorporation in 1947, the foundation has become an important adjunct to the advancement of Oregon State.

EXECUTIVE COMMITTEE *as of January 1982*

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STAFF

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Erin Haynes, Associate Director for Annual Giving
D. L. Strohmeyer, Assistant Director for Annual Giving
Ronald E. Campbell, Associate Director for 4-H and Youth Fund-Raising

Admission, Requirements, Fees

Admission

OREGON STATE UNIVERSITY WELCOMES all students of good moral character without regard to race, creed, sex, marital status, age, religion, handicap, or national origin who provide evidence of suitable preparation for work at the university level.

Admission to Freshman Standing

High school seniors may receive early confirmation of admission to OSU by applying any time after October 15 of their final year.

Oregon residents being admitted as freshmen:

1. Must have been graduated from a standard or accredited high school *and*
2. Must meet *one* of the following:
   a. Have a 2.75 high school grade-point average (GPA) or above in all high school subjects taken toward graduation, *from the first through the sixth semester,** for admission fall, winter, or spring terms; *or*
   b. Have a predicted first term college GPA (based on a combined measure of high school GPA and Scholastic Aptitude Test or American College Test scores) of 2.00 or above; *or*
   c. Have a minimum grade-point average of 2.00 in 15 graded (A-F) term hours of college-level course work taken in an accredited collegiate institution; *or*
   d. Have a minimum grade-point average of 2.00 in 12 graded (A-F) term hours of prescribed course work taken during a regular summer session at OSU.

Nonresidents being admitted as freshmen:

1. Must have been graduated from an accredited high school *and*
2. Must meet *one* of the following:
   a. Have a 2.75 grade-point average in all high school subjects taken towards graduation *from the first through the sixth semester** to enter any term; *or*
   b. Have a minimum 2.25 grade-point average combined with a satisfactory combined score on the SAT or ACT; *or*
   c. Have a 2.25 grade-point average in 15 graded (A-F) term hours of college-level course work taken in an accredited collegiate institution; *or*
   d. Have a 2.00 grade-point average in 12 graded (A-F) term hours of prescribed course work taken during a regular summer session at OSU.

Applicants admitted as freshmen must also have a score of at least 30 on the Test of Standard Written English (TSWE) of the SAT, or a score of 12 on the English section of the ACT. Excepted are applicants who qualify for admission by earning at least a 2.00 GPA (2.25 for nonresidents) in 15 or more graded (A-F) term hours of college-level course work taken in a collegiate institution or in 12 graded (A-F) term hours of prescribed course work taken during a regular summer session at OSU (options *c.* or *d.* above).

Entering freshmen with superior records are provided with the following special academic opportunities:

1. *Advanced Placement Program:* Advanced placement or credit may be granted to entering freshmen who have completed college-level work and who have satisfactorily completed the College Board Advanced Placement Examinations during their senior year. See also 3., *Credit by Examination.*
2. *University Honors Program:* On the basis of high school records and College Board test scores, entering freshmen may be invited to enroll in special honors sections designed to challenge the greater capacities of the superior student. Seminars, research projects, honors papers, independent study, and special courses are offered. Continued participation depends on evidence of sustained intellectual achievement. Qualified students may enter the program up until the beginning of their junior year.
3. *Credit by Examination:* Students with special competence in specific areas may apply on campus for a departmental examination which may qualify them for advanced placement or credit in that department. As an alternative to departmental examinations, students may seek credit through the College-Level Examination Program (CLEP) of the College Entrance Examination Board. CLEP includes nationally normed subject matter examinations and general examinations covering material included in a number of relatively standard courses taught in colleges and universites throughout the United States. Some of these examinations have been accepted by departments of the University. Policy guidelines have been established which make it possible for admitted and enrolled students to: (1) transfer credits through these accepted CLEP examinations to OSU, providing certain criteria are met; and (2) earn credits through accepted CLEP examinations, providing certain criteria are met. Further information about CLEP is available from the University Counseling Center.

Admission by Exception

Oregon State System of Higher Education policy permits admission of a limited number of freshmen who do not meet the minimum requirements. Requests for admission by exception are reviewed by the undergraduate admissions committee. Information concerning this appeal procedure is provided by the Office of Admissions.

Admission of Undergraduate Transfer Students

Undergraduate transfers from other colleges are required to present (1) evidence of eligibility to return to the last college or university attended and (2) a satisfactory grade-point average. Residents must have a cumulative GPA of at least 2.00 (2.25 for nonresidents) to be admissible. A student transferring fewer than 15 graded (A-F) term hours must satisfy the entrance requirements for entering freshmen. Transfers should review "Admission Procedure" and "Placement Examinations," Foreign students entering as undergraduates should review "Admission of Foreign Students."

Oregon State University accepts in transfer college-level courses successfully completed in fully accredited colleges and universities.

Upon arrival on campus, each transfer student is assigned an adviser with whom the academic program is planned. The Office of Admissions determines college entrance eligibility only, while departments determine specific departmental degree requirements.

Transfer students are required to file complete official records of all college academic work attempted, certified by the registrar of each institution where the work was undertaken.

* Completion of high school graduation requirements with minimum standards is essential for subsequent enrollment at the University.

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

a. 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 term hours. A student who has completed 108 lower division term hours 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. For all work accepted in transfer, hours attempted and points earned are used in calculating cumulative grade-point average.

b. Block transfer of vocational-technical credit from accredited or state-approved community colleges into specific departmental programs at Oregon State University may be awarded up to 45 hours on the basis of proficiencies, work experience, and/or technical courses as determined by the appropriate department, but without assignment of grade. Such credits will apply to the agreed transfer program only, and the credit will not be awarded until completion of the program by the student. The 45 hours, or portion thereof, transferred will count as part of the 108 hours defined in *paragraph a.* above.

c. 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 work. Equivalent credit will be awarded only upon the recommendation of the appropriate department, college or school, and approval by the academic requirements committee. If the vocational-technical community college course and the equivalent OSU course vary in credit hours, the number of course credits that may be granted will be the lesser of the two. These credits will count as part of the 108 hours defined in *paragraph a.* 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.

d. In cases where *paragraph b.* above is not applicable, up to 24 term hours of lower division credit for specific vocational-technical community college courses may be awarded (but without assignment of grade) for nonequivalent OSU course work when the proficiencies, training, or experiences gained by the student are recognized by the appropriate OSU department and college or school. Credit will be awarded *only* upon the recommendation of the appropriate department, college or school, and approval of the academic requirements committee. No more credit will be offered by OSU than was offered by the community college for the course involved in a given transfer. The course prefix and number to be used in awarding of such credit is VocT 099. The 24 term hours, or portion thereof, awarded will count as part of the 108 term hours defined in *paragraph a.* above. The credit will not be granted until completion of the student's program. In the event the student transfers into another OSU department, the new department will re-evaluate the appropriateness of such vocational-technical training or experience. This provision may not be used in combination with that in *paragraph b.* above.

Admission as a Special Student

The special student category is designed to aid the enrollment of a person who at the time of application is not planning to complete degree requirements at OSU or who, for reasons which are judged to be acceptable by the undergraduate admissions committee, does not meet regular admission requirements.

The admissions committee may consider for entrance as a special student:

1. A person qualified for regular admission but not planning to earn a degree at Oregon State.

2. A person who is not qualified for regular admission, is at least four years beyond the date that his or her high school class has graduated, and is not planning to earn a degree at Oregon State.

3. A high school junior or senior with a grade-point average of at least 3.00 who is recommended by his or her principal for enrollment in a specific course or courses.

4. A nonresident, ethnic minority applicant who does not meet regular admission requirements but desires to enter some specialized OSU academic program not available in the applicant's state.

5. An otherwise qualified applicant who has been unable to obtain complete and/or official credentials required to document admission as a regular student and for whom admission approval is provided by the undergraduate admissions committee.

Recorded credit will be applied to a degree only if the special student qualifies according to Academic Regulation 1 in the *Schedule of Classes* as a regular student and satisfies regular admissions procedures and regulations.

Admission as an Undecided Student

An undergraduate student undecided about his or her academic major or future goals will find that OSU has a large variety of special programs allowing the undecided student to take a general course of study. Most of the OSU colleges and schools offer this service to the new student. These programs include liberal studies, general science, general agriculture, general business, general engineering, and general home economics. OSU also offers the University Exploratory Studies Program (UESP) to allow undecided students to explore different courses and to help them, through special counseling, to find a suitable major field of study. Additional information may be obtained from the Office of New Student Programs or the departments listed above.

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 indicate the ability to do satisfactory graduate work. See "Graduate School" for further information on advanced degree, postbaccalaureate, and nondegree, special student status. Also see "Admission Procedure" on page 12.

Admission of Foreign Students

A foreign student is admitted according to standards established for each country by the admissions committee. Basically such a student must (1) be qualified to enter a university or graduate school in his or her own country, (2) have achieved a superior scholastic record on the basis of his or her own grading system, and (3) have certified English proficiency as indicated by a score of 500 or more on the Test of English as a Foreign Language (TOEFL). A student with less than a four-year bachelor's degree, or with a diploma, certificate, or title not accepted 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 2.50 is necessary to transfer from an American college or university.

Admission to Summer Term

The only requirement for admission to summer term is ability to do the work. Those persons who expect to attend regular sessions or who wish to receive credit toward a degree at OSU must satisfy regular admission requirements.

Admission to Professional Programs and Schools

To protect students and professional standards, the admission and retention requirements and standards for evaluation and acceptance of transfer credit are often in addition to general admission and transfer requirements. Admission to Oregon State University does not, therefore, automatically admit students to its professional programs and schools. Because professional education is accredited and approved by societies established by the professions, students admitted to these schools must be prepared to undertake the curriculum at whatever level they enter it and to maintain school standards.

Admission from Unaccredited Institutions

Admission from a nonaccredited institution is determined by the appropriate admissions committee. Students admitted from nonaccredited colleges are on probation until they have achieved a satisfactory record at Oregon State. After three terms of work at OSU satisfactory to the academic requirements committee, a student may request validation of work done in a nonaccredited institution of collegiate rank. The committee will consider each petition separately and base its decision on all information available. In some instances, informal examinations by the departments concerned may be required.

Credit for 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.

Admission Procedure

Questions regarding admission and applications for admission, accompanied by the $25 nonrefundable application fee (payable to Oregon State University), should be addressed to the Office of Admissions.

Application Form A is available from the Office of Admissions. The special Oregon high school application form is available at all Oregon high schools early in the first semester of the senior year. The applicant requests the high school principal or the registrar of each college attended to forward certified transcripts of all academic records directly to the Office of Admissions for evaluation. All records submitted become the property of OSU. Transcripts for transfer students must include all schoolwork beyond high school and, for graduate students, all undergraduate and graduate records.

Applications must be received no later than thirty days before the opening of classes for the term of entrance. (This deadline is subject to change as circumstances demand.) If currently attending a college elsewhere, a transfer applicant should apply during his or her final term or semester.

Placement Examinations

High school seniors planning to enter Oregon State must take the SAT or the ACT. See "Admission to Freshman Standing."

Either test, together with high school and other records, provides the academic adviser with valuable information about the student's educational development, abilities, and aptitudes.

Transfer students who have not previously completed a college-level mathematics course must present scores of the SAT or ACT before registration in an OSU mathematics course.

Other placement examinations may be required in certain majors.

Students who enter Oregon State 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.

New Student Programs

Before officially registering for their first term, undergraduate students participate in a program of orientation and advising. Each year, OSU holds several sessions of orientation and advising for new students. One-day programs—for fall, first-term freshmen only—are held during July. Others are scheduled for the period immediately preceding the opening of fall, winter, and spring terms. Fall term transfer students and freshmen who did not participate in the summer program meet on Monday of the week of fall term registration. Freshmen who register during the summer need not return to campus until the day before classes begin, unless they have other commitments. Detailed information is sent to all admitted undergraduate students well in advance of the term of entrance.

Academic Advising

Students entering Oregon State need to be aware of the purpose and importance of academic advising. Advisers assist all students in long- and short-range academic and career planning; provide information on curricula, educational options within the University, and schedule planning; and help interpret University and department requirements. Finally, advisers help students whose academic progress is unsatisfactory, referring them to other University services which provide assistance. Head advisers for each school or college are listed in this catalog and in the *Schedule of Classes.*

Registration Procedures

Once admitted to Oregon State University, the information and procedures for registration become increasingly important. Registration periods, with published dates, are set aside each term. Complete registration instructions, procedures, and deadlines for which every student is fully responsible are detailed in the annual *Schedule of Classes,* available on campus shortly before the opening of fall term. 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 regulations and procedures, and final week schedule, as well as for the listing of courses offered during the academic year.

Readmission

Regular OSU students (those admitted, enrolled, and attending fall, winter, or spring terms), must apply for readmission after being absent from the campus for one or more terms (not including summer term) or after officially withdrawing from school during a term. Applications for readmission must be received in the Registrar's Office at least two weeks before registration begins for the term in question. If the applicant has completed 15 or more graded (A-F) term hours at another institution since leaving OSU, his or her eligibility for readmission is based on the same requirements as for original admission of a transfer student, either resident or nonresident.

Prior to admission or readmission to OSU, students must file in the Registrar's Office official transcripts of all academic work attempted prior to attending or since leaving OSU. Failure to do so will involve questions of academic honesty and possible penalties.

Degrees and Certificates

A list of major programs with the degrees offered in them and the college or school(s) sponsoring each program is found on pages 44-45. Certificate programs are mentioned under "Additional Programs" following this list and described in more detail in "College of Liberal Arts."

Requirements for Baccalaureate Degrees

To earn the Bachelor of Arts degree (B.A.) or Bachelor of Science degree (B.S.), a student must complete: (1) general institutional requirements and (2) requirements of the department and school or college. Curricular and departmental requirements are listed under departmental headings of the 12 colleges and schools. Institutional requirements follow:

General Requirements

a. Each student will complete the following requirements:
   (1) English Composition, Wr 121 (minimum grade of C) ..... 3 term hours

   (2) Physical education, 3 terms in activity courses ..... 3 term hours
   Students over 30 years of age are not required to take physical education. Only one activity course each term will be counted toward the three-term requirement. A total of eight hours of performance courses may be elected above the regular requirement.

   (3) General education
   The curricula for all baccalaureate degrees shall include the following components:

   (a) Physical, biological, and/or mathematical sciences .....15 term hours
   Undergraduate courses numbered 100 or higher offered by the departments of the College of Science and courses from other schools as approved by the College of Science. Currently approved is Oc 331, Introduction to Oceanography, 3 hours.

   (b) Humanities and/or arts ..... 12 term hours
   Undergraduate courses numbered 100 or higher offered by American studies, architecture and landscape architecture, art, English (*Eng* prefix), foreign languages and literatures (except for first-year language courses), history, music, philosophy, religious studies, and theater arts and motion picture/cinematography courses in speech communication, as well as courses from other departments and schools as approved by the College of Liberal Arts. Currently approved are WS 219, Survey of American Women Today, 3 hours; WS 319, Working Women in America, 3 hours; and RS 127, 128, 129, Introduction to Russian Culture, 3 hours each.

   (c) Social sciences .....12 term hours
   Undergraduate courses numbered 100 or higher offered by anthropology, economics, geography (*Geog* prefix), political science, psychology, and sociology, and courses from other schools as approved by the College of Liberal Arts.

   (d) Written and oral English communication (in addition to Wr 121) ..... 6 term hours
   Journalism: J 111,212,223,317.
   Speech: Sp 112,113.
   Writing: Wr 214,222,224,233,234,235, Wr 316 (may take two terms) Wr 323,324 (may take three terms), and 327.
   Any *complete* first-year language sequence also will satisfy this six-hour requirement—Chinese, French, German, Italian, Japanese, Russian, and Spanish.

   Departments, schools, or colleges may restrict the courses used by their major students to satisfy each general educational component. For example, a department, school, or college may elect not to accept a studio course to satisfy the humanities and/or arts component.

b. Term hours: minimum 192 (204 in engineering—except technology majors—and forestry; and 240 in the five-year pharmacy curriculum). The minimum must include:
   (1) Hours in upper division courses: minimum 60, exclusive of upper division physical education activity courses.
   (2) Hours in major: minimum 36, including at least 24 in upper division courses.

c. Distribution of hours for baccalaureate degrees:
   (1) Bachelor of Arts: 36 hours in humanities (except English composition and corrective speech) including proficiency in a foreign language as certified by the Department of Foreign Languages and Literatures, equivalent to that attained at the end of the second-year course in the language.
   (2) Bachelor of Science: 36 hours in science, or 36 hours in social science, or 45 hours in science and social science together.
   (3) Professional bachelor's degree (B.Agr.): fulfillment of all school requirements.

d. Grade-point average: minimum of 2.00 in each of the following:
   (1) All college work.
   (2) All work taken in residence at this institution (exclusive of Division of Continuing Education courses).
   (3) Last 45 hours for which registered.
   (4) At least two of the last three terms.

e. Residence:
   (1) Minimum, the last 45 hours, or 45 of the last 60 term hours if authorized by approval of a petition to the academic requirements committee. Classroom work taken through the Division of Continuing Education is not considered residence work, with the exception of extended campus courses.[1]
   (2) Minimum, 15 hours of upper division credits must be taken in the student's major from courses regularly listed in the OSU *Schedule of Classes* or *Summer Term Bulletin*.
   (3) Subject to approval by the college or school and department in which the student is majoring at Oregon State University and by the academic requirements committee, credits earned in (a) a professional school which is not part of OSU but which is in a field designated for this purpose in the OSU *General Catalog*,[2] or

[1] Extended campus courses are courses regularly listed in the OSU *Schedule of Classes* or *Summer Term Bulletin* which are taught away from campus by members of the OSU faculty as part of their normal teaching loads. Such courses are, in addition, specifically listed as extended campus courses in the *Schedule of Classes* or in a supplement to it.

[2] Fields so designated in the OSU *General Catalog* are dentistry, medicine, optometry, podiatry, and veterinary medicine.

(b) a foreign study program which is sponsored by the Oregon State System of Higher Education may be accepted for all or part of the 45 hours referred to in (1) above, and all or part of the 15 hours referred to in (2) above. In this event, the total program presented for the baccalaureate degree must include a minimum of 45 hours earned by classroom work on the OSU campus in Corvallis.

(4) Credits earned by special examination for credit (Academic Regulation 23) are not considered to be resident study.

f. Dean's certification of fulfillment of all requirements of major school.

g. Restrictions:

(1) Correspondence study: maximum, 60 term hours.

(2) Law or medicine: maximum, 48 term hours.

(3) Music (applied music): maximum, 12 hours. (Restriction not applicable to majors in music.)

h. Application for degree: To become a candidate for a degree a student must have achieved senior standing[3] and must make formal application for the degree. The student must file an application with the registrar during the first week of the term preceding the term in which he or she expects to complete requirements for a degree.

Concurrent and Subsequent Baccalaureate Degrees

Concurrent Baccalaureate Degrees: An undergraduate student may be granted two or more baccalaureate degrees (for example the B.A. or B.S. degree with same or different majors) at the same graduation exercise provided that the student: (1) meets the institutional, college or school, and departmental requirements of the curricula represented by the degrees; (2) completes for each additional degree a minimum of 32 term hours more than the requirements of the curriculum requiring the least number of credits; (3) completes each additional 32 term hours in residence, or as a minimum, 24 of the 32 term hours in residence if authorized by approval of a petition to the academic requirements committee; (4) is registered during the last three terms before graduation at least one term in each appropriate college, school, or department.

Subsequent Baccalaureate Degree(s): (1) A graduate student who has received a previous baccalaureate degree(s) from Oregon State University may be granted additional baccalaureate degree(s) subsequently provided that the requirements for concurrent degrees (AR 27a) are satisfied. (2) A graduate student with a baccalaureate degree(s) from an accredited institution other than Oregon State University may be granted a baccalaureate degree from Oregon State University upon satisfying the institutional residence requirement (AR 26e), and the institutional, college, school, and departmental curricula requirements represented by the degree. Such a student also may obtain concurrent degrees from Oregon State University by satisfying the requirements for concurrent degrees (AR 27a).

Requirements for Certificates

See "Human Services," "Latin American Affairs," and "Women Studies" in this catalog.

Requirements for Advanced Degrees

For advanced degree requirements see the "Graduate School" section of this 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 same section.

[3] Before senior standing may be achieved a student must complete 135 term hours with a grade-point average of 2.00.

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. Courses numbered 400-499, with designation (G) or (g), may be taken for graduate credit. Courses which may be taken for graduate *major* credit are designated (G); courses which may be taken for graduate *minor* credit only are designated (g).
500–599.	Graduate courses. Seniors of superior scholastic achievement may be admitted on approval of instructor and department head concerned.
600–699.	Professional courses which may be applied toward a professional degree but not toward an advanced academic degree.
700–799.	Inservice courses. Limited applicability toward advanced degrees.

Reserved Numbers

100–110, 200-210.	Survey of foundation courses at the freshman and sophomore levels.
400–410, 500-510.	Certain of the numbers in these blocks have been assigned as repeating numbers to specific courses which may be taken for more than one term under the same number, credit being granted according to the amount of work done. Reserved numbers at Oregon State include:
401, 501.	Research.
402, 502.	Independent Study.
403, 503.	Thesis.
405, 505.	Reading and Conference. (Individual reading reported orally to instructor.)
406, 506.	Projects.
407, 507.	Seminar.
408, 508.	Workshop.

Grading System

Grades

The grading system consists of five basic grades, *A, B, C, D,* and *F. A* denotes exceptional work accomplished; *B,* superior; *C,* average; *D,* inferior; *F,* failure. Other marks are *E,* final examination not taken; *I,* incomplete; *W,* withdrawal; *R,* thesis in progress; *P,* pass; *N,* no credit; *S,* satisfactory; *U,* unsatisfactory.

A student who has done acceptable work to the time of the final examination but does not take it will receive an *E.* The *E* may be removed upon presentation to a faculty committee of an acceptable reason for not taking the final examination. An *E* not removed within the first term after the student's return to the institution will be changed to an *F.*

When the quality of the work is satisfactory and the scheduled final examination has been taken but some essential minor requirement of the course has not been completed for reasons acceptable to the instructor, a report of *I* may be made and additional time granted. The instructor states the deficiency and the additional time for completing the deficiency on the grade card. To remove an incomplete, a student must complete the deficiency within the allotted time and the instructor will submit the appropriate grade. If the deficiency is not removed within the allotted time, the instructor may submit a grade other than *I,* based on the work that has been completed. An incomplete not removed within one calendar year following its receipt becomes a *W.*

Students may withdraw from a course by filing the proper forms at the Registrar's Office in accordance with OSU regulations; in such cases a report of *W* is assigned. A student who dis-

continues 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 term hour of *A* grade, 3 points for each term hour of *B*, 2 points for each term hour of *C*, 1 point for each term hour of *D*, and 0 points for each term hour of *F*. Marks of *E, I, W, P, N, R, S,* and *U* are disregarded in the computation of points. The grade-point average is the quotient of total points divided by total term hours in which *A, B, C, D,* and *F* are received.

Scholarship Regulations

Academic Deficiencies (Undergraduate Students)

The academic deficiencies committee has discretionary authority to suspend or place on probation any student not achieving profitable and creditable progress toward graduation (minimum of 2.00 or C for both term and cumulative). Additionally, in order to be considered as making "profitable and creditable progress toward graduation," a full-time student must accumulate at least 30 graded credit hours (all grades except E, I, and W) in every three consecutive terms at OSU. Failure to do so may result in suspension. Part-time students (i.e., students normally registering for fewer than 12 credit hours) are exempt from this rule.[1]

Probation: Any student achieving a grade-point average below 2.00, either term or cumulative, will be placed or continued on probation (unless subject to suspension). Any student on probation may achieve good standing by earning both term and cumulative 2.00.

Suspension: Most suspensions occur when a student is 12 or more points deficient (see "Grades"). If other factors so indicate, (for example—three consecutive terms under 2.00 GPA) a student may be suspended with fewer than 12 points deficiency.

Also, a student 12 or more points deficient for the last two or more terms may be suspended, even though he or she may have a cumulative average above 2.00. (Hence, a student is not able to use previously earned surplus grade points to permit consistently unsatisfactory current work.)

Normally, students who have not been previously suspended at OSU will be exempt from suspension for work attempted fall and winter terms. However, the existing policy will continue to apply to students not making "profitable and creditable" progress toward graduation.

Students who have been suspended or expelled are denied all the privileges of the institution and of all organizations in any way connected with it, and are not permitted to attend any social gatherings of students or to reside in any fraternity, sorority, or club house, or in any of the residence halls.

Suspended students may be assured of being readmitted to OSU if they do one of the following:

a. Complete additional course work at one or more other institutions that will balance the OSU deficiency.

b. Remain out of school for two academic years during which time nothing is done to increase the deficiency.

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.

[1] Copies of current "Probation and Suspension Policies of the Academic Deficiencies Committee" may be obtained at the Registrar's Office.

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:

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

Undergraduate Students

Certified as	*Must complete*
full-time	12 credits
three-quarter time	9 credits
one-half time	6 credits
less than one-half time	total credits certified

Graduate Students

Certified as	*Must complete*
full-time	9 credits
three-quarter time	7 credits
one-half time	5 credits
less than one-half time	total credits certified

2. Students must complete all drop procedures within the first 10 days of the term and withdrawal procedures within the first four weeks of each term. Students withdrawing after the start of the fifth week *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 the student's deficiency is not corrected within two consecutive terms, the University will notify the Veterans Administration of the student's 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.

Student Conduct Regulations

All students enrolled at Oregon State University are expected to conform with certain basic regulations and policies that have been developed to govern the behavior of students as members of the University community. 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 outlined in detail in the OSU *Student Handbook* published every September.

Fees and Deposits

Estimated Fee and Tuition Schedule (per term) for 1982-83*

Term hours	Resident undergrads	Nonresident undergrads	Resident graduate students	Nonresident graduate students
Full-Time				
12-21 credit hours	$463.00	1,338.00	.....	.....
9-16 credit hours	.....	.....	684.00	1,100.00
Part-Time (degree students)				
1 credit hour	89.00	162.00	124.00	170.00
2 credit hours	120.00	266.00	190.00	282.00
3 credit hours	151.00	370.00	256.00	394.00
4 credit hours	182.00	474.00	322.00	506.00
5 credit hours	213.00	570.00	388.00	618.00
6 credit hours	244.00	682.00	454.00	730.00
7 credit hours	281.00	792.00	530.00	852.00
8 credit hours	318.00	902.00	607.00	975.00
9 credit hours	355.00	1,012.00	.....	.....
10 credit hours	392.00	1,122.00	.....	.....
11 credit hours	429.00	1,232.00	.....	.....
Over-Time				
Each additional hour	27.00	104.00	60.00	112.00

Graduate Assistants—Teaching or research assistants pay $90 a term plus $60 each overtime hour. Consult the Graduate School Office for full details..

*** NOTE: These figures are estimates only. Fees and tuition for 1982-83 were not established at the time of publication; see *Schedule of Classes* for current rates.**

Regular Tuition Fees

Students paying regular fees are entitled to services maintained by Oregon State 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 regular 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, auditors, and senior citizens do not receive these services.

Special Fees (subject to change without notice)

Application Fee (not refundable) $25.00
Must accompany admission application.

Late Registration Fee ..... first day $5.00
Students registering after scheduled registration dates of any term pay a late registration fee of *$5 a day for the first day and $1 a day thereafter.* Also applies to part-time students and auditors.

Return-of-Check Fee $7.50
If institutional charges are met by a check which is returned because of any irregularity for which student is responsible, a fee will be charged in the amount of $7.50. The late registration fee will be added to the returned check charge when the returned check was used to pay tuition and fees.

Change-of-Program Fee ..... per course, $1.00*
The student pays this fee for each course change in his or her official program.

Reinstatement Fee $5.00
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.

Special Examination Fee ..... per examination, $15.00
Examination for credit.

Transcript Fee, first copy ..... $ 5.00
Added copies furnished simultaneously, $1.

* Subject to change; see *Schedule of Classes.*

Staff Fee (exept staff auditors) ..... per term hour, $9.00
Staff members may register for courses at a $9-per-term-hour rate. Full-time staff members are limited to a maximum of 3 hours per term, except a *single* course carrying up to 5 hours is permitted. Any employee whose appointment is equivalent to .50 or more (but less than full time) may take up to 10 hours a term at this rate. Payment of fees entitles member to instructional and library privileges only. There is no refund for staff members 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.

Annual Counseling Center Testing Fee $10.00

Graduate Qualifying Examination Fee ..... to $20.00

Microfilming Doctoral Thesis $30.00

Applied Music Fees (see "Music") per term, $50.00 to $100.00

Horseback Riding Fee ..... per term, $70.00

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 (580-10-015)

Except as modified by section 580-10-025(1) a nonresident student is defined as:

a. An unemancipated student whose parent or legal guardian resides outside of Oregon at the time of the student's registration; or

b. An emancipated student who has not met the residency requirements of section 580-10-025(4) at the time of registration. An emancipated student is one whose residence is independent of that of parents or legal guardian, and who receives no financial support from parents or legal guardian.

Payment of Nonresident Fee (580-10-020)

All students who are classified as nonresidents shall pay a nonresident fee.

An Oregon resident student whose classification is changed to that of nonresident during the school year shall pay the nonresident fee beginning the fall term of the next school year. The student is obligated to notify the institution of any change of residence.

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 for residency status prior to the last day to register for the term in which the student seeks change of status.

Waiver of Nonresident Tuition and Fees (580-10-021)

Notwithstanding the provisions of 580-10-015 and 020, certain students as provided below shall be permitted to pay tuition and fees at the same rates as Oregon resident students. Determination of residence shall be made in the same manner as such determination is made for those students who are claiming Oregon residency.

At OSU, students qualifying for this waiver are graduate students who are residents of Alaska, Idaho, Montana, and Washington enrolled in a WICHE regional graduate program.

Changes in Residence (580-10-025)

A student enrolling as an entering freshman after graduating from an Oregon high school with not less than one year of regular attendance shall be considered a resident student. If the student transfers to an institution outside of Oregon and later seeks to enroll again in an Oregon institution, the residence classification shall be re-examined and determined on the same basis as for any other transfer student.

A student whose nonresident legal custodian establishes an Oregon residence during a school term shall be entitled to register as a resident student at the beginning of the next term.

If an emancipated student establishes residence outside of Oregon during the school year, the resident fee shall continue to be assessed until the beginning of the fall term of the next

school year. Thereafter, the student shall be assessed the nonresident fee.

An emancipated student who established an Oregon residence as determined by rule 590-10-030 shall pay a nonresident fee unless:

a. The student establishes Oregon residence at least six months prior to the time of initial registration;

b. The student does not attend an Oregon institution of higher education, either public or independent, including a community college, during any part of such six-month period. However, an emancipated student who does not establish an Oregon residence at least six months prior to initial registration at an Oregon institution, and who resides continuously in Oregon during 12 months, may be considered an Oregon resident for fee purposes if circumstances in the case meet the provisions of rule 580-10-030.

Once established, residence is presumed until the student provides sufficient evidence to refute the presumption.

An unemancipated resident student enrolled in an Oregon institution, who remains in this state after Oregon-residence parents or legal guardian move from the state, shall retain resident classification so long as attendance (except summer sessions) at an institution in Oregon is continuous.

Determination of Residence (580-10-030)

Residence means a bona fide, fixed, and permanent physical presence established and maintained in Oregon, with no intention of changing residence to outside the state when the school period ends. Factors to be considered include abandonment of any prior out-of-state residence, rental or purchase of a home, presence of family, presence of household goods, length of time in state, nature and permanence of employment, sources of financial support, ownership of property, place of voting, and payment of Oregon personal income taxes.

The same criteria will be used to determine whether a resident who has moved has established a non-Oregon residence.

If institutional records show that the residence of a student's legal custodian, or of an emancipated student, is outside of Oregon, the student shall continue to be classified as nonresident until entitlement to resident classification is shown. The burden of proof will be upon the student to show that the classification should be changed.

In determining the residence classification of any person, recognition is given to the principle that residence is not established by mere attendance at a college or university.

Residence Classification of Federal Service Personnel (580-10-035)

A person in federal military service on a full-time basis is qualified for resident classification for fee purposes if that person is assigned to duty in this state, performs duties within the geographical limits of Oregon, and is residing within the state. Claiming Oregon as the person's residence of record for tax or other purposes is not the equivalent of residence in this state.

An Oregon resident entering federal military service retains Oregon residence classification until the claim is voluntarily relinquished.

An Oregon resident who has been in federal military service and assigned to duty outside of Oregon is required to return to Oregon within 60 days after completing federal military service to retain classification as an Oregon resident.

A person who continues to reside in Oregon after separation from federal military service may count the time spent in the state while in federal military service to support a claim for classification as an Oregon resident.

Residence Classification of Aliens (580-10-040)

An alien holding an immigrant visa (admitted for permanent residence in the United States) shall be regarded as a citizen for the purpose of determining residence. Time toward residence shall be counted from the date of receipt of the immigrant visa.

An alien possessing a student visa or other temporary visa cannot be classified as a resident.

Review of Residence Classification Decisions (580-10-045)

A permanent interinstitutional review committee consisting of the officers determining student residence classification at department institutions and two students appointed by the chancellor, with a member of the chancellor's staff, selected by the chancellor, as chair, shall be established. Residence cases of unusual complexity, especially where there may be conflict of rules, may be referred to this committee for decision. Any student who is dissatisfied with the residence classification may appeal to the interinstitutional review commitee for decision. In exceptionally meritorious or hardship cases, totaling not more than 5 percent of the nonresident enrollment of the institution concerned, this committee may allow exceptions to the rules.

A permanent administrative reveiw committee consisting of the chancellor, who shall serve as chair, the assistant attorney general assigned to the department, one student, and a nonvoting member from the chancellor's staff, selected by the chancellor, shall be established. The chancellor may select a staff member to serve as a voting member of the committee and to preside over committee deliberations if the chancellor is unable to attend.. A student whose residence classification has been reviewed by the interinstitutional committee referred to in section (1) of this rule, and who is dissatisfied with the decision of that committee, may appeal to the administrative review commitee. The decision of the administrative review committee shall be final.

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 administrative review committee. The decision of the administrative review committee shall be final.

Deposits

Persons who enroll for academic credit (except staff members) must make a deposit of $25 at the time of first registration. This is required as a deposit against loss or damage of institutional property such as laboratory equipment, library books, or residence hall equipment. At each registration, students are required to reestablish a $25 balance. The deposit, less deductions, is refunded to students who graduate or discontinue study at OSU.

Tuition Refunds

Students who withdraw from the University and who have complied with regulations governing withdrawals may be entitled to a refund of fees paid, depending on time of withdrawal. The refund schedule is as follows:

	Fall '82	*Winter '83*	*Spring '83*
90% if withdrawal is by:	Oct 4	Jan 10	Apr 4
75% if withdrawal is by:	Oct 11	Jan 17	Apr 11
50% if withdrawal is by:	Oct 25	Jan 31	Apr 25
25% if withdrawal is by:	Nov 8	Feb 14	May 9

Students who reduce course loads from full-time to part-time status will be refunded for hours dropped below full-time based on the following schedule:

	Fall '82	*Winter '83*	*Spring '83*
90% if drop is made by:	Oct 4	Jan 10	Apr 4
75% if drop is made by:	Oct 11	Jan 17	Apr 11

There is no refund for over-time hours dropped.

Any claim for a refund must be made in writing before the close of the term in which the claim originated. Refunds are calculated from date of withdrawal or dropping and not from the date when a student ceases to attend classes.

Student Services

Vice-President for Student Services

Robert W. Chick, *Vice-President*

At Oregon State University a variety of student services, programs, and facilities are available to help students adjust successfully to their collegiate environment and receive maximum benefit from their total university experience. The vice-president for student services administers and coordinates these services. They include general student services, new student programs and orientation, financial aid assistance, student housing and resident education programs, counseling and advising services, health services, Memorial Union programs, educational activities, and recreational sports programs.

Office of Student Services

Jo Anne J. Trow, *Associate Dean*
William J. Brennan, Nancy M. Vanderpool, *Assistant Deans*
J. Roger Penn, *Director, Special Programs—Student Services*

The Office of Student Services provides personalized assistance to individual students, organizations, parents, faculty, and other members of the University community. Students who have concerns about University policies or procedures, those with personal problems, and those seeking resource or referral personnel or agencies will find help in this office. Staff members have responsibility for living group advising, student assistance and information programs, student records, withdrawal advising, related instructional programs, the student conduct program, and commuter and older student advising.

New Student Programs

J. Franz Haun, *Director*

The Office of New Student Programs coordinates orientation activities for prospective undergraduates from the time of their first contact with the University through their first year at Oregon State. Programs coordinated by the office include Open House, the Summer Orientation and Advising program, and Moms' and Dads' programs.

Housing

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 educational experience. The University is committed to providing the entering student in the residential setting an integrated program for social, cultural, and educational development beyond the classroom. To ensure that the student has the opportunity for this development, the University has established the following regulation:

Freshmen unaccompanied by dependents who enroll at Oregon State University within one year of high school graduation must live in University cooperatives, residence halls, fraternities, or sororities. Exceptions may be requested through the Office of Student Services and include, but are not limited to, the following: living with relatives, medical or psychological reasons, working for room and board, or equivalent group living experience.

Student Housing and Residence Programs

M. Edward Bryan, *Director*
S. Roger Frichette, *Associate Director*
William Benriter, David Stephen, *Asssitant Directors*

The Department of Student Housing and Residence Programs administers a diverse selection of housing alternatives—University-owned student cooperatives, residence halls, student family housing—all of which offer a variety of programs and services. Through the central office, students can make arrangements for accommodations, discuss exceptional situations, consult with educational programs staff, bring suggestions for improvements, work out financial details, and receive assistance on a number of related concerns and interests. Emphasis is upon providing attractive, safe, reasonably priced living accommodations and programs which satisfy residents' desire for both privacy and community, diversity in living arrangements, quality food, and opportunities to integrate residence educational programs with curricular goals of the University.

Cooperative Houses

The ten cooperative houses at Oregon State University provide small-group living experiences for approximately 550 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, congenial, sharing atmosphere of the cooperative. Cooperative members reduce their board-and-room costs by assuming work duties of three to five hours per week in the houses.

Oregon State University owns and operates seven cooperative houses: Azalea House, Coed Cottage, Oxford House, and Reed Lodge for women; and Avery Lodge, Dixon Lodge, and Heckart Lodge for men.

Co-resident Women, Inc. (a private corporation) operates Anderson House for women. Beaver Lodge and Varsity House are independently owned and accommodate men. All cooperatives are members of the Inter-Cooperative Council (ICC).

Information and application forms may be obtained from the Department of Student Housing and Residence Programs or from the individual houses.

Residence Halls

Through its 13 residence halls and the College Inn, the University offers a variety of living environments including halls for women only, two halls for men only, and several co-educational living areas.

Bloss Hall, Finley Hall, and the College Inn are reserved for students beyond the freshman year while West Hall has been designated as West International House for American and foreign students 21 or older. The "Quiet Place" in Snell Hall emphasizes quiet and privacy. Students interested in the College Inn, which is located at the north edge of campus, should write for more information directly to College Inn, 155 N.W. Kings Blvd., Corvallis, Oregon 97330.

Most student rooms are designed for double occupancy. However, a limited number of single rooms are available in each hall at special rates. Students are responsible for all items furnished and for the upkeep of their own rooms. Insurance for personal belongings is advisable.

For more detailed descriptions of residence halls and the rules and regulations that apply, see the booklet *Residence Hall Handbook.*

Residence Hall and Cooperative Reservations

A reservation in a residence hall or cooperative may be made anytime during the calendar year. Students submit a $50 deposit and either an orange application card (for residence halls) or a yellow application card (for cooperatives). Both cards are available from high school and community college counselors or from the Department of Student Housing and Residence Programs.

Residence Hall Contract

A residence hall contract is activated with the completion of the appropriate form. The contract is for a period of *one academic year* (or remaining portion thereof) or for *one term* (available to students who have been out of high school one year or more) and is binding for that period. Special contracts may be prepared for students engaged in student teaching or for students in other unusual circumstances.

The residence hall contract may be canceled only with penalty as noted below:

1. The entire security deposit will be returned upon request *before* the signing of a contract.
2. *Prior to September 1*, the contract can be canceled by written notification to the director of student housing. The security deposit, less a $15 processing fee, will be refunded.
3. *After September 1*, if the student is to enroll or continue enrollment in the University, the residence hall contract may be canceled only upon payment of $1 per day for the remaining days of the contract period and with the forfeiture of the security deposit.

All contracts are for both room and board. Meal tickets and contracts are not reassignable or transferable.

Contract Period

The contract period for residence halls begins at 9:00 a.m. the day before registration fall term and 1:00 p.m. the day before registration winter and spring terms, and ends at 6:00 p.m. the last day of final examinations each term. Residence halls, except West International House, are closed during Thanksgiving, Christmas, and spring vacations.

Hall Assignment and Policies

The acceptance of the residence hall contract and security deposit does not guarantee preferred assignment or admission to the University. Assignment is made during the summer and is contingent upon the final acceptance for admission by the University and upon available space in residence halls following admission. Assignments for winter and spring terms are mailed within two weeks prior to the opening of the term.

Requests for assignment to a particular hall will be honored whenever possible. Consideration is given to roommate preference if both students complete their contracts near the same time and if roommate requests are mutual. *Assignments are made on the basis of the date of deposit receipt.*

Returning Student Assignment

Present occupants are given preference for returning to the residence halls until June 1. Those completing residence hall contracts after June 1 will be assigned thereafter on the basis of the date of deposit and the availability of space.

Acceptance

The University reserves the right to refuse any contract for accommodations in the University residence halls by returning the security deposit.

Notification of Late Arrival

Unless the Housing Office receives written notification of a late arrival, hall assignments will be canceled at 9:00 a.m. the day after registration fall term and at 9:00 a.m. the first day of class winter and spring terms if check-ins have not been completed by that time.

Residence Hall Rates

[1] **NOTE: The figures listed below are room and board rates for 1981-82. Figures for the 1982-83 academic year were not available at the time of publication. When established, the new rates will be available through the Department of Student Housing and Residence Programs.**

Residence Hall	Double Room	Double Occupied as a Single	Design Single
Standard Halls[2]	$1,915	$2,420	$2,175
Bloss Hall	2,060	2,620	2,379
Sackett Hall	1,945	2,450	2,205
Weatherford Hall	1,815	2,120	1,975

[1] Rates shown are for 19 meals per week. A 15-meal plan decreases each rate by $60. Students with a one-term contract should add $50 for the first payment. Rates do not include social activity fees.

[2] Rates do not include telephone charges for the full phone halls Buxton, Callahan, Poling, and Cauthorn). Rates for these halls are increased by the telephone rates, which are to be determined.

All Oregon State University residence halls and dining facilities are built and operated entirely with income from resident students. No state tax funds are used.

Payment of Room and Board

Residence hall charges include both room and board and must be paid in advance. If it is not possible to pay the full term charge at the beginning of each term, partial payments may be made according to published schedules and as per billing statements. First payments are due with the tuition payment and all other payments are due by the first of the month, which coincides with the student payroll period. It is the responsibility of the student to pay the posted charges on the due dates. A penalty of $1 per day up to a maximum of $5 is assessed by the Business Office for payments made after the tenth of the month.

Security Deposit

The security deposit must accompany the application. The full deposit, less any charges, will be returned to the student after he or she checks out of the residence hall at the completion of the contract period or upon request *before* the contract is signed.

The security deposit is forfeited if the contract is not fulfilled, except in the special cases stated in the contract. If the student contracts to return to the residence halls for the succeeding academic year, the security deposit will be carried forward to the next contract period. Charges for damages cannot be made against the security deposit during the period of the contract. Charges for damages will be billed directly to the student.

At the time of contract termination, the deposit may be used to pay charges for damages caused by the student. Any balance remaining in the deposit after all charges have been paid will be refunded about six weeks after the close of the contract period.

Telephone Service

Bloss, Buxton, Callahan, and Poling Halls, and floors occupied by women in Cauthorn Hall, have telephones located in each student room. Students are able to dial direct to any on-campus number or any number listed in the Corvallis directory. They may receive direct incoming calls. Only credit-card, billing number, or collect long distance calls may be made from room telephones. Students can apply for a billing number for an annual charge of $5.

In all other halls, students may obtain a room telephone by paying an additional charge at the Office of Communication Services after checking into the residence hall.

In halls where room phones are optional, additional phones are located on each floor for student use. Hall telephones may be used only for outgoing collect or credit-card long distance calls. Students may not accept incoming collect calls on these phones or try to place calls from these phones on a prepay basis. Pay station phones are provided for this service.

Meals

All students who live in residence halls may dine in any unit of their choice. Students may select a 15- or 19-meal plan. Brunch and buffet service are provided on Saturdays, Sundays, and holidays. Upon recommendation of the Student Health Service, special diets will be provided at additional cost if special items are purchased to prepare the diet.

Meals are not provided during the Thanksgiving, Christmas, and spring vacations. The last meals served before closing for vacations are Wednesday lunch before Thanksgiving and Friday lunch of final examination week.

Vacation Accommodations

Room-only accommodations are available for residents of West International House during Thanksgiving, Christmas, and spring vacations at an additional charge. Students from other halls are accommodated in West International House on a space-available basis.

Early Accommodations

Students participating in early school programs may be housed in other than their assigned hall. Those arriving prior to the day the contract period begins will be charged room and board at appropriate rates.

Housing for Students Over 21 in West International House

Housing facilities for graduate men and women and other students over 21 years of age are provided in West Hall, which has been designated "International House" to add a world community emphasis to the programs and activities of this living group. West International House is located on 30th Street across from Peavy Hall. Graduate students and those over 21 may live in any of the other residence halls as space is available.

University Housing for Student Families (All Terms)

Oregon State University maintains 94 furnished apartments in Orchard Court for student families. Rentals range from $130 to $160 a month with water and garbage disposal service furnished. Approximately 50 unfurnished, miscellaneous units in the community are also available. Students should apply to the Department of Student Housing and Residence Programs.

Housing in Summer Term

Residence halls are available for summer term students. Couples without children may apply for residence hall accommodations in the summer with the understanding that facilities are designed for single students and may lack some of the conveniences they desire.

Off-Campus Housing

The Office of Student Services and the Memorial Union maintain current bulletin board listings of a variety of rentals available in Corvallis and surrounding communities to help students locate off-campus housing accommodations. Apartment renters' guides, handbooks containing pertinent legal information, and other related materials are available.

Fraternities and Sororities

The 27 fraternities and 14 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. (Additionally, one fraternity with an OSU chapter does not provide housing.) Fundamentally, each group is guided by the principles of friendship, scholarship, leadership, mutual respect, helpfulness, and service to the University community.

All fraternities and sororities are private, nonprofit organizations whose chapter houses are located within a mile radius of campus. Board and room rates approximate those of University-owned residence halls. Extra costs include initial affiliation expenses, social fees, 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 on a limited basis at other times 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 men admitted to Oregon State University. Specific questions concerning rush registration should be directed to Interfraternity Council (IFC), A200, Administrative Services Building.

Information about sororities and rush is *not* automatically sent to admitted women. However, any woman who plans to attend OSU may request pertinent material from Panhellenic Council, A200, Administrative Services Building. **Note: Registration for formal rush must be received by August 15.**

Student Health Center

Donald S. Boots, *Director*

Barbara Edwards, *Management Assistant*

The Student Health Center provides medical services to meet the health care needs of most students. Outpatient clinics for general medical, mental health, gynecological, sport medicine, immunization, and allergy services are open during posted hours Monday through Friday. The health center contains a pharmacy, physical therapy, x-ray, and laboratory departments. A 25-bed infirmary, for students requiring inpatient care or after-hours or weekend outpatient care for urgent problems, is operated on a 24-hour basis. These services are available to all registered students who have paid their current health fees. *Students must present their I.D. cards and current fee receipt at each visit to the health center prior to obtaining services.* Health center services are not available to students' families, faculty, or staff.

The health center staff includes physicians, registered nurses, nurse practitioners, pharmacists, physical therapists, laboratory and x-ray technicians, specialist consultants, and support staff. The Mental Health Clinic, located on the lower level of the health center, is staffed by psychologists, a psychiatric social worker, and psychiatric consultants. All medical records are confidential and are not released unless authorized by the patient.

The health fee entitles the student to health center services, including physicians', nursing, and mental health care. A small additional charge is made for inpatient infirmary care and for after-hours outpatient visits to the health center. Extra charges are made for inpatient infirmary care beyond five days a term, medical supplies and medication, x-ray, laboratory tests, medical specialists' consultations, and other special examinations and services. A list of these extra fees is available at the health center. All expenses connected with specialized medical care including surgical operations, special nursing, and care

rendered from private physicians or private hospitals are the student's financial responsibility.

Medical History Requirement

A prior medical examination is not required of entering students. A medical history summary is required and it is recommended that a tuberculin test (or chest x-ray) have been performed the past year. Also recommended is a diphtheria-tetanus immunization.

Students entering the University from foreign countries are required to have a tuberculin test and/or chest x-ray at the health center and must purchase approved medical insurance before registering for classes.

Student Insurance

A student accident and sickness insurance policy for health expenses not covered by the health center fee is available through Associated Students of Oregon State University.

Career Planning and Placement Center

Tony Van Vliet, *Director*
Marjorie G. McBride, *Associate Director*
Peggy Custer, *Assistant Director*

Each year, more than 400 employers interview students and alumni in the OSU Career Planning and Placement Center. In addition to its interview services, the center maintains student and alumni placement files; provides individual counseling on careers and job placement; holds sessions on writing resumes and on interviewing; and provides up-to-date information on the job market. Last year, the center received notices of more than 27,000 job vacancies.

The center also has an information retrieval system which provides employers with a list of those students registered with the center who also meet the employer's qualifications.

Veterans' Services

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 page 15 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, Oregon 97310 (503) 378-6840.

Counseling Center

Morris L. LeMay, *Associate Dean and Director*
Leslie G. Dunnington, *Assistant Director*

Counseling services are available to all students in the Counseling and Testing Center. There is no fee for counseling; however, if tests are required, a fee might be charged. Services include the following:

Counseling. Counselors aid students in making decisions about educational plans, career goals, personal concerns, and day-to-day problems. Premarital and marriage guidance and individual and group counseling relating to social skills and personal adjustment are provided. All counseling is confidential; information is not released unless authorized by the student.

Academic and Career Planning. The center has a counseling folder for each of the 85 or more academic majors available to undergraduates at OSU. Both general career information and specific academic information are included in these folders. Also available is the booklet *Choosing a Major at OSU*, which can provide valuable information to the new student or those who are thinking about changing their majors. The course, Career Decision Making (Psy 99), is offered each term by the staff counselors. Career interest tests are also available.

The University Exploratory Studies Program offers special counseling to undecided students who need help in choosing a suitable major and making career plans.

Services for the Physically Impaired

Through the Counseling Center, the University offers a program of services to meet the needs of students who are physically impaired. Guiding the University in its efforts toward accessibility are Handicapped Students Unlimited, a student organization, and the OSU Committee on the Handicapped.

Note-takers for the deaf, reader help, and visual-aid equipment ("Visualtek" and "Optacon") for the blind and legally blind are among the services available to physically impaired students at OSU. Also offered are tutorial assistance and help with registration, housing arrangements, or special needs.

These and other services are described in *Special Services for the Handicapped*, a brochure available from the Counseling Center. The brochure includes information about people to contact for assistance and a listing of currently accessible buildings.

For more information about any of these services, contact Pam Walker, Room 131, Memorial Union East (754-3573) or Sally Wong or Nancy Eldredge, Room 322, Administrative Services Building (754-2131: voice and T.T.Y.). The University's coordinator for Section 504 of the federal Rehabiliation Act of 1973 is Dave Bucy, Room 500, Administrative Services Building (754-2001).

Students' Rights to Their Records

Family Educational Rights and Privacy Act of 1974, Public Law 93-380, as amended, provides that Oregon State University students have: (1) the right to inspect their education records that are maintained by Oregon State University; (2) the right to a hearing to challenge the contents of those records when they allege the records contain misleading or inaccurate information; (3) 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 *Student Handbook*. Information about specific procedures is available upon request from the Office of Student Services.

Memorial Union and Memorial Union East

George F. Stevens, *Associate Dean of Students for Student Activities and Director*

Walter J. Reeder, *Director of Operations*

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 a complete foodservice including cafeteria, snack bars and banquet facilities, a bookstore, recreation area including billiards and bowling, a music lounge, 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, foodservice facilities, 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 the students who have given their lives in the service of their country.

Student Activities

Donald R. Sanderson, *Director*

Donald B. Johnson, *Assistant Director*

Oregon State University recognizes the value of student activities as a part of a college education. Leadership experience gained through participation in self-governing organizations and programs encourages the development of civic responsibility. Activities enhance social, recreational, and cultural development by fostering participation in the social, intellectual, and aesthetic life of the campus. Because of their close relationship to the educational program, many activities are cocurricular rather than extracurricular. These activities, whether planned or attended by students, allow them to meet others and to enjoy and feel more involved in University life.

Student Government

The Associated Students of Oregon State University (ASOSU) is the student government on the OSU campus. In recent years ASOSU has become increasingly active in the policy making and operation of the University through student participation on some 75 University committees.

Councils representing both men's and women's living groups have important roles in student self-government. They include Panhellenic Council, Residence Hall Council, Interfraternity Council, and the Inter-Cooperative Council.

Student Accident and Sickness Insurance

The Associated Students of Oregon State University offer a Students' and Dependents' Accident and Sickness Medical Expense Plan to students at registration or at the Memorial Union Business Office until the final day of registration. Premium costs have been kept relatively low to meet students' needs.

Participants in activities, including athletic events such as the recreational sports program, who are registered at the Student Activities Center must have accident insurance coverage. This coverage can be in the form of ASOSU student insurance or personal policies. Information about insurance may be obtained at the Memorial Union Business Office.

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 "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 School of Health and of Physical Education and other organizations. The all-student Encore Committee brings to the campus popular entertainment.

Forensics and Drama

Speech activities have intellectual and cultural value for both the participants and the campus community. Oregon State is a member of the Pacific Forensic League, the Intercollegiate Forensic Association of Oregon, and Model United Nations. Special student organizations, such as Masque and Dagger and chapters of Delta Sigma Rho-Tau Kappa Alpha, Zeta Phi Eta, and National Collegiate Players also provide outlets for forensic and dramatic talent.

A full schedule of forensic activities for both men and women students, including debate, oratory, extempore speaking, after-dinner speaking, and discussion, are under the direction of the Department of Speech Communication. Each year, students compete in state intercollegiate speaking contests and regional and national forensic tournaments. Many other students are given an opportunity to speak or read before service clubs, lodges, granges, and related groups. For participation in these activities, a student may earn regular credit.

Training and experience in acting, play production, and stagecraft are provided by the Department of Speech Communication. Each season, seven major plays and groups of one-act plays are presented in Mitchell Playhouse in connection with course work.

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, OSU Folk Club, Committee on Religious Education, Y-Round Table, Associated Students, Memorial Union Program Council, Sigma Xi, and others.

Minority Cultural Centers

The Oregon State University minority cultural centers (Black, Chicano, Native American) offer various academic, cultural, recreational, and social events related to each respective minority group. Each center is located in a separate facility; all are open to the public.

The cultural centers bring together minority students and faculty with different interests and provide an opportunity for these minorities to mix with a variety of people from the University and local communities. The programs each center offers promote a greater awareness and understanding of lifestyles, problems, history, and cultural contributions of minority groups.

Oregon State's cultural centers are part of the Memorial Union Activities Program. Each center is governed by advisory boards composed of students, faculty, and administrators.

Athletics

A member of the Pacific Ten Conference, Oregon State University regularly competes with other large West Coast universities in men's football, basketball, baseball, track, crew, cross country, wrestling, and golf. Through the Association for Intercollegiate Athletics for Women and Northwest Colleges, the Office of Women's Intercollegiate Athletics conducts a full program of competition in volleyball, basketball, gymnastics, swimming, track and field, golf, tennis, softball, and cross country.

Recreational Sports

Will M. Holsberry, *Director*

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 School of Health and Physical Education administer the following facilities available for recreational sports activities:

Recreational sports facilities. Outdoor Recreation Center, McAlexander Fieldhouse, Parker Stadium Handball Courts, Dixon Recreation Center, rugby and soccer fields, Dixon Field, and University tennis courts.

School of Health and Physical Education facilities. Langton Hall, Women's Gym, intramural track, intramural playing fields, golf practice areas.

Recreational sports program opportunities at Oregon State University include:

Informal recreation. Self-directed activities for all students, faculty, and staff members in racquetball, basketball, gymnastics, volleyball, squash, weight lifting, tennis, handball, judo, karate, table tennis, trampoline, general exercise, and badminton.

Sports clubs. Intercollegiate competition for students in bowling, equestrian events, fencing, frisbee, handball, judo, lacrosse, racquetball, rifle and pistol events, rodeo, rugby, sailing. skiing, soccer, table tennis, tennis, volleyball, and water polo.

Outdoor recreation. An outdoor resource library, equipment rental, and trip planning for backpacking, camping, rock climbing, canoeing, rafting, and skiing.

Office of Intramural Sports. Coordinator for over thirty individual sports (badminton, tennis, judo, handball, archery) or team sports (flag football, basketball, volleyball, softball, water polo, soccer, swimming) and corecreational volleyball, softball, swimming, badminton, and tennis.

Student Media

Frank A. Ragulsky, *Manager*

Student publications include the following: *The Daily Barometer* (daily newspaper); *The Beaver* (yearbook issued in May); *Student Handbook; Fusser's Guide* (student directory published fall term); and *Prism* (magazine published twice during the year).

The well-equipped radio and television studios in Memorial Union East afford practical training in the mass media of communication. Music, information, news, and sports are programmed over KBVR-FM; television programs are prepared and telecast over a closed-circuit system.

Financial Aid

Richard E. Pahre, *Director*

Keith McCreight, *Associate Director*

Philosophy. 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 singly or in various combinations 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.

Estimated Expenses. For the 1982-83 academic year, estimated expenses are listed below. (Tuition and fees will be set by the State Board of Higher Education at a later date and are subject to change without notice.)

	Resident	*Nonresident*
Tuition and fees	$1,230	$4,050
Board and room	2,100	2,100
Books and supplies	300	300
Transportation*	240	240
Miscellaneous**	1,320	1,320
	$5,190	$8,010

Graduate students should add approximately $660 tuition if Oregon residents and $1,770 if nonresidents.

Additional allowances are made for students with dependents and day care costs.

* Transportation covers the costs of getting to OSU at the start of school and necessary trips home for vacation periods.

** Miscellaneous includes such items as clothing, laundry, cleaning, medical and dental expenses, organizations, recreation, and personal supplies. Miscellaneous costs allow the student flexibility in spending priorities.

Eligibility. To qualify for financial aid, a student must demonstrate financial need, be a U.S. citizen or have an immigrant visa, and be enrolled as a full-time student. The only exception is for part-time students who qualify for the Pell (Basic) Grant.

Financial aid is *not* available to students who plan to attend OSU only during summer term.

The University uses College Scholarship Service, a national, nonprofit need analysis organization, to assist in determining financial need. This service uses a fair and uniform analysis system based on a student's family income, assets, and other resources. In applying for financial aid, a student is required to submit a Financial Aid Form (FAF) to College Scholarship Service. Upon receiving the completed application and financial data from College Scholarship Service, the financial aid staff determines a student's eligibility.

Once a student establishes eligibility for financial aid, there is a good chance he or she will be awarded aid, provided he or she meets the deadlines stipulated below and is willing to accept the package provided by the Financial Aid Office. Of the financial aid applications received by OSU by March 1, 1981, for the 1981-82 academic year, 70 percent of the eligible applicants received some form of financial assistance.

Resource Expectations

When students choose to attend college, they assume the responsibility of paying for their education. Tax-supported aid programs exist to supplement their efforts, not to replace them. Certain efforts are expected of each student.

Summer and Academic Year Employment. Students who register full time for summer term and the academic year are expected to contribute minimum employment earnings of $300 for each term they plan to enroll.

Summer Employment. If students do not attend school full time in the summer, they are expected to work and use their earnings for school.

Dependent students are expected to use 80 percent of their earnings. The minimum expected savings is $900 (1981-82 figure). For example, if a student earns $2,000 during the summer, he or she is expected to save $1,600 for educational expenses in the subsequent academic year. Students who earn only $400 during the summer are still subject to the $900 minimum savings expectation.

Independent students are expected to use all of their earnings. Summer living costs are part of the budget allowance. The minimum expectation of $2,120 is the amount a student could earn if employed full time at the minimum wage. It is assumed that living expenses during the summer will total $1,220 and that a student will save at least $900 for educational expenses in the subsequent academic year. Exceptions to the earnings expectations are made only for very unusual circumstances.

Parent Contribution. The parents of dependent students are expected to assume part of the responsibility for their son's or daughter's education, if financially able. The information provided by them on the Financial Aid Form is used to determine financial strength and *ability* to contribute. (It does not attempt to measure willingness to contribute.) Factors considered include size of family, number of family members in college, age of parents, medical costs, non-consumer debts, and assets. If parents are unable to provide the expected contribution, it may be possible to obtain a Guaranteed/Federally Insured Student Loan as a replacement.

Students' Assets. Students are expected to use 35 percent of their assets each year for the cost of attending OSU. Assets may include savings, stocks and bonds, and property.

Other Resources. Students are expected to use all their available resources such as veterans' benefits, child support, Aid to Dependent Children funds, school year earnings, loans or cash gifts from relatives or friends, or any other funds received from any source. All known resources should be reported on the application. Later, students should report resource changes of $100 or more to the Financial Aid Office as soon as possible.

Application Procedures

Returning OSU students and nonresident freshmen may request application forms from the Financial Aid Office. Transfer students can pick up an application from their current college or university. Entering Oregon freshmen should obtain application forms from their high schools. Applications are generally available from Oregon high schools in early November and from the OSU Financial Aid Office in early December.

With the exception of the Guaranteed Student Loan program, students may apply for scholarships, loans, grants, and College Work-Study on a single application form, the FAF referred to above. Send the FAF to College Scholarship Service, P.O. Box 1907, Berkeley, California 94701. On the FAF, students should indicate that they would like a copy of the analysis sent to OSU. Resident undergraduates should also request that a copy be sent to the Oregon State Scholarship Commission for state need grant and cash award consideration. The suggested deadline for submitting the FAF, for which College Scholarship Service needs a minimum of three weeks to process before forwarding to OSU, is February 1. The FAF analysis must be received at OSU by March 1 for scholarships, loans, grants, and College Work-Study consideration. Applications received after that date may be considered for loans, grants, or work-study only if funds are still available.

Students who plan to transfer to OSU from another college or university and would like to be considered for scholarships must also send a copy of their academic transcript directly to the OSU Financial Aid Office by March 1. This is in addition to the transcript sent to the OSU Admissions Office.

Students transferring from another college or university must supply the OSU Financial Aid Office with financial aid records from all schools previously attended. This important requirement must be met even if a student did not receive financial aid from the previous school.

A separate form is required for Guaranteed Student Loan applications, which are processed throughout the year. Oregon residents may obtain applications and instructions from the OSU Financial Aid Office; nonresidents should contact their home bank for application forms.

Types of Aid*

The aid programs described below are available to undergraduates only. Graduate students are eligible only for National Direct Student Loans, College Work-Study, and Guaranteed Student Loans. Graduate students should apply through their departments for assistantships and research grants.

Please note that all the figures used in the following financial aid sections are estimates for 1982-83.

Grants

Each of the following is a grant which is not repaid by the student.

Pell (Basic) Grant. Eligibility for the Pell Grant is restricted to undergraduates enrolled at least half time (six credit hours a term). The maximum award for Oregon residents is $1,210; nonresidents enrolled full time in an Oregon school may receive up to $1,750.

Supplemental Educational Opportunity Grant (SEOG). Eligibility for the SEOG is restricted to undergraduates enrolled full time in a degree program who demonstrate a high need for financial assistance. The amount of the award varies from year to year according to the availability of funds. The maximum award during 1981-82 was $200 a term.

State Need Grant/Cash Award. Undergraduates who are permanent residents of Oregon are eligible for this grant. The amount of the award varies from year to year according to the availability of funds. (For the 1981-82 academic year, the awards ranged from $280 to $640.)

Scholarships. Scholarships administered by the Financial Aid Office are based on financial need and scholastic ability. The University's financial aid committee coordinates the scholarships. Students who apply will be considered for all scholarships for which they qualify.

Eligibility is restricted to undergraduates who have completed fewer than 12 terms and to undergraduate transfer students who supply the OSU Financial Aid Office with their academic transcript by March 1.

Most academic schools and departments offer some scholarships that are not based on financial need; students should contact those departments directly. Other sources of private scholarships are local service clubs, industries, and other groups. Graduate students should contact their department for information on assistantships, fellowships, and graduate scholarships.

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

State Scholarships for Returning Foreign Students. Scholarships for a limited number of undergraduate and graduate students attending OSU from foreign countries have been made available in the past through the state scholarship commission. However, continuation of these awards is dependent upon funding by the Oregon Legislature. To be considered for a scholarship a student must demonstrate financial need and have a cumulative grade-point average of at least 2.50.

Loans

Each of the following is a loan which must be repaid by the student.

National Direct Student Loan (NDSL). Undergraduates, postbaccalaureate students, and graduate students enrolled full time in a degree program are eligible for these loans. For the freshman and sophomore years, a student may borrow up to $3,000; through the junior and senior years and postbaccalaureate study, a student may borrow a total of $6,000; and through graduate study, a student may borrow up to $12,000 total. The maximum loan per year at OSU depends on funds available, the student's year in school, and amounts previously borrowed.

Interest on this loan (at the rate of 5 percent) begins six months after the student ceases to attend school at least half time; the first payment is due nine months after he or she ceases to attend school. The repayment period is ten years. A student owing $1,000 would have a quarterly principal payment of approximately $25; a $3,000 loan carries an approximate quarterly principal payment of $75.

Students may defer payment if they serve in the military, the Peace Corps, or VISTA; if they return to school after an absence; or if they are temporarily disabled.

Health Professions Student Loan (HPL). This loan program is restricted to juniors, first-year seniors, and second-year seniors enrolled full time in the OSU School of Pharmacy. All eligible students, regardless of income tax status, must have their parents complete the parent information portion of the FAF. A student may borrow up to $2,500, plus yearly tuition costs, if eligible.

Interest on this loan (at the rate of 9 percent) begins nine months after the student ceases to attend school at least half time. Students who practice pharmacy in a federally designated "shortage" area may have a portion of the loan canceled. The first payment is due 12 months after the student ceases to attend school. The repayment period is ten years.

Guaranteed/Federally Insured Student Loan. This loan is available to undergraduates, postbaccaluareate students, and graduate students officially admitted to OSU. (This requires payment of the $25 application fee and evaluation by the Office of Admissions.) Applications are available from the student's home bank or from any financial aid office. Students must borrow from a bank in their home state of legal residence; a processing fee is charged by the bank.

An undergraduate student may borrow up to $2,500 annually for a maximum total of $12,500. Graduate or professional students may borrow up to $5,000 a year for a maximum total of $25,000. (The maximum total for graduate or professional students includes loans obtained as undergraduates.) Each bank may establish its own loan limit within these guidelines. Students should consult with their home banks to determine the maximum amount.

Students with loans outstanding prior to January 1, 1981, pay 7 percent interest. Interest and repayment for these students begins nine months after ceasing to attend school at least half time. Students who borrow for the first time after January 1, 1981, pay 9 percent interest; interest and repayment begin six months after ceasing to attend school at least half time. In most cases, minimum monthly payments are at least $50. The repayment period is ten years.

Additional Loan Programs

Regular Student Loans. Loans based on financial need analysis are available to students in good standing at the University who have completed at least one term at OSU. The borrowing maximum is $700. Interest is charged at 7 percent annually on any unpaid balance. Repayment can be made at any time but must begin nine months after a student leaves college, or if enrolled less than full time. A Contract of Guaranty (cosigner) is required for all students. OSU students, spouses, staff, and faculty are not eligible to act as cosigners.

Other Loans. A number of OSU students qualify for loan programs made available by private donors and trust accounts. Students not eligible for other types of aid, or in need of more assistance than provided through other sources, may contact the Financial Aid Office about these loans.

Emergency Loans. The Financial Aid Office maintains a short-term emergency loan fund for continuing students attending at least half time and those who have been admitted for the subsequent fall term. Emergency loans up to a maximum of $200 are available to meet temporary needs during an academic year. There is a $4 service charge. The loan must be repaid by the end of each term.

Deferred Tuition. Each term students can request to pay tuition and fees through monthly payments. Applications for this program are available each term at Gill Coliseum during registration and at the Financial Aid Office. There is a $4 service charge.

College Work-Study

The work-study program provides part-time employment during the academic year and full-time employment during summer term, contingent on the availability of funds. Undergraduates, postbaccalaureate students, and graduate students enrolled full time in a degree-granting program are eligible. A student may not work more than 30 hours (average) a week during school. The pay rate varies from minimum wage to $4.25 an hour, depending on the job. The maximum award depends on realistic earnings and eligibility as determined by need analysis.

Most jobs are on campus or in the Corvallis community. A dependent student may work full time during the summer in his or her parents' community if a job and funds are available; independent students may work full time during the summer in Corvallis if funds are available.

Employment

Many students who do not qualify for work-study find part-time employment during the year to cover a portion of their educational expenses. The Financial Aid Office lists any part-time job that a department, agency, or individual wishes to post. Students can also contact other departments, offices, and businesses to seek employment. Application for part-time work should usually be made after registration to avoid schedule conflicts.

Award Notification

When the Financial Aid Office has determined the kind and amount of aid for which a student qualifies, the student will be notified by letter of the award. This letter will also stipulate the conditions of the award.

Disbursement Procedures. Grants and scholarships will appear each term as a credit on the student's fee statement. Students sign for and receive NDSL and GSL/FISL loan checks beginning on fee payment days at Gill Coliseum. After fee payment days each term, NDSL checks are available at the Business Office. Guaranteed and federally insured student bank loan checks are disbursed at the Financial Aid Office.

All students receiving aid must sign a notarized statement that any aid they receive will be used only for their education-related expenses.

Student Rights and Responsibilities

Academic Progress Requirements. Financial aid recipients are required by regulation to maintain satisfactory progress in order to continue to receive aid. Undergraduate and postbaccalaureate students are required to complete at least 12 hours a term and a total of 36 hours for the academic year; graduate students must complete at least 9 hours a term and a total of 27 hours for the academic year. (Four-term students must have 48 hours as an undergraduate or postbaccalaureate; graduate students, 36 hours.) Failure to meet these minimum requirements may result in cancellation of aid for subsequent terms or school years. Should aid be withheld for academic reasons, the student will be requested to explain in writing the reasons he or she did not achieve the minimum standard. A decision as to continuation of aid will be made by the financial aid staff. Decisions may be appealed first to the director of financial aid, the financial aid committee, and next to the associate dean of student services.

Change in Status. Students must notify the Financial Aid Office if they withdraw from the University during a term or do not register for a term. Changes in family status must also be reported (marriage, separation, divorce, childbirth).

Reporting of Other Resources. A financial award may be canceled at any time if there is evidence that the statement of financial conditions was misrepresented on the application. Students must inform the Financial Aid Office promptly of any significant changes ($100 or more) in the information originally submitted. This includes reporting any scholarship, grant, loan, or earnings other than those indicated on the award letter. Receipt of funds such as VA, BIA, CETA, ADC, welfare, assistantships, fellowships, research grants, inheritances, trust funds, spouse income, and any other resources that were not stated on the application must be reported. The financial aid award may be adjusted to reflect the change in the student's resources. In some circumstances this may require a reduction or repayment of financial aid monies received during the award year. Students are also encouraged to report any significant decreases that affect their financial resources.

Funding Statement. Awards may be adjusted during the year by the Financial Aid Office because of inadequate institutional, state, or federal funding; or other unforeseen factors such as changes in student attrition or percentage of award acceptance.

Renewal of Financial Aid. Students must reapply each year for continued aid. Oregon State University is not obligated to continue aid beyond the last term stated on the award letter. Applications completed after the preferred March 1 deadline may not receive full consideration for all programs because of lack of funds. Renewal of financial aid depends on the student's academic performance, financial need, and the availability of student financial aid funds.

Appeals. Students who are dissatisfied with a decision of a financial aid staff member may appeal that decision, either in person or in writing, to the following persons in the order indicated: the director of financial aid, the financial aid appeals subcommittee, and the associate dean of student services.

Repayment Policy

Students who withdraw from Oregon State University prior to completion of a term must repay to OSU a portion of financial aid received through Pell, SEOG, NDSL, and GSL/FISL/USAF programs. The portion of financial aid which must be repaid is calculated based on the date of withdrawal and the amount of the cash disbursement. (The cash disbursement is the amount of aid money remaining after tuition and fees are paid.)

The cash disbursement repayment policy is as follows:

Week of classes	*Percent student repays*
1	75
2	75
3	50
4	50
5	25
6	25
7	0

All required financial aid repayment must be made to OSU before the end of the current academic year or before additional Title IV funds may be disbursed to the student, whichever occurs first. Repayment is made to the OSU Business Office. It is the student's responsibility to provide proof of repayment to the OSU Financial Aid Office. A copy of the receipt from the Business Office meets this requirement.

All students who receive financial aid and then withdraw from classes at OSU must also petition the Financial Aid Office in regard to their failure to meet academic satisfactory progress requirements. Petitions can be obtained from the Financial Aid Office and must be approved before additional financial aid is made available.

Cost Minus Resources Equals Need

Once a student applies for and establishes eligibility for financial aid, he or she is awarded an amount that supplements his or her ability to pay educational costs. This amount is based on an evaluation of the total cost for the terms attended minus the total amount of resources available to the student during that period of time.

Budget Development

Outlined below is a sample standard budget for a single, resident undergraduate for three terms at OSU. The total, $5,190, is of course, the 1982-83 estimate. For single nonresidents, the total is $8,010. The Financial Aid Office also provides sample budgets for single and married students, including those with children, for four terms (12 months) at the University.

Financial aid will not be provided to help students with expenses above the standard amounts unless very unusual circumstances exist. Students whose budget estimates vary greatly from the standard should examine their figures to see if they have included all costs or if their estimates are too high in some areas.

Sample Budgets

Listed below are several theoretical examples of how aid eligibility is determined, based on standard budgets and resource expectations.

José is a single, dependent, resident junior attending fall, winter. and spring terms. His resources, which total $2,480, are listed below.

• minimum summer earnings	$ 900
• expected parent contribution (from FAF analysis)	930
• assets (35 percent of $1,000 savings)	350
• loan from grandmother	300
	$2,480

José estimates that his total costs will be $5,190 for the nine-month academic year. His total need then will be $2,710.

total costs	$5,190
less total resources	−2,480
	$2,710

If José were paying nonresident tuition, his costs would be $2,820 higher because he would pay out-of-state tuition and have a larger transportation allowance. His need would then be $5,530.

Karen is a married, independent, resident senior attending fall, winter, and spring terms. Her spouse is working part time and taking no classes. She estimated her costs would be $11,290 for the June-June time period (independent students show a 12-month budget).

Her resources, listed below, total $7,580.

• stated summer earnings	$2,120
• parent contribution	0
• spouse earnings	4,880
• loan from spouse's parents	300
• assets (35 percent of $800 worth of stock)	280
	$7,580

Since Karen estimates that her total costs will be $11,290 and her total resources will be $7,580, her total need is $3,710.

total costs	$11,290
less total resources	−7,580
	$ 3,710

The Aid Package

Once a student's need has been determined, an aid package will be developed that depends on the availability of funds and the amount of need in relation to other students. The Financial Aid Office attempts to meet a student's full need, but doing so is not always possible. Students who complete their applications after the February 1 deadline may not receive all the aid they need because of insufficient funds. It may not be possible to meet the needs of students who indicate that they do not wish to accept certain types of aid or students with extremely high needs (over $5,000) because of maximum limits within individual aid programs.

Receiving a scholarship has no effect on a student's aid if he or she is not receiving funds from NDSL, SEOG, or College Work-Study. Students receiving aid from any of these programs are limited to a maximum amount of aid. A student whose full need has been met prior to receipt of a scholarship will have his or her aid reduced by an amount equal to the scholarship; the reduction will usually be made from the loan or from work-study. If a student's full need had not been met, the scholarship can be allowed to fill the unmet need. Each student's situation is treated individually.

The following are possible sample packages for the students shown in the previous examples.

José has a need of $2,710.

Pell (Basic) Grant	$1,100
Supplemental Educational Opportunity Grant (SEOG)	600
College Work-Study (as requested on application)	1,010
total aid	$2,710

The amount of the Pell Grant is determined by the federal Pell Office. The amount of SEOG is the maximum provided for a student at OSU for three terms during 1981-82. Work-study brings the total assistance to $2,710. José applied prior to March 1 and did not limit the types of aid he would accept.

If José were a nonresident, his need would have been $5,530. His aid package might look like this:

Pell Grant	$1,570
SEOG	600
College Work-Study	1,500
total aid	$3,670

As a nonresident, José would receive a larger Pell Grant award because his costs are greater. He is already receiving the maximum SEOG award. This time he received more work-study, $1,500; it would be difficult to earn more than that while going to school full time. José's need is undermet by $1,860. He indicated on his application that he would not accept a loan, so he is going to have to cut his expenses by $1,860, get more help from his parents, earn more in the summer, or process a loan at a later date.

Karen's need is $3,710. She has a very high grade-point average, but she missed the scholarship deadline. Her aid package might look like this:

Pell (as determined by Pell Office)	$1,210
NDSL (as requested on application)	2,500
total aid	$3,710

Karen did not receive a scholarship because her application was received after March 1. She did not receive SEOG because there were insufficient SEOG funds to award any to applicants after March 1. She received NDSL because she requested it on her application. She did not request College Work-Study.

The above aid packages are samples only and they illustrate only three situations. A student's actual package depends on many factors: types of aid requested, amount of funds available in various programs, where the student's need ranks with other students, what his or her grades are (for scholarships), and when the application was completed. Not all students are eligible to receive scholarships and grants, the types of aid the Financial Aid Office tries to provide first. If students are not eligible or if funds are not available, an attempt will be made to meet the need with loans and College Work-Study according to the preference indicated on the application.

Scholarships

All-Campus Scholarships

AGSTEN SCHOLARSHIP: $300 to a freshman, based on university scholastic requirements and financial need, honoring Clarence W. Agsten.

AIR FORCE ROTC SCHOLARSHIPS: (see "AEROSPACE STUDIES").

ALBRIGHT MEMORIAL SCHOLARSHIP: A four-year scholarship covering tuition and books, honoring Mable Norman Albright. Applicant must be a graduating senior from a Benton County high school. Selection based on scholastic standing, high school and community activities, good citizenship, and financial need.

ANDREWS SCHOLARSHIP: Full tuition through an endowment left by Naomie Catherine Andrews. Selection based on financial need and seriousness of purpose.

ARIZONA SAWYERS SCHOLARSHIP: $500 to an Oregon woman student intending to pursue a teaching career.

ARMY ROTC SCHOLARSHIPS: (see "MILITARY SCIENCE").

BABB SCHOLARSHIP: $500 to an outstanding freshman athlete, in memory of Bert Babb, Sr.

BAIRD SCHOLARSHIP: $500 to an outstanding varsity basketball player, in memory of Dr. Earl E. Baird.

BANK OF ST. HELENS SCHOLARSHIP: Tuition for an outstanding entering freshman athlete from Columbia County.

BARTLETT SCHOLARSHIP: $500 to an entering freshman of exceptional character and scholarship who has been active in football in high school, honoring Dr. C. L. Bartlett.

BERGER SCHOLARSHIPS: Scholarships ranging from $300 to $800. Available to both resident and nonresident undergraduates. Selections based on high scholarship, financial need, and character, with promise of rendering service to the University. A memorial to Marie Harbeck Berger.

BLITZ-WEINHARDT FOUNDATION SCHOLARSHIP: $500 to a senior varsity athlete for the senior year.

BOSWORTH SCHOLARSHIP: $500 to a premedical student who has been admitted to medical school and who has financial need, a memorial to Ralph L. Bosworth.

COLLINS SCHOLARSHIPS: Scholarships provided as a memorial to James Harrison Collins for graduates of Columbia County high schools. Each awardee must be in top 15 percent of graduating class, be of excellent character, and have an outstanding record of service to school and community.

DAVIS SCHOLARSHIPS: $300 each to six resident members of the OSU chapter of Acacia Fraternity, and $300 each to six entering freshman men or women who are National Merit semifinalists, provided by the Walter Edwin Davis and Edith McKay Davis Fund.

INEZ DARLING DAVIS SCHOLARSHIP: Endowment fund to provide a scholarship to a deserving sophomore student.

DELTA DELTA DELTA SCHOLARSHIP: One or more scholarships given by Delta Delta Delta, national sorority, to worthy undergraduate women.

U. G. Duback Scholarship Fund: Endowment fund for undergraduates. Preference to students with financial need and qualities of academic promise and character; provided as a memorial to Dr. U. G. Duback, first dean of men at OSU.

Evans Products Scholarship: $500 to a deserving athlete attending OSU.

Fisher Ford Scholarship: In-state tuition to an entering freshman athlete from the Portland market area, provided by Joe Fisher Freeway Ford.

Sunnie and Roy Foy Scholarship: Financial assistance of varying amounts, with priority to graduates of Weatherwax High School, Aberdeen, Washington, and second consideration to Corvallis High School or Crescent Valley High School graduates. Based on financial need, citizenship, and extracurricular activities.

Eldon Frink Scholarship: Full tuition to a junior or senior majoring in a program of environmental significance through agriculture, home economics, or forestry. Award based on scholastic standing and financial need.

Gill Scholarship: Approximately $500 to a needy American Indian student who is a resident of one of the eleven western states, provided by the William Harris Gill Education Fund.

Herrin Scholarship: Tuition and fees for juniors or seniors, based on high scholarship, unimpeachable character, and service to the University; honoring William and Alice Herrin.

Holmes Scholarship: About $300 awarded annually to a worthy graduate of a Jackson County high school; provided by Harry and David Holmes of Medford.

Horn Scholarship: Approximately $1,500 for a varsity football or basketball player, in honor of Bud Horn.

Hoyt Scholarships: Grants of varying amounts from an endowment established by the late Charles H. Hoyt.

Jackson Foundation Scholarships: Three $1,200 scholarships made possible through a trust established by the late Mrs. Maria C. Jackson in memory of her husband C. S. Jackson, founder of the *Oregon Journal*. Applicants must be graduates of an Oregon high school. Recipients chosen on the basis of scholastic standing and financial need. Preference given to the son or daughter of any present or former employee of the *Oregon Journal*.

Keck Scholarship: $500 to the incoming freshman athlete who most closely typifies the qualities of the late Mike Keck, OSU varsity basketball player.

Leonora H. Kerr-Folk Club Scholarship: Full tuition to an outstanding freshman woman from an Oregon high school; provided by a fund established as a tribute to Mrs. William Jasper Kerr and supplemented by the Oregon State University Folk Club.

Fred Meek Scholarship: Endowment fund to provide a scholarship to a deserving junior in the School of Pharmacy on the basis of scholastic ability and need.

Navy ROTC Scholarships: (see "Naval Science").

North's Scholarship: $1,500 to a southern Oregon student-athlete in any sport, provided by North's Restaurant, Inc.

Oregon Chapter, American College of Nursing Home Administrators Scholarship: $300 annually to a health care administration major specializing in long-term care administration, without regard to financial need. Preference to Oregon residents who intend to become licensed practicioners in Oregon.

Oregon State University Book Store, Inc., Scholarships: Full tuition and fees scholarships presented annually to students who have maintained good scholarship and citizenship and who have financial need.

Oregon State University Dads' Club Scholarships: Partial tuition and fees to men and women selected by the Oregon State University Dads' Club. Recipients chosen on basis of scholastic achievement and leadership potential.

Oregon State University Folk Club Scholarships: One or more full tuition scholarships to outstanding freshman women from Oregon high schools.

Oregon State University Honors Scholarships: Two $2,000 scholarships to entering freshmen, to be awarded $500 a year for four years. National Merit Award semifinalists from Oregon and those semifinalists from out of state who have indicated a preference for Oregon State University are eligible to apply.

Oregon State University Mothers' Club Scholarships: Tuition and fees to men and women selected by the Mothers' Club Scholarship Committee. Recipients must need financial aid, be of high character, and have average or above grades. Honor scholarships will be given to a man and a woman with grade-point averages above 3.00.

OSU Mothers' Club-Hawaii Unit: $300 scholarship for a returning student who is a resident of Hawaii, based on financial need and satisfactory scholastic progress.

OSU Panhellenic Council Scholarships: Three $250 awards annually to sorority members who have made significant contributions to their sororities and the Panhellenic system while maintaining scholastic excellence.

O Yate Ki-Native American Student Association Scholarship: $500 award based on service to the Indian Club during the previous year.

Pendleton Elks Lodge Scholarship: For an athlete from Ukiah, Pilot Rock, Helix, Athena, or Pendleton.

Phi Kappa Phi Merit Scholarships: $500 each to an entering freshman and to an OSU junior, based on academic merit.

Ben and Ethel Pubols Scholarship: $100 awarded alternately to a student in the School of Home Economics and the School of Agriculture.

Ramsey Scholarship: $500 to a male student, based on citizenship, academic standing, and athletic ability; provided by Frank and Frances Ramsey.

Reid Scholarship: $500 to an outstanding incoming freshman or varsity basketball player, provided by Dr. and Mrs. David E. Reid.

Reynolds Scholarship: $500 for an incoming freshman athlete from Union, Wallowa, Baker, or Umatilla county; a memorial to Charles Reynolds.

Ritchie Scholarships: Awards from $400 to $800 to entering graduates of Oregon high schools who have financial need, outstanding ability, and academic promise; provided by the late Elizabeth P. Ritchie.

Shu Tan Wu Scholarship: Honors Hui-O-Hawaii's honorary adviser, Sbu Tan Wu, and provides assistance to an enrolled student from Hawaii in financial need.

Swift Scholarship: $500 to an incoming male freshman who graduated from a high school in Baker, Grant, Harney, or Malheur counties; a memorial to Derald D. Swift.

Thrift Shop Scholarship: Full tuition to an outstanding freshman woman from a Benton County high school.

Valley Scholarship: $500 for a varsity letterman in any major sport who has completed his athletic eligibility at OSU; based on financial need and seriousness of purpose in attaining a B.S. degree; a memorial to Wayne Valley, Jr.

Van Kirk Scholarship: Varying amounts to undergraduates in any field; applicants must be U.S. citizens, have financial need, and show academic promise; honoring Mary Van Kirk.

Rueben C. Winslow and Myron M. Winslow Scholarships: Tuition assistance to students with financial need and a grade-point average of at least 3.00.

College of Liberal Arts

E. B. Aldrich Journalism Scholarship: Annual award of full tuition to a junior or senior majoring in journalism at OSU from Clatsop, Tillamook, Columbia, Umatilla, Morrow, Wheeler, or Gilliam counties. Provided by the *East Oregonian*.

Kate L. Bartholomew Journalism Scholarship: Annual award of $500 to a sophomore, junior, or senior preparing for a career in journalism. Provided by Frank Bartholomew, chairman of the board and former president of United Press International and an OSU alumnus, in memory of his mother.

Harold and Rachel Hollands Scholarship: Approximately $400 annually awarded, alternating between art and agricultural economics, in memory of Rachel Hollands. Selection of recipient based on financial need, scholastic achievement, good character, and U. S. citizenship.

Ingalls Scholarship: Approximately $400 annually to encourage OSU students toward careers in journalism; includes a summer internship at the Corvallis *Gazette-Times*; provided by Robert C. Ingalls.

Jackman Institute Scholarship: Annual award of $750 to a junior or senior preparing for a career in agricultural journalism; provided by the E. R. Jackman Institute.

Lake Journalism Scholarship: $150 presented annually by the OSU student chapter of Women in Communications, Inc., to an OSU woman journalism student in memory of Adelaide V. Lake, former OSU journalism professor.

The Matsen-Davidson Scholarship in Art: Approximately $500 awarded annually to an incoming freshman in art who has just graduated from an Oregon high school. The award is based on artistic achievement and financial need.

W. Verne McKinney Scholarship: Annual award of $600 for an OSU journalism student from the circulation area of the *Hillsboro Argus*, mainly Washington County. Provided by the McKinney family.

Music Tuition Scholarship: Through the generosity of an anonymous donor, as well as from funds contributed to the department's scholarship program, the Department of Music offers a limited number of renewable scholarships to students who will be attending OSU for the first time as degree candidates in music or music education. The scholarships range in value from partial to full in-state tuition, excluding fees. Selection is based on an audition and interview, and academic and musical achievement.

Oregon Newspapers Foundation, Inc., Scholarships: The foundation, wholly owned by Oregon Newspaper Publishers Association, Inc., operates a scholarship program for the benefit of worthy Oregon journalism and advertising students.

Reader's Digest Foundation Grants: Annual grant of $1,500 allocated to students engaged in research or travel in gathering material for news or feature stories or taking news or documentary photographs.

The Scripps-Howard Foundation Scholarship: Annual $1,000 grant awarded to one or more students in technical journalism who are willing and able to work in order to provide a part of their educational expenses.

Norma Seibert Print Scholarship: One-year tuition awarded annually to an undergraduate art major in printmaking. Selection based on submitted portfolio of prints.

Fred M. Shideler Technical Journalism Scholarship: Annual award of $100 to an incoming freshman majoring in technical journalism. Funds provided by the OSU chapter of Society of Professional Journalists, Sigma Delta Chi, in honor of Fred M. Shideler, head of the OSU Department of Journalism 1932-1967, and member of the OSU faculty for 40 years.

Sue and Fred Shideler Scholarship: Annual award of $200 to assist a currently enrolled technical journalism major.

D. Palmer Young Memorial Drama Scholarship: 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 in Communications, Inc., Scholarship: $250 awarded on a biennial basis by the Portland chapter of the organization to an outstanding student majoring in journalism.

College of Science

Alumni Physician Scholarship in Premedicine: $500 to a premedical student assured of entrance to an accredited medical school, funded through an OSU Foundation endowment.

Amoco Foundation, Inc. Scholarship in Geology: $800 to an entering freshman in geology, selected by geology faculty on basis of grades (at least 3.00 through student's high school career) and potential and without regard to financial need. Recipient may retain scholarship for up to four years if he or she achieves at least "B" average each year and makes progress towards a geology degree.

Asarco, Inc. Scholarship in Geology: $750 to a junior or senior in geology with exceptional all-around activities and scholastic ability. Preference given to students planning career in minerals industry. Candidates must be U.S. or Canadian citizens.

Benton County Medical Auxiliary Scholarship: Provided through Benton County high schools to encourage their seniors to enter a paramedical field. Scholarship amount may vary from year to year depending on organization finances.

Benton County Medical Society Scholarship: $500 to an undergraduate premedical student. Selection based on scholarship, financial need, and qualities, such as personality and ability, determined by personal interview. Recipient need not be an Oregon resident, and may be of any race, color, or creed.

Ralph H. Bosworth Memorial Scholarship: Approximately $500 to premedical student who has been accepted for admission to a standard medical school. Selection criteria determined by OSU Scholarships Committee.

Copson Scholarship: Approximately $200 annually from a gift of June Seeley Copson, '15, to establish a scholarship in memory of her husband Godfrey Vernon Copson '11, former head of the Department of Bacteriology. Award made to a junior or senior who shows outstanding promise in the College of Science.

Paul Copson Memorial Scholarships: Approximately $200 annually from the bequest of June Seeley Copson, '15, for each of two scholarships, one in physics and one in mathematics. Awards made to juniors or seniors on the basis of character, promise in scholarship, and general scientific aptitude.

Samuel M. Evans, Jr. Memorial Fund: $150 or more to a worthy undergraduate in geology nominated by geology faculty on basis of scholastic achievement and promise as an earth scientist; in memory of Samuel M. Evans, Jr., who died in the service of his country on November 18, 1970.

Augustine and Rita Gombart Medical Scholarship: An award of approximately $600 annually from the bequest of Dr. and Mrs. Gombart to two deserving students in premedicine.

Jesse Hanson Scholarships: Approximately $600 annually from the bequest of Jesse Hanson for deserving students in science who are residents of Benton County.

Harris Scholarships: $600 each to a chemistry and a biochemistry major. Selection based on scholarship and financial need. Funds provided by Dr. Milton Harris, an OSU alumnus.

Cyril Robert Herrick, Jr. Memorial Scholarship in Marine Biology: $200 to a worthy junior or senior with an interest in marine biology, established in memory of C. Robert Herrick, Jr., a high school student who had hoped to pursue a career in marine biology.

Christian John Hunt Memorial Scholarship: Endowment fund established by family and friends of Christian and Marguerite Hunt to provide scholarships and grants to deserving undergraduates in geography.

Dora Krueger Scholarship: Approximately $500 annually from the bequest of Dora Krueger for each of six students in preveterinary medicine. Awards made to sophomores, juniors, or seniors on the basis of character, scholarship, and need.

Longview Fibre Company Pulp and Paper Undergraduate Scholarship: $500 to a worthy sophomore or junior in chemistry. Selection based on need of financial assistance, scholarship, professional interest, and personal qualities. Recipient must be a permanent U. S. resident. Summer employment with company may be available.

C. J. Meechan Scholarships in Science: $500 scholarships to two undergraduates and one $1,000 award to an entering graduate student based on scholarship and other accomplishments. Established by C. J. Meechan, '51, an OSU graduate in physics.

Mark H. Middlekauf Scholarship in Bacteriology: Approximately $10,000 available annually.

Sait Scholarship in Computer Science: Awarded to an undergraduate in computer science selected by the Department of Computer Science.

Joseph E. Simmons Memorial Scholarship: $200 or more to a worthy and promising student in microbiology. Established by the widow and friends of the late Professor Joseph E. Simmons, formerly head of the Department of Bacteriology.

Union Oil Company of California Foundation Scholarship: $500 to a worthy undergraduate geology major nominated by the faculty of the Department of Geology on the basis of scholastic achievement, extracurricular activities, and good citizenship. Candidates must be U. S. citizens.

School of Agriculture

Agricultural Engineering Scholarship: $300 to a sophomore, junior, or senior in agricultural engineering or agricultural engineering technology. Selection based on demonstrated leadership, initiative, and achievement in the classroom and in extracurricular activities related to the student's professional development.

American Society of Agricultural Engineers Student Branch Scholarship: $100 to an incoming freshman in agricultural engineering. Provided by the OSU student branch of ASAE.

Armour & Company: $500 to a junior in food science and technology. Minimum 2.50 GPA and interest in sensory evaluation of foods.

P. M. Brandt and G. H. Wilster Memorial Scholarship: One year's tuition to a student majoring in food science and technology or dairy microbiology. Sponsored by the Oregon Dairy Industries.

Le Roy Breithaupt Award: In memory of Professor LeRoy Breithaupt to create a permanent endowment fund, the annual income of which may be used each year to recognize and reward an outstanding junior or senior in agricultural economics.

Bumble Bee Seafoods, Inc. Scholarship: $500 annually to a junior or senior in food science and technology, supported by work in selected engineering courses, with potential summer employment between junior and senior years and renewal of scholarship during the senior year. Limited to students with sincere interest in career in commercial fisheries industry.

Don Burlingham Scholarships: Endowment fund to provide scholarships or work scholarships for sophomores, juniors, and seniors enrolled in soil science, crop science, or horticulture. Preference given to students with financial need and qualities of citizenship, leadership, and character.

John Cavalero Scholarship: One $100 scholarship to a student from Multnomah, Washington, Clackamas, or Columbia counties who intends to major in horticulture. Presented by the North Willamette Valley Horticulture Society.

Harold A. Cohn Scholarship: $1,000 provided annually by Superior Packing, Inc. and C2L Inc., Ellensburg, Washington, to an outstanding student in animal science. Aims to encourage the sheep industry in the Northwest, emphasize production of sheep on ranches and ranges as an industry compatible with the sociological, economic, and aesthetic goals of the region.

Columbia Laboratories Scholarship: $300 to an upperclass major in food science and technology with a minor or emphasis in business.

Del Monte Scholarship: $300 to a junior in food science and technology. Selection based largely on past academic performance and sincere interest in food technology.

First National Bank of Oregon Scholarship: $500 for a senior in agricultural economics. Limited to Oregon residents and awarded on the basis of scholastic achievement, leadership, and financial need.

General Dillingham Produce Industry Scholarship: $1,000 to a full-time junior or senior intending to enter fresh fruit and vegetable industry in an area between production and marketing. Award based on sincerity of purpose, character, leadership, and scholastic record. Help provided to obtain employment between junior and senior years.

H. H. Gibson Memorial Scholarship: Approximately $250 provided annually as a memorial to Professor Gibson by his family, for an Oregon high school graduate in vocational agriculture.

Food Science Department Scholarship: One term's tuition to an outstanding food science major.

Fred and Helen Gross Scholarship: One term's tuition awarded to an outstanding sophomore or junior in animal science (including rangeland resources). Recipient selected on scholastic achievement (GPA of 2.50 or better), financial need, character, and an expressed interest in livestock production.

Milton Guymon Memorial Award: $300 annually, provided by Multnomah Anglers and Hunters Club to the Department of Fisheries and Wildlife in support of the leadership training program for seniors majoring in fisheries and wildlife.

Jess Hanson Undergraduate Scholarship in Poultry Science: Full tuition to an eligible freshman; $1,100 to a sophomore; $1,300 to a junior; $1,500 to a senior.

Harold and Rachel Hollands Scholarship: Approximately $400 annually awarded, alternating between agricultural economics and art in memory of Rachel Hollands. Selection of recipient based on financial need, scholastic achievement, good character, and U.S. citizenship.

Hubbard Farm Charitable Foundation Scholarship: Open to juniors, seniors, or graduate students in poultry science, $1,000. Rotates annually between undergraduates and graduates.

G. R. Hyslop Memorial Foundation Scholarships: Tuition and fees for one year; one to an outstanding high school senior and one to a junior in crop science.

I. R. JONES MEMORIAL BOOK SCHOLARSHIP: $75 to a junior or senior. Selection based on scholarship, leadership, and participation in dairy activities.

KIWANIS RODEO SCHOLARSHIP: Awarded to an OSU student who is outstanding in the Rodeo Club.

URSULA BOLT KNAUS SCHOLARSHIP: Full tuition to a student above the freshman level. Awarded on alternate years to a student in the School of Agriculture who has financial need and at least a 2.50 cumulative grade-point average.

EZRA J. KRAUS MEMORIAL SCHOLARSHIP: One or more full tuition scholarships available to students in ornamental horticulture on the basis of financial need and scholarship.

EZRA J. KRAUS GRADUATE FELLOWSHIP IN ORNAMENTALS: $1,500 awarded to a graduate student in ornamentals. Selection based on financial status, scholastic merit, and professional potential of student as stated in nominations requested from major professors.

LAMB-WESTON, INC. SCHOLARSHIP: $500 to an entering freshman in food technology from a high school in the vicinity of Weston, Oregon.

BILL LENDERKING SCHOLARSHIP: One term's tuition to the outstanding sophomore in food science and technology, based on scholarship, leadership, activities, professional interest, and development; renewable.

RALPH N. LUNDE MEMORIAL AWARD: A reference volume provided by the Ralph N. Lunde Memorial Fund, to recognize the professional growth of a student in agricultural engineering or agricultural engineering technology. Limited to students within 70 credit hours of graduation.

L. A. MCCLINTOCK MEMORIAL SCHOLARSHIP: One term's tuition to an outstanding junior in animal husbandry or range management for use during student's senior year.

MCKENZIE SCHOLARSHIP: $150 provided as a memorial to Gary McKenzie by his parents, for a freshman in agriculture who has been an active member of Future Farmers of America.

WILLIAM MENKE MEMORIAL FELLOWSHIP: $500 to a graduate student in ornamental horticulture. Based on scholarship and leadership.

MILWAUKIE ROD AND GUN CLUB SCHOLARSHIP: $100 each for two outstanding seniors in fisheries and wildlife. Preference given qualified students from the Milwaukie area. Selection based on scholastic ability, leadership, career interest in fisheries and wildlife, and financial need.

MOORMAN MANUFACTURING COMPANY OF CALIFORNIA SCHOLARSHIP: $300 annually by the Moorman Manufacturing Company of California, Inc., 550 South San Gabriel Boulevard, P.O. Box 1000, San Gabriel, Calif. 97778. Aims to encourage scholarship in the Department of Animal Science with the hope and expectation recipients will enter careers in the dairy industry.

NORTHWEST FOOD PROCESSORS ASSOCIATION SCHOLARSHIP: One term's tuition to an outstanding junior in food science and technology, based on scholarship, leadership, activities, professional interest, and development.

ORDER OF THE ANTELOPE FOUNDATION SCHOLARSHIP: Endowment fund to provide scholarships for undergraduate and graduate studies directed toward the development, protection, and management of the fish and wildlife resources of Oregon.

OREGON ASSOCIATION OF NURSERYMEN SCHOLARSHIP: $500 to a deserving student in ornamental horticulture. Award based on scholarship and financial need.

OREGON ASSOCIATION OF NURSERYMEN SCHOLARSHIP (CLACKAMAS CHAPTER): $500 scholarship awarded to a deserving student beginning his or her studies in ornamental horticulture. Award based on scholarship and need.

OREGON BEEF INDUSTRY SCHOLARSHIP: One year's tuition to a junior awarded by Oregon Cattlemen's Association and Oregon Beef Council. Selection based upon scholarship, participation in department activities, and leadership ability.

OREGON FEDERATION OF GARDEN CLUBS SCHOLARSHIPS: The Claire Hanley Fund of the Oregon Federation of Garden Clubs provides two or more scholarships or work/scholarship grants to Oregon residents (undergraduate or graduate) majoring in horticulture. Selection based on scholarship, need, and personal qualifications.

OREGON HORTICULTURAL SOCIETY: Tuition scholarships to undergraduates in horticulture or related field; preference to horticulture majors. Recipients selected by Oregon Horticultural Society Scholarship Committee.

OREGON SEED TRADE ASSOCIATION SCHOLARSHIPS: Awarded to freshmen, sophomores, or juniors in agricultural and resource economics and in crop science who are interested in the Oregon seed trade industry and have demonstrated high academic achievement.

OREGON TURKEY IMPROVEMENT ASSOCIATION SCHOLARSHIP: $500 for a junior or senior in poultry science interested in some phase of the turkey industry. Preference given to Oregon residents and students who anticipate working in Oregon's turkey industry.

ORE-IDA: $500 to a junior or senior in food science and technology. Minimum 3.00 GPA. Preference to Ore-Ida employees' children and minorities.

PACIFIC EGG AND POULTRY SCHOLARSHIP: Variable in number. Open to incoming freshmen ($250), sophomores, juniors, seniors, and graduate students ($750) who have interest in poultry science. Not restricted to majors. Agricultural engineering, food science and technology, agricultural resource and economics, general agriculture, and preveterinary medicine majors eligible to apply; forms in Department of Poultry Science.

PNW REGION ASAE FRESHMAN AWARD: $50 to a freshman in agricultural engineering or agricultural engineering technology for superior academic achievement. Provided by the Pacific Northwest Region of the American Society of Agricultural Engineers.

PACIFIC NORTHWEST PLANT FOOD ASSOCIATION SCHOLARSHIP: $250 to an outstanding junior or senior in agriculture majoring in soils.

RALSTON PURINA COMPANY SCHOLARSHIPS: $500 each, annually, to outstanding seniors in agriculture in Land Grant colleges of the United States. Oregon State seniors in this field who rank in the upper 25 percent of the class and who have financial need may apply through dean of agriculture.

CLIFFORD E. SAMUELS SCHOLARSHIP: One term's tuition to the outstanding freshman in food science and technology, based on scholarship activities and professional interest. Student selected fall term of sophomore year.

BILL SCHAFFER MEMORIAL SCHOLARSHIP: $100 provided by Multnomah Anglers and Hunters Club for a sophomore major in fisheries and wildlife in recognition of accomplishments and to promote continued excellence in the study of wildlife conservation and management.

CHAN SCHENCK CONSERVATION SCHOLARSHIP: $200 provided by Multnomah Anglers and Hunters Club for a junior or senior majoring in fisheries and wildlife to allow continued study of wildlife conservation and management.

UNITED FARM AGENCY SCHOLARSHIP: $500 annually to a senior in agriculture. Selection based on financial need, qualities of leadership, and activity in chosen field.

R. M. WADE FOUNDATION SCHOLARSHIP: $300 annually for a junior or senior majoring in agricultural education.

JAMES H. WEATHERSPOON SCHOLARSHIP: $750 annually to a junior or senior in agriculture who plans to return to the farm or ranch. Preference to applicants from northeastern Oregon who show a high level of scholastic achievement, participation in extracurricular and community service activities, and financial need.

ERNEST H. WIEGAND SCHOLARSHIP: Approximately one term's tuition to an outstanding senior in food science and technology, based on scholarship, leadership, activities, professional interest, and development.

WESTERN OREGON LIVESTOCK ASSOCIATION SCHOLARSHIPS: Two one-term tuition scholarships to a sophomore. Selection based upon scholarship, participation in departmental activities, and livestock background.

WESTERN ROD AND REEL CLUB SCHOLARSHIP: $300 annually to a junior or senior majoring in wildlife or fisheries. Selection based on real financial need, ambition and desire for further study, and scholastic accomplishment.

School of Business

ARTHUR YOUNG AND COMPANY SCHOLARSHIP: $250 annually to an outstanding student in accounting; recommendation by accounting faculty, primarily on basis of scholarship and professional promise.

CLUB MANAGERS OF OREGON SCHOLARSHIPS: Two $750 scholarships awarded to sophomore or junior students in hotel and restaurant management. Awarded on the basis of junior or senior year standing for the year of the award; scholastic achievement; interest in the hospitality industry as demonstrated by prior work experience, preferably in a club; interest in club management as a career; and financial need. Selection by program director and a representative of the dean's office.

COUNTRY COUSIN—R. R. KELLER SCHOLARSHIP: $300 annually to a student in hotel and restaurant management for his or her senior year. Recipient selected by faculty based on interest and accomplishment in the restaurant industry and promise for future success in the industry.

HELEN MAE CROPSEY MEMORIAL SCHOLARSHIP: $150 annually to a woman enrolled in the School of Business for her senior year; awarded on the basis of scholastic achievement and potential for future success in business.

MARSHALL AND MELISSA MARTIN DAWES SCHOLARSHIP: $300 to a School of Business student for his or her senior year, awarded on basis of academic achievement and financial need.

FIRST NATIONAL BANK OF OREGON SCHOLARSHIP: $600 awarded annually to a student with prime interest in finance and banking. Selection made by a representative group of faculty.

OREGON HOTEL/MOTEL ASSOCIATION SCHOLARSHIP: $500 annually to a student enrolled in hotel and restaurant management for his or her junior or senior year. Recommendation by HRM faculty on basis of academic achievement, interest and accomplishment in the hotel/motel industry, and promise for future success. Preference given to Oregon residents.

LOUISE JACKMAN ORNER SCHOLARSHIP: $300 annually to a junior or senior woman majoring in business administration. Selection based primarily on academic achievement; candidates must be Oregon residents, have been graduated from an Oregon high school, and have at least a 3.00 cumulative GPA at OSU. Financial need is secondary and considered only when a tie occurs between finalists. Requires recommendation from an instructor or adviser in business administration.

PEAT, MARWICK, MITCHELL AND COMPANY SCHOLARSHIP: Two $250 scholarships annually to students in the field of accounting; recommendation by accounting faculty, primarily on basis of scholarship and professional promise.

PORTLAND HOTEL ASSOCIATION SCHOLARSHIP: $500 annually to a student in hotel and restaurant management for his or her freshman, sophomore, junior, or senior year. Awarded on the basis of academic achievement, prior work experience in the hospitality industry; extensive and varied work experience in the lodging industry will receive special consideration. Applicants must be residents of Oregon, Washington, Idaho, or Montana. Selection procedure administered by the director of the hotel and restaurant management program.

RAYMOND A. POWELL SCHOLARSHIP (Senior): $1,000 annually to a School of Business student for his or her senior year; awarded on basis of academic achievement (minimum 3.60 University accumulative grade-point average), leadership ability, and potential for future success in business.

RAYMOND A. POWELL SCHOLARSHIP (Junior): $1,000 annually to a School of Business student for his or her junior year; awarded on basis of academic achievement (minimum 3.75 University accumulative grade-point average), leadership ability, and potential for future success in business.

BERTHA W. STUTZ-CORVALLIS WOMAN'S CLUB SCHOLARSHIP: $300 annually to a sophomore, junior, or senior woman from the Corvallis area who is majoring in business administration or business education; award based on merit and need. Selection by Corvallis Woman's Club Scholarship Committee from nominations by business administration or business education instructors.

THUNDERBIRD/RED LION—CHRIS LUNDE MEMORIAL SCHOLARSHIP: $500 annually to a student in hotel and restaurant management for his or her freshman, sophomore, junior, or senior year. Awarded on the basis of academic achievement, prior work experience in the hospitality industry; extensive and varied work experience in the lodging industry will receive special consideration. Applicants must be residents of Oregon, Washington, Idaho, or Montana. Applicants who participate in intercollegiate athletics will receive additional consideration. Selection procedure administered by the director of the hotel and restaurant management program.

VILLAGE GREEN SCHOLARSHIPS: Two $300 scholarships annually to students enrolled in the hotel and restaurant management program for their junior and/or senior year; recommendation by hotel and restaurant management faculty and the dean of the School of Business; primarily on the basis of demonstrated interest and accomplishment in the hotel-restaurant industry through prior work experience and promise for future success. Preference given to Oregon residents.

WESTERN KRAFT SCHOLARSHIPS: Two $360 scholarships provided by the Western Kraft Corporation to juniors in the School of Business for their senior year. Candidates must be U.S. citizens.

School of Education

LUCILLE BORIGO SCHOLARSHIP: $300-$500 annually to high school seniors who are members of Future Business Leaders of America and intending to pursue a full-time course of study in office administration for business teachers at OSU. Application should be made through local FBLA chapter to the State Department of Education.

H. H. GIBSON MEMORIAL SCHOLARSHIP: Approximately $250 provided annually as a memorial to Professor Gibson by his family, for an Oregon high school graduate in vocational agriculture.

DENABELLE LINVILLE SCHOLARSHIP: Financial assistance for a deserving woman student. Must be Oregon resident. Fifteen awards available at the undergraduate level to students pursuing a teaching career.

PARENT-TEACHER SCHOLARSHIPS: $250 annually with a maximum of $1,000, to encourage capable young people to enter elementary or secondary teacher training in Oregon. Open to freshmen, sophomores, and juniors; award based on scholarship, character, personality, leadership, school citizenship, and sound health. Apply through the Oregon Congress of Parents and Teachers, 8050 SE 13th, Portland, Oregon 97202.

R. M. WADE FOUNDATION SCHOLARSHIP: $300 annually for a junior or senior majoring in agricultural education.

School of Engineering

AIIE STUDENT CHAPTER SCHOLARSHIP: $250 awarded to an industrial or general engineering freshman or sophomore.

ALCOA SCHOLARSHIPS: Awards to three seniors in electrical, mechanical, or industrial engineering, provided by the Aluminum Company of America Foundation.

AMERICAN CAN FOUNDATION SCHOLARSHIP: Grants to four students in engineering in any class. Both scholarship and financial need are considered; summer employment available.

ASCE SCHOLARSHIP: Full tuition for a senior in civil engineering, provided by the American Society of Civil Engineers (Oregon Section).

ATLANTIC-RICHFIELD SCHOLARSHIPS: $2,000 to be awarded to a chemical engineering major.

BECHTEL SCHOLARSHIP: $500 to a junior or senior in engineering, provided by the Bechtel Foundation.

BELKNAP SCHOLARSHIP: Variable amount to current engineering students who have particular need of financial assistance; a memorial to Inez J. Belknap.

BOEING SCHOLARSHIPS: Awarded to six juniors or seniors majoring in civil, electrical, or mechanical engineering.

CENTRAL LINCOLN PUD SCHOLARSHIP: Tuition and $150 for books and fees for an entering electrical engineering male freshman from a high school in the service area of the Central Lincoln Peoples Utility District.

CHEVRON SCHOLARSHIPS: Awards to three entering freshmen in chemical engineering; based on scholarship, potential, and financial need; awards to undergraduate students, one in electrical engineering, one in mechanical engineering, one in chemical engineering, and one in civil engineering; provided by the Chevron Oil Company.

RALPH A. CHAPMAN MEMORIAL SCHOLARSHIPS: Variable amount to a sophomore, junior, or senior in the School of Engineering. Selection based on scholarship and financial need.

CHEMICAL ENGINEERS OF OREGON SCHOLARSHIP: Tuition for an entering freshman or a sophomore in chemical engineering; based on scholarship, potential, and financial need.

COVERT SCHOLARSHIP: Approximately $200 to a freshman in chemical engineering; based on scholarship, ability, and potential leadership; provided by the late Lloyd W. Covert.

DOW SCHOLARSHIP: $300 each to three entering freshmen in chemical engineering; based on scholarship, potential, and financial need; provided by the Dow Chemical Company.

DUPONT SCHOLARSHIP: $300 each to three entering freshmen in chemical engineering; based on scholarship, potential, and financial need.

RICHARD L. EARNHEART SCHOLARSHIP: Award to a current undergraduate student in electrical engineering.

FOUNDRY EDUCATION SCHOLARSHIPS: Variable amount to students interested in the foundry industry, provided by the Foundry Education Foundation.

FREIGHTLINER SCHOLARSHIPS: Awards to two juniors or seniors in mechanical engineering.

GEORGE W. GLEESON SCHOLARSHIP: Variable amount to sophomore, junior, or senior in engineering.

JOHN E. GRUND MEMORIAL SCHOLARSHIP: $1,200 to a student enrolled in nuclear engineering.

HANNA NICKEL SMELTING COMPANY SCHOLARSHIP: $1,000 for two Oregon or Washington resident sophomore, junior, or senior students in chemical, civil, electrical, industrial, mechanical, geological, or mining engineering on the basis of scholarship and need.

HERMANN SCHOLARSHIP: Approximately $500 annually to one or more seniors in civil engineering, in memory of Otto Hermann.

GLENN HOLCOMB SCHOLARSHIP: Variable amount to a junior or senior in civil engineering.

ITT-RAYONIER SCHOLARSHIP: Award to a junior or senior who is a U.S. citizen in chemical, mechanical, electrical, or civil engineering; provided by ITT-Rayonier Foundation.

MCCALL SCHOLARSHIP: Income from a memorial fund for a faculty-selected senior in civil engineering, provided in the name of the late Jim McCall.

URSULA BOLT KNAUS SCHOLARSHIP: Full tuition scholarship awarded alternate years to a sophomore, junior, or senior majoring in electrical engineering. Selection based on financial need, qualities of leadership, and activity in chosen field.

LONGVIEW FIBRE PULP AND PAPER SCHOLARSHIPS: Three awards to sophomores, juniors, or seniors in mechanical or chemical engineering.

PAPER INDUSTRY MANAGEMENT ASSOCIATION SCHOLARSHIP: Award to a junior or senior in chemical engineering; based on scholastic standing and financial need.

PETER KIEWIT SONS' SCHOLARSHIPS: Awards in varying amounts to current students in civil engineering technology.

WILLIAM M. PORTER MEMORIAL SCHOLARSHIP: $1,000 for a mechanical engineering student in the junior or senior year on the basis of scholarship.

PROFESSIONAL ENGINEERS OF OREGON EDUCATION FOUNDATION: Three scholarships in memory of W. Morgan Allen and Abraham A. Osipovich awarded to engineering students in accredited programs on the basis of financial need and scholarship.

KENNETH H. SPIES SCHOLARSHIP: Variable amount to a senior in civil engineering (environmental).

SOCIETY OF AMERICAN MILITARY ENGINEERS (PORTLAND POST) SCHOLARSHIPS: Award to a non-contract freshman ROTC student for winter and spring terms and award to a non-contract sophomore ROTC student for the academic year.

STAUFFER CHEMICAL SCHOLARSHIPS: $300 each to three entering freshmen in chemical engineering based on scholarship, potential, and financial need; given by Stauffer Chemical Company.

WESTERN KRAFT SCHOLARSHIP: Awards each to three upperclass engineering students who are U.S. citizens, provided by the Western Kraft Corporation.

School of Forestry

ALBERT H. POWERS MEMORIAL SCHOLARSHIP: Income from an endowment fund, to an outstanding student in forestry. A memorial to Albert H. Powers, prominent Oregon livestock man, for many years a representative of this industry on the Oregon State Board of Forestry.

AUFDERHEIDE MEMORIAL SCHOLARSHIP: Income from an endowment fund, a memorial to Robert Aufderheide, class of 1935, to an outstanding forestry student.

AUTZEN FOUNDATION SCHOLARSHIP: $625 provided for an outstanding student in forestry.

CRAHANE MEMORIAL SCHOLARSHIPS: Two scholarships provided from an endowment fund for outstanding freshmen (preference to Oregon residents) entering the School of Forestry and majoring in forest management, forest engineering, or forest products. A memorial to Joe M. Crahane, prominent Oregon lumberman.

GORDON AND PRISCILLA DUNCAN SCHOLARSHIP: Income from endowment fund for a deserving forestry student, preferably in forest products, nominated by forestry faculty.

PAUL M. DUNN SENIOR SCHOLARSHIP: Income from an endowment established in 1964 by Paul M. and Neva K. Dunn. Awarded annually to the outstanding senior in the School of Forestry. Based on scholastic achievement and potential professional ability.

FORESTRY MINORITY SCHOLARSHIP: Annual award equivalent to resident tuition for deserving American Indian, Mexican American, or black American students entering or enrolled in School of Forestry. Provided by forestry staff.

FRERES SCHOLARSHIP: $500 for an outstanding freshman in forestry with first preference to graduates of Regis, Stayton, Detroit, Mill City, or Cascadia high schools, second preference to any graduate of Linn or Marion County high school; a memorial to Harold "Bud" Freres.

JAMES W. GIRARD MEMORIAL SCHOLARSHIP: Income from an endowment, a memorial to James Girard, distinguished forest consultant, for an outstanding forestry student majoring in forest engineering, forest management, or forest products.

HART SCHOLARSHIP: Income from an endowment fund, a memorial to Floyd Hart, prominent Oregon lumberman, for a senior in forest management, forest engineering, or forest products.

HOO HOO CLUB SCHOLARSHIP: An annual award to an outstanding forest products student. Selection by School of Forestry Scholarship Committee.

HOO HOO ETTE CLUB SCHOLARSHIP: An annual award of $500 to a top senior woman student in forest engineering, forest management, or forest products.

ROBERT F. KENISTON MEMORIAL SCHOLARSHIP: Established in 1971 by Mrs. Keniston, her family, and friends. Awarded annually to an upperclass student in forestry who demonstrates sincerity of purpose, good character, high scholarship, and potential for success in the profession. No restriction as to major, residence, or sex. Selection by School of Forestry Scholarship Committee with preference given to forest management majors.

W. F. MCCULLOCH MEMORIAL SCHOLARSHIP: Income from an endowment fund awarded alternate years to an upper division forest engineering, forest management, or forest products student exemplifying good character and potential for success in the forestry profession.

OREGON LOGGING CONFERENCE SCHOLARSHIP: Annual award for three or four deserving, faculty-selected students majoring in forest engineering, forest products, or forest management.

KURT JON PETERSON MEMORIAL SCHOLARSHIP: Income from an endowment fund for an outstanding student in forest engineering, forest management, or forest products.

RANDALL MEMORIAL SCHOLARSHIP: Income from an endowment fund, a memorial to "Casey" Randall, forestry faculty member; awarded annually to forest engineering, forest management, or forest products student chosen by school staff.

ITT-RAYONIER FOUNDATION SCHOLARSHIP: $1,000 for an upperclass student in forest management, forest engineering, or forest products; based on high scholarship and need.

ROGUE VALLEY HOO HOO CLUB SCHOLARSHIP: $500 to an outstanding forest products student with emphasis in wood industry management. Preference given students from the Josephine-Jackson County area, with selection by School of Forestry Scholarship Committee.

ROLLINS, BURDICK, HUNTER OF OREGON INC. SCHOLARSHIP: $500 to an outstanding senior in forest management, forest engineering, or forest products.

ST. REGIS PAPER COMPANY SCHOLARSHIP: $2,000 provided by the St. Regis Paper Company to an outstanding forestry student extending through the junior and senior years. Recipient selected from juniors nominated from Schools of Forestry at Washington State University, University of Idaho, University of Washington, University of Montana, and Oregon State University.

SIERRA-CASCADE LOGGING CONFERENCE FORESTRY SCHOLARSHIPS: $1,000 each for two juniors in forest engineering, forest management, or forest products at OSU or other western forestry schools; must be residents of Oregon, California, or Nevada.

SLATER MEMORIAL SCHOLARSHIP: Income from an endowment fund, a memorial to Durward F. Slater, class of 1952, to an upperclass forestry student. Preference given to forest management majors.

SISKIYOU CHAPTER, SOCIETY OF AMERICAN FORESTERS SCHOLARSHIP: $500 for an upper division student majoring in forest management, forest engineering, or forest products. Selection based on scholarship, potential, and need. Nominations from the school's scholarship committee; selection by Siskiyou Chapter. Applicants must be student members of the SAF.

SOUTHWEST FOREST INDUSTRIES SCHOLARSHIP: Two awards of $1,000 each for forest engineering, forest management, or forest products students of high scholastic merit and financial need. Selection by Southwest Forest Industries from nominees submitted by School of Forestry Scholarship Committee.

C. WYLIE SMITH III MEMORIAL SCHOLARSHIP: Income from an endowment fund to outstanding students majoring in forest engineering, forest management, or forest products. First preference given to students from Coos, Curry, or western Douglas counties with selection by Coos Chapter Society of American Foresters from nominees submitted by School of Forestry Scholarship Committee.

SNELLSTROM SCHOLARSHIP: Income from endowment fund, a memorial to John R. Snellstrom, prominent Oregon lumberman and legislator, for outstanding forestry students in forest management, forest engineering, or forest products. Selection by School of Forestry Scholarship Committee.

SOUTH SANTIAM EDUCATIONAL AND RESEARCH PROJECT SCHOLARSHIPS: $6,000 annually provided by the Northwest Area Foundation for six Oregon students enrolled in forest engineering, forest products, or forest management. One scholarship of $1,000 available for resident American Indian, Mexican American, and black American forestry students.

MARGARET O. STARKER MEMORIAL SCHOLARSHIP: Income from a bequest to further forestry education and research at OSU School of Forestry; awarded to a deserving student selected by forestry staff.

WOLFSON MEMORIAL SCHOLARSHIP: Awarded annually to a forest management major with proven scholarship performance, potential for success in the profession, and apparent need. In memory of David Wolfson.

School of Health and Physical Education

C. V. LANGTON SCHOLARSHIP: Dedicated to the memory of C. V. Langton and awarded to the outstanding junior based on scholarship, leadership, and potential for future achievement.

DR. EVA M. SEEN SCHOLARSHIP: Dedicated to the memory of Eva Seen and awarded to junior women in physical education who are preparing to teach. A recognition of excellence in scholarship, personal characteristics, contributions to campus and community life, and potential for future achievement.

CAROL LEE SWIM MEMORIAL AWARD FUND: Dedicated to the memory of Carol Swim and awarded to an undergraduate in physical education from any of the following schools: Bemidji State College, Oregon State University, Southern Illinois State University, or University of North Carolina. Criteria for selection of the recipient include a variety of personal and professional characteristics.

WALTER C. THORSELL SCHOLARSHIP: Dedicated to the memory of Walter Thorsell and awarded annually to a junior or senior for strong academic achievement in the safety studies curriculum.

LARRY A. YOUNG PROFESSIONAL DEVELOPMENT AWARD: Presented in memory of Larry Young to the safety studies student who has made outstanding professional contributions. Selection made by the Portland Chapter of the American Society of Safety Engineers.

School of Home Economics

RUTH BECKWITH SCHOLARSHIP: Two scholarships of at least $400, annually to two or more deserving students currently enrolled or planning to enroll in School of Home Economics; preference given to student in housing (family resource management).

BUENA M. STEINMETZ SCHOLARSHIP: $300 annually to a junior, senior, or graduate student, man or woman, majoring in child development or family relationships; in memory of Buena M. Steinmetz.

LEONE ELLIOTT COVERT SCHOLARSHIP: Approximately $400 to a freshman student in home economics; provided by the late Mrs. Covert. Award made on basis of scholarship, ability, and potential leadership.

ELECTRICAL WOMEN'S ROUND TABLE OF OREGON SCHOLARSHIP: $150 to a junior, awarded on basis of financial need, scholarship, and interest and aptitude in electrical equipment.

GLADYS WHIPPLE GOODE SCHOLARSHIP: $600 annually to undergraduate interested and talented in clothing, textiles, and related arts; preference given to Oregon resident.

VIRGINIA HOUTCHENS MEMORIAL SCHOLARSHIP: $225 annually to senior or second term junior from Lane County enrolled in School of Home Economics; awarded on basis of interest and aptitude for home economics, financial need, and scholarship.

JACKSON COUNTY HOME EXTENSION SCHOLARSHIP: $600 annually to a sophomore, junior, or senior from Jackson County seeking a career in home economics; awarded on the basis of financial need, high scholarship, and an interest and aptitude in this field.

JOHNSON SCHOLARSHIP: $100 annually as a memorial to Miss A. Grace Johnson, professor of household administration, 1915-1933; to a junior or senior in home economics whose grade-point average is above the student body's average.

LEE SCHOLARSHIP: $100 annually to a junior in home economics who has shown improvement in college work, stability, and meritorious record in all activities, and general worthiness; a memorial to Mrs. Minnie E. Lee and Mr. J. B. Lee.

HELEN MCDOWALL MEMORIAL SCHOLARSHIP: Two scholarships, $600 each, annually to a sophomore, junior, or senior from Clackamas County enrolled in the School of Home Economics: award based on scholarship, financial need, interest, and aptitude for home economics.

DOROTHY SHERRILL MILLER SCHOLARSHIP: $300 annually to a deserving student in home economics in recognition of high scholarship.

OEHC KIRMIS SCHOLARSHIP: $100 annually to a junior in home economics; by the Oregon Extension Homemaker's Council in memory of Esther Kirmis.

OEHC LATHROP SCHOLARSHIP: $100 annually to a junior in home economics; a memorial to K. Ethel Lathrop provided by the Oregon Extension Homemaker's Council.

OEHC TRINDLE SCHOLARSHIP: $325 annually to a junior in home economics; memorial to Eleanor Trindle provided by the Oregon Extension Homemaker's Council.

AZALEA AND CHARLES SAGER SCHOLARSHIP: $400 annually to a worthy junior or senior in the School of Home Economics, preferably one who lives in Azalea House.

DOROTHY SCHILLING MEMORIAL SCHOLARSHIP: Varying amount to a junior, senior, or graduate student with talent and potential in the aesthetic aspects of clothing; in memory of Dorothy Schilling.

School of Pharmacy

HEALTH PROFESSIONS SCHOLARSHIPS: Varying amounts annually to full-time pharmacy majors who are citizens or are lawfully admitted for permanent U.S. residence, have financial need, and maintain a 2.50 GPA. Application through Financial Aid Office.

LANE COUNTY PHARMACEUTICAL ASSOCIATION SCHOLARSHIPS: Available to third- and fourth-year pharmacy students on the basis of scholastic standing, professional activities, and financial need.

MEEK SCHOLARSHIP FUND: Established by the will of Fred Meek; provides annual scholarship on the basis of scholastic ability and need for a third-year pharmacy major.

GOLDEN FUND: Frank and Ester Golden Student Aid Fund, established by the will of Ester L. Golden, provides several modest grants for pharmacy students who have demonstrated superior scholastic ability and financial need.

WAGNER MEMORIAL SCHOLARSHIP FUND: Established by the will of Kermit R. Wagner for outstanding professional activities and financial need of pharmacy students.

School of Veterinary Medicine

ALLEN PRODUCTS COMPANY, INC. SCHOLARSHIP: Annual award of $1,000 to a sophomore, junior, and senior.

CHINTIMINI KENNEL CLUB SCHOLARSHIP: Annual awards of $800 to a sophomore and senior with a special interest in dogs.

DIAMOND LABORATORIES, INC. SCHOLARSHIP: Annual award of $500 to a junior.

OREGON VETERINARY MEDICAL ASSOCIATION: $150 to a first-year veterinary medicine student who is a resident of Oregon.

PACIFIC EGG AND POULTRY ASSOCIATION SCHOLARSHIP: $750 awarded to graduate students with an interest in poultry science.

PFIZER SCHOLARSHIP PROGRAM: Annual award of $400 to a junior.

ROGUE VALLEY VETERINARY MEDICAL ASSOCIATION: Annual award of $300 to a sophomore or junior.

4-H VETERINARY MEDICINE SCHOLARSHIP: Two $1,000 awards made annually by Champion Valley Farms to former 4-H members currently enrolled in a U.S. school of veterinary medicine.

WOMEN'S VETERINARY MEDICAL ASSOCIATION STUDENT GRANT: A $500 grant to a second- or third-year veterinary medical student attending a college or school of veterinary medicine in the United States or Canada.

For Foreign Students

The following scholarships and fellowships, both undergraduate and graduate, are available to assist foreign students attending Oregon State.

GERTRUDE STRICKLAND SCHOLARSHIP: A fund to provide financial assistance to foreign students. Awards are made by University Financial Aid Committee to a limited number of qualified foreign students.

MILAM FELLOWSHIP: For undergraduate or graduate foreign students in home economics, established in tribute to Ava B. Milam Clark, dean of the School of Home Economics 1917-1950.

Administered by Other Agencies

CORVALLIS ROTARY CLUB SCHOLARSHIP: Tuition and fees to a graduate of a Benton County high school or a resident of Benton County who, because of school boundaries, attended high school in a neighboring county. Application submitted to the Scholarship Committee of the Corvallis Rotary Club through the club president. Application should express financial need, educational interests, and goals in a letter of not more than two typewritten pages.

CROWN ZELLERBACH FOUNDATION SCHOLARSHIPS: $750 per year for four years to students in education. Information through high school principals.

DALY SCHOLARSHIPS: Limited number of awards made annually to worthy young people of Lake County by the Bernard Daly Educational Fund, established through the will of the late Dr. Bernard Daly of Lakeview. Selections based on a qualifying examination held in Lake County.

EASTERN STAR SCHOLARSHIPS: Scholarships provided by the Grand Chapter of Oregon of the Order of Eastern Star for members or daughters of members completing the junior year in Oregon colleges and in need of financial assistance for the senior year.

FORESTRY MEMORIAL SCHOLARSHIP: Income from funds contributed as memorials to graduates and friends of the School of Forestry to a worthy student; administered through OSU Alumni Association.

4-H FUTURE FARMERS OF AMERICA, AND FUTURE HOMEMAKERS OF AMERICA SCHOLARSHIPS: Members should make inquiries to teachers and club leaders regarding local scholarship opportunities.

INSTITUTE OF FOOD TECHNOLOGISTS UNDERGRADUATE SCHOLARSHIP: $300 annually to a freshman in field of food technology. Application made on official form to head of department. Selection by Committee on Education, Institute of Food Technology.

MARIA C. JACKSON-GENERAL GEORGE A. WHITE STUDENT-AID FUND FOR CHILDREN OF WAR VETERANS: Two $750 scholarships annually (one to a man, one to a woman) to children of war veterans; selection based on need and scholarship. Application through United States National Bank of Portland.

MCCLINTOCK MEMORIAL SCHOLARSHIP: $150 to an outstanding junior in animal husbandry or range management; provided through funds established by the Oregon Farm Bureau Federation as a memorial to L. A. McClintock, well known Oregon stockman. Recipients selected by the Board of Directors of the Oregon Farm Bureau Federation.

NORTHWEST CANNERS AND FREEZERS ASSOCIATION SCHOLARSHIP: $100 annually to an outstanding junior majoring in food technology.

OREGON HOME ECONOMICS ASSOCIATION SCHOLARSHIP: $500 over a four-year period awarded a senior in an Oregon high school for enrollment as a home economics major in an Oregon college granting a degree in home economics. Application through high school teacher of home economics.

OREGON PUBLIC EMPLOYE'S UNION SCHOLARSHIPS: Three $300 scholarships to students whose parents are members of O.P.E.U. Selection based upon scholastic achievement and financial need.

OREGON'S PUBLIC EMPLOYE'S UNION SCHOLARSHIP (OSU Faculty Chapter No. 72): $100 annually to a son or daughter of a chapter member; for outstanding scholastic achievement.

P.E.O. SCHOLARSHIPS: Provided by Oregon State Chapter of P.E.O. for Oregon junior or senior women, outstanding and worthy of financial assistance.

PORTLAND HOME ECONOMICS IN EDUCATION SCHOLARSHIP: One scholarship for $300 to freshmen majoring in home economics in an Oregon college.

PORTLAND ROSE FESTIVAL SCHOLARSHIP: Tuition and fees for members of the royal court who enroll at Oregon State University.

UNION PACIFIC RAILROAD SCHOLARSHIPS: $200 each for study of agriculture or home economics to an outstanding 4-H Club member in each county in Oregon served by Union Pacific Railroad.

WAR ORPHANS EDUCATIONAL ASSISTANCE ACT OF 1956: A student whose parent died from causes incurred in World War I, World War II, or the Korean War, who is between the ages of 18 and 23, and who has completed high school, may apply for 36 months of education and training at Oregon State University. The act provides $110 per month for full-time training. Eligible students should apply to the Veterans' Administration.

WILLAMETTE INDUSTRIES SCHOLARSHIPS: $550, $676, and $776 awarded to beginning sophomores, juniors, and seniors, respectively, enrolled in forestry, business, or engineering. Scholarships are contingent upon student working during the summer at one of Willamette Industries operations.

E. E. WILSON SCHOLARSHIPS: Annual assistance grants up to $800 each, from a trust fund provided in the will of E. E. Wilson, Corvallis banker and attorney. Awards, based primarily on financial need, followed by character and scholastic attainments, granted to deserving young men and women who are bona fide residents of Benton County. To apply, eligible students should submit a letter to the E. E. Wilson Scholarship Awards Committee, Mr. Fred C. Zwahlen, Jr., Coordinator, Agriculture Hall 229, Oregon State University.

Honors and Awards

Honor and Recognition Societies

Organization	Men or women	Date established nationally	Date established at OSU	Type or field of interest
General Honor Societies				
Alpha Lambda Delta	Both	1924	1933	Freshmen scholarship
Blue Key	Both	1924	1934	Senior leadership
Cardinal Honors	Both	1932	1979	Junior leadership
Mortar Board	Both	1918	1933	Senior leadership
Phi Eta Sigma	Both	1923	1949	Freshman scholarship
Phi Kappa Phi	Both	1897	1924	Scholarship
Sigma Xi	Both	1886	1937	Science research
Departmental Honor Societies				
Alpha Epsilon	Both	1963	1975	Agricultural Engineering
Alpha Pi Mu	Both	.....	1969	Industrial Engineering
Beta Alpha Psi	Both	1919	1959	Accounting
Beta Gamma Sigma	Both	1913	1963	Business
Epsilon Pi Tau	Both	1930	1931	Vocational/Industrial Engineering
Eta Kappa Nu	Both	1904	1921	Electrical Engineering
Kappa Delta Pi	Both	1911	1928	Education
Omicron Delta Upsilon	Both	1915	1979	Economics
Omicron Nu	Both	1912	1919	Home Economics
Phi Alpha Theta	Both	.....	1980	History
Phi Sigma Alpha	Both	1920	1978	Political Science
Pi Delta Phi	Both	1906	1962	French
Pi Tau Sigma	Both	1916	1941	Mechanical Engineering
Rho Chi	Both	1908	1922	Pharmacy
Sigma Delta Pi	Both	1919	1970	Spanish
Sigma Pi Sigma	Both	.....	.....	Physics
Sigma Tau Delta	Both	1924	1981	English
Tau Beta Pi	Both	1885	1924	Engineering
Xi Sigma Pi	Both	1908	1921	Forestry
Professional Fraternities				
Alpha Zeta	Both	1897	1918	Agriculture
Eta Sigma Gamma	Both	1967	1979	Health Science
Phi Chi Theta	Both	1924	1924	Business
Women in Communications	Women	1909	1925	Journalism
Zeta Phi Eta	Women	1893	1967	Speech
Recognition Societies				
Angel Flight	Both	.....	1961	Air Force
Arnold Air Society	Both	1947	1951	.....
Beaver Believers	Both	.....	1959	Athletic greeters
Iota Sigma Pi	Women	1916	1960	Chemistry
Order of Omega	Both	.....	1976	Greeks
Phi Lamba Upsilon	Both	1899	1928	Chemistry, Biochemistry, and Chemical Engineering
Phi Sigma	Both	1915	1933	Biology
Scabbard and Blade	Men	1904	1920	Military
Other Societies				
Society of American Military Engineers	Both	.....	1980	Military
Swords of Honor	Both	.....	1980	Military
Talons	Women	.....	1933	Service
Thanes	Men	.....	1936	Service

High scholarship is recognized at Oregon State in several ways: *junior honors*, presented at the end of a student's sophomore year; *senior honors*, presented at the time of graduation; *election to membership* in various honor societies; *personal awards*, which may take the form of certificates, plaques, money prizes, or items of intrinsic value.

General honors and awards may be won by students in any school or curriculum. Other awards are open to students in particular schools or departments. Oregon State students compete for awards provided by national and regional sponsors in many fields as well as for essay and oratorical prizes, awards for proficiency in special fields, and awards for all-around distinction.

All-Campus Honors and Awards

JUNIOR HONORS: Conferred by the Oregon State Chapter of Phi Kappa Phi on students who have completed at least 45 term hours of sophomore work at Oregon State with a grade-point average of at least 3.50.

SENIOR HONORS: Conferred each year by the Faculty Senate on those candidates for the baccalaureate degree who have maintained high scholastic standing in their respective schools and who have been in attendance at Oregon State University for at least two regular academic years. The designation *With Highest Scholarship* is conferred upon those students graduating with a cumulative GPA of 3.75 or better; the designation *With High Scholarship* is conferred upon students with a GPA of at least 3.25, but less than 3.75.

ALLWORTH MEMORIAL UNION AWARD: Recipient selected on the basis of a significant and continuing contribution to the students of Oregon State University demonstrated through outstanding leadership and service on Memorial Union committees, programs, and projects. A memorial to Edward Christopher Allworth, organizer and long-time manager of the Memorial Union.

ALPHA LAMBDA DELTA SENIOR BOOK AWARD: The Maria Leonard Book Award presented to the Alpha Lambda Delta graduating senior with the highest cumulative grade-point average.

AMERICAN ASSOCIATION OF UNIVERSITY WOMEN OUTSTANDING SENIOR RECOGNITION AWARD: Awarded by the A.A.U.W. to recognize a senior woman of outstanding scholarship, character, and personality for her contribution to campus and community life.

BLUE KEY DUBACH AWARDS: Presented annually by Oregon State chapter of Blue Key to five graduating seniors outstanding in perpetuation of high ideals and unselfish service to OSU; in honor of Dr. U. G. Dubach, dean of men 1924-1947; names are inscribed on plaque in Memorial Union.

EOP HONOR ROLL AWARD: For students enrolled in the Educational Opportunities Program or the Special Services Project; for outstanding academic achievement. Eligible students must have achieved at least a B average in all classes during the previous term (or terms).

RICHARD CHAMBERS MEMORIAL AWARD: Presented annually to an undergraduate for outstanding research and writing on environmental issues.

MACKENZIE-BLUE KEY MEMORIAL AWARD: Presented annually to two students who exhibit outstanding qualities and abilities as student leaders in service and loyalty to OSU; in memory of Donald Wilson MacKenzie, class of 1953. Cash and names inscribed on plaque in Memorial Union.

MORTAR BOARD JAMESON AWARD: Presented annually by the Oregon State chapter of Mortar Board to the outstanding Mortar Board member, selected on the basis of leadership, service, attitude, and contribution; in honor of Kate W. Jameson, dean of women 1923-1941.

MICHAEL J. PALMER AWARD: The recipient of this award is selected on the basis of demonstrated and significant leadership through participation in student governance and/or student activities; in memory of Michael J. Palmer, class of 1978.

GRADUATE PUBLICATIONS AWARD: Presented annually to graduate students who publish outstanding papers in professional journals.

OSU SCHOLARSHIP AND LEADERSHIP AWARDS: Presented to selected freshmen, sophomore, junior, and senior men and women students, based on scholarship and leadership. Three awards each to freshmen and sophomore men and women; five awards each to junior and senior men and women. Awards to women are a memorial to Clara H. Waldo; those to men are a memorial to E. A. Cummings.

OSU SCHOLASTIC AWARDS: Presented to the man and woman in the sophomore, junior, and senior classes who have the highest grade-point averages for their five, eight, or eleven terms. These awards are a memorial to Drucilla Shepard Smith.

College of Liberal Arts

ROBERT L. BALL PHOTOGRAPHY AWARD: Presented annually in memory of Mr. Ball, who began his long photography career by taking pictures of OSU students and events. Intended to recognize the student who most consistently displays artistic ability and techniques in photographing even the most routine assignments. Along with a trophy there is a cash award of $100.

BAROMETER AD TROPHY: Awarded to *Daily Barometer* advertising solicitor who has contributed most to financial health of student newspaper.

BAROMETER AWARD: Trophy to the freshman student who has contributed most to general welfare and improvement of the *Daily Barometer*.

ALICE CAREY DILWORTH SENIOR AWARDS: At least $100 presented annually to the outstanding senior in music on the basis of scholarship and professional ability. Name of recipient engraved on a plaque displayed in the music department office and on a plaque presented to the recipient.

EUGENE REGISTER-GUARD PHOTO AWARD: $100 awarded annually for photojournalism, provided by Alton F. Baker, Jr., publisher of the Eugene *Register-Guard*.

FRENCH AWARD: Presented annually to an undergraduate for excellence in the study of French language and literature.

INGALLS AWARD: Trophy given annually to the senior who has contributed most to the welfare of student publications; award is recorded on a plaque, a memorial to Claude E. Ingalls, formerly editor of the Corvallis *Gazette-Times*.

FRANKLIN J. MATCHETTE PRIZE: $100 presented each spring term. Awarded by the Department of Philosophy to an undergraduate for excellence in the study of philosophy.

MUSIC EDUCATION AWARD: Presented annually to the outstanding senior in music education.

NATIONAL PRESS PHOTOGRAPHERS ASSOCIATION (NPPA) AWARD: Annual award of $25 for the best photograph taken by a journalism student within the academic year.

KALERVO OBERG AWARD: Presented annually to the outstanding senior in anthropology; in memory of the late Dr. Kalvero Oberg, distinguished American anthropologist.

"PROF MAC" MEMORIAL PLAQUE: Awarded annually to the day and night editors of the *Daily Barometer* who have excelled in typographical proficiency and have contributed most to general news excellence. Provided by Dr. Charles D. Byrne in memory of the late C. J. McIntosh, founder of journalism at Oregon State and staff member 28 years.

JANET SCHULTZ MEMORIAL AWARD: Given annually to the staff member who contributes most to the *Beaver* yearbook. The recipient's name is engraved on a permanent plaque and he or she receives $100 in cash. Provided by Dr. and Mrs. Harold W. Schultz in memory of their daughter, editor of the 1967 *Beaver*.

THE SOCIETY OF PROFESSIONAL JOURNALISTS, SIGMA DELTA CHI CITATION: Certificate awarded by national organization to outstanding senior interested in journalism.

THE SOCIETY OF PROFESSIONAL JOURNALISTS, SIGMA DELTA CHI SCHOLARSHIP AWARD: Certificates awarded to journalism seniors in recognition of high scholastic standing in all college work.

SIGMA DELTA PI SPANISH AWARD: A Spanish masterpiece and the medal of the American Association of Teachers of Spanish given annually to the advanced student of Spanish who has made the greatest progress during the academic year.

ROBERT WAYNE SMITH BOOK AWARD: $25 for purchase of paperbacks from the OSU Book Store awarded annually by Department of History. Selection based on best research papers or review essays submitted in history courses during the academic year.

College of Science

ATMOSPHERIC SCIENCES CHAIRMAN'S AWARD: Annual award of $50 to the graduating senior in atmospheric sciences with the best academic record in undergraduate studies.

BERT E. CHRISTENSEN AWARD: An annual grant equal to the cost of travel to a national or regional meeting of the American Chemical Society awarded to an outstanding teaching assistant in chemistry.

IOTA SIGMA PI AWARDS: A $25 gift certificate for books given to a junior woman in chemistry or a closely related field; for high academic standards. A Chemical Rubber Handbook of Chemistry and Physics to a freshman woman in chemistry with the highest GPA.

JEROME C. R. LI AWARD: Presented to an outstanding graduate student in statistics; recipient has name engraved on plaque and receives membership in Institute of Mathematical Statistics.

MERCK AND COMPANY AWARDS: Chemical books valued at $15 awarded to two seniors for high academic standards and leadership qualities in chemistry.

PHI LAMBDA UPSILON AWARD: Gift certificate for books awarded to the outstanding student (chosen from biochemistry-biophysics, chemistry, or chemical engineering) in each of the undergraduate classes.

PHI SIGMA AWARDS: Two certificates to the outstanding undergraduate and graduate students who have shown creative interest in biology.

PHYSICS UNDERGRADUATE AWARD: An annual award of $100 for the best original paper submitted by an undergraduate physics major on any subject in physics.

WILLIAM M. STONE AWARD IN MATHEMATICS: An annual cash award to a undergraduate or graduate student from any department for the best paper where mathematics is applied to another discipline.

School of Agriculture

AGRICULTURAL COOPERATIVE COUNCIL OF OREGON AWARD: An annual award equivalent to one term's tuition to a junior or senior in agricultural economics who has shown interest in farmer cooperatives and agricultural business management. In honor of Paul Carpenter, an OSU agriculture Extension agent and council secretary.

AGRICULTURAL EXECUTIVE COUNCIL AWARDS: Plaque to outstanding junior and senior in agriculture who have compiled outstanding records of scholarship, leadership, character, and community service.

ALPHA GAMMA RHO SOPHOMORE AWARD: Trophy to student in agriculture who has completed 90 term hours with a grade-point average of at least 2.75 and who is enrolled for the seventh term in college; purpose to promote scholarship, develop leadership and character.

ALPHA ZETA FRESHMAN AWARD: Awarded during the first term of the sophomore year to the student in agriculture receiving the highest GPA in the freshman class.

AMERICAN SOCIETY OF ANIMAL SCIENCE AWARDS: Award certificates and emblems presented spring term to outstanding sophomore, junior, and senior students in animal science. Nominees must be enrolled in a four-year curriculum of animal science for at least three quarters, and rank scholastically among the top 10 percent of their class. Names printed on department plaque.

JOHN T. BABCOCK UNDERGRADUATE STUDENT OF EXCELLENCE AWARD: Recognizes outstanding scholastic, leadership, and professional achievement toward long-range professional goals while an undergraduate student in agriculture. Recognition at annual awards banquet includes a plaque, $1,000, and name entered on permanent plaque. Nominations by departments.

JOHN T. BABCOCK MASTER'S DEGREE STUDENT OF EXCELLENCE AWARD: Recognizes outstanding master's degree candidate whose research benefits Oregon's agriculture and natural resources. Recognition at annual awards banquet includes a plaque, $1,000, and name entered on permanent plaque. Nominations by departments.

JOHN T. BABCOCK PH.D. STUDENT OF EXCELLENCE AWARD: Recognizes outstanding Ph.D. candidate whose research benefits Oregon's agriculture and natural resources. Recognition includes a plaque, $1,000, and name entered on permanent plaque. Nominations by departments.

ARTHUR G. B. BOUQUET HORTICULTURE AWARD: Awarded to a junior or senior in horticulture, based on the student's intellectual competence, leadership ability, and financial need.

ANN DAHLSTROM AWARD: Plaque for most improvement in riding ability.

RALPH N. LUNDE MEMORIAL AWARD: Agricultural engineering reference volume presented to the outstanding sophomore or junior student in the Department of Agricultural Engineering; name engraved on a permanent plaque in Gilmore Hall.

THE OREGON SOCIETY OF FARM MANAGERS AND RURAL APPRAISERS AWARD IN AGRICULTURAL ECONOMICS: A cash award equivalent to one term's tuition to an outstanding sophomore or junior majoring in agricultural economics at Oregon State University.

OUTSTANDING SENIOR IN AGRICULTURE AWARD: Recognizes an outstanding senior in the School of Agriculture. Recognition includes a plaque, $1,000, and name entered on permanent plaque. Students who have completed 135 term hours nominated by departments.

F. E. PRICE AWARD: Certificate of recognition presented to the outstanding senior student in agricultural engineering technology as determined by local students; name engraved on bronze plaque in Gilmore Hall.

SALEM GARDEN CLUB AWARD: For students specializing in horticulture. Recipients selected by Salem Garden Club's Scholarship Committee.

ERNEST H. WIEGAND AWARD: $100 and name of outstanding senior in food technology inscribed on plaque in foyer of Wiegand Hall. Selection by Oregon section and student chapter of Institute of Food Technologists.

School of Business

WALL STREET JOURNAL AWARD: Medallion and subscription to best all-around man or woman graduate in business as determined by the business administration faculty; based on scholarship.

School of Education

KAPPA DELTA PI AWARD: Awarded to a junior or senior in education who is outstanding scholastically, has great promise as a teacher, and has need for financial assistance.

NATIONAL BUSINESS EDUCATION ASSOCIATION AWARD OF MERIT: Awarded to an outstanding graduating senior in business education for distinguished achievement in that field. Recipient receives one-year professional membership in National Business Education Association and Western Business Education Association.

School of Engineering

AMERICAN SOCIETY OF AGRICULTURAL ENGINEERS HONOR AWARD: Certificate of recognition and key awarded to one recipient from the student chapter of ASAE as determined by local selection; name engraved on bronze plaque in Gilmore Hall.

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS CERTIFICATE OF MERIT: Certificate of merit and pin awarded to the junior student member of the chapter judged the outstanding student during preceding academic year.

AMERICAN INSTITUTE OF INDUSTRIAL ENGINEERS: Pins awarded and names of the outstanding senior industrial engineer and the student who contributed most to AIIE activities during the year engraved on a plaque. Awards of $75, $25, and $15 are given annually for the best papers presented at the joint senior-student chapter meeting of AIIE.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS AWARDS: Awards of $50, $35, and $25 are given annually for the best papers prepared and delivered in the student branch of the society.

AMERICAN SOCIETY FOR TESTING AND MATERIALS: Certificate of recognition and subscriptions to ASTM publications. One or two awards each year to outstanding juniors and seniors who have shown an interest in the materials field.

ETA KAPPA NU AWARD: Certificate of merit to the outstanding sophomore in electrical engineering; name engraved on a bronze plaque in Dearborn Hall.

GENERAL ENGINEERING SENIOR AWARD: Certificate of merit to the outstanding senior in general engineering; name engraved on plaque in Covell Hall.

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS: Cash awards, certificate, and travel allowance to regional meeting in support of the student papers contest sponsored by the student branch of IEEE.

AMERICAN SOCIETY OF METALS, TOM JOHNSTONE AWARD: An award of $500 paid by the Oregon Chapter of the American Society for Metals (ASM) to a student majoring in mechanical engineering with a major emphasis in materials science. The award is given to a junior for the senior year.

RALPH N. LUNDE MEMORIAL AWARD: Engineering reference volume presented to the outstanding sophomore or junior student in the Department of Agricultural Engineering; name engraved on a plaque in Gilmore Hall.

WESLEY NISHIMURA MEMORIAL AWARD: Cash award to outstanding junior in the Department of Electrical and Computer Engineering.

PI TAU SIGMA AWARD: One handbook presented to the outstanding sophomore in mechanical engineering.

R. L. RICHARDSON MEMORIAL AWARD: Certificate of merit to a graduating senior who, in addition to scholastic achievement, has made a noteworthy contribution to the educational activities or programs of the School of Engineering. Name engraved on a plaque displayed in the recipient's department for one year.

JOSEPH SCHULEIN AWARD: Certificates of merit to a graduating senior and a graduate student who, in addition to scholastic achievement, have made contributions to the educational activities or programs of the Department of Chemical Engineering.

SIGMA TAU AWARD: A medal awarded each year by the Tau Beta Pi chapter to the sophomore student in engineering who as a freshman was the most outstanding student.

School of Forestry

WILLIAM M. ESKEW MEMORIAL AWARD: Dedicated to memory of William Eskew and awarded annually for outstanding performance in Forestry Orientation Day contest competition.

KELLY AXE AWARD: Presented by Kelly Axe Company to the senior in forestry who has contributed most to the success of the School of Forestry.

XI SIGMA PI PLAQUE: Awarded each year to the student in forestry who has maintained the highest GPA during the sophomore year.

School of Home Economics

OMICRON NU ACHIEVEMENT AWARD: Awarded annually to one to four outstanding seniors in home economics. Based on high scholarship, leadership, and service in home economics and on all University activities.

OMICRON NU FRESHMAN AWARD: Awarded to the freshman in home economics with the highest GPA who has been enrolled three terms at OSU.

OMICRON NU JUNIOR AWARD: Awarded to a junior in Omicron Nu elected by members of the organization for contributions to the community through extracurricular activities.

OREGON DIETETIC ASSOCIATION ACHIEVEMENT AWARD. An annual award of $100 to a dietetics major entering an approved internship. The recipient is chosen on the basis of ability, professional promise, work experience, and activities.

STOKELEY-VAN CAMP, INC. AWARD: A silver tray given to a top-ranking graduating senior in home economics by Stokeley-Van Camp, Inc.

School of Pharmacy

BRISTOL LABORATORIES AWARD: An engraved plaque and a personalized medical reference manual awarded to a graduating senior who has combined scholastic excellence with professional service.

KAPPA PSI AWARD: Awarded to a graduating chapter member on the basis of leadership, service, and character.

LAMBDA KAPPA SIGMA ETHEL JAY HEATH KEY: Awarded to chapter members in the upper 10 percent of the graduating class.

LAMBDA KAPPA SIGMA RECOGNITION AWARDS: Awarded to graduating senior members selected on the basis of high academic performance, professional interest, and outstanding service.

LEMMON PHARMACAL AWARD: A certificate and a $150 check awarded to an outstanding graduating senior.

LILLY ACHIEVEMENT AWARD: An inscribed trophy encasing a gold medal awarded to a graduating senior for scholastic achievement, professional service, and leadership.

MCKESSON DRUG COMPANY AWARD: A plaque presented to the president of the student branch of the Oregon-American Pharmaceutical Association for recognition of outstanding service and leadership.

MCNEIL AWARD: A mortar and pestle awarded to a graduating senior who exhibits interest and excellence in pharmacy administration. Recipient is eligible to compete for a $2,000 McNeil Consumer Products Company Scholarship.

MERCK, SHARP, AND DOHME AWARDS: *The Merck Manual* and the *Merck Index* awarded to two graduating seniors with outstanding scholastic achievement in pharmaceutical chemistry and pharmaceutics courses.

OREGON SOCIETY OF HOSPITAL PHARMACISTS AWARD: Awarded to two graduating seniors who have shown aptitude and distinct interest in hospital pharmacy.

OREGON STATE PHARMACEUTICAL ASSOCIATION AWARD: A plaque and a check awarded to a graduating senior for outstanding contribution to the advancement of pharmacy through involvement in professional associations.

PORTLAND RETAIL DRUGGISTS ASSOCIATION AWARD: A plaque and a check awarded annually to the graduating senior with an outstanding interest and activity in the professional, political, and economic matters surrounding drug distribution.

PROFESSIONAL SOCIETY OF PHARMACISTS AWARD: Awarded to a graduating senior for outstanding service to the profession of pharmacy.

RHO CHI AWARD: An advanced reference work in pharmacy or related health field awarded each year to a junior having the highest scholastic rating in professional studies.

RHO CHI CERTIFICATES OF MERIT: Awarded to juniors on the basis of scholastic excellence in professional studies.

SMITH KLINE CORPORATION AWARD: An engraved plaque to a senior selected for superior achievement in clinical pharmacy.

UPJOHN PHARMACY ACHIEVEMENT AWARD: An inscribed plaque and a $100 check awarded to a graduating senior for outstanding performance and interest in research in the pharmaceutical sciences.

School of Veterinary Medicine

MERCK VETERINARY AWARD: Presented annually to the junior and senior students with the highest GPA in the School of Veterinary Medicine.

OREGON VETERINARY MEDICAL ASSOCIATION AWARD: $150 awarded annually to an Oregon resident in his or her first year of veterinary school.

Academic Services and Special Programs

William Jasper Kerr Library

Rodney K. Waldron, *Director of Libraries*

The William Jasper Kerr Library is a six-story building containing 910,000 volumes, 380,000 government documents, and nearly 850,000 microform pieces. Materials are, with a limited number of exceptions, on open shelves directly available to faculty and students.

The library is arranged in two major subject divisions. The first four floors comprise the social science, humanities, and business division. Located on the first floor are newspapers, U.S. and U.N. publications, the Reserve Book Room, and the Map Room.

The second (main) floor houses the general periodicals and subject areas of philosophy, psychology, and history. The reference services for the division are located on this floor along with the main card catalog for the entire library. The central circulation desk is also on this main floor.

The third floor is occupied by administrative, acquisition, and cataloging offices and resources in economics, law, and the social and political sciences.

The fourth floor houses material in the fields of education, literature, music, and art. The Curriculum Library and the Special Collections Room are also on this floor.

The science-technology division is located on floors five and six. The fifth floor contains the reference services of the division which include a card catalog of the materials on the top two floors. On the fifth floor are the collections in theoretical and applied science and floor six contains those in agriculture, forestry, pharmacy, and engineering.

The library offers the latest in automated bibliographic searching through the Library Information Retrieval Service (LIRS). Detailed information about this service is available at both the social sciences-humanities (second floor) and the science-technology (fifth floor) reference desks.

Carrels for Ph.D. candidates and faculty, individually assigned on a term basis, are provided on all floors. Each floor also has a conference room for use of undergraduates and others. All book collections are under the direction of subject specialists.

Collections. The books in the library and the 28,000 or more volumes added annually are closely coordinated with teaching and research. The collections are therefore primarily technical and scientific. although substantial increases are being made in books for the humanities and social sciences. Subjects in which special strength has been developed are textiles, costume design, nutrition, mathematics, horticulture, taxonomy, and oceanography. Collections of some distinction are also being built in biology, food technology, chemistry, plant pathology, mycology, and entomology. Over 5,900 periodicals are received currently. These periodicals represent a portion of the 17,600 total serials received by the library. A major portion of the library's holdings are consequently bound serials. Newspapers received currently, a number of which are on microfilm, total 160. The library has one of the more comprehensive map collections in the Northwest. This ever-growing collection now contains about 167,000 maps.

Like most large libraries, Kerr Library is a general depository for publications of the U.S. Government. In addition, the library receives, on a depository basis, materials from the United Nations, official publications of the state of Oregon, and materials from many industrial and business organizations and institutions.

Books may be taken for home use by anyone connected with Oregon State and by others with permission. Bound and unbound journals do not circulate. Students may keep books for two weeks, with privilege of renewal. Faculty members may borrow for more extended periods with exclusive borrowing rights for the initial two-week period.

All books, numbering over 3,800,000 volumes, in the libraries of the several state institutions of higher education are available, through unified administration, to the students and faculty of Oregon State. In addition, chiefly through the facilities of the Pacific Northwest Bibliographic Center, books are borrowed from and lent to other libraries in the Pacific Northwest and throughout the nation and world.

Unified Facilities. Library facilities of the state institutions of higher education in Oregon are coordinated through the Library Council of the Oregon State System of Higher Education.

The collections at the several institutions are developed to meet special needs on each campus, but the book stock of the libraries, as property of the state, circulates freely to permit the fullest use of all books. Faculty members and students from the various institutions of the Oregon State System of Higher Education may borrow directly from libraries on other campuses on presentation of an identification card.

University Honors Program

Margaret E. Meehan, *Director*

The University Honors Program offers enriched educational opportunities to students of superior scholastic ability. All students in the program participate in an agenda of honors colloquia, and they may elect special honors seminars. In their junior year, honors students begin departmental honors work, the nature of which is determined by the department. It may include special seminars, guided reading, independent study, research, and a senior project or thesis.

In honors colloquia and seminars, honors students and their elect faculty, in small groups of from ten to fifteen, consider and explore together select topics or themes. Intended to enliven awareness and understanding of the world of knowledge and of problems and issues of common and critical concern, these special or particular subjects are ideally pursued through thoughtful discussions and analysis and the articulate exchange of interpretations and values.

Admission. Entering freshmen are admitted to the University Honors Program on the basis of high scholastic achievement, suitable scores on the Scholastic Aptitude Test, and letters of recommendation. Oregon State University and transfer students are admitted on the basis of their grade-point average and are eligible for admission through the first term of their junior year.

Application. For application forms or for further information, students may phone, write, or, always welcome, they may visit the University Honors Program, Bexell Hall 209.

Requirements. To graduate in the University Honors Program, students are required to:

1. Maintain a minimum grade-point average of 3.25, and in the work of their major fields maintain the minimum grade-point average set by their respective departments.

2. Complete eight honors colloquia. (First-term juniors coming into the program may request adjustment of the colloquia requirement.)
3. Satisfy, in their junior and senior years, departmental requirements, including the completion of a senior project or thesis.

Honors Courses

Ho 250 Honors Colloquia 1 hour each term 1 ①
Reserved for students in the University Honors Program. Graded P/N.

Ho 350 Honors Colloquia 1 hour each term 1 ①
Reserved for students in the University Honors Program. Graded P/N.

Ho 407 Honors Seminar Terms and hours to be arranged
Reserved for students in the University Honors Program.

University Studies

Judith L. Kuipers, *Dean*

The following interdisciplinary course, offered under the *Univ* prefix, is sponsored by the Office of Undergraduate Studies.

Univ 330 **Bioethics** 3 hours 1 ③
An introduction to ethical decision making. Demonstration of the principles of ethical decision making; application of these principles to selected problems in scientific and medical fields; critical examination of pressures affecting such decision making. Emphasis on ethical, rather than technical, aspects of each problem. Open to students in any field.

Summer Term

Duane Andrews, *Director*
Anita F. Whittle, *Assistant to the Director*

Nearly every department on campus offers courses during summer term. Most courses are scheduled in an eight-week term in which classes meet four hours per week. Students who want a more accelerated schedule may sign up for sequences or workshops. Sequences typically meet for several hours a day during an eleven-week term; many carry a full year's credit in a subject. Workshops typically meet several hours a day for two to six weeks and carry proportionally less credit. More than 800 courses, sequences, and workshops are offered each summer.

Students enrolled in the eight-week term may earn up to twelve hours of credit, or more with the approval of their dean. Students enrolled in the eleven-week term may take one complete sequence plus six hours of credit, making a total of 15-18 hours in the eleven-week period.

University and private housing is plentiful in summer. Information and application forms for University housing are available from the OSU Department of Housing.

Nonresidents and residents pay equal fees in summer. There are no admission requirements for summer term and no application is necessary. Students simply register for courses. However, attendance at summer term does not guarantee admission to the University; to attend OSU other terms, formal admission must be made through the Office of Admissions.

The *Summer Term Bulletin* contains information on courses, tuition, registration, and housing. For a free copy, write the Summer Term Office.

International Education

John Van de Water, *Director*
Marvin L. Durham, *Foreign Student Adviser*
Carol Martin, *Foreign Study Adviser*
Joe Cousins, *Assistant Foreign Student Adviser*

To promote policies, programs, and activities that will contribute to a broader understanding among nations and peoples, the University combines on-campus activities with programs of study, research, teaching, and technical assistance in many areas of the world.

The foreign study adviser assists students who wish to participate in the study abroad programs of the University and assists in developing opportunities for travel and work abroad.

The foreign student advisers assist students from abroad in their personal, social, and academic adjustment to American university life. Additional assistance is given in connection with visas and finances. The advisers help to promote educational and social experiences between foreign students and American student groups, faculty, and community.

West International House serves as an international residence hall for the University campus. More than 250 foreign and American students reside at West, where a variety of academic and social programs of a cross-cultural dimension are offered. West International House is jointly administered by the Office of International Education and the Student Housing Office.

Foreign Study Programs

The Oregon State System of Higher Education sponsors overseas study centers in France, Germany, Japan, and Mexico. The Oregon study centers administered by Oregon State University are:

Country	*University*	*Resident Director*
France	University of Poitiers	Katherine Kirsch (UO)
Germany	University of Hohenheim University of Mannheim University of Stuttgart University of Tubingen University of Konstanz	Fritz Kramer (PSU)
Japan	Waseda University	Peter Anton (OSU)
Mexico	University of Guadalajara	José Gutierrez (WOSC)

These centers—each with a different type of program—allow qualified students from a wide variety of disciplines to earn two to three terms of academic credit from Oregon State University while pursuing their studies abroad. Instruction at the French, German, and Mexican universities is in the native language; thus candidates for admission must demonstrate language proficiency for full participation in the academic, cultural, and social life of the university to which they apply. Center participants are enrolled for a language and orientation course in each country immediately before the beginning of the school year. At Waseda University in Tokyo, where students have an opportunity to study the history, culture, and economic conditions of Japan, instruction is in English. Proficiency in Japanese is desirable but not a prerequisite.

Other study abroad programs:

The *Liberal Arts Study Program* is offered for OSU credit in London, England; Cologne, West Germany; and Avignon, France, through the Northwest Inter-Institutional Council on Study Abroad. Students may enroll for one or more terms of art, history, drama, political science, literature, language, or other subjects especially pertinent to the London, Cologne, or Avignon locale.

Under the *New Zealand Exchange Program*, juniors and seniors in agriculture may study at Lincoln College in Canterbury, New Zealand, while registered at OSU.

The Australian Exchange Program enables undergraduate business majors to spend three terms at the New South Wales Institute of Technology in Sydney, Australia.

For details on requirements, eligibility, and opportunities for study abroad, including summer programs conducted by OSU abroad, see the foreign study adviser.

English Language Institute

Allen Sellers, *Acting Director*
Kristy Spikes, *Assistant to the Director*

General information. The English Language Institute offers multi-level intensive English language courses in vocabulary and reading, structure, speech, writing, listening comprehension, and study skills, as well as cultural and social orientation to the American university community. Enrollment is about evenly divided between students sponsored by foreign governments and international organizations and those who are privately supported. The institute's primary function is to help provide students with the level of broad language skills necessary for competent study at an American college or university.

The academic experience is supplemented by social, cultural, and recreational activities. Also, the conversant program furnishes an opportunity for at least one hour a week of conversation with native speakers, usually University students. In addition, students already admitted and enrolled at Oregon State are provided assistance in evaluating language skills, identifying deficiences, and designing the supplemental course work necessary to overcome these deficiencies while continuing in their University programs.

Students at the English Language Institute have the same privileges as regularly enrolled American students in the use of campus recreational facilities, library, bookstore, student health, and counseling services.

English for specific purposes. The Division of Special Programs of the English Language Institute operates on the basis of proposals submitted to it by foreign educational missions, embassies, and international organizations. Unlike the institute's ongoing core curriculum in general language skills development, the Division of Special Programs develops curricula to serve the specific needs of sponsored trainees.

English for science and technology clearinghouse. The English Language Institute houses an international clearinghouse for teaching materials and methods in English for science and technology. The clearinghouse publishes the *ESP Newsletter*, a monthly publication available by subscription and containing information related to research in English for science, technology, and other specific purposes.

Humanities Development Program

Peter J. Copek, *Director*
Laurie McKenzie-Carter, *Administrative Assistant*
Aileen Ajootian, *Bibliographer*

The Humanities Development Program, supported by grants from the National Endowment for the Humanities and the National Oceanic and Atmospheric Administration, offers disciplinary and interdisciplinary course work in three areas of study. Courses in the program enable students to depart from the traditional ways a subject has been approached within the bounds of academic specialties. In particular it links the study of the humanities with programs in the scientific and professional schools. All courses in the program are open to any student, regardless of major, and can be used to satisfy the University's general education requirements. Conferences, lectures, and film series enrich the curricular offerings. Distinguished visitors are brought to the campus by the program throughout the year, and these visits are coordinated with topics under discussion in the courses offered by the program.

Areas of Study

Northwest Studies examines the historical events, the cultural heritage, and the present state of the "Oregon Country." Courses in this area focus on Northwest literature, archaeology, history, culture, the American frontier, and the American Indian. An interdisciplinary seminar sums up these various studies.

Marine and Maritime Studies links the humanities with the social and marine sciences in examining the "sea community" as a social and cultural phenomenon as well as an area of scientific inquiry. Courses in this area include Maritime Art, Literature and the Sea, Prehistory/Maritime Adaptations, Maritime History and Culture, Contemporary Issues in Oceanography, Latin America and the Sea, and the Impact of the Sea on the German Mind.

Twentieth Century Studies offers courses in which the primary objective is to explore and understand the experience of contemporary social life in the developed West and in non-Western societies as a complex, evolving whole. Course work in this area includes a series of four core courses plus thematic complements, including: Class in Contemporary American Life, Film and Society, Political Communities, the Mythology of Modern Culture, Science and Society, Technology and Progress, Ethics and Values in Engineering, and Bioethics.

The staff of the Humanities Development Program offers information and advising about courses in the program. Reading materials related to courses are also available in the office.

Museums, Galleries, and Collections

The educational resources of the University include museums, 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, 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.

The Horner Museum, the Natural History Museum, and the Marine Science Center at Newport aim to acquaint the public with our cultural heritage, history, fauna, flora, and the distinctive features of Oregon. Most other collections serve primarily research and teaching functions and may be viewed by prior appointment with their curators. Permanent collections and museums include:

The Horner Museum (L. Skjelstad, Director) contains materials pertaining to the natural and human history of Oregon, as well as objects from other cultures. The museum's purpose is to conserve the cultural and scientific heritage of the area and provide educational and research opportunities for OSU students and faculty, and the public. Exhibits change two or three times a year. The museum is located in the basement of Gill Coliseum.

The University Archives (Laurie Filson, Archivist) is the official repository for the records of the University. Holdings include departmental records, University publications, an alphabetically arranged reference file, more than 100,000 photographs, a growing collection of faculty manuscripts, an oral history collection, and several dozen scrapbooks. The archives, in the basement of the Administrative Services Building, maintains the largest microfilming operation on campus.

The Natural History Collection (R. M. Storm, Curator) includes 550 mounts of birds and mammals in the J. C. Braly Collection, housed on the first floor of Cordley Hall II. A collection of specimen skins on the fifth floor is used mainly for teaching.

The Public Wing of the OSU Marine Science Center at Newport (D. E. Giles, Curator) includes 17 aquariums which generally accommodate about 80 species of marine fishes and 200-300 species of invertebrates. Displays present a spectrum of marine subjects, including historic voyages, the earth's crust, coastal geology, tides, oceanic circulation, estuaries, and the marine resources of Oregon.

The Archaeological Collection (D. R. Brauner, R. E. Ross, Curators) consists of material specimens, artifacts, field notes, drawings, sketches, and photographs accumulated in the course of archaeological investigation. Altogether, several thousand items of primary archaeological documentation comprise this collection, which is housed in Waldo Hall.

The Neumann Collection (T. C. Hogg, Curator), a gift from Holm W. Neumann, Ph.D., M.D., includes several hundred human bones and fossil casts, anthropometric equipment, and approximately 5,000 volumes on anthropological history, theory, and methodology. All of the materials are housed in Waldo Hall.

The Archive for the History of Science and Technology (P. L. Farber, Curator), located in Weniger Hall, is part of the research resources of the program in the history of science. The collection consists of manuscripts, books, notebooks, and correspondence of researchers in science, agriculture, forestry, and engineering. The collection is particularly strong in documents concerning these fields in the Pacific Northwest.

The Department of Clothing, Textiles, and Related Arts (R. E. Gates, Curator) houses a collection of more than 700 historic and ethnic textiles. Among the earliest textiles in the collection are those from Coptic Egypt and Peru. A collection of 300 historic American costumes dates from 1805 to the present. The materials are housed in Milam Hall.

The Systematic Entomology Laboratory (J. D. Lattin, Curator), housed in Cordley Hall, contains approximately 2,200,000 insects and mites, chiefly from the Pacific Northwest. The collection is especially strong in Hymenoptera, Coleoptera, Homoptera, Diptera, and Hemiptera. Of special interest are the collections of beetles of the Pacific Northwest, sphecoid wasps of the world, bees, mites associated with scarabs, marine mites, leaf hoppers, plant bugs, and aquatic insects.

The Fisheries and Wildlife Bird and Mammal Collections (B. J. Verts, Curator) include more than 10,000 specimens of birds and 7,500 specimens of mammals, as well as the Braly Ornithological Collection, Overton Dowell, Jr. Bird Collection and field notes, Alex Walker Ornithological Collection and Library, Oregon Game Commission Collection, and Grace McCormac French ornithological notes and literature. The collections are on the lower floor of Nash Hall.

The Forest Products Collection (R. L. Krahmer, Curator) contains approximately 2,500 species of wood, primarily from North and South America, Southeast Asia, and Africa. The collection is housed in Peavy Hall.

The Department of Art Slide Collection (E. Bostwick, Curator), in Fairbanks Hall, contains 48,000 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.

The Fine Arts Collection (N. Corwin, Curator), consists of medieval illuminated manuscript pages, older European and Japanese prints, twentieth century paintings, prints, mosaics, sculpture, and crafts. Selections from the collection are exhibited occasionally in the Fairbanks Gallery.

The Geological Collections (R. S. Yeats, Director), located in Wilkinson Hall, 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. The Petrology Collection (H. E. Enlows, Curator) contains thousands of rock specimens from many parts of the world. The Silurian 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 except China.

The Herbarium (K. L. Chambers, Curator), housed on the fourth floor of Cordley Hall, contains about 200,000 named specimens of seed plants, ferns, mosses, and fungi. Emphasis is on collections from western North America. The herbarium is also the repository for the Morton E. Peck Herbarium of Willamette University, a research collection of Oregon flora consisting of more than 30,000 sheets. Part of the herbarium, a collection of 750 sheets of marine algae, is housed at the Marine Science Center in Newport. Another part, the Mycological Collections (W. C. Denison, Curator), consists of approximately 40,000 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.

The Ichthyological and Herpetological Collection (C. E. Bond and R. M. Storm, Curators) contains more than 6,000 cataloged lots of fish representing 30,000 specimens. In addition, there are about 100,000 uncataloged specimens available for study. The collection emphasizes fishes of the Pacific Northwest, but specimens from many parts of the world are held. The herpetological section contains more than 10,000 specimens, mostly from western North America. The collection is located on the ground floor of Nash Hall. Use of the collection is restricted to qualified students and investigators.

The McDonald Collection (R. K. Waldron, Director), on the third floor of Kerr Library, consists of rare books. Fine examples of typography, works of famous illustrators, numerous fine bindings, and several first editions are represented in the collection.

The Memorial Union Gallery (G. F. Stevens, Director) 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. Local artists exhibit in the gallery in Memorial Union East.

The Fairbanks Arts Gallery (B. Chappell and N. Corwin, Directors), exhibits monthly shows of contemporary art by local, regional, and national artists. On occasion, the gallery's exhibits are drawn from the Department of Art's collection. The gallery is located on the first floor of Fairbanks Hall.

The Honors Program Gallery (M. Meehan, Director), on the second floor of Bexell Hall, shows changing exhibits of art from campus collections.

The Women's Center Gallery (Lynn Jackson, Acting Director), schedules two exhibits each month of OSU students and local artists. The gallery is in the Women's Center.

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 Communication Skills Center offers a free drop-in writing lab and tutored programs in grammar, spelling, vocabulary, and punctuation. In addition, a number of free or low-cost courses are scheduled in reading, writing, vocabulary, and study skills.

The Mathematical Sciences Learning Center provides self-study materials for mathematics, computer science, and statistics courses, as well as testing, tutors, and equipment.

Other schools, departments, or programs offering learning and resource centers include animal science, business, chemistry, the Counseling Center, botany and plant pathology, education, the Educational Opportunities Program, forestry, geography, health, home economics, foreign languages, music, and political science.

The Office of Student Services maintains listings of locations and hours of operation.

Educational Opportunities Program

Miriam W. Orzech, *Director*

Oregon State University's Educational Opportunities Program (EOP) is designed to provide special assistance to those who have traditionally been denied equal access to educational opportunities. Those who do not meet regular University admission requirements but are recognized as having the potential to successfully complete a college degree program will be considered for admission to the University through the program's special admission category. Students who do meet the University's admission requirements may also apply to EOP.

Each prospective applicant is informed as fully as possible of the kinds of assistance and services the program offers. Assistance and services include information about available financial aid, academic placement testing, tutoring, counseling, EOP developmental classes, academic advising, and academic achievement awards. The full scope of the applicant's opportunities and responsibilities is clarified to prevent misunderstanding and to provide each student with as much self-assurance as possible after official admission and acceptance into the program.

After arriving 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 will determine the nature of the student's participation in EOP. The plan is subject to continual re-examination 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, Waldo Hall 337.

Special Services Project

Lita J. Verts, *Director*

Special Services Project (SSP) is a federally sponsored academic assistance program for those from low-income backgrounds, whose parents did not graduate from a college or university, or who are physically handicapped. SSP provides counseling, tutoring, and access to basic skills-building classes. Students have access to a learning center and a learning laboratory. The progrm also sponsors cultural enrichment activities.

United States citizens or permanent residents may inquire about the program at Waldo Hall, Room 337.

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. Anyone is welcome both to teach and register for classes. Each term, more than 3,000 students enroll in approximately 100 courses.

Class content, which is limited only by the imaginations and interests of the participants, ranges from backpacking to batik, karate to kundalini yoga, dog obedience to wine tasting, and money management to house design. Classes are noncredit, nongraded, and with the exception of expenses for materials, free. Participants are also invited to offer films, guest lectures, conferences, or special seminars under sponsorship of the Experimental College. For more information about this student-administered program, contact the director of the Experimental College.

Women's Center

Lynn Jackson, *Acting Director*

The Women's Center is a gathering place for individuals and groups concerned with promoting the status of women. In addition to office space, the building contains a library, a resource file, and a comfortable lounge.

The center offers educational and entertaining programs which focus on women's issues. Programs include seminars, monthly art exhibits, workshops, films, and lectures. Support groups form every term.

The center gathers, organizes, and makes available materials pertaining to women's issues. Resources include indexes and catalogs, a small lending library of books, job listings, and listings of scholarship and fellowship programs. Referrals and counseling for personal problems are offered as well as information about educational programs, organizations, conferences, career opportunities, and legislation affecting women.

WICHE Student Exchange Program

The Western Interstate Commission for Higher Education (WICHE) Professional Student Exchange Program has been developed to assist students in the 13 western states (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming) obtain access to professional programs not available in their home states. Oregon's participation in WICHE enables qualified resident students to apply for training at designated institutions in physical therapy, optometry, occupational therapy, public health, podiatry, and graduate library studies, in any of the WICHE participating states. Oregon receives students in medicine, dentistry, law, dental hygiene, forestry, architecture, graduate nursing, pharmacy, and veterinary medicine.

WICHE students receive preference in admission and pay resident tuition at state-supported institutions, or reduced tuition at private institutions. Students must make application and obtain certification 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; preprofessional 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 may be obtained by writing to: certifying officer, WICHE Professional Student Exchange Program, P. O. Box 3175, Eugene, Oregon 97403.

Cooperative Education

Joe Hlebichuk, *Director*
Janine Moothart, *Assistant Director*

Cooperative education, or co-op, enables students to enhance their knowledge, personal development, and professional preparation. Also known as field experience, internship, practicum, or externship, co-op blends academic study with productive, on-the-job training in business, industry, government, or social service agencies. Since co-op draws on a variety of resources, it returns benefits not only to the student and to the employer, but also to the community and to the University.

Developing placements. Field placements are directly related to the student's career and educational goals and are jointly supervised by the faculty coordinator and the field placement supervisor. Placements are either full or part time. Students normally earn from three to sixteen credits through courses numbered 410 or 510. Work periods usually alternate with class work between the sophomore and senior years or during graduate studies.

Selection. Before placement, students are interviewed by their faculty coordinator and evaluated for qualifications, interests, and aptitudes. Students selected for the program are then referred to an employer on the basis of the employer's position description and the student's qualifications and needs. The employer interviews candidates and makes the final decision on hiring.

In addition to its placement services, the Office of Cooperative Education serves as a resource center for information on co-op for students, faculty, and potential employers.

National Student Exchange Program

Judith L. Kuipers, *Coordinator*
Sabina Jacques, *Co-coordinator*

The National Student Exchange, a consortium of 61 state-supported colleges and universities, allows students to attend, for up to one academic year, an institution of higher learning in another area of the United States. In bringing together students from different parts of the country, the program encourages participants to broaden their academic, social, and cultural awareness. Through a simplified admissions process, students are able to enroll at their host institutions with the same financial benefits enjoyed by in-state residents. Credits and grades are recorded back at the home campus as a part of the student's regular transcript.

To qualify, a participant must (1) be a full-time student; (2) have sophomore or junior standing during the exchange (Academic Regulation 26e states that a student must complete the last 45 term hours at OSU in order to graduate from OSU); (3) have a minimum cumulative GPA of 2.5; (4) be an Oregon resident.

For more information about this opportunity for educational travel and study in a new environment, contact the dean of undergraduate studies or the student coordinator in the Student Activities Center.

Division of Continuing Education

R. Duane Andrews, *Director*

The OSU Division of Continuing Education provides five major services for adult learners:

1. Extension of credit courses in off-campus locations throughout the state. Adult learners may arrange with colleges, schools, and departments to work toward degrees in off-campus credit classes which are held evenings, weekends, and other convenient times. Credit may be earned also through correspondence courses offered by OSU and other OSSHE institutions.

2. A program of workshops and seminars to meet continuing educational needs of professionals.

3. A conference consultation and management service to meet the educational needs of professional business, industrial, and government personnel.

4. Administration of Thundering Seas, a school for fine crafts located at Depoe Bay. The Thundering Seas program is designed for part-time students who are interested in becoming better craftspersons.

5. Management of the OSU Foundation Center.

Many of the programs available through OSU/DCE are conducted in cooperation with schools, businesses, industries, and governmental agencies.

University Publications

Thomas H. Sanders, *Director*

The Office of University Publications writes, edits, and designs the official publications of Oregon State University, including catalogs, books, posters, brochures, and programs. The office also coordinates production with the OSU Department of Printing.

The OSU Press, the only university-affiliated press in Oregon, publishes books of interest to the University and to the Pacific Northwest. In addition, the press publishes other scholarly materials such as colloquium proceedings and monographs.

Instructional Resources and Materials

Benjamin P. Purvis, *Director*

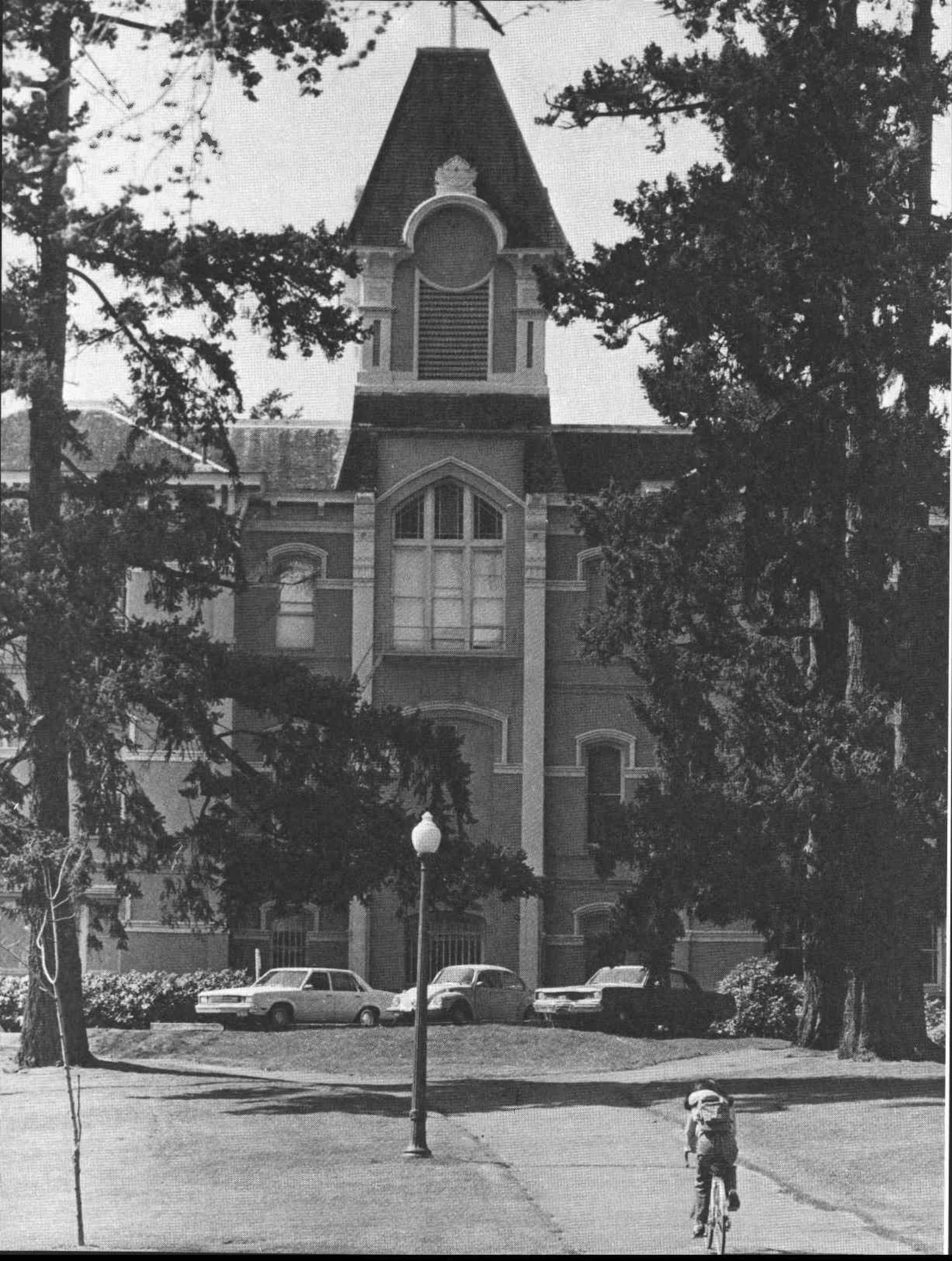
IRAM provides resident faculty with instructional media support to improve their classroom instruction. The system includes six basic services: (a) classroom a-v equipment: scheduling, delivery, and operation; (b) departmental a-v equipment maintenance and repair service (departments pay for all parts and projection lamps; when a-v equipment is used for laboratory purposes, such as self-learning centers, a labor charge may also be assessed); (c) classroom instructional media materials production: art, graphic arts transparencies, and photography; (d) University Learning Center (language lab): faculty and student area for audio and video taped lesson study; (e) film rental service: scheduling, delivery to classroom, set up, show, and return of film (instructional department must pay all film rental fees); (f) consultation service: preparation of course objectives for appropriate instructional materials, a-v equipment specifications, classroom and building design, and instructional research proposal design.

IRAM is also responsible for University services not directly related to resident instruction. These are the Photographic Service, the University Graphic Arts Service, and noninstructional uses of Milam, Withycombe, Wilkinson, and Peavy auditoriums. The user must pay for these services; price lists and/or cost estimates are available from IRAM.

Instructional Development

Dean Osterman, *Director*

The Instructional Development Office offers OSU faculty help in planning and evaluatiing their teaching. Through workshops and seminars, faculty can evaluate teaching skills, improve lectures, reorganize course material, evaluate testing methods, or work on other ways to strengthen their classroom techniques.



Major Programs

Major fields of study and the degrees offered in them at Oregon State University are listed below. The third column shows the college, school(*s*), or in one instance, institute which sponsors each program. The abbreviations used stand for the following: *Ag=School of Agriculture; Bus=School of Business; Ed=School of Education; Engr=School of Engineering; For=School of Forestry; H&PE=School of Health and Physical Education; HEc=School of Home Economics; LA=College of Liberal Arts; Oc=School of Oceanography; Phar=School of Pharmacy; Sci=College of Science; VM=School of Veterinary Medicine.*

Adult Education	*Ed.M.*	Ed
Agricultural and Resource Economics	*B.S.,M.S.,Ph.D.*	Ag
Agricultural Education	*B.S.,M.S.,Ed.M.*	Ag, Ed
Agricultural Engineering	*B.A.,B.S.,M.A.,M.S.,A.E.*	Engr
Agricultural Engineering Technology	*B.A.,B.S.*	Ag, Engr
Agriculture, General	*B.S.,B.Agr.,M.Agr.*	Ag
American Studies	*B.A.,B.S.*	LA
Animal Science	*B.S.,M.S.,Ph.D.*	Ag
Anthropology	*B.A.,B.S.*	LA
Applied Visual Arts	*B.F.A.*	LA
Art	*B.A.,B.S.*	LA
Atmospheric Sciences	*B.A.,B.S.,M.A.,M.S.,Ph.D.*	Sci
Biochemistry	*M.A.,M.S.,Ph.D.*	Sci
Biochemistry and Biophysics	*B.A.,B.S.*	Sci
Bioengineering	*M.S.*	Engr
Biology	*B.S.*	Sci
Biophysics	*M.A.,M.S.,Ph.D.*	Sci
Botany and Plant Pathology	*B.A.,B.S.,M.A.,M.S.,Ph.D.*	Sci
Business Administration	*B.A.,B.S.,M.B.A.*	Bus
Business Education	*B.A.,B.S.,M.A.,M.S.,Ed.M.*	Ed
Chemical Engineering	*B.A.,B.S.,M.A.,M.S.,Ch.E., Ph.D.*	Engr
Chemistry	*B.A.,B.S.,M.A.,M.S.,Ph.D.*	Sci
Child Development and Family Life	*B.A.,B.S.,M.A.,M.S.,Ph.D.*	HEc
Civil Engineering	*B.A.,B.S.,M.A.,M.S.,C.E., Ph.D.*	Engr
Civil Engineering-Forest Engineering	*B.A.,B.S.*	Engr, For
Clothing, Textiles, and Related Arts	*B.A.,B.S.,M.A.,M.S.*	HEc
College Student Services Administration	*M.S., Ed.M., Ed.D., Ph.D.*	Ed
Community College Education (joint with UO and PSU)	*Ed.D.*	Ed
Computer Science	*B.A.,B.S.,M.A.,M.S.,Ph.D.*	Sci
Construction Engineering Management	*B.A.,B.S.*	Engr
Counseling (M.S. in Counseling is joint with OCE)	*M.S.,Ph.D.*	Ed
Crop Science	*B.S.,M.S.,Ph.D.*	Ag
Distributive Education	*B.A.,B.S.*	Bus
Economics	*B.A.,B.S.*	LA
Education, General	*M.A.,M.S.,Ed.M.,Ed.D.,Ph.D.*	Ed
Electrical and Computer Engineering	*B.A.,B.S.,M.A.,M.S.,E.E., Ph.D.*	Engr
Elementary Education	*B.A.,B.S.,M.Ed.*	Ed
Engineering (Computer Science)	*B.A.,B.S.*	Engr
Engineering Physics	*B.A.,B.S.*	Engr
English	*B.A.*	LA
Entomology	*B.A.,B.S.,M.A.,M.S.,Ph.D.*	Sci
Family Resource Management	*B.A.,B.S.,M.A.,M.S.,Ph.D.*	HEc
Fisheries Science	*B.S.,M.Agr.,M.S.,Ph.D.*	Ag
Food Science and Technology	*B.S.,M.S.,Ph.D.*	Ag
Foods and Nutrition	*B.A.,B.S.,M.A.,M.S.,Ph.D.*	HEc
Forest Engineering	*B.S.,M.F.,M.S.,Ph.D.*	For
Forest Management	*B.S.,M.F.,M.S.,Ph.D.*	For
Forest Products	*B.S.,M.F.,M.S.,Ph.D.*	For
Forest Science	*M.F.,M.S.,Ph.D.*	For
French	*B.A.*	LA
General Science	*B.A.,B.S.,M.A.,M.S.,Ph.D.*	Sci
Genetics	*M.A.,M.S.,Ph.D.*	Sci
Geography	*B.A.,B.S.,M.A.,M.S.,Ph.D.*	Sci
Geological Engineering (joint with U. of Idaho)	*B.A.,B.S.*	Engr
Geology	*B.A.,B.S.,M.A.,M.S.,Ph.D.*	Sci
Geophysics	*M.A.,M.S.,Ph.D.*	Oc
German	*B.A.*	LA
Guidance and Counseling	*Ed.M.,Ed.D.*	Ed
Health	*B.A.,B.S.*	H&PE
Health Care Administration	*B.A.,B.S.*	Bus, H&PE, HEc
Health Education	*B.A.,B.S.,Ed.M.*	H&PE, Ed
History	*B.A.,B.S.*	LA
Home Economics, General	*B.A.,B.S.,M.H.Ec.*	HEc
Home Economics Education	*B.A.,B.S.,M.A.,M.S.,Ed.M.*	Ed, HEc
Horticulture	*B.S.,M.S.,Ph.D.*	Ag
Hotel and Restaurant Management	*B.A.,B.S.*	Bus, HEc
Industrial Arts Education	*B.A.,B.S.,M.S.,Ed.M.*	Ed
Industrial Engineering	*B.A.,B.S.,M.A.,M.S.,I.E.,Ph.D.*	Engr
Institution Management	*B.A.,B.S.*	HEc
Interdisciplinary Studies	*M.A.*	Grad School
Journalism (technical)	*B.A.,B.S.*	LA
Liberal Studies	*B.A.,B.S.*	LA
Management Science	*M.S.*	Bus
Marine Resource Management	*M.A.,M.S.*	Oc
Materials Science	*M.Mat.S.*	Engr
Mathematical Sciences	*B.S.*	Sci
Mathematics	*B.A.,B.S.,M.A.,M.S.,Ph.D.*	Sci
Mechanical Engineering	*B.A.,B.S.,M.A.,M.S.,M.E., Ph.D.*	Engr
Metallurgical Engineering (joint with U. of Idaho)	*B.A.,B.S.*	Engr
Microbiology	*B.A.,B.S.,M.A.,M.S.,Ph.D.*	Sci
Mining Engineering (joint with U. of Idaho)	*B.A.,B.S.*	Engr
Music	*B.A.,B.S.*	LA
Nuclear Engineering	*B.A.,B.S.,M.A.,M.S.,Ph.D.*	Engr
Nutrition	*M.S.,Ph.D.*	Nutrition Res Instit
Ocean Engineering	*M.Oc.E.*	Engr
Oceanography	*M.A.,M.S.,Ph.D.*	Oc
Pharmacy	*B.A., B.S., M.S., Ph.D.*	Phar
Philosophy	*B.A.,B.S.*	LA
Physical Education	*B.A.,B.S.*	H&PE
Physics	*B.A.,B.S.,M.A.,M.S.,Ph.D.*	Sci
Political Science	*B.A.,B.S.*	LA
Poultry Science	*B.S.,B.Agr.,M.S.,Ph.D.*	Ag
Psychology	*B.A.,B.S.*	LA
Rangeland Resources	*B.S.,M.Agr.,M.S.,Ph.D.*	Ag
Reading	*Ed.M.*	Ed
Religious Studies	*B.A.,B.S.*	LA
Resource Economics	*M.S.,Ph.D.*	Ag, For
Resource Recreation Management	*B.A.,B.S.*	For
Science Education	*B.A.,B.S.,M.A.,M.S.,Ph.D.*	Sci
Science Education	*B.A.,B.S.,Ed.M.,Ed.D.*	Ed
Secondary Education (degrees are in norms indicated below)*	*B.A.,B.S.*	Ed

* *Basic and standard endorsements:* agriculture, biology, business, chemistry, distributive education, health, home economics, industrial arts, language arts, language arts-social studies, mathematics, physical education, physical science-general science, physics, reading, social studies, trade and industrial education (vocational).

Basic endorsements only: driver education, music, speech impaired.

Sociology	*B.A.,B.S.*	LA
Soil Science	*B.S.,M.S.,Ph.D.*	Ag
Spanish	*B.A.*	LA
Speech Communication	*B.A.,B.S.*	LA
Statistics	*M.A.,M.S.,Ph.D.*	Sci
Trade and Industrial Education	*B.A.,B.S.,M.S.,Ed.M.*	Ed
Veterinary Medicine	*D.V.M.*	VM
Veterinary Science	*M.S.*	VM
Vocational Education	*M.A.,M.S.,Ed.M.,Ed.D.,Ph.D.*	Ed
Wildlife Science	*B.S.,M.S.,Ph.D.*	Ag
Zoology	*B.A.,B.S.,M.A.,M.S.,Ph.D.*	Sci

Additional Programs

Undergraduate: The College of Liberal Arts offers certificate programs in *human services, Latin American affairs,* and *women studies,* which may be taken concurrently with any major degree program. Preprofessional programs in *dentistry, dental hygiene, medicine, medical technology, nursing, optometry, physical therapy, podiatry,* and *veterinary medicine* are offered by the College of Science. In the medical technology, predentistry, premedicine, preoptometry, and preveterinary programs, a bachelor's degree may be earned from Oregon State University after three years on campus plus one year in the appropriate professional school. The College of Liberal Arts offers suggested course work in preparation for the study of *law. Aerospace studies, military science,* or *naval science* may be taken as a comajor in any school.

Graduate: Fields in which graduate minors are offered are listed on page 234.

Definitions

Course—a subject of study offered through a single term.

Sequence—closely related courses extending through more than one term.

Elective—optional rather than required course.

Curriculum (plural *curricula*)—an organized program of study required for a specific degree.

Term hour—one unit of credit representing approximately three hours of the student's time each week for one term. This time may be assigned to work in classroom or laboratory or to outside preparation.

Grade-point average—total number of grade points received for A, B, C, D, or F grades divided by total number of term hours taken. For each term or credit hour completed with an A, 4 grade points are awarded; for B, 3 points; for C, 2 points; for D, 1 point; for F, no points.

Reading a Course Listing

The elements of a typical course listing, found under department headings in the colleges and schools which follow, is illustrated by the political science course printed below.

PS 422 International Law (g)
3 hours 3 ①
Theories and historical development of international law, problems in development, classic cases. Prerequisite: PS 417.

Prefix (**PS**): an abbreviation representing the department offering the course.

Number (**422**): indicates the approximate level of the course (see page 14—Course Numbering System).

Title (**International Law**)

Credit hours (3 hours): the number of term hours of credit awarded for successful completion of the course.

Meeting time (3 ①): the number of class meetings per week and length of the meeting period. 3 ① indicates that the class meets three times a week for one hour each meeting. For another example, 2 ① 1 ③ would indicate two one-hour meeting periods and one three-hour period.

Graduate credit (g): designates that the course may be taken as part of a graduate minor. Undergraduate courses numbered 400-499 that carry a (g) or (G) may be taken for graduate credit. Those designated (G) may be taken as part of a graduate major or minor.

Course description (Theories . . . classic cases.)

Prerequisite (PS 417): the background necessary for successful performance in a course. Occasionally a course will have a *corequisite* usually indicating a course to be taken simultaneously with the course described.

LIBERAL ARTS

FACULTY

As of January 1982

David J. King, *Dean*

Richard L. Clinton, *Associate Dean*

Gordon W. Gilkey, *Dean Emeritus*

J. Jerry O'Connor, *Director, Advising and Student Services; Director, Liberal Studies*

Horton L. Fross, *Director Emeritus, Advising and Student Services*

Professors Emeritus Cormack, W. Davis in Anthropology; Martel, Piper, Sinnard, Solberg in Architecture and Landscape Architecture; Fox, Gilkey, Wasson in Art; Butts, Carter, Childs, Crocker, Foreman, Hewitt, Jeffress, H. B. Nelson, F. Norris, Onstad, Schroeder, E. Smith, Staver, N. W. Wilson in English; Bourbousson, Ferran, Kraft, Kuney in Foreign Languages and Literatures; Heintzelman, J. G. Jensen in Geography; Berkeley, Carlin, Carson, R. W. Smith in History; I. C. Harris, Shideler in Journalism; W. Campbell, Moltmann, O'Connor, Walls, Wilson in Music; F. Harris in Philosophy; McGrath, Swygard in Political Science; Crooks, Mills in Psychology; Foster, F. Parks, Plambeck in Sociology; C. N. Harris, H. M. Livingston, A. L. I. Wallace, C. R. Winger in Speech Communication

Anthropology *Professors* Hogg, Padfield, Smith (department chair)
Associate Professors Beals, Hall, Johnson, Ross, Young
Assistant Professors Brauner, Ovitz, Stander, Tentchoff
Instructor Saleeby
Research Associate Honey

Architecture and Landscape Architecture *Professors* DeDeurwaerder, Ellis, Glass
Associate Professors Metzger, Stadsvold
Assistant Professors Andrick, Kuklok, Read, Stewart (department chair)
Instructor Lindsey

Art *Professors* Bowman, Chappell (department chair), Crozier, Gunn, Jameson, Levine, Munro, Rock, Sandgren, Sponenburgh, Taysom, Wiprud, Wong
Associate Professors Branch, Brown, Hardesty
Assistant Professors Corwin, Fosque, Spark
Instructors Hoffman, Johnson, Ness

Economics *Professors* Harter, Patterson (department chair), Towey, Vars, Wilkins, Wolfson
Associate Professors J. Dost, Farness, Farrell, McFarland, Orzech, Sorenson
Assistant Professors Bible, Dolp, K. Fraundorf, M. Fraundorf, McMullen

English *Professors* C. Garrison, Groshong, R. King, Potts, Weaver
Associate Professors R. Carlson, Copek, R. Daniels, Dankleff, Finnigan, R. Frank (department chair), S. S. Johnson, P. Nelson, Oriard, D. Robinson, Sprinker, Taylor
Assistant Professors Ahearn, Ede, D. Evans, R. Jones, Ludwig, Pfeil, Rice-Sayre, Schwartz, Wess, Willey
Instructors Armstrong, Bohnaker, J. Brunk, Carroll, Engesser, Galperin, L. Garrison, Hartmann, C. Howell, P. Howell, Kimball, Leman, Lundborg, McClanahan, McKinney, Paolo, Robbins, Roth, N. Rudinsky, Runciman, Sher, Tyree

Foreign Languages and Literatures *Professors* Cadart-Ricard, Malueg (department chair), Rossbacher, Sjogren
Associate Professors Carroll, Dill, Kiekel, G. Levine, Lusetti, Stehr, Verzasconi
Assistant Professors Doudoroff, Maclean, Knight
Instructors Gillman, Goesch

Geography *Professors* Highsmith, Northam
Associate Professors Frenkel, Maresh (department chair), Muckleston, Nolan, Pease, Rosenfeld
Assistant Professors Jackson, Kimerling, Matzke

History *Professors* Adolf, D. King, McClintock (department chair), T. Meehan, Murdzek, Shaw, Wax, Williams, Wubben
Associate Professors Ferngren, McIlvenna, Philipp, Robbins, Trow
Assistant Professors Ferguson, Kopperman, Sarasohn
Senior Instructor M. Meehan

Journalism *Professors* Birdsall, Dorn, Phillips, Zwahlen (department chair)
Associate Professors T. Carlson, Deutsch
Assistant Professors Folts, McNees, Sanders

Music *Professors* Brye, Douglass
Associate Professors Borgir, M. Carlson, Eiseman (department chair), Gilmore, Jeffers, Knapp
Assistant Professors Coolen, Heller, Schink
Senior Instructors A. Carlson, Krueger, White

Philosophy *Professor* Anton
Associate Professors Dale (department chair), List
Assistant Professors Leibowitz, Moore, Scanlan, Uzgalis

Political Science *Professors* Dealy, Fuquay, Maddox, McClenaghan, Walter (department chair)
Associate Professor Shepard
Assistant Professors R. Johnson, Liggett, Protasel
Instructor Abendschein

Psychology *Professors* Gillis (department chair), Larsen, Rohde, Warnath
Associate Professors Burt, Cruse, Madden, Murphy, Saslow, Simmons, W. Smotherman
Assistant Professor Taubman
Instructor M. Smotherman

Religious Studies *Professors* Clarke, Hovland (department chair), Yonker
Assistant Professors Borg, Hosoi
Instructor Arnold

Sociology *Associate Professors* Hacker, Jenné, Klemke Langford, Shively, Starnes, Tiedeman (department chair)
Assistant Professors Baumann, Finlay

Speech Communication *Professors* Bennett, Crisp (department chair), Conkey, Doler, Hildebrandt, Keltner, Valentine, Weinman
Associate Professors Robertson, Wallace
Assistant Professors Beachley, George, Kelly, Shaw
Instructors M. Bennett, Bobo, Enns, Evans, Hensley, H. Hildebrandt, Larson, Manuto, McDowell, Riggs, Sanz, Stewart, Van Eman, Wigle

The College of Liberal Arts offers major programs in the humanities, the social sciences, and the arts.

The *humanities* include fields of knowledge and experience having to do with the productions of people as feeling, thinking communicators—English, foreign languages and literatures, journalism, history, philosophy, religious studies, and speech communication.

The *social sciences* include those fields of knowledge having to do with human institutions, customs, and behavior—anthropology, economics, geography, political science, psychology, and sociology.

The *arts* help establish the basis for lifelong creative expressiveness in various art forms including music, the theater, art, architecture, and landscape architecture.

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	History	Psychology
Anthropology	Journalism (technical)	Religious Studies
Art	Liberal Studies	Sociology
Economics	Music	Speech Communication
English*	Philosophy	
Foreign Languages and Literatures*	Political Science	

* *B.A. only.*

The Bachelor of Fine Arts (B.F.A.) is offered in applied visual arts. The major program in geography is offered through the College of Science.

Minors

Students throughout the University may elect minor programs in anthropology, art, economics, English, foreign languages and literatures, history, music, philosophy, political science, psychology, and religious studies.

The College of Liberal Arts also offers many courses in the arts, humanities, and social sciences which are of value to all students and which 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.

Requirements

In addition to fulfilling University requirements (page 13), the candidate for a baccalaureate degree (except for the B.F.A.) must complete the following College of Liberal Arts requirements:

Distribution Requirements

1. Connections (LS 100).
2. A sequence in a laboratory science.
3. A sequence in a social science.
4. A sequence in an additional science or social science from departments not used to satisfy requirement 1 or 2.
5. Two sequences in the humanities from different departments.
6. A sequence in the arts.
7. A second-year foreign language, or a sequence in a non-European culture (African, Asian, Russian, Latin American).
8. Mth 100 or *one* of the following: Mth 121, 122, 162, or 163.

To satisfy requirements 2 through 7, sequences may be selected from courses in a single or in related disciplines. With the possible exception of requirement 7, sequences selected must be outside of the student's major field and must consist of a series of closely related courses with an integrated theme or focus extending through more than one term. Sequences selected must be on the advisory list available in the College of Liberal Arts office or must be approved by the academic adviser and the dean.

Concentration Requirements

A maximum of 60 term hours may be included in either departmental or interdepartmental majors.

For specific requirements in each major see listings below.

Electives

At least 27 hours of elective courses are required for graduation. At least half of the elective hours in a departmental major must be in courses outside of that department.

B.F.A. in Applied Visual Arts

Candidates for the B.F.A. degree must complete only distribution requirements 1, 2, 3, and 4 and one year of a foreign language.

Concentration requirements differ from the 60-hour maximum described above and are outlined under departmental requirements in the Department of Art section below.

Meeting Requirements

To help students meet specific requirements of the University and general distribution requirements of the College of Liberal Arts, the college suggests the following curriculum for the first two years. Specific courses should be selected in consultation with an assigned academic adviser.

Freshman Year	*Hours*
Arts, humanities, or social science sequence	8–12
Laboratory science sequence	9–12
Foreign language or non-European culture sequence	9–12
Connections (LS 100) (required of all freshmen)	1
English Composition (Wr 121)	3
Mathematics	4
Electives	0–9
Sophomore Year	
Humanities or arts sequence	8–12
Second social science or science sequence	9–12
Second-year foreign language (for B.A. degree)	9–12
Major program requirements	18–24
Electives	0–9

Junior and senior programs should be planned in close consultation with the departmental adviser for major requirements and be approved by an adviser.

Teacher Certification

Basic norm programs are offered in art, English, journalism, language arts-social studies, foreign languages and literatures (French, German, Russian, Spanish), music, social studies, and speech communication. Also available are standard norm programs in English education, language arts-social studies, and social science education.

Students interested in qualifying for a state teacher's certificate should consult with the appropriate adviser for the teaching area, e.g., social studies, English, or art. Designated teaching norm advisers are listed in the office of the director of advising.

Certificate Programs

Certificate programs in human services, Latin American affairs, and women studies are offered to all students and may be taken concurrently with any major degree program.

Program on Gerontology

Administered through the School of Home Economics, the Program on Gerontology involves seven schools and fourteen departments throughout the University, including the College of Liberal Arts. 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. Undergraduate students may elect an emphasis in gerontology; graduate students an integrated minor. For further information, contact the director in the Department of Human Development and Family Studies, School of Home Economics.

University Honors Program

The Honors Program provides opportunity for individual enrichment and achievement. For information regarding eligibility, application forms, organization of the program, and advisers, see "University Honors Program," page 37.

Liberal Arts Programs and Courses

AMERICAN STUDIES

The undergraduate, interdisciplinary degree-granting program in American studies is offered for students interested in American society, culture, values, and institutions. Rather than major in one discipline, the student, in consultation with the director, selects relevant courses from all College of Liberal Arts departments and from departments in other schools of the University. A major in American studies may choose to concentrate in ethnic studies (Black, Chicano, Native American) or women studies, may double major in a traditional discipline and American studies, or may combine an American studies major with a commission in aerospace, military, or naval science.

Candidates for the B.A. or B.S. degree must complete the following:

1. University requirements for graduation (see page 13).

2. College of Liberal Arts distribution requirements (see above).

3. A minimum of 45 hours of approved courses including (a) AmS 311; (b) a year's study of American history; (c) a year's study of American literature; and (d) a minimum of 24 upper division hours from at least *three* departments in courses pertinent to a study of American social, cultural, political, or economic development.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

AmS 311 Topics in American Studies
3 hours 1 ③
Selected topics, changed annually, which integrate American ideas, values, institutions, and events. Required of sophomore or junior majors. May be repeated a second year for a maximum of six credits. Open to nonmajors by permission of the director.

***AmS 405 Reading and Conference**
(g) Terms and hours to be arranged
Supervised and directed studies by members of the Board of American Studies or assigned professors, as arranged by the student and the director.

***AmS 407 Seminar (g)**
Terms and hours to be arranged
Close examination of chosen American topics, including methods and research. For seniors or advanced students. Open to nonmajors by permission of the director.

AmS 410 American Studies Internship
(g) 1-12 hours
Directed, supervised, and evaluated work in the field; arranged one term in advance to supplement students' classroom work in preparation for vocational and professional careers.

* Graduate credit for AmS 405 and 407, singly or combined, must not exceed 9 hours.

ANTHROPOLOGY

The Department of Anthropology offers B.A. and B.S. degree programs. Courses meet the needs of students interested in a comprehensive understanding of human societies and cultures past and present. Prehistoric, historic, ethnographic, and linguistic study provide 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, and preparation for pursuits in business, public service, or education.

In addition to University and college requirements, students majoring in anthropology must complete 42-46 term hours which include the following courses: Anth 105,106/312; two adviser-approved 400-level courses in cultural anthropology; 320,321,322/430,431, 432/490,491,492; and an approved topical course. Students electing a minor in anthropology take 18-22 hours of core courses plus 12 hours of electives.

The department also participates in the Master of Art 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.

Lower Division Courses

Anth 105 Introduction to Archaeology and Physical Anthropology
3 or 5 hours 3 ① or 5 ①
Prehistory, paleoanthropology, human and cultural evolution, archaeology, agricultural and urban development.

Anth 106
Introduction to Cultural Anthropology
3 or 5 hours 3 ① or 5 ①
Historic and contemporary cultures, culture change, economic development, language and culture.

Anth 107 Anthropology Today
3 hours 3 ①
Contemporary human issues from an anthropological perspective with anthropological subdisciplines applied to problem solving in modern society.

Anth 199 Special Studies
Terms and hours to be arranged
American Sign Language, 3 hours, graded P/N.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Anth 312 Age, Sex, and Family
3 hours 3 ①
Basic principles and practices of social grouping in human cultures; differences and similarities in people's concepts of aging, sexuality, family, kinship, and territory. Prerequisite: 3 hours of anthropology.

Anth 314,315,316 Peoples of the World
3 hours each 3 ①
Historical and contemporary descriptions of significant regional cultural variations and participation in contemporary world affairs. *Anth 314:* North America. *Anth 315:* Southeast and Insular Asia. *Anth 316:* Africa. Need not be taken in order.

Anth 320,321,322
Physical Anthropology
3 hours each 3 ①
Human and primate evolution, human biological variation. *Anth 320:* processes of evolution, primate taxonomy and behavior. *Anth 321:* primate evolution, fossil humans. *Anth 322:* genetics and morphology of human populations. Prerequisite: Anth 105 or equivalent in biological science. Need not be taken in order.

Anth 323,324,325
Physical Anthropology Laboratory
2 hours each 2 ②
Lecture and laboratory exercises in osteology, anthropometry, anatomy, and serology in human and nonhuman primates. To accompany Anth 320,321,322.

Anth 401 Research (g)

Anth 402 Independent Study

Anth 403 Thesis

***Anth 405 Reading and Conference (g)**

Anth 406 Projects (g)
Section Z, American Sign Language, 3 hours, graded P/N.

***Anth 407 Seminar (g)**

Anth 408 Workshop (g)
Terms and hours to be arranged

Anth 410 Internship
3-15 hours to be arranged
Opportunities for students at junior and first- or second-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. Prerequisite: 6 hours of anthropology.

Anth 411,412,413
Anthropology of North America (g)
3 hours each 3 ①
Anth 411: peoples and cultures before European contact. *Anth 412:* the European colonial period and the consequences for aboriginal cultures. *Anth 413:* the effects of industrialization. Prerequisite: 9 hours of anthropology. Need not be taken in order. Not offered every year.

Anth 414,415,416
Anthropology of Africa (g)
3 hours each 3 ①
Cultures of sub-Saharan Africa, problems and solutions posed in Africa's quest of modernization. Prerequisite: 9 hours of anthropology. Need not be taken in order. Not offered every year.

Anth 430,431,432 Archaeology (g)
3 hours each 3 ①
Method and theory in American archaeology, development of Old and New World civilizations from their paleolithic bases, significance of archaeology to the analysis of human culture. Prerequisite: 9 hours of anthropology. Need not be taken in order.

* Graduate credit for Anth 405 and 407, singly or combined, must not exceed 9 hours.

Anth 433
Archaeology of the Northwest (g)
3 hours 3 ①
Materials and theories relating to prehistoric aboriginal cultures of the Northwest. Evaluation of different theories on the origins and adaptations of prehistoric populations to various ecological zones within the Northwest; comparisons of the cultural development through prehistoric times of the Columbia Plateau, intermontane and coastal zones of Oregon, Washington, and British Columbia. Special emphasis on the theories of origin, subsequent development of prehistoric cultures in the Northwest, and the present circumstances of archaeology in the Northwest. Prerequisite: upper division standing.

Anth 434 Field Archaeology (g)
3 hours to be arranged
Archaeological field strategies emphasizing reconnaissance and survey. Application of field equipment and project management. Prerequisite: Anth 430.

Anth 436 Archaeology Field School
(g) 1-10 hours to be arranged
Lectures, demonstrations, and field exercises in archaeology field methods and techniques. Equipment and supplies, field camp management, site surveying and mapping, site excavation, keeping records, field cataloging, writing site reports. Prerequisite: 9 hours of anthropology.

Anth 440,441,442
World Cultures (g)
3 hours each 3 ①
Description and analysis of different regional cultures of the world. Emphasis on history of different regions, present cultural patterns that are manifest, and implications of these patterns for the contemporary world. Areas include Southeast Asia, India, China, the Arctic, the Carribean, Meso-America, South America, the Pacific, the Middle East, and Europe. Sections may be repeated under different titles. At least one course offered each term. Consult the *Schedule of Classes* for offerings. Prerequisite: 5 hours of anthropology.

Anth 470,471,472
Selected Topics in Anthropology (g)
3 hours each 3 ①
Recent advances in anthropology and their application to special fields of study. Topics vary from term to term but may include ethnohistory, ethnoscience, sociolinguistics, human ecology, history of anthropology, anthropology of religion, political anthropology, economic anthropology, race and racism, culture change, culture and the individual, anthropological theory, education and culture, people in maritime communities, mythology, folklore, cultures of the Northwest, development of maritime cultures, sociobiology, statistical applications, sign language, osteology, eugenics, and applied anthropology. Prerequisite: 9 hours of anthropology. Need not be taken in order.

Anth 480 Cultural Resource Policies and Research Methods (G)
3 hours 3 ①
Description and analysis of requirements and demands for cultural resource management. The rapidly expanding area of cultural resource management; developmental history and procedures of field and laboratory work. Prerequisite: Anth 105,430.

Anth 485 Applied Anthropology (G)
3 hours 2 (1½)
Practical aspects of anthropological work in areas of national and international concern. Emphasis on roles and ethical considerations associated with practicing anthropology. Students encouraged to pursue topics appropriate to career goals. Prerequisite: 9 hours of upper division social science, including at least one 400-level anthropology course.

Anth 490,491,492
Anthropological Linguistics (g)
3 hours each 3 ①
Language as an aspect of human behavior and culture: phonological analysis, grammatical analysis, comparative linguistics, sociolinguistics: cognitive anthropology. Prerequisite: 9 hours of anthropology. Need not be taken in order.

Anth 493,494,495
Linguistics Laboratory (g)
1 hour each 1 ②
Simulated and actual field experience in linguistic, sociolinguistic, and ethnoscientific data collection. To accompany Anth 490,491,492,470 (ethnoscience), and 471 (sociolinguistics). Prerequisite: 9 hours of anthropology.

Graduate Courses
Also see courses marked (g) above.

Anth 510 Graduate Internship
3-15 hours to be arranged
Closely supervised field experience providing opportunities for graduate students to obtain on-the-job experience with off-campus agencies during regular term sessions. Allows students to broaden and deepen their understanding and appreciation of their graduate academic activity. Supervised and evaluated by individual faculty members.

Anth 520 Theory of Culture
3 hours to be arranged
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.

Anth 560
Anthropological Research Design
3 hours 2 (1½)
Critical examination of research design and methodology in anthropology; analysis of methods and procedures of research in the subfields of anthropology. Prerequisite: 9 hours of upper division social science, including at least one 400-level anthropology course.

ARCHITECTURE AND LANDSCAPE ARCHITECTURE

Oregon State University no longer offers preprofessional programs in architecture or landscape architecture. The courses listed below are largely for the use of students in other schools (primarily the Schools of Agriculture and Home Economics). Some of the courses listed will be transferred to the Department of Horticulture in the School of Agriculture during the 1982-83 academic year. Students should consult the *Schedule of Classes* for specific information on these courses.

The sequence in landscape design (ALA 490,491,492) is for students completing their senior year in 1982-83.

Lower Division Courses

ALA 111 Graphics
3 hours 3 ②
Basic techniques of architectural graphic presentation. Manipulation of instruments, freehand perspective, shade, shadow, projections, sectioning. Graphic problem solving as a means of idea generation, evaluation, and communication as directly applied in architecture, landscape architecture, and interior design studios. Consent of instructor required.

ALA 178
Housing and Architectural Philosophy
3 hours any term 2 ① 1 ②
Domestic architecture. Small-house planning and graphic communication with reference to the needs of students in agriculture, business, education, engineering, forestry, and home economics.

ALA 179 Architectural Drawing
3 hours 3 ②
Residential and small structures; detail drawing; development of working drawings.

ALA 180
Architectural House Planning
3 hours 3 ②
Single- and multi-family projects. Prerequisite: ALA 178.

ALA 200 Delineation
3 hours 3 ②
Perception and communication, use of perspective, shade and shadow, orthographic projection, and delineation to show common architectural forms. Skills necessary for discrimination of form, color, and composition and for free experimentation of aesthetic expression. Pencil, pen and ink, and related media skills emphasized in delineation. Prerequisite: ALA 111. Must be taken in order.

ALA 218 Construction
3 hours 2 ②
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.

ALA 280 Landscape Design Theory
3 hours fall or spring 2 ②
Functional and aesthetic aspects of landscape planning in the creation and preservation of human environment.

ALA 290,291 Landscape Design I
3 hours each 3 ③
Application of theory to environmental planning and design. Prerequisite: ALA 111,280. Field study required.

Upper Division Courses

ALA 326,327,328 Plant Materials
3 hours each 2 ②
Trees, shrubs, vines, and perennials and their uses in plant composition. Must be taken in order.

ALA 359,360
Landscape Construction
3 hours each 3 ②
Landscape construction problems; topography, land forms, materials of construction; structures and construction techniques; grading and drainage. Prerequisite: ALA 291. Must be taken in order.

ALA 426,427,428 Plant Composition
3 hours each 3 ②
Aesthetic and environmental aspects of plant materials, planting plans, and specifications. Prerequisite: ALA 291,328. Must be taken in order.

ALA 490,491,492 Landscape Design III 4 hours each 2 ③
A synthesis of all procedures and practices of planning and design in the development of comprehensive plans and specifications. Must be taken in order. Consent of instructor required. Field study required.

ART

The curriculum in art is offered to develop and enrich the professional, intellectual, and cultural background of the student and to provide an awareness

and understanding of the historical and contemporary significance of art as a unique element in society.

Major programs are designed to offer an extensive range of professional development in combination with a choice of other subjects leading to a broad and liberal education. These programs provide a basis for vocational opportunities or later graduate study in such fields as advertising design, applied design, photography, crafts, fine art, art history, and art education.

The department offers: (1) degree programs leading to the B.A. and B.S. degrees in art and the B.F.A. degree in applied visual arts; (2) professional education for students planning to enter an art-oriented occupation or graduate school; (3) elective and service courses for students majoring in other departments; and (4) graduate credit courses which can be integrated into the Master of Arts in Interdisciplinary Studies (M.A.I.S.) degree program offered by the Graduate School. The department also provides for exhibitions, lectures, workshops, and other presentations related to the visual arts.

Candidates for the B.A. or B.S. degree may study in one or more of the following studio areas: craft design, fine arts, or graphic design.

Prospective candidates for the B.F.A. degree may elect one of, or an approved combination of, graphic design, craft design, or fine arts. The College of Liberal Arts requirements for the B.F.A. differ from those for other degrees. Students who have examined the program and who wish to become candidates for the B.F.A. degree should declare their interest to a member of the art faculty.

Departmental Requirements

For the B.A. or B.S. degree:

Core Curriculum—21 hours

Must be completed before taking upper division art courses.

	Hours
Intro to the Visual Arts (Art 101)	4
Basic Drawing (Art 105)	4
Basic Design (Art 110)	4
Drawing/Figure (Art 205)	3
Color Theory (Art 209)	3
Three-Dimensional Design (Art 210)	3

Freshman Year—48 hours

Freshman Orientation (Art 100)	1
Basic Design (Art 110)	4
Basic Drawing (Art 105)	4
Intro to the Visual Arts (Art 101)	4
English Composition (Wr 121)	3
Approved CLA requirements	27
Electives	3
Physical education	2

Sophomore Year—48 hours

Three-Dimensional Design (Art 210)	3
Color Theory (Art 209)	3
Drawing/Figure (Art 205)	3
Approved 200-level studio	6
Intro to Art History (Art 201,202,203)	9
Approved CLA requirements	23
Physical education	1

Junior Year—48 hours

Upper division art studio	9
One year 300-level art history	9
Approved CLA requirements	18
Electives	12

Senior Year—48 hours

Upper division art studio	9
Approved CLA requirements	9
Approved upper-division electives	30

For the B.F.A. degree (a professional degree in graphic design, craft design, or fine arts totaling 108 hours):

Lower Division—43 hours

Core curriculum (see above)	21
Studio	12
Art history (200 level)	9
Orientation	1

Upper Division—65 hours

Art history (300-400 level)	9
Studio	43
Drawing	9
B.F.A. senior seminar	3
Adviser's review	1

Visual Arts Minor—36 hours

The Department of Art offers a minor program for undergraduate students with majors in other disciplines. The minor in visual arts includes the core curriculum of 21 hours and 15 hours of approved electives. At least 12 of the elective hours must be in upper division courses.

Lower Division Courses

Art 100 Orientation
1 hour — 1 ①
A lecture course that introduces incoming freshmen and transfer students to the Department of Art; degree programs, career possibilities, honor programs, and study abroad programs. Graded P/N.

Art 101
The Visual Experience/An Introduction
4 hours — 3 ①; 1 hour to be arranged
An introductory lecture course using visual materials with emphasis on methods and motivations that generate the visual experience, both past and present.

Art 105 Basic Drawing
4 hours — 2 ③; 2 hours to be arranged
Studio course in traditional and experimental drawing techniques with emphasis on developing skills in perception and visual organization.

Art 110 Basic Design
4 hours — 2 ③; 2 hours to be arranged
Studio course that explores fundamental concepts and theories of design through the study of the visual elements and principles of art.

Art 199 Special Studies
Terms and hours to be arranged

Art 201,202,203
Introduction to Art History
3 hours each — 3 ①
A historical survey of architecture, painting, sculpture, and crafts. from prehistory to the present, with emphasis on the development of Western art. Prerequisite: Hst 101,102,103. Recommended that sequence be taken in order.

Art 205 Drawing/Figure
3 hours — 2 ③
Introductory studio work in drawing from the life model, with emphasis on developing drawing skills and technique. Prerequisite: Art 105.

Art 209 Color Theory
3 hours — 2 ③
Studio course in the understanding and application of color theories as they apply to the visual arts. Prerequisite: Art 110.

Art 210 Three-Dimensional Design
3 hours — 2 ③
Studio course in fundamental concepts of design and structure of three-dimensional space and form.

Art 221 Introduction to Fiber Art
3 hours — 2 ③
Studio course applying design elements and principles to simple non loom fiber art techniques.

Art 225 Ceramics
3 hours — 2 ③
Studio course in basic materials and techniques of ceramics, with emphasis on three-dimensional design concepts.

Art 235 Jewelry and Metal Design
3 hours — 2 ③
Studio course in processes and techniques of designing, forming, and fabricating nonferrous metals for jewelry construction and metalsmithing procedures.

Art 241 Beginning Photography
3 hours — 2 ③
Studio course in photography with creative expression and innovative possibilities stressed. Problems in visual theory; demonstrations and lectures on both the technical and historical artistic growth of the medium.

Art 244 Graphic Design/Lettering
3 hours — 2 ③
Studio course in fundamentals of lettering with emphasis on essential techniques and use of tools. Major type families and rendering procedures for comprehensive and build-up lettering. Required for graphic design majors.

Art 245 Applied Design I
3 hours — 2 ③
An extension of Art 110 with emphasis on development of ideas and their effective communication. Techniques and methods of a variety of media appropriate to specific two-dimensional design assignments.

Art 246 Applied Design II
3 hours — 2 ③
An in-depth study of the organization of two-dimensional visual phenomena. Development of a system of techniques and procedures which can be applied to analysis and solution of design problems. Prerequisite: Art 110,245.

Art 249 Calligraphy
3 hours — 2 ③
Studio course in fundamentals of lettering with the edged pen; emphasis on Italic and related Roman alphabets. Optional for graphic design majors. Prerequisite: sophomore standing.

Art 281 Beginning Printmaking
3 hours — 2 ③
An introductory studio course in basic techniques of lithography, intaglio. and woodcut printmaking.

Art 285 Beginning Sculpture
3 hours, 2 terms — 2 ③
Studio course in basic materials and approaches used in sculpture; a foundation for further three-dimensional work in the visual arts.

Art 291 Beginning Painting
3 hours, 2 terms — 2 ③
An introductory studio course with emphasis on basic materials and techniques in painting.

Art 295 Beginning Watercolor
3 hours — 2 ③
An introductory studio course with emphasis on basic materials and techniques in watercolor painting.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Art 321 Fiber Design/Introduction
3 hours — 2 ③
Basic techniques of constructed and surface design textiles, emphasizing the design potentials of fiber. Prerequisite: core curriculum.

Art 322 Fiber Design/Construction
3 hours 2 ③
Various fibers and techniques involved in the construction of on-loom and off-loom textiles. Prerequisite: core curriculum.

Art 323 Fiber Design/Dye Techniques
3 hours 2 ③
Surface design techniques employing various dye application methods. Prerequisite: core curriculum. Offered alternate years.

Art 325 Ceramics
3 hours, 3 terms 2 ③
Intermediate studio course with emphasis on wheel throwing, hand building, functional and nonfunctional forms, and ceramic sculpture. Prerequisite: core curriculum; Art 225.

Art 326 Ceramics/Glazing
3 hours 2 ③
Intermediate studio course in various aspects of glazing, decorative techniques, and practical application of glaze concepts and technology. Prerequisite: core curriculum: Art 225.

Art 335 Jewelry and Metal Design
3 hours any term, 3 terms 2 ③
Intermediate studio course in design, technique, and skill development for jewelry construction with precious and semiprecious materials, and for metalsmithing hand processes of raising, forging, and fabrication with nonferrous metals. Prerequisite: core curriculum; Art 235.

Art 338 Metal Design Studio
3 hours 2 ③
Intermediate studio course in procedures, techniques, and design relationships. Single content areas such as ancient techniques, casting processes, enameling methods, engraving, repoussé, and others offered on a single-term basis. Prerequisite: 6 hours of Art 335.

Art 341,342,343 Photography
3 hours each 2 ③
Intermediate studio courses that investigate the creative aspects of photography. *Art 341:* demonstration of the zone system, photographic chemistry, and archival processes. *Art 342:* critique sessions on technical and aesthetic aspects of the medium. *Art 343:* operation of and techniques of using the view camera. Prerequisite: core curriculum. Must be taken in order.

Art 344,345,346 Graphic Design I
3 hours each 2 ③
Intermediate studio courses in principles and processes of graphic design communication. Projects and exercises stress the generation and refinement of original graphic images and symbols and the application of those images and symbols to the solution of visual communication problems. Prerequisite: core curriculum; Art 244. Must be taken in order.

Art 347,348,349 Graphic Design/Production Processes
3 hours each 2 ③
Intermediate studio courses. *Art 347:* introduction to graphic thinking. Advertising concepts and layout techniques to help communicate an advertising idea. *Art 348:* typography and the technical language and processes essential for designers. *Art 349:* preparation of artwork for the printer; various processes and requirements for graphic reproduction. Lectures, projects, field trips. Prerequisite: core curriculum; Art 244. Must be taken in order.

Art 355,356,357 Illustration
3 hours each 2 ③
Studio courses with lectures and projects in illustration techniques and materials. *Art 355:* introductory course in materials and techniques. *Art 356:* content areas such as book illustration, wildlife illustration, medical illustration, and cartooning. *Art 357:* illustration preparation for mechanical reproduction in two to four colors. Prerequisite: core curriculum. Must be taken in order.

Art 361,362,363 History of Art
3 hours each 3 ①
Lecture course on principal stylistic manifestations of European architecture, painting, sculpture, and crafts from the late Middle Ages to 1750. *Art 361:* Italian Renaissance art. *Art 362:* Northern Renaissance art *Art 363:* Baroque art. Prerequisite: Art 201,202,203. Need not be taken in order.

Art 364,365,366 History of Art
3 hours each 3 ①
Lecture courses covering the principal movements in architecture, painting, sculpture, and crafts in Europe and American since 1750. *Art 364:* late 18th century neoclassicism and the 19th century. *Art 365:* 20th century art from 1900 to 1945. *Art 366:* art since 1945. Prerequisite: Art 201,202,203. Need not be taken in order.

Art 371 Creative Art Projects
3 hours any term, 3 terms 3 ②
Advanced studio work on approved projects in drawing, painting, sculpture, graphic arts, ceramics, metal design, and fabric design. Upper division standing, one year lower division work in the selected medium, and approval of instructor required.

Art 375 Drawing/Figure
3 hours any term, 2 terms 2 ③
Studio course in drawing from the life model; emphasis on developing skills and understanding of the human form. Prerequisite: core curriculum.

Art 376 Drawing/Composition
3 hours 2 ③
Studio course in drawing with emphasis on exploration and structuring of visual relationships. Prerequisite: core curriculum.

Art 381 Printmaking/Relief
3 hours 2 ③
Intermediate studio course in relief printmaking with emphasis on woodcut; may include other relief processes. Prerequisite: core curriculum.

Art 382 Printmaking/Intaglio
3 hours 2 ③
Intermediate studio course in intaglio printmaking. Emphasis on etching, aquatint, and soft ground; may include other intaglio printmaking. Prerequisite: core curriculum.

Art 383 Printmaking/Serigraphy
3 hours 2 ③
Intermediate studio course in basic silkscreen printing techniques including handcut stencils and photo screen methods. Other topics include screen construction, types of fabrics, printing inks. Emphasis on photo silkscreen. Prerequisite: core curriculum.

Art 384 Printmaking/Lithography
3 hours 2 ③
Intermediate studio course in most aspects of stone and metal plate lithography. Prerequisite: core curriculum.

Art 385 Sculpture
3 hours 2 ③
Studio work in sculpture, with emphasis on the development of aesthetic expression through a variety of three-dimensional media. Prerequisite: core curriculum; Art 285.

Art 386 Sculpture/Life Modeling
3 hours 2 ③
Study of human form and anatomy with emphasis on developing modeling skills and techniques. Prerequisite: core curriculum; Art 285.

Art 387 Sculpture/Bronze Casting
3 hours 2 ③
Introduction to principles and processes of lost wax bronze casting techniques. Prerequisite: core curriculum; Art 285.

Art 391,392,393 Painting
3 hours 2 ③
Studio work in painting, with emphasis on painting expressions and observation of recent and current approaches. *Art 391:* figurative expression. *Art 392:* abstraction and nonobjective expression. *Art 393:* contemporary visual expression. May be taken in any order. Prerequisite: core curriculum; Art 291.

Art 395 Watercolor
3 hours, 3 terms 2 ③
Intermediate studio course in painting with aqueous materials. Emphasis on media and composition.

Art 401 Research (g)

Art 402 Independent Study (g)

Art 403 Thesis

***Art 405 Reading and Conference (g)**

***Art 406 Projects (g)**
Section A, Adviser's Review, 1 hour, graded P/N.

***Art 407 Seminar (g)**

Art 408 Workshop (g)
Terms and hours to be arranged

Art 410 Internship (g)
1-12 hours to be arranged
A one-term 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 hours.

Art 421 Fiber Studio (g)
3-5 hours, 3 terms 2 ③
Advanced work in fiber art with emphasis on development of individual directions and interests. Prerequisite: 9 hours of 300-level fiber design.

Art 425 Ceramics Studio (g)
3-5 hours, 3 terms 2 ③
Development of an individual approach to the varied aspects of ceramics. Prerequisite: Art 325,326.

Art 435 Metal Design Studio (g)
3-5 hours, 3 terms 2 ③
Individual study in approved directions to further development of design and technique for jewelry construction, metalsmithing procedures, and other related areas. Prerequisite: 9 hours of 300-level jewelry and metal design.

Art 441 Advanced Photography (g)
3-5 hours, 3 terms 2 ③
Using the camera as a tool to sharpen aesthetic and visual perception. Prerequisite: Art 341, 342,343.

Art 444,445,446 Graphic Design II (g)
3-5 hours each 2 ③
An extension of Art 344,345,346, with problems of greater complexity and broader scope; emphasis on finished work and portfolio development. Prerequisite: Art 344,345,346. Must be taken in sequence.

Art 447 Graphic Design/Portfolio (g)
3 hours 2 ③
Portfolio development; résumé writing; slide portfolio; matting of artwork for presentation purposes; letters of reference. Open to art students and students from other departments.

Art 455 Illustration Studio (g)
3-5 hours, 3 terms 2 ③
Sequence of advanced illustration courses designed to aid in producing original art in special areas of illustration for a professional portfolio. Prerequisite: Art 355,356,357.

* Graduate credit under Art 405, 406, and 407 may not total more than 9 hours.

Art 461,462,463
Styles in American Art (g)
3 hours each 3 ①
Selected topics for specialized study of the visual arts in the United States. *Art 461:* arts and ideas, colonial to 1900. *Art 462:* movements and styles, 1900 to 1945. *Art 463:* directions and issues, 1945 to present. Prerequisite: 9 hours of upper division art history. Need not be taken in order.

Art 464,465,466
Thematic Studies in Art History (g)
3 hours each 3 ①
Specialized study of the several subdivisions of art historical inquiry, including environment, symbolism, the human image, materials, and techniques. Themes are presented as one term offerings and include such topics as: Egyptian art, maritime art, aesthetics of French art, portraiture, wood as an art medium, techniques of intaglio and relief. Prerequisite: 9 hours of upper division art. Need not be taken in order.

Art 475 Drawing Studio (g)
3-5 hours, 3 terms 2 ③
Development of an individual approach to the varied aspects of drawing; emphasis on exploration of traditional and contemporary techniques and styles. Prerequisite: 9 hours of 300-level drawing.

Art 481 Printmaking Studio (g)
3-5 hours, 3 terms 2 ③
Studio workshop in relief, intaglio, lithographic, and silkscreen media on an individual project basis. Prerequisite: Art 381,382,383.

Art 485 Sculpture Studio (g)
3-5 hours, 3 terms 2 ③
Development of individual interests and directions in sculpture. Prerequisite: Art 385,386, 387.

Art 491 Painting Studio (g)
3-5 hours, 3 terms 2 ③
Development of individual interests and directions in painting. Prerequisite: Art 391,392, 393.

ECONOMICS

The Department of Economics offers a major program leading to the B.A. or B.S. degree. Instruction serves the cultural and informational needs of all students interested in economic problems in relation to citizenship; provides a sound basis for later professional or graduate education in economics; supplies a foundation for law, business, or public service; and meets the prescriptions found in professional curricula.

Departmental requirements

An undergraduate economics major must complete at least 50 term hours of economics courses, including the following:

Principles of Economics (Ec 213,214)	8
Microeconomic Theory (Ec 357,458)	7
Macraeconomic Theory (Ec 475,476)	8
Approved statistics course, plus one of the following: Ec 315,380	6

Additional economics courses must be 200-level or above and must include one upper division sequence.
As part of the College of Liberal Arts' distribution requirements, economics majors must complete Mth 101,162,163.

Undergraduate students may elect a minor in economics to complement course work in their major discipline. A minor in economics consists of 24-30 hours, including Principles of Economics (Ec 213,214) and at least 16 hours of upper division courses. The 16 hours should emphasize one of the following areas: international economics, quantitative economics, theory, microeconomic issues, macroeconomic policy, regional economics, labor, prelaw, or economic philosophy and institutions.

Some upper division economics courses are offered on an irregular basis. Students and advisers should consult with the department chair regarding scheduling of particular courses.

Lower Division Courses

Ec 115 Outlines of Economics
4 hours 4 ①
Major economic concepts and institutions: market structure, government economic policies; international economic relationships. Should not be taken in place of Ec 213 or 214.

Ec 199 Special Studies
Terms and hours to be arranged

Ec 213,214 Principles of Economics
4 hours each 4 ①
Ec 213: Microeconomics. Supply and demand, prices and wages, market structures; the economic role of government; economics of energy, the environment, poverty. *Ec 214:* Macroeconomics. Theories of unemployment and inflation; money and banking; international trade; economic growth and alternative systems. Need not be taken in order.

Ec 215 Economic History and Development of the United States
3 hours 3 ①
Survey of U.S. economic history directed toward developing an understanding of contemporary economic institutions and problems and the process of economic development.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Ec 307 Seminar
3 hours 3 ①

Ec 315
Introduction to Economic Research
3 hours 3 ①
Basic methods of economic research; data sources, collection, and presentation; hypothesis formulation and testing. Research project. Prerequisite: a course in statistics and Ec 214; concurrent registration in an economic theory course advised.

Ec 320 Contemporary Economic Issues
3 hours 3 ①
Applications of economic principles to selected U.S. and world economic problems such as unemployment, poverty, pollution, overpopulation, trade and development. Prerequisite: 3 hours of introductory economics. Not offered every year.

Ec 333 Unorthodox Economics
3 hours 3 ①
Critical survey of contemporary reformist and radical economics: scope and method, applied topics. Prerequisite: Ec 214.

Ec 335 Environmental Economics
3 hours 3 ①
Interrelationships between economic activity and the environment; benefits and costs of economic growth; analysis of government policies to affect environmental quality.

Ec 355
The Industrial Market Economies
3 hours 3 ①
Measurement and evaluation of economic performance in large free-market countries since World War II. Output and resource markets examined in terms of achievement of affluence, stability, freedom, efficiency, equity. Particular attention given to performance in the United States, Canada, France, Germany, Italy, Japan, and the United Kingdom. Prerequisite: Ec 214.

Ec 357 Microeconomic Theory
4 hours 4 ①
Intermediate microeconomic theory, prices and output under various market structures. Prerequisite: Ec 115 or 214.

Ec 380
Survey of Quantitative Economics
3 hours 3 ①
Mathematics and statistics used in analysis of economic problems and applications to economic theory and measurement. Prerequisite: Ec 214.

Ec 383 Introduction to Econometric Methods
4 hours 4 ①
Introduction to the methodology of applied economics, including basic mathematical and statistical techniques central to economic research conducted by government and industry. Prerequisite: Ec 357; St 311.

Ec 401 Research

Ec 402 Independent Study

Ec 403 Thesis

Ec 405 Reading and Conference (g)
Graduate credit limited to 9 hours.

Ec 406 Projects

†Ec 407 Seminar (g)

Ec 408 Workshop (g)
Terms and hours to be arranged

†Ec 411,412
Monetary and Banking Theory (g)
4 hours each 4 ①
Nature and functions of money; commercial banking; the money market; monetary, credit, and central banking theory; domestic and international impacts of monetary policy; nonbank financial institutions; foreign banking systems and international banking agencies. Prerequisite: Ec 214. Must be taken in order.

Ec 413 Manpower Economics (g)
3 hours 3 ①
Provides students with: (a) basic knowledge of the economics of the labor market and employment theory; (b) familiarity with the problems and process of measuring labor force activity; (c) appreciation for the evolution of manpower policy at federal, state, and local levels; (d) basic knowledge of the range of federal and nonfederal programs in the manpower field; and (e) understanding of manpower policies and practices in the private sector of the economy. Prerequisite: an introductory course in economics.

Ec 414 Regional Economics (g)
4 hours 4 ①
Determination of level of economic activity within a region. Techniques of regional analysis; location theory, intersectorial flow analysis, input-output analysis, economic base theory. Prerequisite: Ec 214.

Ec 415 Urban Economics (g)
4 hours 4 ①
Implications of agglomeration on the economic base, housing and land use patterns, transportation, the public economy, and social disorganization. Prerequisite: Ec 214.

† Applicable toward a graduate major in agricultural and resource economics, School of Agriculture.

Ec 421 Collective Bargaining (g)
3 hours 3 ①
Theories, processes, and practices of collective bargaining. Prerequisite: introductory economics. Taught concurrently as Sp 421.

Ec 425 Labor Problems (g)
3 hours 3 ①
Sources and nature, labor movement history and objectives, union organizations, public regulation of unions, collective bargaining procedures, collective bargaining contracts. Prerequisite: Ec 214.

Ec 426 Labor Legislation (g)
3 hours 3 ①
Basis of labor, legality of unions and their activities, labor injunctions, unions and antitrust laws, the Norris-La Guardia Act, the National Labor Relations Act and its amendments, the N.L.R.B. and unfair labor acts, cases interpreting labor laws. Prerequisite: Ec 214.

Ec 427 Labor Economics (g)
3 hours 3 ①
Wage determination, distribution theory as applied to wages, employment theory, economic insecurity and public policy, social security. Prerequisite: Ec 214.

Ec 429 Public Expenditure (g)
4 hours 4 ①
Composition and growth of government spending; theory of public expenditure; governmental budgeting, concepts and practice; analysis of public expenditure programs; benefit-cost analysis; intergovernmental fiscal relationships; current topics in economic analysis of public programs. Prerequisite: Ec 214.

Ec 430 Public Finance (g)
4 hours 4 ①
Incidence of government expenditures and taxes; structural characteristics and economic effects of local, state, and federal taxes; current issues in tax and transfer program reform. Prerequisite: Ec 214.

Ec 440,441 International Economics
(g) 4 hours each 4 ①
International trade, international financial arrangements, trade restrictions, capital movements, exchange rates, international economic organizations and financial institutions, comparative growth. Prerequisite: Ec 214. Must be taken in order.

Ec 445,446 Economic Development
(g) 3 hours each 3 ①
Theories and policies for economic development in both the developing and developed parts of the world. Prerequisite: Ec 214. Must be taken in order.

Ec 448
Economic Survey of Latin America (g)
3 hours 3 ①
Evolution of economic systems in Latin America, contemporary organizational forms, institutional economic relations. Prerequisite: Ec 214. Not offered every year.

Ec 450,451
Comparative Economic Systems (g)
3 hours each 3 ①
Contemporary economic systems; capitalism, socialism, communism. Prerequisite: Ec 214. Must be taken in order.

Ec 453 Soviet Economics (g)
3 hours 3 ①
Soviet economic history and structure, economic calculation and performance, money and finance, trends and prospects. Prerequisite: Ec 214. Not offered every year.

Ec 454
Economic History of Modern Europe
(g) 4 hours 4 ①
The industrialization of Europe, origin and development of economic institutions, implications for the industrialization of underdeveloped areas. Prerequisite: Ec 214. Not offered every year.

Ec 458,459 Microeconomic Theory
(g) 3 hours each 3 ①
Decision making in an enterprise economy, price and output under various market structures, welfare economics. Prerequisite: Ec 214. Must be taken in order.

Ec 461 Industrial Organization (g)
4 hours 4 ①
Industrial and financial dimensions of U.S. business and their implications for economic efficiency, economic power, and social control. Prerequisite: Ec 214. Not offered every year.

Ec 463 Transportation Economics (g)
3 hours 3 ①
Economic analysis of the development and structure of the transportation sector of the economy, with particular emphasis on the role played by government regulation and the implications of various deregulatory schemes. Prerequisite: Ec 213.

Ec 465 Health Economics (g)
3 hours 3 ①
Economic foundations of health and medical care policy; demand, supply, and cost relationships affecting health care institutions; productivity and efficiency in health delivery systems; alternative methods for financing medical care; economics of health manpower; health planning. Prerequisite: introductory economics; senior standing.

Ec 470 History of Economic Thought
(g) 4 hours 4 ①
Theory dealing with socioeconomic problems. Prerequisite: Ec 214. Not offered every year.

†Ec 475,476
Macroeconomic Theory and Policy (g)
4 hours each 4 ①
National income and product accounts; theory of aggregate demand, employment, price level, economic growth; monetary and fiscal policy; current economic problems. Prerequisite: Ec 214. Must be taken in order.

†Ec 480,481,482
Mathematical Economics (g)
3 hours each 3 ①
Mathematical methods of economic analysis. Theory of economic structure and optimization developed through calculus and linear methods; these mathematical tools developed simultaneously with their application to economic problems. Some acquaintance with calculus recommended. Prerequisite: Ec 214; Mth 163 or 200. Must be taken in order. Not offered every year.

Ec 483 Econometrics (g)
4 hours 4 ①
Methods of investigating economic activity through the application of statistical methods; survey of alternative procedures of measuring economic activity. Prerequisite: Ec 383.

Ec 487 American Economic History
(g) 4 hours 4 ①
Economic development of United States from colonial times to present. Prerequisite: Ec 214. Not offered every year.

Ec 499 Topics in Economic Analysis
(g) 4 hours 4 ①
An intensive introduction to economic analysis; designed primarily for graduate students with no previous training in economics. Prerequisite: senior or graduate standing.

Graduate Service Courses
See also courses marked (g) above.

Ec 512,513
Economic History and Development
3 hours each 3 ①
Historical development of industrial economies, sources of historical change, structural characteristics, long-term growth trends. Must be taken in order. Not offered every year.

†Ec 514 Macroeconomic Analysis
4 hours 4 ①
Determination of income, employment, and prices according to classical, Keynesian, and monetarist models. Self-adjusting mechanisms and effects of monetary, fiscal, and incomes policies. Prerequisite: Ec 475,476 or equivalent.

Ec 515,516
Contemporary Economic Thought
3 hours each 3 ①
Twentieth century economics; value theory, welfare economics, imperfect competition; institutionalism; theory of employment, money, national income, economic fluctuations; growth; innovations in methodology. Prerequisite: Ec 475,476, or equivalent. Must be taken in order. Not offered every year.

Ec 527,528
History of Economic Thought
3 hours each 3 ①
Contribution of greatest economic thinkers from earliest times to present with particular attention to schools of thought. Must be taken in order. Not offered every year.

Ec 530 Public Policy Analysis
3 hours 3 ①
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.

Ec 540 Human Resource Economics
3 hours 3 ①
Theoretical and empirical analysis of labor force participation, job acceptance, and unemployment. Effects of investment in education and training, health, and information. Determinants of employability, occupational choice, and mid-career changes. Aspects of work-related security and transfer payment programs. Distribution of income and wealth in relation to labor market activity.

Ec 550 Regional-Locational Economics
3 hours 3 ①
Microeconomic regional analysis. Analysis of spatial distributions of economic activity, regional development strategies, project impact statements, regional quality of life, and distribution implications of various private and public decisions involving industrial location, public plans, and private projects.

ENGLISH

The Department of English offers instruction in literature and writing to meet the needs of students (1) who seek the cultural and intellectual values of the undergraduate major or minor, (2) who plan to teach English in the elementary and secondary schools, (3) who plan to pursue graduate work in English, and (4) who desire the broadening influence of humanistic studies.

Major Program

English majors must complete University language requirements for the B.A. degree; complete (1) three hours of Shakespeare (Eng 201 or 202 or 203); (2) two of the following sequences: Survey of English Literature, Survey of American Literature, and World Literature; and (3) a total of 27 hours in upper division courses in the department, including 9 hours in literature be-

fore 1800 and 9 hours in literature since 1800; and (4) History of Western Civilization.

A major in English may be combined with course work in another discipline, such as business, or with a preprofessional program such as premedicine or prelaw.

Courses required for certification as a teacher of English in Oregon high schools are listed under "School of Education."

Minor Program

The minor in English allows students to concentrate in one area of the liberal arts while developing the reading and writing skills often requested by employers. Students minoring in English choose from among four areas of concentration: general English studies, English literature, American literature, and writing. The minor requires 24-30 hours of course work; some of these hours may be applied toward the University's general education requirements.

Graduate Program

The department participates in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) degree program; see "Graduate School."

COURSES IN LITERATURE

Lower Division Courses

Eng 91,92,93
English for Foreign Students
3 hours each 3 ①
Vocabulary building, reading, writing, speaking, and comprehension of spoken discourse adapted to needs of individual. Need not be taken in order. Not offered every year. For further information, contact Office of International Education.

Eng 101,102,103
Survey of English Literature
3 hours each 3 ①
English literature presented in chronological sequences. *Eng 101:* from Beowulf to Milton. *Eng 102:* from Milton through Coleridge. *Eng 103:* from Byron to the present. Need not be taken in order.

Eng 104,105,106
Introduction to Literature
3 hours each 3 ①
Study of types of literature for greater understanding and enjoyment. *Eng 104:* fiction. *Eng 105:* drama. *Eng 106:* poetry. Need not be taken in order.

Eng 107,108,109 World Literature
3 hours each 3 ①
The great plays, poems, and novels of western civilization. *Eng 107:* the Classic World: Hebrew, Greek, Roman, and Christian to St. Augustine. *Eng 108:* the Renaissance to the Age of Reason; Dante to Voltaire. *Eng 109:* the Romantic Revolt; Goethe to Gide. Need not he taken in order.

Eng 110 Comedy in Film
3 hours 2 ① 1 ②
Film as comic art form and social document. One film and two lectures per week.

Eng 111 Tragedy in Film
3 hours **2** ① 1 ②
Film as tragic art form and social document. One film and two lectures per week.

Eng 115 Effective Reading
3 hours 3 ①
To develop better comprehension and greater speed in reading. Offered summer term only.

Eng 116 Vocabulary Building
3 hours any term 3 ①
Vocabulary improvement through reading; study of roots and prefixes with frequent progress tests. Open to freshmen and sophomores only. For further information, contact the Educational Opportunities Program.

Eng 199 Special Studies
Terms and hours to be arranged

Eng 201,202,203 Shakespeare
3 hours each 3 ①
The major plays chronologically. Need not be taken in order.

Eng 211 Selected Topics in Literature and Language
3 hours 3 ①
May be repeated for credit. See *Schedule of Classes* for term offerings.

Eng 253,254,255
Survey of American Literature
3 hours each 3 ①
Readings from American literature with emphasis on major writers. *Eng 253:* colonial and early national literature to Emerson and Thoreau. *Eng 254:* Whitman to Dreiser. *Eng 255:* Sinclair Lewis to the present. Need not be taken in order.

Eng 256
Literature of the Black Man in America
3 hours 3 ①
Study of literary production of America and elsewhere reflecting the contribution of black writers to our literary heritage. Not offered every year.

Eng 263 Great Books
3 hours 3 ①
Great books of the world and their influence. Not offered every year.

Eng 275 The Bible as Literature
3 hours 3 ①
Structure, literary types, ideas of the Bible; its influence on our literature.

Eng 280
Selected Topics in Literature and Society
3 hours 3 ①
Introduction to the study of literature in its social context. Topics change each term. May be repeated for credit.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

The upper division courses marked with an asterisk are not offered every year.

Eng 312 American Literary Beginnings
3 hours 3 ①
Origins of American literature, and of the American character, in writings from the first explorers to the early decades of the 19th century.

Eng 317,318,319 The American Novel
3 hours each 3 ①
Selected American novels from the beginning to the present. *Eng 317:* Cooper to Crane; *Eng 318:* Dreiser to Faulkner; *Eng 319:* Mailer to present. Need not be taken in order.

***Eng 320 American Drama**
3 hours 3 ①
Selected American plays from O'Neill to the present.

***Eng 321**
Contemporary American Poetry
3 hours 3 ①
In-depth focus on a selection of major modern American poets from 1940 to the present.

***Eng 325 Medieval Epic and Romance**
3 hours 3 ①
The better medieval stories, with emphasis usually on Arthurian legends. All readings in English.

***Eng 326**
Chaucer and His Contemporaries
3 hours 3 ①
Major works by the great authors of the late Middle Ages. All readings in English.

***Eng 328**
Literature of the Early Renaissance
3 hours 3 ①
Prose and poetry from Skelton through Sidney.

***Eng 329**
Literature of the Elizabethan Age
3 hours 3 ①
Selected writings from Spencer through Marlowe.

***Eng 330**
The Metaphysical and Cavalier Poets
3 hours 3 ①
Major poetry of Donne and Jonson, as well as such followers as Herbert, Crashaw, Marvell, Carew, Herrick, Lovelace, and Suckling.

***Eng 331 Milton**
3 hours 3 ①
Major poetry of John Milton, with special attention to *Paradise Lost.*

Eng 332 The Augustan Age
3 hours 3 ①
Selected writings of Dryden, Pope, Swift, and their contemporaries.

Eng 333 The Age of Johnson
3 hours 3 ①
Selected writings of Samuel Johnson and his contemporaries.

***Eng 334 Early Romantic Literature**
3 hours 3 ①
Emphasis on Blake, Coleridge, and Wordsworth.

***Eng 335 Later Romantic Literature**
3 hours 3 ①
Emphasis on Keats, Byron, and Shelley.

***Eng 336**
The Age of Dickens (1830-1870)
3 hours 3 ①
Fiction, poetry, and nonfiction prose of such writers as Dickens, Bronte, Carlyle, and Tennyson.

***Eng 337 The Age of Realism and Symbolism (1870-1900)**
3 hours 3 ①
Writings of such authors as G. Eliot, Hardy, Swinburne, and Wilde.

***Eng 338 Literature in Transition**
3 hours 3 ①
English, Irish, and American writers from the turn of the century to World War I, including Conrad, James, Joyce, and Yeats.

***Eng 339 "The Waste Land" and After**
3 hours 3 ①
English and American writers from World War I to the present, including Waugh, Hemingway, T. S. Eliot, Lawrence, and Fitzgerald.

***Eng 340,341,342**
Literature of the Irish Renaissance
3 hours each 3 ①
Eng 340: James Joyce; *Eng 341:* dramatic works of Synge, Yeats, O'Casey, Beckett; *Eng 342:* Yeats. Need not be taken in order.

Eng 345 Methods and Materials of Literary Criticism
3 hours 3 ①
Critical analysis and evaluation of literary texts, based on the principles of literary judgment. Prerequisite: junior standing.

***Eng 354,355,356**
Continental European Literature
3 hours each 3 ①
Continental European literature in translation, chiefly French, German, and Russian. *Eng. 354:* 1870 to 1914; *Eng 355:* 1918 to 1939; *Eng 356:* 1945 to the present. Need not be taken in order. Not offered every year.

Eng 360 Literature and the Sea
3 hours 2 (1½)
American and British literature of the sea; emphasis on the historical and social context. Topics include imagery of the sea, use of the ship as a microcosm of society, the ship's captain as instance of the complex responsibilities of authority, the figures of the sailor as hero and victim.

***Eng 374 The Short Story**
3 hours 3 ①
Survey of the short story; reading and analysis of masterpieces of the form.

Eng 401 Research

Eng 402 Independent Study

Eng 403 Thesis

Eng 405 Reading and Conference (g)

Eng 406 Projects

Eng 407 Seminar (g)
Terms and hours to be arranged

Eng 410 Internship in English
3, 6, or 9 hours to be arranged
Provides upper division English majors with supervised, on-the-job work experience, with accompanying academic readings, with nine hours combined work and study for each three hours of credit. Prerequisite: junior standing in English; 15 hours of literature; 6 hours of writing. Graded P/N.

***Eng 411,412,413**
Development of the Drama (g)
3 hours each 3 ①
Reading and analyzing plays. *Eng 411:* Classical (Greek and Roman). *Eng 412:* Renaissance and Neoclassical. *Eng 413:* Romantic and Modern. Prerequisite: 9 hours of literature. Need not be taken in order.

***Eng 417,418,419 The English Novel**
(g) 3 hours each 3 ①
Selected English novels from the eighteenth century to the present. *Eng 417:* Richardson through Austen. *Eng 418:* Scott through Eliot. *Eng 419:* Conrad through Greene. Prerequisite: 18 hours of literature. Need not be taken in order.

Eng 420 Northwest Literature (g)
3 hours 3 ①
Study of the literature of the Northwest region, including works by Don Berry, H. L. Davis, Madeleine DeFrees, Vardis Fisher, Ken Kesey, Theodore Roethke, and William Stafford. Prerequisite: upper division standing.

***Eng 425**
Studies in Middle English Literature (g)
3 hours 3 ①
Works of Geoffrey Chaucer, with some readings of other writers of the fourteenth and fifteenth centuries. Topics change from term to term; see *Schedule of Classes.* May be repeated for credit for a maximum of 9 hours for M.A.I.S. field of study or graduate minor. Prerequisite: upper division standing; 9 hours of literature or equivalent.

***Eng 430**
Studies in Renaissance Literature (g)
3 hours 3 ①
Particular writers, genres, problems, and movements in sixteenth-century literature. Topics change from time to time; see *Schedule of Classes.* May be repeated for credit for a maximum of 9 hours for M.A.I.S. field of study or graduate minor. Prerequisite: upper division standing; 9 hours of literature or equivalent.

***Eng 435 Studies in Shakespeare (g)**
3 hours 3 ①
Shakespeare's works from a variety of critical and scholarly perspectives, including the development of his verse, the application of archetypal and ritual theory to the plays, the relationship of the plays to their sources, existential philosophy and Shakespearean drama, structure in the tragedies. May be repeated for credit for a maximum of 9 hours for M.A.I.S. field of study or graduate minor. Prerequisite: at least two quarters of Shakespeare and upper division standing.

***Eng 440 Studies in Seventeenth-Century Literature (g)**
3 hours 3 ①
Particular writers, ideas, attitudes, genres, and movements in seventeenth-century literature: British, American, or Continental. Topics change from term to term; see *Schedule of Classes.* May be repeated for a maximum of 9 hours for M.A.I.S. field of study or graduate minor. Prerequisite: upper division standing; 9 hours of literature or equivalent.

***Eng 445 Studies in Eighteenth-Century Literature (g)**
3 hours 3 ①
Particular writers, genres, problems, and movements in eighteenth-century literature: British, American, and Continental. Topics change from term to term; see *Schedule of Classes.* May be repeated for credit for a maximum of 9 hours for M.A.I.S. field of study or graduate minor. Prerequisite: upper division standing; 9 hours of literature or equivalent.

***Eng 450 Studies in Nineteenth-Century Literature (g)**
3 hours 3 ①
Particular writers, genres, problems, and movements in nineteenth-century literature: British, American, and Continental. Topics change from term to term; see *Schedule of Classes.* May be repeated for credit for a maximum of 9 hours for M.A.I.S. field of study or graduate minor. Prerequisite: upper division standing; 9 hours of literature or equivalent.

***Eng 454 Individual Authors (g)**
3 hours 3 ①
Major English authors as listed in the *Schedule of Classes.* May be repeated for credit. Prerequisite: 9 hours of literature. Not offered every year.

***Eng 455 Studies in Twentieth-Century Literature (g)**
3 hours 3 ①
Particular writers, genres, problems, and movements in twentieth-century literature: British, Irish, American, and European. Topics change from time to time; see *Schedule of Classes.* May be repeated for credit for a maximum of 9 hours for M.A.I.S. field of study or graduate minor. Prerequisite: upper division standing; 9 hours of literature or equivalent.

***Eng 460 Studies in Drama (g)**
3 hours 3 ①
Particular dramatists, national movements, conventions, and types of world drama. Topics change from term to term; see *Schedule of Classes.* May be repeated for credit for a maximum of 9 hours for M.A.I.S. field of study or graduate minor. Prerequisite: upper division standing; 9 hours of literature or equivalent.

***Eng 465 Studies in the Novel (g)**
3 hours 3 ①
Particular novelists, national movements, conventions, and types of the novel throughout its history. Topics change from time to time; see *Schedule of Classes.* May be repeated for credit for a maximum of 9 hours for M.A.I.S. field of study or graduate minor. Prerequisite: upper division standing; 9 hours of literature or equivalent.

***Eng 470 Studies in Poetry (g)**
3 hours 3 ①
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 he repeated for credit for a maximum of 9 hours for M.A.I.S. field of study or graduate minor. Prerequisite: upper division standing; 9 hours of literature or equivalent.

Eng 480
Studies in Literature and Society (g)
3 hours 3 ①
Investigation of the relationship between literature and social formations and practices. Topics change each term. May be repeated for credit for a maximum of 9 hours for M.A.I.S. field of study or graduate minor. Prerequisite: upper division standing or permission of instructor.

Eng 481,482,483
Major American Writers (g)
3 hours each 3 ①
Intensive study each term of two or three major authors such as Hawthorne, Emerson, Whitman, Melville, James, Twain, Dickinson, Frost, Eliot, Hemingway, Faulkner. Prerequisite: 9 hours of literature. Need not be taken in order.

Eng 487 Children's Literature (g)
3 hours 3 ①
Reading material suitable for elementary grades and criteria used in selecting books for children.

Eng 488 Literature for Teachers (g)
3 hours 3 ①
For students who plan to teach English. Critical reading and analysis of literature selected primarily from state-adopted texts.

Eng 490
Development of the English Language
(g) 3 hours 3 ①

Eng 491 The Structure of English (g)
3 hours 3 ①
New analytic and descriptive methods applied to English grammar. Prerequisite: senior standing.

COURSES IN WRITING

Lower Division Courses

Wr 40 Basic Writing Skills
3 hours to be arranged
A nontransferable course which does not count toward graduation requirements. Students scoring below selected norms take Wr 40 before taking Wr 121. Self-instructional materials with emphasis on flexible programming. At least three hours a week must be spent in the Communication Skills Center. Graded P/N.

Wr 120
Preparatory English Composition
3 hours 3 ①
Educational Opportunities Program students only. Designed as a transitional course for students with special linguistic backgrounds. Construction and production of university-level written compositions stressed. Does not satisfy Wr 121 requirement. May be repeated for credit for a maximum of 6 hours. For further information, contact the Educational Opportunities Program.

Wr 121 English Composition
3 hours any term 3 ①
Reading serious literature perceptively and writing precise and meaningful prose. Introduction to the methods of exposition: basic sentence patterns; effective organization; fundamentals of paragraph development; the forms of discourse (description, narration, exposition). Wr 121 is the University requirement in English composition. The term in which a student takes it is determined alphabetically; see *Schedule of Classes*. Prerequisite: Students scoring below selected norms take Wr 40 before taking Wr 121.

Wr 199 Special Studies
Terms and hours to be arranged

Wr 214 Business English
3 hours any term 3 ①
Current practices in producing clear, concise business letters with appropriate emphasis on psychology and salesmanship. Prerequisite: Wr 121.

Wr 222 English Composition
3 hours any term 3 ①
Reading serious literature perceptively and writing precise and meaningful prose. Continued practice in exposition with emphasis on the research paper: writing the precis, paraphrasing, using direct quotations, and acknowledging sources. The rhetoric of sentences and paragraphs; techniques of argument and persuasion. Readings emphasize material that provokes student response, provides a variety of references, and affords practical experiences in using primary and secondary sources. Prerequisite: Wr 121.

Wr 224 Introduction to Fiction Writing
3 hours 3 ①
Discussion workshop; encouragement of rudimentary talents. Student work examined in context of contemporary published work. Prerequisite: Wr 121. May be repeated to form a 6- or 9-hour sequence.

Wr 230 Effective Writing
3 hours 3 ①
Open only to students who place low on the comprehensive English examination required by some schools. Prerequisite: Wr 121.

Wr 241 Introduction to Poetry Writing
3 hours 3 ①
Discussion workshop. Rudiments of mechanics and some background in development of modern poetry. Prerequisite: Wr 121. May be repeated to form a 6- or 9-hour sequence.

Upper Division Courses

Courses numbered 400-499 and designated *(g)* or (G) may be taken for graduate credit.

Wr 316 Advanced Expository Writing
3 hours any term, 2 terms 3 ①
Study and writing of exposition. Prerequisite: Wr 121.

Wr 323 English Composition
3 hours any term 3 ①
Reading serious literature perceptively and writing precise and meaningful prose. Continued practice in advanced composition with emphasis on the elements of style: diction, tone, precision and economy, emphasis, figurative language. Readings emphasize poetry and prose which demonstrate varieties of style. Prerequisite: Wr 121.

Wr 324 Short Story Writing
3 hours any term, 3 terms 3 ①
Study and writing of the short story. Prerequisite: Wr 121.

Wr 327 Technical Report Writing
3 hours any term 3 ①
The various skills and forms used in technical communication. Prerequisite: Wr 121.

Wr 341 Poetry Writing
3 hours any term, 3 terms 3 ①
Study and writing of verse. Prerequisite: Wr 121.

Wr 401 Research

Wr 402 Independent Study

Wr 403 Thesis

Wr 404 Writing and Conference (g)

Wr 406 Projects

Wr 407 Seminar (g)

Wr 408 Workshop
Terms and hours to be arranged

Wr 411 English Composition for Teachers (g) 3 hours 3 ①
For students expecting to teach English.

FOREIGN LANGUAGES AND LITERATURES

The Department of Foreign Languages and Literatures offers major programs leading to the B.A. degree in French, German, and Spanish; the major program in Russian has been suspended temporarily. Lower division instruction is offered in Italian, Japanese, and Russian and, upon occasion, in Latin, Portuguese, and Chinese. The major programs provide the student with the opportunity to develop the basic language skills, as well as an understanding of and an appreciation for the foreign literature and culture.

Major Requirements

Lower division courses are prerequisite to the major. Students with previous training or experience in the language will take a departmental examination to determine premajor requirements. The minimum upper division requirements in each major are:

Major in French—43 hours

Intermediate composition and conversation	8
Littérature et civilisation françaises: 19e et 20e	18
French pronunciation and phonetics	6
Advanced comp and conv	3
Approved upper division electives including at least 6 hours on the 400 level	8

Major in German—39 hours

Composition and conversation	9
Survey of German literature	9
Approved upper division electives including at least 8 hours on the 400 level	21

Major in Spanish—38 hours

Intermediate composition and conversation	8
Approved courses in Hispanic literature and/or language	8
Approved upper division electives including at least 6 hours on the 400 level	22

Minor programs. The Department of Foreign Languages and Literatures offers minor programs in French, German, and Spanish for undergraduate students with majors in other disciplines. Minors include a core of courses in language, literature, and culture of the respective language, as well as upper division electives in language, literature, culture, and/or linguistics.

The *non-European culture requirement* of the College of Liberal Arts must be met with courses in a second foreign language or in a non-European culture as approved by the student's adviser.

For future teachers, the department offers courses meeting the certification requirements of the secondary education basic norm and the elementary education area of concentration in French, German, and Spanish. See "School of Education."

The department cooperates with other institutions of the State System of Higher Education in administering overseas study centers at Poitiers, France; Stuttgart, Germany; Tokyo, Japan; and Guadalajara, Mexico. See "International Education" and "Foreign Study Centers."

Interdepartmental programs. The department participates in the Latin American affairs certificate program and offers areas of concentration for the liberal studies major. See "Latin American Affairs" and "Liberal Studies."

A language laboratory provides opportunity for supplemental practice and drill. Collateral tapes and recordings are available both for class use and for individual study.

Courses numbered 400-499 and designated (g) may be taken as part of a graduate minor in another school or as one of three fields acceptable for the Master of Arts in Interdisciplinary Studies (M.A.I.S.) degree program. See "Graduate School."

FRENCH

Lower Division Courses

Fr 101,102,103 First-Year French
4 hours each 4 ①
Pronunciation, grammar, reading, writing, and conversation. For students with no previous training in French. Must be taken in order.

Fr 199 Special Studies
Terms and hours to be arranged
Beginning French Conversation, 1 or 2 hours, graded P/N.

Fr 201,202 Second-Year French
4 hours each 4 ①
Grammar review, simple composition, and reading of modern French authors; oral use of the language. Prerequisite: Fr 101,102,103, or placement. Must be taken in order.

Fr 211 Introductory Composition
2 hours 2 ①
Continued development of language skills. Emphasis on written expression, vocabulary expansion, and grammar review. Required of French majors. Prerequisite: Fr 202 or placement.

Fr 214,215 Second-Year Conversation
2 hours each 2 ①
Practice to improve aural comprehension and oral expression. Offered concurrently as intensive course fall term, with prerequisite: Fr 202 or placement. Offered in sequence winter and spring terms, with prerequisite enrollment in Fr 202. Must be taken in order.

Upper Division Courses
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Fr 301
Introduction to French Literary Studies
2 hours 2 ①
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.* Required for the major in French; to be completed prior to Fr 341B,342B,343B: Prerequisite: Fr 202 or placement.

Fr 311
Selected Topics in the French Language
2-4 hours to be arranged
Translation, composition, stylistic analysis, specialized vocabulary (e.g., commercial). May be repeated for credit when topic differs. See *Schedule of Classes* for term offerings.

Fr 314,315 Intermediate French Composition and Conversation
4 hours each 4 ①
Extensive practice in speaking and writing. Required of French majors. Conducted in French and must be taken in sequence. Prerequisite: Fr 211; Fr 214 or placement. Must be taken in order.

Fr 321 Selected Topics in Francophone Literature
2-4 hours to be arranged
Literary works, themes, movements, or authors from French-speaking areas of the world. May be repeated for credit when topic differs. See *Schedule of Classes* for term offerings.

Fr 331,332
French Pronunciation and Phonetics
3 hours each 3 ①
Intensive study of French pronunciation and diction. Close phonetic analysis of French sounds, French intonation, and tone patterns. In-class drills; language laboratory assignments. Prerequisite: Fr 103 or consent of instructor. Required of foreign languages and literatures education majors; required of French majors. Must be taken in order.

Fr 341,342,343 Littérature et Civilisation françaises: de Napoléon à l'époque contemporaine
3 or 6 hours each 3 ①, 2 ①, 1 hour to be arranged
Fr 341A,342A,343A, 3 hours each, 3 (1): Cultural life of the French people from Napoleon to the present. *Fr 341B,342B,343B,* 3 hours each, 2 (1), 1 hour to be arranged. Literary life of the French people from Napoleon to the present. Both conducted in French by two different instructors with two grades given. Required of French majors. Majors must enroll in A and B concurrently; nonmajors may enroll in either A or B. Prerequisite: Fr 211,301. Need not be taken in order. Nine hours constitute a sequence and may be applied toward the humanities requirement for CLA majors.

Fr 399 Proctor Experience
2-4 hours to be arranged
Supervised practicum for advanced students. Assignments as proctors or tutors in lower division French language courses. No more than three hours may be used to satisfy degree requirements in French or in foreign languages and literatures education in French.

Fr 401 Research

Fr 402 Independent Study

Fr 403 Thesis

Fr 405 Reading and Conference (g)

Fr 407 Seminar (g)
Terms and hours to be arranged

Fr 441,442,443 Littérature et Civilisation françaises: des origines à la Révolution (g)
3 or 6 hours each 3 ①, 2 ①, 1 hour to be arranged
Cultural and literary life of the French people from ancient times to the end of the Revolution, as reflected in history, art, architecture, music, literary works, philosophy, science, and social institutions. *Fr 441A,442A,443A,* 3 hours each, 2 (1), 1 hour to be arranged. Cultural life of French people from origins to 1799. *Fr 441B,442B,443B,* 3 hours each, 3 (1): Literary life of French people from origins to 1799. Both conducted in French by two different instructors with two grades given. Majors must enroll in A and B concurrently; nonmajors may enroll in either A or B. Prerequisite: Fr 341,342,343, or equivalent. Need not be taken in order. Not offered every year.

Fr 467,468,469 Advanced French Composition and Conversation (g)
3 hours each 3 ①
Grammar review, vocabulary drill; oral reports and original presentations in French; analysis of writing styles and techniques; original compositions. Conducted in French. Prerequisite: Fr 315 or equivalent. Need not be taken in order. Part of sequence offered each year.

GERMAN

Lower Division Courses

Ger 101,102,103 First-Year German
4 hours each 4 ①
Pronunciation, conversation, grammar, reading, and writing. For students with no previous training in German. Must be taken in order. Two kinds of courses equally satisfy the various foreign language requirements. *Ger 101A,102A,103A:* Class text accompanied by language lab tapes. *Ger 101B,102B,103B:* With additional audio-visual materials.

Ger 121,122,123
Beginning Conversational German
2 hours each 2 ①
Pronunciation drills; practice in speaking and comprehension; vocabulary building for practical usage. Use of motion pictures and tapes; practice in small groups with tutors. Concurrent enrollment in Ger 101A,102A,103A recommended. Must be taken in order. Graded P/N.

Ger 199 Special Studies
Terms and hours to be arranged
Section A, German Folksinging, 1 hour, graded P/N.

Ger 201,202 Second-Year German
4 hours each 4 ①
Conversation, reading comprehension, and vocabulary building. Grammar review and composition. Prerequisite: Ger 103 or placement. Must be taken in order.

Ger 203 Intermediate German
4 hours 4 ①
Conversation and oral comprehension; grammar review, writing, and reading comprehension. Required of German majors and participants in Stuttgart program; also required as prerequisite for upper division courses. Prerequisite: Ger 202 or placement.

Ger 211,212,213
Reading and Translating
2 hours each 2 ①
Reading and translating on the intermediate level in various areas of interest (e.g. literature, scientific articles, newspapers, magazines). May be taken concurrently with Ger 203 or above. Prerequisite: Ger 201,202 or equivalent. Need not be taken in order.

Ger 221,222,223 Conversational German
2 hours each 2 ①
Pronunciation drills, practice in speaking and comprehension, vocabulary building for practical usage. Use of motion pictures. May not be taken in place of Second-Year German (Ger 201,202) to satisfy the foreign language requirement. May be taken concurrently with Second-Year German. Prerequisite: one year of college German or consent of instructor. Need not be taken in order. Graded P/N.

Upper Division Courses
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Ger 301,302,303
German Literature in Translation
3 hours each 3 ①
Major works from the early Middle Ages to the twentieth century. Read in translation. No previous German required. Need not be taken in order. Not offered every year.

Ger 311,312
Introduction to German Literature
3 hours each 3 ①
General concepts of literature and fundamental principles of poetics with attention to the development of genres and theories. Recommended for all German majors. Prerequisite: Ger 203 or placement. Need not be taken in order. Not offered every year.

Ger 321,322,323 Scientific German
2 to 4 hours 2 to 4 ①
Recommended for students interested in science or medicine. Articles in science, surgery, history of medicine, and current clinical literature are read. Consent of instructor required. Must be taken in order. Not offered every year.

Ger 331
German Pronunciation and Phonetics
3 hours 3 ①
Fundamentals of German pronunciation. Phonology; phonetic and contrastive analysis of sounds; phonemes, intonation, and tone patterns. Not offered every year.

Ger 334,335,336
German Composition and Conversation
3 hours each 3 ①
Speaking and writing the language, style and syntax, translation of modern literary texts into German, writing of original compositions. Conducted in German. Required of all German majors. Prerequisite: Ger 203 or placement. Need not be taken in order.

Ger 341,342
German Culture and Civilization
3 hours each 3 ①
German civilization with emphasis on its cultural, political, and social aspects. Taught in English. Open to all students. Required for teacher certification and recommended for German majors as well as prospective study abroad participants. Prerequisite: Ger 203 or placement. Must be taken in order. Not offered every year.

Ger 343,344,345
Survey of German Literature
3 hours each 3 ①
Major works from the early Middle Ages to the twentieth century. Required for majors. Prerequisite: Ger 203 or equivalent. Corequisite: one hour of Ger 402 Independent Study: Survey of German Literature. Need not be taken in order.

Ger 360,361,362 Workshop in German
2 or 4 hours each 2 ① or 4 ①
Active use of the German language in skits, drama, forensics, or communication. No more than four hours may be used to satisfy the degree requirements in German or German foreign languages and literatures education. Prerequisite: Second-Year German or consent of instructor. Need not be taken in order. Not offered every year.

Ger 401 Research

Ger 402 Independent Study

Ger 403 Thesis

Ger 405 Reading and Conference (g)

Ger 407 Seminar (g)

Ger 408 Workshop (g)
Terms and hours to be arranged

Ger 409 Practicum
Terms and hours to be arranged
A supervised practicum for advanced students. Assignments as proctors or tutors in connection with lower division German language courses. No more than three hours may be used to satisfy degree requirements in German or German foreign languages and literatures education.

Ger 411 German Enlightenment and Storm and Stress (g)
3 hours 2 (1½)
The works of Lessing, Wieland, and Herder; poetic schools; dramatic works; contribution of the writers of this age towards a new understanding of literature; literary theory and literary criticism. Prerequisite: Ger 203 or placement. Not offered every year.

Ger 412 Die Klassik (g)
3 hours 2 (1½)
Goethe's and Schiller's classical period as seen in their plays, novels, poetry, and literary theory including Goethe's "Faust" and Schiller's important critical essays. Prerequisite: Ger 203 or placement. Not offered every year.

Ger 413 Romanticism and Realism (g)
3 hours 2 (1½)
Individual works of nineteenth-century literature in all genres, currents of literary thought and philosophic background. Prerequisite: Ger 203 or placement. Not offered every year.

Ger 421,422 German Literature of the Twentieth Century (g)
3 hours each 2 ①½
Prose, drama, and poetry of the modern period. Representative works of such writers as Brecht, Dürrenmatt, Mann, Kafka, Hesse, Weiss. Recommended for German majors. Prerequisite: Ger 203 or equivalent. Need not be taken in order. Not offered every year.

Ger 423 Selected Topics in German Literature and Language (g)
2 to 4 hours 2 to 4 ①
Major works, literary movements, or authors from the early Middle Ages to the twentieth century. Topic chosen for a given term is listed in the *Schedule of Classes*. Prerequisite: Ger 203 or placement.

Ger 424,425,426 Advanced German Composition and Conversation (g)
3 hours each 3 ①
Speaking and writing the language with attention to style and syntax; translations from English into German; writing of original compositions. Required of German majors. May be repeated twice for undergraduate credit. Maximum 9 hours graduate credit. Prerequisite: Ger 334,335,336, or placement. Need not be taken in order.

ITALIAN

Lower Division Courses

It 101,102,103 First-Year Italian
3 hours each 3 ①
Pronunciation, grammar, reading, and conversation. Must be taken in order. Not offered every year.

It 201,202,203 Second-Year Italian
3 hours each 3 ①
Grammar review, composition, and reading of modern Italian authors. Oral use of the language. Must be taken in order. Not offered every year.

It 199 Special Studies
Terms and hours to be arranged

Upper Division Course

It 405 Reading and Conference
Terms and hours to be arranged

LATIN

Lower Division Courses

Lat 101,102,103 First-Year Latin
3 hours each 3 ①
Fundamentals of Latin grammar, with appropriate readings. *Lat 101:* grammar, vocabulary, with appropriate readings. *Lat 102:* fundamentals of grammar continued; more emphasis on reading. *Lat 103:* grammar continued; greater emphasis on reading significant passages from important Latin authors. Not offered every year.

Lat 299 Special Studies
Terms and hours to be arranged

ORIENTAL LANGUAGES

Chn 101,102,103 First-Year Chinese
4 hours each 4 ①
Essentials of colloquial Mandarin with emphasis on conversation and easy reading. Must be taken in order. Not offered every year.

PORTUGUESE

Lower Division Courses

Port 101,102,103
First-Year Portuguese: Brazilian
4 hours each 4 ①
Pronunciation, grammar, reading, and conversation. For students with no previous training in Portuguese. Must be taken in order. Not offered every year.

RUSSIAN

Lower Division Courses

Rus 101,102,103 First-Year Russian
4 hours each 4 ①
Pronunciation, grammar, reading, and conversation. Must be taken in order.

Rus 199 Special Studies
Terms and hours to be arranged
See *Schedule of Classes* for term offerings.

Rus 201,202 Second-Year Russian
4 hours each 4 ①
Grammar review, composition, and reading of modern Russian authors; oral use of the language. Prerequisite: Rus 101,102,103. Must be taken in order.

Rus 203 Intermediate Russian
4 hours 4 ①
Conversation and oral comprehension. Translation of modern Russian authors. Prerequisite: Rus 202 or equivalent. Not offered every year.

Rus 402 Independent Study

Rus 405 Reading and Conference (g)

Rus 407 Seminar (g)
Terms and hours to be arranged

Courses Temporarily Suspended

Rus 111,112,113 Russian Conversation
2 hours each. Not offered every year. 2 ①

Rus 311,312,313
Survey of Russian Literature
3 hours each 3 ①

Rus 314,315,316 Intermediate Russian Composition and Conversation
3 hours each 3 ①

Rus 317,318,319
Directed Reading in Russian
2 hours each 2 ①

Rus 320,321,322 Scientific Russian
3 hours each 3 ①

Rus 330
Russian Pronunciation and Phonetics
3 hours 3 ①

Rus 401 Research

Rus 403 Thesis

Rus 409 Practicum
Terms and hours to be arranged

Rus 411
Nineteenth-Century Russian Literature
(g) 3 hours 3 ①

Rus 412
Tolstoy, Dostoyevsky, and Chekhov
(g) 3 hours 3 ①

Rus 413
Contemporary Soviet Literature (g)
3 hours 3 ①

Rus 421,422,423
Modern Russian Literature (g)
3 hours each 3 ①

Rus 461,462,463 Advanced Russian Composition and Conversation
3 hours each 3 ①

Courses from other departments accepted for major credit when major is offered:

RS 127,128,129
Introduction to Russian Culture
See Liberal Studies for description.

SPANISH

Lower Division Courses

Span 101,102,103 First-Year Spanish
4 hours each 4 ①
Development of listening, pronunciation, reading, and writing skills. Must be taken in order.

Span 105,106
First-Year Spanish: Intensive
5 hours each 5 ①
Similar to Span 101,102,103 but in two terms. Must be taken in order.

Span 199 Special Studies
Terms and hours to be arranged
1-, 2-, 3-hour sections, graded P/N.

Span 201,202 Second-Year Spanish
4 hours each 4 ①
Further development of comprehension, speaking, reading, and writing skills; contemporary Hispanic authors; laboratory assignments. Must be taken in order. Prerequisite: Span 106 or placement.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Span 301,302 Spanish Conversation
2 hours each 2 ①
Designed to improve facility in oral communication. Assignments in laboratory. May be taken independently or concurrently with Span 309. Prerequisite: Span 202 or placement. Need not be taken in order.

Span 309 Spanish Composition: Theory and Practice
3 hours 3 ①
Review of grammatical concepts, development of writing skill, and expansion of vocabulary. Recommended for participants in Mexico Studies Program (Guadalajara). Required for Spanish majors and as a prerequisite for Span 348. Prerequisite: Span 202 or placement.

Span 310 Directed Reading in Spanish
3 hours 3 ①
Guided reading and study of selected texts in literature and culture to improve reading facility and comprehension. Recommended prerequisite for Span 331,338,340. Combined with Span 331, or 338, or 340 constitutes a humanities sequence in Spanish for nonmajors. Prerequisite: Span 202 or placement.

Span 318,319 Introduction to Hispanic Literature
4 hours each 4 ①
Covers literary works of Spain and Spanish America in the various genres with emphasis on internal criticism. Prerequisite: Span 310 or placement. Need not be taken in order. Not offered every year.

Span 331 Selected Topics in Language and Literature
2-4 hours to be arranged
May be repeated for credit. See *Schedule of Classes* for current term's offerings. Prerequisite: Span 309 or 310 or placement.

Span 338 Peninsular Culture and Civilization
4 hours 4 ①
Historical development and contemporary aspects of the culture of the peoples of Spain. Prerequisite: Span 309 or placement. Offered alternate years.

Span 340 Iberoamerican Culture and Civilization
4 hours 4 ①
The civilizations and cultures of Iberoamerica. Prerequisite: Span 309 or placement.

Span 348,349 Intermediate Spanish Composition and Conversation
4 hours each 4 ①
Review of grammar, writing of compositions, extensive practice in speaking. Required for Spanish majors. Prerequisite: Span 309 or placement. Must be taken in order.

Span 350 Spanish Pronunciation and Phonetics
2 hours 2 ①
Recognition, production, and transcription of the Spanish sound system. Emphasis on the supersegmental features, intonation, stress, juncture. Prerequisite: Span 202 or placement. Not offered every year.

Span 401 Research

Span 402 Independent Study

Span 403 Thesis

Span 405 Reading and Conference (g)

Span 407 Seminar (g)
Terms and hours to be arranged

Span 409 Practicum
Terms and hours to be arranged
Supervised practicum for advanced students. Assignments as proctors or tutors in lower division Spanish language courses. Only three hours may be used to satisfy degree requirements in Spanish or Spanish foreign languages and literatures education.

Span 438 Selected Topics in Luso-Hispanic Culture (g) 2 to 4 hours tba
Contemporary aspects of the cultures of Spain, Portugal, or Latin America. Topics, hours, and language of instruction varies from term to term. See *Schedule of Classes* for current term's offerings. May be repeated once for credit. Prerequisite: Span 338 or Span 340.

Span 442,443 Twentieth-Century Spanish Literature (g)
4 hours each 4 ①
Representative Spanish prose, poetry, and drama from the Generation of 1898 to the present. Prerequisite: Span 310 or placement. Need not be taken in order. Not offered every year.

Span 445,446 Spanish-American Literature (g)
4 hours each 4 ①
Masterpieces of the several national literatures of Spanish America; literary movements. Prerequisite: Span 310 or placement. Need not be taken in order. Not offered every year.

Span 462,463 Advanced Spanish Composition and Conversation (g)
3 hours each 3 ①
Original compositions, debate and platform speaking in Spanish, translation of modern literary texts into Spanish. Prerequisite: Span 349 or placement. Offered alternate years. Must be taken in order.

LINGUISTICS

Lower Division Course

Ling 199 Special Studies
Terms and hours to be arranged

Upper Division Courses

Ling 344 Selected Topics in Linguistics
2-4 hours to be arranged
May be repeated for credit. See *Schedule of Classes* for term offerings.

Ling 401 Research

Ling 402 Independent Study

Ling 403 Thesis

Ling 405 Reading and Conference (g)

Ling 407 Seminar (g)

Ling 408 Workshop
Terms and hours to be arranged

Ling 451 General Linguistics (g)
3 hours 3 ①
Language systems; comparative philology; historical, descriptive, and structural linguistics; semantics; phonetics and phonemics. Prerequisite: 9 hours upper division French, German, or Spanish. Not offered every year.

Ling 452 Romance Linguistics (g)
3 hours 3 ①
Evolution and development, comparative phonology and morphology. Prerequisite: Ling 451; 9 hours upper division Romance languages. Not offered every year.

Ling 453 Germanic Linguistics (g)
3 hours 3 ①
Evolution and development; comparative and structural linguistics, especially German and English; phonology and morphology. Prerequisite: Ling 451; 9 hours upper division Germanic languages. Not offered every year.

FOREIGN STUDY PROGRAMS

Courses listed in the foregoing Foreign Languages and Literatures sections are available also to students studying at overseas study centers sponsored by the Oregon State System of Higher Education and administered by Oregon State University (see page 38). Courses listed below (designated with *F* suffixed to the course number) may be taken only at the overseas study centers.

Oregon Study Center in France
University of Poitiers, France

Fr 114,115,116F French Conversation
2 hours each 2 ①

Fr 307,308,309F Directed Reading in French 2 hours each 2 ①

Fr 314,315,316F Intermediate French Composition and Conversation
3 hours each 3 ①

Fr 328,329,330F French Culture and Civilization 3 hours each 3 ①

Fr 411,412,413F Seventeenth-Century French Literature (g)
3 hours each 3 ①

Fr 417,418,419F Nineteenth-Century French Literature (g)
3 hours each 3 ①

Fr 423,424,425F Twentieth-Century French Literature (g)
3 hours each 3 ①

Oregon Study Center in Germany
University of Stuttgart, Germany

Ger 111,112,113F German Conversation
2 hours each 2 ①

Ger 311,312,313F Directed Reading in German
2 or 3 hours each 2 or 3 ①

Ger 321,322,323F Scientific German
2 to 4 hours each 2 to 4 ①

Ger 331,332,333F German Pronunciation and Phonetics
3 hours each 3 ①

Ger 334,335,336F Intermediate German Composition and Conversation
2 or 3 hours each 2 or 3 ①

Ger 354F Special Topics in Language and Literature
Terms and hours to be arranged
May be repeated for credit.

Ger 364F Individual Authors
Terms and hours to be arranged
May be repeated for credit.

Ger 411,412,413F Age of Goethe (g)
3 hours each 3 ①

Ger 414,415F The German Novel (g)
3 hours each 3 ①

Ger 416F The German Novelle (g)
3 hours 3 ①

Ger 417,418,419F German Drama (g)
3 hours each 3 ①

Ger 421,422,423F German Literature of the Twentieth Century (g)
3 hours each 3 ①

Ger 424,425,426F Advanced German Composition and Conversation
2 or 3 hours each 2 or 3 ①

Ger 427,428,429F German Romanticism (g) 3 hours each 3 ①

Ger 430,431,432F German Poetry (g)
3 hours each 3 ①

Oregon Study Center in Japan
Waseda University, Tokyo

Jpn 104,105,106F First-Year Japanese
7 hours each 4 (1½) 10 ① 4 (1½)

Jpn 204,205,206F
Second-Year Japanese
7 hours each 4 (1½) 10 ① 4 (1½)
Prerequisite: Jpn 106F.

Jpn 314,315,316F Third-Year Japanese
7 hours each 4 (1½) 10 ① 4 (1½)
Prerequisite: Jpn 206F.

Jpn 414,415,416F Advanced Japanese
7 hours each 4 (1½) 10 ① 4 (1½)
Prerequisite: Jpn 316F.

Various Overseas Study Centers

Ling 450F
Language and Language Learning
5 hours 2 (2½)
Introduction to linguistics, the universals of language, and the nature of language learning.

GEOGRAPHY

The Department of Geography is a joint department of the College of Liberal Arts and the College of Science. Both undergraduate and graduate majors are administered through the College of Science.

Geography courses offered for social science credit serve four purposes: (1) the general educational needs of students majoring in other departments, (2) the subject norm requirements of social studies teachers, (3) course requirements for a geography major in the College of Science (see page 97) or for a Liberal Studies major in the College of Liberal Arts, and (4) needs of graduate minors.

The following courses are recommended for a minimum geography concentration:

Lower division: 9 hours from Geog 106, 203,205,207,210; Ggs 227, Introduction to Physical Geography; and Ggs 261, Maps and Map Interpretation.

Upper division: Geog 321,367,382 and 12 hours of 400-level geography courses.

Students contemplating graduate work in geography are urged to take an appropriate foreign language and two terms of statistics.

Lower Division Courses

Geog 106 World Regional Geography
3 hours 3 ①
The earth as the home of people; examination of world environments and how people have adjusted to, organized, used, and modified them. Geog 106,203,205,207,210 may be taken individually or in any combination for sequences of two or more terms, as needed. Need not he taken in order.

Geog 199 Special Studies
Terms and hours to be arranged

Geog 203
Society, Resources, and Environment
3 hours 3 ①
Geography of human adaptation to the earth's environmental limitations; modifications of earth systems to achieve human benefits; ramifications of human influences, including increased population, food supply, land use control, resource exploitation, and technology examined with a geographer's eye for alternatives. Geog 106,203, 205,207,210 may be taken individually or in any combination for sequences of two or more terms, as needed. Need not he taken in order.

Geog 205
Geography and the Modern World
3 hours 3 ①
Geographical expressions and consequences of the political division of space. Geog. 106,203, 205,207,210 may be taken individually or in any combination for sequences of two or more terms, as needed. Need not be taken in order.

Geog 207
Location, Economy, and Society
3 hours 3 ①
Structure, patterns, and locational principles of economic activities; examination of regional economic development, agricultural land use, industrial location, distribution of service activity. Comparison of real-world examples with theory. Geog 106,203,205,207,210 may he taken individually or in any combination, as needed. Need not be taken in order.

Geog 210 Culture and Landscape
3 hours 3 ①
The ways cultures and societies vary and function spatially and modify the environments they occupy to produce humanized landscapes. Geog 106,203,205,207,210 may be taken individually or in any combination for sequences of two or more terms, as needed. Need not be taken in order.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Geog 313
Geography of the Pacific Northwest
3 hours 3 ①
Human and economic geography of Pacific Northwest with special reference to Oregon. Prerequisite: 6 hours of lower division geography.

Geog 321
Changing Human Landscapes
3 hours 3 ①
Historical analysis of human agency in environmental alteration and landscape change; studies of the processes of landscape alteration. Prerequisite: 6 hours of lower division geography.

Geog 326 Geography of Europe
3 hours 3 ①
Physical, cultural, and economic aspects of Europe (excluding the USSR) with emphasis on the processes which have shaped Europe as a cultural region. Prerequisite: 6 hours of lower division geography.

Geog 328 Geography of Latin America
3 hours 3 ①
Regional analysis of the Latin American nations, industrial and commercial development and potentialities. Prerequisite: 6 hours of lower division geography.

Geog 329
Geography of the United States
3 hours 3 ①
Economic and settlement geography, current problems in people-environment relationships. Prerequisite: 6 hours of lower division geography.

Geog 339 Area Studies
3 hours 3 ①
Physical realities and cultural processes and conditions that have given geographical identity to and influenced people's organization and use of selected world areas. Areas vary; number may be repeated with consent of adviser. Prerequisite: 6 hours of lower division geography.

Geog 350 Population Geography
3 hours 3 ①
Spatial characteristics and dynamics of world population growth. Regional characteristics of growth and changes in density; future projections. Population growth as related to economic development, food supply, energy, and resources; growth as a problem. Prerequisite: 6 hours of lower division geography.

Geog 367 Economic Geography
3 hours 3 ①
Spatial variations in the economic landscape; principles and theories of spatial organization; applications to contemporary problems of growth, development, and resource use. Prerequisite: 6 hours of lower division geography.

Geog 382 Cities of the World
3 hours 3 ①
Survey of selected world cities in the context of urban evolution and spatial development. Relates the development, function, and morphology of world cities to current understanding of geographical location theory and functional order. Prerequisite: 6 hours of lower division geography.

Geog 405 Reading and Conference (g)
Terms and hours to be arranged

Geog 480 Geography of Transportation (G) 3 hours 3 ①
Concepts, principles, and underlying bases of areal exchange emphasizing the movement of goods and forms of transportation. Spatial interaction is examined through models and graph theory. Prerequisite: Geog 367 and 9 hours of upper division geography.

Geog 481
Industrial Location Analysis (G)
3 hours 3 ①
Location of manufacturing activity. Empirical and theoretical examinations of the determinants of location, including intraurhan location. Techniques of measurement of areal associations and relationships in manufacturing. Prerequisite: Geog 367 and 9 hours of upper division geography.

Geog 489
Topics in Economic Geography (g)
3 hours 2 ① 2 ①
Theoretical constructs, applied topics, and methodologies. Topics vary; number may be repeated with consent of adviser. Prerequisite: Geog 367, and 9 hours of upper division geography, and topical background.

Geog 582 Applied Urban Geography
3 hours 3 ①
Application of principles of urban geography to modern city problems: growth, employment, decline, sprawl, transportation; planned development; Pacific Northwest case studies. Prerequisite: Geog 382, 480,481.

Geog 583
Area and Community Development
3 hours 2 ① 1 ②
Area and community development as a professional geographical activity; basic concepts, objectives, methods, and techniques applied to practical problems and solutions. Prerequisite: Ggs 420, Geog 480,481.

HISTORY

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, journalism, and business.

Students are urged to complete language requirements for the B.A. degree. Their programs will be worked out with their advisers. Those interested in high school teaching may have their programs planned to satisfy state social studies certification requirements.

History courses may be used to satisfy the humanities and/or arts component of the University general education requirements for the baccalaureate degree.

The department also offers a minor program for undergraduate students with majors in other disciplines. Students electing a minor in history may choose one of three options: U.S. history; European history; or non-European, non-United States history.

History also may be used as a major or one of the minors in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) degree program or as a minor in other graduate programs.

Departmental requirements

Minimum total term hours required	45
Minimum upper division hours, including 9 hours of 400-level courses	27
Courses that must be included in the 45-hour minimum:	
Hst 101,102,103 or 121,122, or equivalent courses approved by adviser	9–10
9 hours of U.S. history (upper division courses may be used)	9
Courses in a non-European, non-U. S. history area	8
Hst 309 (Colloquium) or Hst 420 (Historiography)	3–4
Hst 407 (Seminar)	5
History electives	9–11

Lower Division Courses

Hst 101,102,103
History of Western Civilization
3 hours each — 3 ①
Human history: governmental, economic, social, religious, intellectual, and aesthetic activities in Europe, Asia, and America. Special effort made to relate past to contemporary events and institutions. *Hst 101:* prehistory to 1450 A.D. *Hst 102:* 1450 to 1815. *Hst 103:* 1815 to present. Need not be taken in order.

Hst 121,122
History of Western Civilization
5 hours each — 5 ①
Similar to Hst 101,102,103. A two-term sequence. Need not be taken in order.

Hst 199 Special Studies
Terms and hours to be arranged

Hst 201,202,203
History of the United States
3 hours each — 3 ①
Rise and development from beginning to present; economic, social, and cultural life, political changes and international relations. *Hst 201:* Colonial beginnings to 1840. *Hst 202:* 1840 to 1898. *Hst 203:* 1898 to present. Need not be taken in order.

Hst 221,222
History of the United States
5 hours each — 5 ①
Similar to Hst 201,202,203. A two-term sequence. Need not he taken in order.

Hst 230,231,232
Great Men and Women of History
2 hours each — 2 ①
Lives of men and women who have distinguished themselves in politics, science, religion, philosophy, literature, and the arts from ancient times to the present. Need not be taken in order. Not offered every year.

Hst 260,261,262
Great Americans in Thought and Action
2 hours each — 2 ①
Personality and leadership of men and women who have been outstanding in various fields of endeavor, great movements, and critical periods. Need not be taken in order.

Upper Division Courses
Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Hst 309 Colloquium
Terms and hours to be arranged

Hst 311 Comparative Marine Culture
4 hours — 2 (1½)
Comparison of the Pacific Northwest before the European penetration with early Mediterranean cultures, the Chinese and other Pacific cultures, the Vikings, and the western Europeans. Exploration of major river systems (China and the United States), as well as inland seas and lake cultures; comparative control cultures involving the Papagos in southwestern North America and the Aborigines of Australia; exploration of the changing images and realities of the relationship between the sea and the development of American culture.

Hst 320 The Ancient Near East
4 hours — 4 ①
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.

Hst 321,322 Greece and Rome
4 hours each — 4 ①
Hst 321: History of Greece. Ancient Greek city-states, their political and cultural evolution, their decline, and permanent contribution to western civilization. *Hst 322:* History of Rome. Growth of ancient Rome to a world power and its subsequent decline and fall. Need not be taken in order.

Hst 327,328
History of Medieval Europe
4 hours each — 4 ①
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 900; *Hst 328:* 900 to 1400. Need not be taken in order. Not offered every year.

Hst 331,332,333 Early Modern Europe
3 hours each — 3 ①
Political, social, intellectual, and cultural history of Europe from about 1400 to 1789. *Hst 331:* the Renaissance. *Hst 332:* the Reformation. *Hst 333:* the scientific revolution, absolute monarchy, and the Enlightenment. Need not be taken in order. Not offered every year.

Hst 335,336,337
Europe Since The French Revolution
4 hours each — 4 ①
Political, economic, social, and intellectual developments since the French Revolution. *Hst 335:* 1789-1850. *Hst 336:* 1850-1914. *Hst 337:* 1914-present. Need not be taken in order. Not offered every year.

Hst 350,351 Modern Latin America
4 hours each — 2 ① 1 ②
History of the republics of Latin America, emphasizing the reaction to imperialism and the growth of nationalism and internationalism. *Hst 350:* Mexico and Caribbean nations. *Hst 351:* Middle and South American nations. Need not be taken in order.

Hst 363 Women in U.S. History
3 hours — 3 ①
Women in the United States: their role in and contribution to our political, economic, social, cultural, and intellectual life from the colonial period to the present. Course takes historical approach to the contribution of women and an analytical approach to their role in history. Not offered every year.

Hst 364,365
History of Black Americans
4 hours each — 4 ①
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 order.

Hst 367,368
History of the American Indian
3 hours each — 3 ①
A study of the American Indian north of Mexico prior to European contact to the present. *Hst 367:* the indigenous population prior to European contact; initial alterations in and continued disruption of Indian society and culture; Indian-white conflict; emergence of U.S. government-Indian policy to 1848. *Hst 368:* 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. Need not be taken in order.

Hst 369 Environmental History of the United States
3 hours — 3 ①
Environmental history of the United States from the colonial period to the present with emphasis on the beginnings of the conservation movement in the late 19th and early 20th centuries and the development of an environmental ethic in recent years.

Hst 381,382 History of Africa
4 hours each — 4 ①
History of Africa from earliest times to present. *Hst 381:* from the origins of human society over a million years ago to the abolition of the trans-Atlantic slave trade in the 19th century. Work of archaeologists in uncovering our origins on the continent; the ancient kingdoms; arrival of Europeans in the 15th century and development of the trans-Atlantic slave trade until its abolishment. *Hst 382:* 20th century Africa. European imperialism and colonization; African resistance, nationalism, and independence; the challenge of the present. Need not be taken in order.

Hst 387,388,389
History of the Middle East
3 hours each — 3 ①
A political, social, and religious survey from the 7th century to the present, including rise and fall and heirs of the Islamic Empire, institutions of the Ottoman Turks, impact of Western imperialism upon the Middle East, evolution of new nations after World War I, and the Arab-Israeli conflicts. *Hst 387:* birth and early history of Islam. *Hst 388:* Ottoman and Persian Empires. *Hst 389:* modern Islamic world. Prerequisite: Hst 101,102,103 or upper division standing. Need not be taken in order.

Hst 391,392 East Asia
4 hours each — 4 ①
History and culture of China, Japan, and Korea. *Hst 391:* From Shang Dynasty to 1839. *Hst 392:* 1839 to present. Need not be taken in order.

Hst 396,397 Southeast Asia
4 hours each 4 ①
History of Southeast Asian nations and cultures from their origins to their emergence as modern states. Emphasis is on Burma, Cambodia, Indonesia, Laos, Malaysia, the Philippines, Thailand, and Vietnam, with some attention to Singapore. *Hst 396:* From origins to 1900. *Hst 397:* 1900 to present. Need not be taken in order. Offered alternate years.

Hst 401 Research

Hst 402 Independent Study

Hst 403 Thesis

***Hst 405 Reading and Conference** (g)

Hst 406 Projects

***Hst 407 Seminar** (g)
Terms and hours to be arranged

Hst 410 History Internship (g)
1-12 hours to be arranged
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 hours of credit, but no more than 6 hours may be used to satisfy the history major requirement of 45 hours.

Hst 415 Selected Topics in History (g)
4 hours 2 ②
Selected topics of special or current interest not covered in other courses. For upper division and graduate students. May be repeated once. Prerequisite: 9 hours of history and upper division standing.

Hst 420 Historiography (g)
4 hours 2 ②
How history has been, and is being, written. Topics include the great historians, philosophy of history, types and use of historical evidence, varieties of historical investigation. Intended to provide a critical awareness of factors that influence the writing of history.

Hst 421 Hellenistic Greece (g)
4 hours 4 ①
A history of the Greek world from the end of the Peloponnesian War to the Roman conquest of Greece. Prerequisite: Hst 101 or upper division standing.

Hst 424,425
European Diplomatic History (g)
4 hours each 2 ②
The foreign relations of European great powers from 1815 to 1914, and from 1914 to the present. Prerequisite: Hst 101,102,103. Need not be taken in order. Not offered every year.

Hst 427,428,429
History of Western Thought (g)
3 hours each 3 ①
History of aesthetic, social, political, philosophical, and scientific thought and of the intellectual milieu in which they have developed. *Hst 427:* 500 B.C.-1700 A.D.; *Hst 428:* 1700 A.D.-1860 A.D.; *Hst 429:* 1860 A.D. to present. Prerequisite: Hst 101,102,103 or upper division standing. Need not be taken in order. Not offered every year.

Hst 430,431,432 English History (g)
3 hours each 3 ①
Political, economic, social, intellectual, and religious developments since 1485; evolution from Empire to Commonwealth and Britain's part in transition. *Hst 430:* 1485 to 1688. *Hst 431:* 1688 to early 19th century. *Hst 432:* early 19th century to present. Prerequisite: Hst 101,102, 103 or upper division standing. Need not be taken in order.

* Graduate credit for Hst 405 and 407, singly or combined, must not exceed 9 hours.

Hst 435,436
History of Modern Germany (g)
4 hours each 4 ①
Political, economic, social, and intellectual developments in the nineteenth and twentieth centuries. *Hst 435:* 1815-1914. *Hst 436:* 1914-present. Prerequisite: Hst 101,102,103 or upper division standing. Not offered every year.

Hst 440,441 History of Russia (g)
4 hours each 4 ①
Political, economic, social, and cultural developments from the origins of the Russian state through the Stalinist regime. *History 440:* 862-1801. *History 441:* 1801-1953. Prerequisite: Hst 101,102,103 or upper division standing. Need not be taken in order.

Hst 442 History of Soviet Political and Economic Institutions (g)
3 hours 3 ①
The Communist Party; state and public administration; state planning commission and public corporations; cooperatives, in theory and structure. Prerequisite: Hst 101,102,103 or upper division standing. Not offered every year.

Hst 456
Problems in Latin American History
(g) 4 hours spring 1 ② 2 ①
Origins and development of political instability and social economic stagnation in parts of Latin America; selective problems endemic to the region. Prerequisite: Hst 350 or 351.

Hst 460,461,462
American Thought and Culture (g)
3 hours each 2 ②
American thought, ideals, and institutions; contribution to American culture by schools, newspapers, magazines, motion pictures, radio, art, literature, television, and philosophy. Prerequisite: Hst 201,202,203 or upper division standing. Need not be taken in order.

Hst 464,465
American Diplomatic History (g)
4 hours each 4 ①
American diplomatic relations from the nation's founding to 1898 and from 1898 to the present. Prerequisite: Hst 201,202,203 or upper division standing. Need not be taken in order. Not offered every year.

Hst 467,468 The American Frontier
(g) 4 hours each 3 ①
Advance of American settlement across successive frontiers in continental United States and the contributions made by this movement to American political, economic, social, and cultural institutions. *Hst 467:* the Colonial and Trans-Appalachian Frontier; *Hst 468:* the Trans-Mississippi Frontier. Prerequisite: Hst 201,202, 203 or upper division standing. Need not be taken in order.

Hst 469 History of Pacific Northwest
(g) 3 hours 3 ①
Growth and development of Oregon, Washington, and Idaho from Indian times to present, with emphasis on political, economic, social, cultural changes. Prerequisite: Hst 201,202,203 or upper division standing. Offered every term.

Hst 471,472 Colonial America (g)
4 hours each 4 ①
Economic, political, social, religious, and intellectual development of colonial North America from the English background to 1763. *Hst 471:* to 1689. *Hst 472:* 1689-1763. Prerequisite: Hst 201,202,203 or upper division standing. Need not be taken in order.

Hst 473
The Era of the American Revolution (g)
4 hours 4 ①
The American Revolution, the drafting of the Constitution, and the launching of the new nation. Prerequisite: Hst 201,202,203 or upper division standing.

Hst 474
Jeffersonian and Jacksonian Democracy
(g) 4 hours 4 ①
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. Prerequisite: Hst 201,202,203 or upper division standing. Not offered every year.

Hst 475 Civil War and Reconstruction
(g) 4 hours 4 ①
Origins of the war and of the critical post-war era from the 1830's to the 1880's. Special attention given to the changing historiography of the period. Prerequisite: Hst 201,202,203 or upper division standing. Offered alternate years.

Hst 477
The Progressive and New Deal Eras (g)
4 hours 4 ①
Twentieth-century U.S. history from 1900 to 1939, with emphasis on political and economic developments; attention given to diplomatic, cultural, and social change. Prerequisite: Hst 203. Not offered every year.

Hst 478 Contemporary United States
(g) 4 hours 4 ①
Developments since 1939 which have promoted fundamental and profound shifts in American life, in particular the phenomenon of growing public and private questioning of the meaning and direction of American life in a world in revolutionary transition. Prerequisite: Hst 201, 202,203 or upper division standing. Not offered every year.

Hst 492 Japan Since 1854 (g)
4 hours 4 ①
Japan's emergence from isolation to the position of a world power. Prerequisite: Hst 391,392 or equivalent. Not offered every year.

Hst 495
China in the Twentieth Century (g)
4 hours 4 ①
Revolutionary China from Confucian to Communist. Prerequisite: Hst 391,392 or equivalent.

Courses from other departments accepted for major credit:

HstS 411,412,413 History of Science
(G) 3 hours each 3 ①
See General Science in "College of Science" for description.

HUMAN SERVICES

The certificate program in human services is an interdisciplinary program for students with career interests in the social services professions. A complement and supplement to a student's major program, the human services program provides special training in the delivery and administration of social services. Following completion of required course work, students are expected to demonstrate competency in three skill areas: information collection, understanding and dealing with people, and effective communication. The certificate, which is an official notation on the transcript that the student has completed the requirements specified, may be awarded concurrently with any degree for a recognized major at OSU. Interested students should contact the director of advising or the director of human services, College of Liberal Arts.

Curriculum—37 hours

Human services seminar (LS 471) *or* Problems and Issues in Pub Admin (PS 413)	3
Organizational Behavior (BA 361)	4
2 of the following 3:	
Behavior Analysis (Psy 221); Human Differences (Psy 312); Basic Experiences in Small Groups (Sp 223) *or* Group Dynamics (Psy 361) *or* Theory of Small Groups (Soc 430)	6
Interviewing (Sp 319)	3
Proficiency in written communication (English Comp, Wr 222, or Technical Report Writing, Wr 327, are suggested as aids in developing proficiency)	
Minimum of 6 hours of approved courses in *one* of the following areas: corrections, drug abuse, disabilities, health, children and adolescence, gerontology, family	6
Internship	15

A list of additional courses is available to be used as optional courses as needed to attain skill competencies.

JOURNALISM

The Department of Journalism offers a major program leading to a B.A. or B.S. degree in technical journalism. The program is accredited by the American Council on Education for Journalism.

Course work provides students with an education in liberal arts, expertise in journalism, and knowledge of a scientific-technical area. Students majoring in technical journalism select one of four areas of specialization: print journalism, broadcast journalism, technical writing, or photojournalism. Students also must select a minor in one of the following areas: aerospace studies, agricultural and resource economics, agricultural education, animal science, applied economics, atmospheric sciences, business administration, computer science, construction engineering management, earth sciences, fisheries and wildlife, food science and technology, foods and nutrition, forestry, gerontology, health science, home economics, life sciences, military science, naval science, oceanography, pharmacy, physical sciences, poultry science, rangeland resources, safety studies, or soil science.

Journalism may also be taken as an area of concentration in home economics communications, as a minor in general agriculture or other options in agriculture, or as a sports communication minor in the School of Health and Physical Education.

Elementary courses furnish a background in communications media and the fundamentals of newswriting and editing. Others offer training in more specialized writing, layout and design, and photography. Students may gain experience by working on the *Barometer*, the daily student newspaper, and other student publications. Individual projects enable students to work closely with instructors and technical experts in developing publications, research papers, and articles.

Departmental Requirements—45 hours

Core Block—36 hours

Survey of Amer Journalism (J 110)	3
Newswriting (J 111)	3
Newswriting and Reporting (J 212)	4
Copyediting (J 214)	3
Public Info Methods (J 318)	3
Technical Reporting (J 319)	3
Industrial-Business Pubs (J 333)	3
Photojournalism (J 334)	3
Contemporary Tech Journalism (J 393)	3
Indepen Study: Photojournalism (J 402)	1
Indepen Study: Comput Edit (J 402)	1
Projects (J 406) or Intern (J 410)	3
Law and Regul of Mass Media (J 465)	3

Plus 9 hours in approved program selected from:

Editorial Writing (J 223), Special Feature Articles (J 317), Technical Photojournalism I (J 434), Technical Photojournalism II (J 435), History of Journalism (J 440), The Media and Society (J 450), Selected Topics in Journalism (J 470), History of Photography (J 480), Photography for Industrial Publications (J 484), Environmental/Wildlife Photography (J 485), Intro to the Broadcast Mass Media (BMC 241), Beginning Broadcasting (BMC 262), Basic Television Operations (BMC 267), Principles of Television Newsfilm (BMC 360), Professional Radio Announcing (BMC 361), Broadcast Media Writing (BMC 363), Television Production (BMC 366), Instructional Uses of Television (Sp 451), Advanced Writing (Wr 233), Advanced Expository Writing (Wr 316), Technical Report Writing (Wr 327)

Technical Minor Requirements

Aerospace Studies—27 hours

Aerospace Studies III (AS 311,312,313)	9
Aerospace Studies IV (AS 411,412,413)	9
American Foreign Policy (PS 418)	3
International Organization (PS 420)	3
Prob of Internat Relations (PS 443)	3

Agricultural and Resource Economics—28 hours

Applied Econ for Rural Areas (AREc 231)	3
Agricultural Bus Management (AREc 211)	5
Agricultural Marketing (AREc 311)	5
Reading and Conference (AREc 405)	3
Public Policy in Ag (AREc 411)	4
Land and Water Econ (AREc 461)	3
International Ag Devel (AREc 462)	3
Farm Management (AREc 414)	5
Agricultural Finance (AREc 431)	3
Managerial Econ (AREc 471)	3

Agricultural Education—27 hours

Special Studies (AEd 199)	1
Reading and Conference (AEd 405)	3
Seminar (AEd 407L)	1–12
Remaining hours in *other* agriculture departments	

Animal Science—28 hours

Animal Science (AnS 121)	3
Animal Nutrition (AnS 311)	3
Prin of Animal Breeding (AnS 278)	4
Meats (AnS 351)	3
Rangeland Resources (Rng 341)	3
One production course (from AnS 421,422, 423 or 424)	4
8 hours selected from: CS 324, AREc 211, AnS 231, AnS 316, P 121, Sls 100, FW 251, Hort 111, VM 341	8

Applied Economics—27 hours

*Principles of Economics (Ec 213,214)	8
Microeconomic Theory (Ec 357)	3
Macroeconomic Theory and Policy (Ec 475)	4
20 hours selected from: Ec 411, Ec 414, Ec 425, Ec 429, Ec 430, Ec 440,441, Ec 445, Ec 450, Ec 461, AREc 231, AREc 411, AREc 461, AREc 462	20

* To be taken as a distribution sequence in the College of Liberal Arts. Need not count in total hours for the minor. Minor is thus 27 hours.

Atmospheric Sciences—29 hours

Weather and Human Interactions (AtS 292)	3
Intro to the Atmosphere (AtS 300)	3
Weather Analysis Lab (AtS 301)	2
Weather Analysis Lab (AtS 433,434,435)	9
Air Pollution Meteorology (AtS 492)	3
9 hours selected from: G 200, Ggs 227, Ggs 327,328, GS 311,312, Oc 331, Oc 491	9

Business Administration—32 hours

Intro to Bus (BA 101) or Intro to Bus Data Proc (BA 131)	4
Financial Accounting (BA 211)	4
Business Law (BA 226)	4
Quantitative Business Methods (BA 235)	4
Management Processes (BA 302)	4
Marketing (BA 312)	4
Finance (BA 313)	4
Bus and Its Environ (BA 495) or Basic Acc and Finan Anal (BA 217)	3–4

Recommended electives

Manag Acc (BA 212)	4
Organ Behav (BA 361)	4
Environ Law: Water and Air (BA 415)	3
Govern Rel in Bus (BA 498)	3

Computer Science—28-31 hours

Intro to Computer Science (CS 211) *or* Intro to Bus Data Processing (BA 131)	3–4
Computer Organization (CS 212)	4
Intro to Symbolic Language Programming, FORTRAN (CS 213)	4
Assembly Language Programming (CS 312)	4
Data Structures (CS 313)	4

PLUS ONE OF THREE OPTIONS:

Option A (Computer Science Concentration)

Systems Programming (CS 411,412,413)	9
or	
Intro to the Theory of Computation (CS 321) *and* Data Systems Analysis (CS 431,432)	10

Option B (Business Concentration)

Business Data Processing (BA 231)	4
Business Data Processing Sys (BA 331)	4

Option C (Computer Engineering Concentration)

Logic Systems (EE 103)	3
Switching and Coding Systems (EE 371)	4
Computer Engineering (EE 473 *or* EE 474 *or* EE 475)	4

Construction Engineering Management—36 hours

Technical Problems (CET 111,112,113)	6
Graphics (GE 115)	3
Mechanics: statics, dynamics, strength of materials (CET 252,253,254)	9
Civil Engineering Drawing (CET 232)	3
15 hours selected from: CET 221,222,223, CET 261, CET 321,322, CET 341,342, 343, CET 362, CET 371, CET 381, CET 407, CET 441,442,443, CET 461	15

Earth Sciences—29 hours

Principles of Geology (G 211,212,213)	12
Geomorphology (G 322) *or* Physical Geography (Ggs 327)	4
Physical Geography (Ggs 328 or 329)	4
Soils and Men (Sls 100)	3
Intro to the Atmosphere (AtS 300)	3
Maps and Map Interpretation (Ggs 261) *or* Intro to Oceanography (Oc 331)	3
Recommended electives:	
Geology of Oregon (G 352)	3
Environ and Engineering Geol (G 361)	4

Fisheries and Wildlife—27 hours

Prin Wildlife Conservation (FW 251)	3
Wildlife Resources: Mammals (FW 252)	3
Wildlife Resources: Birds (FW 253)	3
Wildlife Resources: Fish (FW 254)	3
15 hours selected from: FW 313, FW 314, FW 315, FW 420, FW 451, FW 458	15

Food Science and Technology—29 hours

Food Proc (FST 220,222,224)	9
Food Proc Lab (FST 221,223,225)	3
Food Microbio (Mb 440)	3
Food Microbio Lab (Mb 441)	2
Food Chem (FST 411,412,413)	12

Foods and Nutrition—36 hours

Nutrition (FN 225)	4
Family Nutrition (FN 325)	3
Foods (FN 220,221 *or* FN 215,335)	8
Meal Management (FN 313)	3
Family Food Buying (FN 411)	3
Microbiology (Mb 130 *or* 302)	3
Hum Anat and Phys (Z 332,333)	6
6 hours selected from: BB 350, FN 415, FN 416, FN 417,418,419, FN 425	6

Forestry—27 hours

Introduction to Forestry (F 111)	4
Soils and Man (Sls 100)	3
Wood Technology and Utilization (FP 210)	4
*Forest Biology (F 340)	4
Recreational Use of Public Lands (RR 371) *or* Outdoor Recreation Policy (RR 473)	4
9 hours selected from: F 153 or 254, F 260, F 427, F 460, FE 392, FP 441, FP 442, FP 453, RR 171, RR 321, Rng 341, FW 251,252, or 253	9

Gerontology—29 hours

Program Manag and Admin in Aging Serv (FL 407)	3
Health Aspects of Geron (H 433)	3
Perspectives on Aging (HDFS 407)	3
Sociology of Aging (Soc 480)	3
Gerontology Practicum (HDFS 406)	3
14 hours selected from: FN 407, HDFS 446,, GS 452, PE 491, Ed 496, Phr 507a, FRM 407	14

Health Science—28-29 hours

Nutrition (FN 225)	4
Man, Health, and Environment (H 334)	3
Communicable and Noncommunicable Diseases (H 320)	3
Environmental Health (H 440T)	3

PLUS ONE OF TWO OPTIONS:

Option A: Community Health

Select 5 of the following courses:

Drug Prob in Public Education (H 364)	3
First Aid in Emergency Care (H 386)	3
Safety Education (H 380)	3
Projects (H 406)	3
Health Agencies and Programs (H 420)	3
Control of Chronic Disease (H 422)	3
Health Aspects of Gerontology (H 423)	3
Epidemiology (H 426)	3

Option B: Environmental Health

Safety Education (H 380)	3
Institutional Hygiene (H 442)	3
Intro to the Atmosphere (AtS 300)	3
Federal and State Food Reg (FST 421)	2
Biology of Radiation (GS 450)	2
Epidemiology (H 426)	3

Home Economics—33 hours

Clothing Construction (CT 210) *or* Clothing and Man (CT 211)	3
Textiles (CT 250)	3
Tech Skills in Inter Illus (CT 241) or Intro to Resident Inter (CT 341)	3
Foods (FN 215)	5
Nutrition (FN 225)	4
Family Housing and Its Envir (FRM 235)	3
Decision Making and the Consumer (FRM 250)	3
Home Equip and Ener Manag (FRM 330) or Personal and Family Finance (FRM 341)	3
Prenatal and Inf Devel (HDFS 225)	3
Con American Families (HDFS 240)	3

Life Sciences—30 hours

General Chemistry (Ch 104,105,106)	13
Genetics (Gen 311)	4
One of the following groups:	
Zoology (Z 201,202), Introductory Microbiology (Mb 130) *or* General Microbiology (Mb 302), General Botany (Bot 201)	13
Biology (Bi 211,212), Introductory Microbiology (Mb 130) *or* General Microbiology (Mh 302)	13

* Journalism students minoring in forestry should take Botany 202 in their laboratory science sequence requirement to meet prerequisites for this core course.

Military Science—33 hours

Military Science I (MS 111,112,113)	3
Military Science II (MS 211,212,213)	6
Military Science III (MS 311,312,313)	9
Advanced Summer Camp (MS 314) *or* Concepts of Internat Relations (PS 417) and Prob of Internat Relations (PS 443)	6
Military Science IV (MS 411,412,413)	9

Naval Science—36 hours

Naval Science I (NS 111,112,113)	9
Naval Science II (NS 211,212,213)	9
Naval Science III: Marine Corps Option (NS 321,322,323) *or* Naval Science III (NS 311,312,313)	9
Naval Science IV: Marine Corps Option (NS 421,422,423) *or* Naval Science IV (NS 411,412,413)	9

Oceanography—27 hours

Intro to Oceanography (Oc 331)	3
Princ of Biological Oceanog (Oc 490)	3
Princ of Physical Oceanog (Oc 491)	3
Princ of Geological Oceanog (Oc 492)	3
Princ of Chemical Oceanog (Oc 493)	3
12 hours selected from: Bi 370, CE 407, CE 414, CE 415, FW 465, FW 470, GS 331, Oc 499, Z 451, Z 452	12

Pharmacy—31-37 hours*

One year of biology (GS 101,102,103 *or* Z 201,202,203 *or* Bi 211,212,213)	9–15
Safety in the Use of Drugs (Phc 315)	2
Pharmacy Technology (PSc 317)	5
Medical Care (PSc 345)	4
Pharmacy Management (PSc 349)	3
Pharmacy Law (PSc 351)	2
Drug Information Sources (PSc 380)	3
Hospital Pharmacy (PSc 460)	3

Physical Sciences—27 hours

General Physics (Ph 201,202,203)	12
Organic Chemistry (Ch 226,227,228 *or* Ch 334,335,336)	8–9
7 hours selected from: BB 350, Ph 205, Ph 206, Ph 411, BB 461, Ch 419	7

Poultry Science—27 hours

Poultry Science (P 121)	3
Poultry Meat Production (P 421)	4
Egg Production (P 422)	4
Seminar (P 407)	1
6 hours selected from: P 199, P/VM 311, P 312, P 321, P 406, P 411, P 441	6
9 hours selected from: AnS 121, AnS 211, AnS 351, VM/P 311, VM 451, CrS 201, AET 211, AET 361	9

Rangeland Resources—28 hours

Rangeland Resources (Rng 341)	3
Rangeland Improvement (Rng 342)	3
Range Plant Communities (Rng 343)	3
Rangeland Analysis (Rng 441)	4
Rangeland-Animal Relations (Rng 442)	4
Range Management Planning (Rng 443)	3
8 hours in other agriculture departments	8

Safety Studies—27 hours

Employee and Indus Health Prac (H 281)	3
First Aid and Emergency Care (H 358)	3
Principles of Accident Prevention (H 181)	3
Fire Prev and Control (H 381)	3
Accident Hazards and Codes (H 382)	3
Safety Program Management (H 486)	3
9 hours selected from: H 331, H 360, H 406, H 407, H 443, H 480, H 481, H 485, IA 341,342, IE 390, IE 407, IEd 477, Sp 407	9

Soil Science—33 hours

27 hours from: Soils (Sls 210), Soil Water and Plant Growth (Sls 311), Soil Management and Conservation (Sls 314), Soils and Land Use (Sls 321), Soil Fertility (Sls 324), Seminar (Sls 407), Soil Chemistry (Sls 412), Soil Chemical Analysis (Sls 413), Soil Physics (Sls 421), Soil Physics Laboratory (Sls 422), Soil Morphology and Survey (Sls 432), Forest Soils (Sls 454)	27
At least two other courses in other agriculture departments	

* Prerequisite: Intermediate Algebra I (Mth 95) or equivalent; one year of chemistry (Ch 104, 105,106 *or* Ch 201,202,203 *or* Ch 204,205,206).

Technical minors are also offered in agricultural engineering, crop science, Extension education, and horticulture. See department chair for requirements.

Lower Division Courses

J 110 Survey of American Journalism

3 hours — 3 ①

Theory and practice of American journalism; introductory to courses in reporting, writing, editing, and production. Major study areas: theory and concepts governing the mass media; techniques of print and broadcast journalism. For majors and nonmajors.

J 111 Newswriting

3 hours — 3 ①

Writing news and feature stories.

J 212 Newswriting and Reporting

4 hours — 2 ① 2 ②

Writing for newspapers and magazines, both general and technical; writing styles. Students cover a news beat and furnish stories for the *Daily Barometer* and/or departmental publications. Prerequisite: J 111; typing ability.

J 214 Copyediting

3 hours any term — 2 ① 1 ②

Copy reading, head writing, proofreading, and makeup; actual experience in editing copy. Required for advanced positions on the *Barometer*. Prerequisite: J 212.

J 223 Editorial Writing

3 hours — 3 ①

Writing editorials, policy and ethics, makeup of editorial pages of trade journals and newspapers. Prerequisite: J 212.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (G) may be taken for graduate credit.

J 317 Special Feature Articles

3 hours — 3 ①

Interviewing and gathering information, writing and editing, marketing of feature articles for magazines and newspapers, popularizing scientific-technical material.

J 318 Public Information Methods

3 hours — 3 ①

Planning and executing informational campaigns, methods of informing public of public affairs, and other enterprises in which students are interested. Prerequisite: J 111.

J 319 Technical Reporting

3 hours — 3 ①

Interpreting scientific-technical information for the public through news stories and feature articles written for general and trade publications. Developing an understanding of working relationships between journalists and scientists, including experience in interviewing such news sources. Prerequisite: J 212.

J 333 Industrial-Business Publications

3 hours — 1 ③

Introduction to industrial editing; principles and problems of editing company publications, industrial, business, and other specialized magazines. Review of technical, trade, and business publications and their writing styles and formats.

J 334 Photojournalism

3 hours — 2 ① 1 ②

Introduction to black and white 35 mm photography; camera operation; exposure; developing film; printing. Planning, production, and use of black and white photographs in newspapers, magazines, and other publications.

J 335 Mechanics of Publishing

3 hours — 2 ① 1 ②

Printing processes; typographic development and display; type identification; paper and ink; copy fitting and estimating; design, layout, and processing of materials for publication.

J 350 Industrial Advertising
3 hours 2 ① 1 ②
Its role in newspapers and magazines, with special emphasis on industrial, technical, and scientific publications; basic display advertising layout; writing advertising copy; selling advertising; graphic design in display ads; advertising campaigns.

J 351 Journalism Projects
2 hours 1 ① 1 ②
For staff members of student publications, with course designation assigned as follows: J 351A, *Barometer*; J 351B, *Beaver*; J 351C, *Prism*; J 351D, *Ag News-Notes*; and J 351E, all other publications produced by students through the Department of Journalism. May be repeated for a maximum of 12 hours. Consent of instructor required.

J 393
Contemporary Technical Journalism
3 hours 3 ①
Role, functions, and responsibilities of mass and specialized media in interpreting science and other technical fields to the reading public. Advanced technical reporting and writing. Research and discussion of specialized fields such as science, medicine, education, urban/rural problems, and the environment and their relationship to the government and public. Selection of and trip to a town in which to try out reporting and writing techniques gained in this and other courses.

J 402 Independent Study

J 405 Reading and Conference (g)

J 406 Projects
Required of seniors majoring in technical journalism. Individual projects relating to the student's technical field. Should be taken as a block. Prerequisite: senior standing in technical journalism.

J 407 Seminar (g)
Terms and hours to be arranged

J 410 Journalism Internship (g)
3-15 hours to be arranged
One-term residency with a publication or organization where a student may receive practical experience related to the objectives of the technical journalism program. The intern observes and produces; the work is supervised and evaluated both by the organization management and the journalism faculty. Available to senior students reviewed as candidates by the faculty and chosen by the intern organization. May be repeated for a total of no more than 15 hours, but no more than 6 hours may be used to satisfy the journalism requirement of 47 hours. Maximum of 9 hours graduate credit.

J 431 Broadcast Journalism (g)
3 hours 2 ① 1 ②
Philosophy and principles of broadcast news reporting; current operating practices in writing, editing, and presenting news for broadcast; use of audio and video tape, wire services, facsimile, film in news reporting by radio and television. Prerequisite: J 212; Sp 262.

J 434 Technical Photojournalism I (g)
3 hours 2 ① 1 ②
Theory of exposure and development; screening prints for publication; special techniques for dealing with low-level lighting; the photograph as journalistic medium in scientific and technical publications; specialized photographic equipment; specialized films and developers. Prerequisite: J 334 or consent of instructor.

J 435 Technical Photojournalism II
(g) 3 hours 2 ① 1 ②
Introduction to color photography; developing and printing color transparencies; use of color photographs in publications. Introduction to lighting, macrophotography, slide copying. Prerequisite: J 434.

J 440 History of Journalism (g)
3 hours 3 ①
Concepts and principles involved in the growth and development of journalism in the United States including the evolution of communications agencies, technical advances, and the relationship of the media to political, economic, social, scientific, and industrial trends. Prerequisite: senior or graduate standing.

J 444 Television News (g)
4 hours 3 ②
Introduction to television news techniques; reporting and writing in words and pictures; current concepts in TV news reporting. Prerequisite: J 111, 431.

J 450 The Media and Society (g)
3 hours 3 ①
Organization, operation, functions, duties, and responsibilities of the mass communication media. Role of consumers of the mass media.

J 465
Law and Regulation in Mass Media
(g) 3 hours 3 ①
Legal and ethical aspects of technical journalism in such fields as science, industry, and technology. Included are concepts of press freedom and responsibilities, legal control of publications, copyright, censorship, media codes, and governmental regulations of radio and television. Prerequisite: senior standing.

J 470 Selected Topics in Journalism
(g) 3 hours 3 ①
Examination of current advances in journalism technology; trends in technical journalism; improved methods in writing and visual reporting of technical subject matter including business and economic news. Prerequisite: 9 hours of upper division journalism. May be repeated for credit for a maximum of 9 hours.

J 480 History of Photography (g)
3 hours 1 ① 2 ②
History of the people and developments that have contributed to the advancement of photography, particularly photojournalism. Besides readings, students are required to complete three term reports on (1) an individual photographer; (2) a technological advancement; and (3) photography as a record of social change. Prerequisite: upper division standing.

J 484 Photography for Industrial Publications (g)
4 hours 2 ① 2 ②
Techniques used by the industrial photographer, including architectural photography, industrial portraiture, product photography, and basic lighting. Prerequisite: J 334 or consent of instructor.

J 485 Environmental/Wildlife Photography (g)
4 hours 2 ① 2 ②
Techniques used in photographing wildlife and natural processes, including macrophotography, microphotography, telephoto lenses, and special films. Prerequisite: J 334 or consent of instructor.

LATIN AMERICAN AFFAIRS

The certificate program in Latin American Affairs offers students 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.

Curriculum

Proficiency in Spanish or Portuguese, equivalent to that attained at the end of the second-year sequence, or by placement scores.

At least 30 hours from the following approved courses:

Modern Latin American History (Hst 350,351)	8
Iberoamerican Culture and Civil (Span 340)	4
A seminar on Latin America through any of the participating departments	3
At least 15 hours from at least two of the following eight areas:	
Anthropology of the Caribbean (Anth 440C)	3
Anthropology of Latin America (Anth 440L)	3
Cultural Anthropology of South America (Anth 440LA)	3
International Agricultural Development (AREc 462)	3
Geography of Latin America (Geog 328)	3
Economic Survey of Latin America (Ec 448)	3
Problems in Latin America History (Hst 456)	4
Latin America Culture: Separate Realities (Hst 413B)	4
Governments and Politics in Latin America (PS 360)	5
Sociology of Minority Relations (Soc 437)	3
*Intermediate Comp and Conv (Span 348,349)	8
*Selected Topics in Luso-Hispanic Culture (Span 438)	3
*Spanish American Literature (Span 445,446)	8

Appropriate open-ended courses (402, 405,407) through participating departments, as well as transfer credits, may also be used to satisfy requirements.

LIBERAL STUDIES

A major program in liberal studies leading to either a B.A. or 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.

Students entering this program are expected to indicate agreement with the purposes of the program and should consult the director of Liberal Studies.

Candidates for the B.A. or B.S. degree must complete the following:

1. University requirements for graduation (see page 13).
2. College of Liberal Arts distribution requirements (see page 47).
3. A field program major of 45-60 hours which is thematic in nature and developed with course work from two or more departments in the College of Liberal Arts and approved by the student's designated adviser. At least 27 hours must be upper division. (Journalism and speech communication credits are restricted. See department chairs for details.)

Lower Division Courses

RS 127,128,129
Introduction to Russian Culture
3 hours each term 3 ①
RS 127: the imperial heritage. *RS 128:* the revolutionary tradition. *RS 129:* the Soviet era. Need not be taken in order. Not offered every year.

* Spanish majors must choose from two areas other than Spanish to fulfill the 15-hour minimum.

LS 100 Connections
1 hour 1 ①
An orientation to the liberal arts, exploring connections among the humanities, the social sciences, the arts, and the modern world.

LS 199 Special Studies
Terms and hours to be arranged

Upper Division Courses

LS 306 Projects
Section A, Student Counselor Orientation, and Section B, Peer Counseling, graded P/N.

LS 307 Seminar

LS 402 Independent Study

LS 403 Thesis

LS 406 Projects

LS 407 Seminar (g)
Graduate credit must not exceed 9 hours.

LS 408 Workshop
Terms and hours to be arranged

LS 471
Special Topics in Human Services
3 hours 1 ③
Application of psychological, educational, sociological, health, and administrative issues to the development of human services skills, including collecting information, interviewing, understanding others, dealing with problems, communicating, and supervising. Directed towards the solution of human service problems. Prerequisite: 9 hours of social science or family life.

MUSIC

The Department of Music, accredited by the National Association of Schools of Music, offers courses leading to the B.A. or B.S. degree in music or music education. The department meets a variety of students' interests and goals, offering courses for both majors and nonmajors.

Major program in music

Through a basic core curriculum in the College of Liberal Arts, students can major in music while concurrently preparing for a career in business, medicine, law, dentistry, or varied technological fields. Through an expanded curriculum, music majors may concentrate on career preparation in music alone.

Departmental degree requirements are a minimum of 57 hours, of which 30 must be upper division. The minimum must include the following:

	Hours
Literature and Mat of Music I (Mus 121,122,123)	12
Literature and Mat of Music II (Mus 221,222,223)	9
Ear Training II (Mus 234,235,236)	3
Literature and Mat of Music III (Mus 321,322,323)	9
Hist of Music (Mus 324,325,326)	9
Special Studies: Global Musics (Mus 499)	3
Lower division electives	3
[1] Upper division electives	9

Major program in music education

Music education majors have several areas of emphasis available: public school teaching with state certification in music at the elementary, junior, and senior high school levels (K-12 certificate); state certification in music in combination with preparation for elementary classroom teaching (K-9 certificate); or preparation for independent music teaching. Requirements for music education follow:

	Hours
Lit and Mat of Music (Mus 121,122,123)	12
Lit and Mat of Music (Mus 221,222,223)	9
Ear Training I (Mus 134,135,136)	3
Ear Training II (Mus 234,235,236)	3
History of Music (Mus 324,325,326)	9
Special Studies: Global Musics (Mus 499)	3
Conducting (Mus 315,316 or 315,318)	4
Mus in the Elem School (MuE 372)	3
Mus in the Jun High Sch (MuE 373)	3
Choral Meth and Mat for High Sch (MuE 474) or Intr Meth and Mat for the High Sch (MuE 475)	3
Studio Instruct (MuP 190-196, 290-296)	8
Perform Group (Mus 140-168)	6
Instrument Techniques (MuE 376-379)	6
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Piano and vocal proficiency examinations must be passed at the end of the sophomore year.

Minor program

Students majoring in other disciplines may elect a minor in music. The minor program consists of the following 30 hours:

Lit and Mat of Music I (Mus 121,122,123)	12
Lit and Mat of Music II (Mus 221,222,223)	9
[3] Upper division electives	9

Nonmusic majors. A wide diversity of courses, for which no background in music is required, is offered especially for the nonmajor (see Mus 101-110). These courses may be used to fulfill the University's general education requirements, the College of Liberal Arts' distribution requirements, or may be used as free electives.

Performance. All students are eligible to audition for the various bands, orchestras, choruses, and chamber ensembles. These groups give concerts on campus and some engage in brief tours of the state.

Lessons. Individual lessons at the intermediate and advanced levels are available with instructor consent. Group lessons are normally restricted to music majors. Students should contact the department office for application procedures and fee schedules.

Graduate program. The Department of Music participates in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) degree program and offers a graduate minor. Areas of specialization include music history and literature, theory and composition, performance (including conducting), pedagogy, and world, folk, and jazz traditions.

[1] Students preparing for careers in music are urged to consult with their academic adviser regarding additional courses appropriate to their particular concentration.
[2] Twelve music education hours are counted as humanities credit under the University's general education requirements.
[3] Performance organizations and ensembles are not to be included in the upper division electives for the minor.

Scholarships. The music tuition scholarship program contributes toward tuition each term of a music major's four years in college. Auditions and interviews normally take place in February, March, and April each year. Selection is based on academic and musical achievement.

Music Learning Center. In addition to books and printed music in Kerr Library, phonograph records, printed music, modern listening facilities, and electronic and computerized learning aids are available in the Music Learning Center in Benton Hall.

Electronic Music Studio. The Electronic Music Studio houses high quality sound recording, duplicating and playback equipment, ,and a custom-designed electronic music synthesizer.

Lower Division Courses

Mus 101 Music for the Listener
3 hours 3 ①
For nonmajors. Study of selected repertoire, primarily from the Western classical tradition, to help students gain an understanding of musical forms and styles, and to become more perceptive listeners.

Mus 102 Survey of Music History
3 hours 3 ①
For nonmajors. The development of western music from the middle ages to the present. Prerequisite: Mus 101. Need not be taken in order.

Mus 103 Great Composers
3 hours 3 ①
For nonmajors. A study of the life and works of one or several related great composers (Bach, Mozart, Brahms, and others—see *Schedule of Classes*). Prerequisite: Mus 101. Need not be taken in order. Course may be repeated for credit.

Mus 104 Masterworks for Orchestra
3 hours 3 ①
For nonmajors. Orchestral music from the Baroque period to the present; emphasis on standard repertoire. Prerequisite: Mus 101. Need not be taken in order.

Mus 107 Folk Music in America
3 hours 3 ①
For nonmajors. Definitions, concepts, social contexts, and analysis of European, African, and American Indian folk music traditions in the United States. Need not be taken in order.

Mus 108 Global Musics
3 hours 3 ①
For nonmajors. Survey of the world's musics with attention to musical styles and cultural contexts. Included are Oceania, Indonesia, Africa, Asia, Latin America; see *Schedule of Classes* for subject being offered. May be repeated for credit. Need not be taken in order.

Mus 109 Introduction to Jazz
3 hours 3 ①
For nonmajors. A listener's approach to the development of jazz through its various styles. Need not be taken in order.

Mus 110
Fundamentals of Music Theory
3 hours 3 ①
For nonmajors. Music reading and writing of scales, chords, and rhythm patterns.

Mus 121,122,123
Literature and Materials of Music I
4 hours each 5 ①
An integrated, team-taught approach to the study of Western art music, including repertory, melodic, harmonic, and rhythmic components, formal organization, and composition. Three lectures, one ear-training lab, and one keyboard harmony lab.

Mus 134,135,136 Ear Training I
1 hour each 2 ①
Aural comprehension of the basic melodic, rhythmic, and harmonic elements of music.

Mus 140 University Choir
2 hours 3 ① 1 (1½)
A highly select ensemble of 50-55 mixed voices, chosen by audition in the fall of each year; on- and off-campus concerts and short (or, occasionally, extended) tours; wide variety of literature; folk dancing.

Mus 141 University Singers
1 hour 3 ①
A select ensemble of 50-60 voices, chosen by audition at the beginning of each term. Wide variety of literature. Concerts each term.

Mus 142 Vocal Jazz Ensemble
1 hour 2 ①
From 20-24 voices, chosen by audition at the beginning of each term. Special emphasis given to music in the jazz/swing idiom.

Mus 143 Men's Glee Club
1 hour 1 ②
From 50-60 members, chosen by audition at the beginning of each term. Variety of literature. Concerts each term and occasional short tours.

Mus 144 Madrigal Singers
1 hour 3 ①
From 8-12 singers, chosen by audition at the beginning of each term. Emphasis on English and Italian madrigals.

Mus 145
Vocal Ensemble: Miscellaneous
1 hour
Various small vocal chamber music ensembles; barbershop quartets, opera ensembles, Gregorian chanters.

Mus 150 Symphonic Band
2 hours 2 ① 1 ②
A select ensemble of approximately 80 wind and percussion players chosen by audition; variety of challenging wind literature. Concerts and radio performances each term.

Mus 151 Concert Band
1 hour 2 ①
Wind and percussion ensemble of approximately 70 players, open to all students on campus with the approval of the director. Challenging wind literature studies and performed each term.

Mus 152 Jazz Band
1 hour 2 ①
Large and small jazz ensembles, chosen by audition. Concentration on current jazz styles. Performances each term.

Mus 153 Marching Band
2 hours 3 ① 1 ②
A marching and playing unit of more than 160 musicians, open to all students on campus with the approval of the director. Performs for home football games; one trip each year to an off-campus game.

Mus 154 Basketball Band
1 hour
An ensemble of approximately 50 players, chosen by audition, consisting largely of marching band members. Performs for home basketball games.

Mus 160
University Symphony Orchestra
2 hours 1 ⑧ 1 ①
An ensemble of 60-85 players, chosen by audition. Rehearsal and performance of standard and unusual orchestra works from the 18th, 19th, and 20th centuries. Concerts each term.

Mus 161 Chamber Orchestra
1 hour 1 ② 1 ①
A select ensemble of 35-40 players; performances of works for small orchestra from the sixteenth century to the present day. Open to all students by consent of conductor.

Mus 164 Chamber Ensemble: Strings
1 hour 1 ①
Performance of chamber music. Prerequisite: audition.

Mus 165
Chamber Ensemble: Woodwinds
1 hour 1 ①
Performance of chamber music. Prerequisite: audition.

Mus 166 Chamber Ensemble: Brass
1 hour 1 ①
Performance of chamber music. Prerequisite: audition.

Mus 167
Chamber Ensemble: Percussion
1 hour 1 ①
Performance of chamber music. Prerequisite: audition.

Mus 168
Chamber Ensemble: Miscellaneous
1 hour 1 ①
Performance of chamber music for mixed instrumental and vocal ensembles. Prerequisite: audition.

Mus 180
Group Lessons: Piano (Basic Level)
1 hour 2 ①
Elementary group instruction involving piano skills and basic theory.

Mus 181 Group Lessons: Piano (Intermediate Level)
1 hour 1 ①

Mus 182 Group Lessons: Voice
1 hour 1 ①

Mus 183
Group Lessons: Orchestral Instruments
1 hour 1 ①

Mus 199 Special Studies
1-3 hours to be arranged

Mus 221,222,223
Literature and Materials of Music II
3 hours each 3 ①
Advanced harmony, techniques of analysis, musical form, composition, and continued study of the repertory of Western music. Keyboard skills integrated into course. Two lectures and one keyboard lab weekly. Prerequisite: Mus 123.

Mus 231,232,233 Keyboard Harmony
1 hour each 1 ①
Keyboard application of harmonic principles being studied concurrently in Literature and Materials of Music II; exercises in diatonic and chromatic harmony, modulation, figured bass realization, transposition and improvisation. Prerequisite: Mus 123 or equivalent. Must be taken in order.

Mus 234,235,236 Ear Training II
1 hour each 2 ①
Sight-singing; melodic and harmonic dictation. Prerequisite: Mus 123 plus Mus 136 or consent of instructor.

Mus 299 Special Studies
1-3 hours to be arranged

Upper Division Courses
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Mus 315 Conducting
2 hours 2 ①
Basic baton techniques. Prerequisite: Mus 223, 233,236.

Mus 316,317 Choral Conducting
2 hours each 2 ①
Advanced baton techniques, score reading; principles of developing choral excellence. Practical experience conducting campus organizations. Prerequisite: Mus 315. Must be taken in order.

Mus 318,319 Instrumental Conducting
2 hours each 2 ①
Advanced baton techniques, score reading, principles of developing band and orchestra excellence. Practical experience conducting campus organizations. Prerequisite: Mus 315. Must be taken in order.

Mus 321 Literature and Materials of Music III: The 16th Century
3 hours 3 ①
A study of 16th century music, based on listening and analysis of the repertory, and written exercises in counterpoint. Prerequisite: Mus 223.

Mus 322 Literature and Materials of Music III: The Early 18th Century
3 hours 3 ①
A study of 18th century music style, with emphasis on written work, in chorale style, and counterpoint. Prerequisite: Mus 321.

Mus 323 Literature and Materials of Music III: Music After 1945
3 hours 3 ①
A study of representative styles in music from 1945 to the present. Prerequisite: Mus 223.

Mus 324,325,326 History of Music
3 hours each 3 ①
Survey of musical forms and styles from Gregorian chant to present. Prerequisite: Mus 223. Must be taken in order.

Mus 337,338
Electronic Music Composition I
3 hours each 3 ①
Introduction to electronic music synthesis. Basic studio techniques and survey of representative literature. Prerequisite: Mus 223.

Mus 340 University Choir
2 hours 3 ① 1 (1½)
A highly select ensemble of 50-55 mixed voices, chosen by audition in the fall of each year; on- and off-campus concerts and short (or, occasionally, extended) tours; wide variety of literature; folk dancing.

Mus 341 University Singers
1 hour 2 ①
A select ensemble of 50-60 voices, chosen by audition at the beginning of each term; wide variety of literature; concerts each term.

Mus 342 Vocal Jazz Ensemble
1 hour 2 ①
From 20-24 voices, chosen by audition at the beginning of each term; special emphasis given to music in jazz/swing idiom.

Mus 343 Men's Glee Club
1 hour 1 ②
From 50-60 members, chosen by audition at the beginning of each term; variety of literature; concerts each term and occasional short tours.

Mus 344 Madrigal Singers
1 hour 3 ①
From 8-12 singers, chosen by audition at the beginning of each term; emphasis on English and Italian madrigals.

Mus 345
Vocal Ensemble: Miscellaneous
1 hour
Various small vocal chamber music ensembles; barbershop quartets, opera ensembles, Gregorian chanters.

Mus 350 Symphonic Band
2 hours 2 ① 1 ②
A select ensemble of approximately 80 wind and percussion players, chosen by audition. Variety of challenging wind literature. Concerts and radio performances each term.

Mus 351 Concert Band
1 hour 2 ①
Wind and percussion ensemble of approximately 70 players, open to all students on campus with the approval of the director. Challenging wind literature studied and performed each term.

Mus 352 Jazz Band
1 hour 2 ①
Large and small jazz ensembles chosen by auditions. Concentration on current jazz styles. Performances each term.

Mus 353 Marching Band
2 hours 2 ① 1 ②
A marching band and playing unit of more than 160 musicians, open to all students on campus with the approval of the director. Performs for home football games; one trip each year to an off-campus game.

Mus 354 Basketball Band
1 hour
An ensemble of approximately 50 players, chosen by audition, consisting largely of marching band members. Performs for home basketball games.

Mus 360
University Symphony Orchestra
2 hours 1 ② 1 ①
An ensemble of 60-85 players, chosen by audition. Rehearsal and performance of standard and unusual orchestral works from the 18th, 19th, and 20th centuries. Concerts each term.

Mus 361 Chamber Orchestra
1 hour 1 ② 1 ①
A select ensemble of 35-40 players; performances of works for small orchestra from the sixteenth century to the present day. Open to all students by consent of instructor.

Mus 364 Chamber Ensemble: Strings
1 hour 1 ①
Performance of chamber music. Prerequisite: audition.

Mus 365
Chamber Ensemble: Woodwinds
1 hour 1 ①
Performance of chamber music. Prerequisite: audition.

Mus 366 Chamber Ensemble: Brass
1 hour 1 ①
Performance of chamber music. Prerequisite: audition.

Mus 367
Chamber Ensemble: Percussion
1 hour 1 ①
Performance of chamber music. Prerequisite: audition.

Mus 368
Chamber Ensemble: Miscellaneous
1 hour 1 ①
Performance of chamber music for mixed instrumental and vocal ensembles. Prerequisite: audition.

Mus 399 Special Studies
1-3 hours to be arranged

Mus 401 Research

Mus 402 Independent Study

Mus 403 Thesis

Mus 405 Reading and Conference (g)

Mus 406 Projects (g)

Mus 407 Seminar (g)
See *Schedule of Classes* for specific topics.

Mus 408 Workshop (g)
Terms and hours to be arranged

Mus 415,416,417 Advanced Conducting
(g) 3 hours each 3 ①
Advanced techniques of conducting—both choral and instrumental. Baton technique, interpretation, study of major scores. Prerequisite: Mus 317 or 319. Must be taken in order.

Mus 424 Vocal Literature (g)
3 hours 3 ①
Solo vocal literature from the Renaissance to the present. Prerequisite: Mus 223. Offered alternate years.

Mus 425 Keyboard Literature (g)
3 hours 3 ①
Study of representative literature of selected master composers from the pre-Bach period to the present with illustrative performances by students and faculty. Prerequisite: Mus 223. Offered alternate years.

Mus 426 Chamber Music Literature
(g) 3 hours 3 ①
Chamber music from Haydn to present with emphasis on music in the standard literature. Prerequisite: Mus 223. Offered alternate years.

Mus 427 The Opera (g)
3 hours 3 ①
Composers, libretti, and styles with emphasis on current operatic repertoire, assigned reading and listening. Prerequisite: Mus 223. Offered alternate years.

Mus 428
Music of the Twentieth Century (g)
3 hours 3 ①
Important trends in music since 1910, major composers and their works. Prerequisite: Mus 223. Offered alternate years.

Mus 431 Choral Arranging (g)
3 hours 3 ①
Arranging for choral organizations, including special problems in writing for younger choruses. Prerequisite: Mus 223. Offered alternate years.

Mus 432,433 Orchestration and Band Arranging I, II (g)
3 hours each 3 ①
Ranges and capabilities of instruments. Principles of scoring for standard symphony orchestra, concert band, and football band. Problems of scoring for subprofessional and public school ensembles. Prerequisite: Mus 223. Offered alternate years.

Mus 434 Composition I (g)
3 hours 3 ①
Principles of melodic construction and musical design. Written work in small forms and conventional tonal idioms. Prerequisite: Mus 223. Offered alternate years.

Mus 435 Composition II (g)
3 hours 3 ①
Written work in larger forms; techniques of twentieth-century composition. Prerequisite: Mus 434. Offered alternate years.

Mus 437,438 Electronic Music Composition II (g)
3 hours each 3 ①
Advanced studies in electronic synthesis. Advanced studio techniques and the realization of extended composition. Prerequisite: Mus 338. Must be taken in order.

Mus 439 Studies in Musical Analysis
(g) 3 hours 3 ①
The relationship of analysis to performance, unusual approaches to analysis, the relation of musical form to emotional expression, aesthetics. Emphasis on individual reports by students. Prerequisite: Mus 223. Offered alternate years.

Mus 499 Special Studies (g)
3 hours 3 ①
Intensive work in musicology and ethnomusicology, involving specific topics from both Western and non-Western civilizations. See *Schedule of Classes* for topics. May be repeated for credit. Prerequisite: Mus 223 or 326.

MUSIC EDUCATION COURSES

Upper Division Courses
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

MuE 371 Fundamentals of Music for Elementary Classroom Teachers
4 hours 5 ①
Music activities for elementary teachers in training. Introductory course designed to build basic musicianship through experiences that apply to teaching of music in elementary classroom.

MuE 372
Music in the Elementary School
3 hours 3 ①
Basic principles of Orff, Kodaly, and Dalcroze; review of materials currently available and appropriate for elementary school. For *all* K-9 and K-12 music education majors and suggested as an elective for nonmajors who have successfully completed Mus 371.

MuE 373
Music in the Junior High School
3 hours 3 ①
Materials and repertoire for junior high school general music, choral and instrumental groups. For *all* K-9 and K-12 music education majors. Not open to non-music or non-music education majors. Prerequisite: Mus 113.

MuE 376
Instrumental Techniques: Strings
2 hours 2 ①
Basic instruction in stringed instruments. For music majors and specialists in music education.

MuE 377
Instrumental Techniques: Woodwinds
2 hours 2 ①
Basic instruction in woodwind instruments. For music majors and specialists in music education.

MuE 378
Instrumental Techniques: Brass
2 hours 2 ①
Basic instruction in percussion instruments. For music majors and specialists in music education.

MuE 379
Instrumental Techniques: Percussion
2 hours 2 ①
Basic instruction in woodwind instruments. For music majors and specialists in music education.

MuE 474 Choral Methods and Materials for the High School (g)
3 hours 3 ①
Repertory of choral groups in the high school; program planning and administration. Prerequisite: Mus 316,326.

MuE 475 Instrumental Methods and Materials for the High School (g)
3 hours 3 ①
Repertory of hand (including stage band) and orchestra in the high school; program planning and administration. Prerequisite: Mus 318,326.

MuE 476 Marching Band Techniques (g)
2 hours 2 ①
Marching fundamentals, styles, show design, and music selection. Prerequisite: Mus 433.

Courses from other departments accepted for major credit:

Ed 407 Seminar
3 hours 3 ①

Ed 408o Special Secondary Methods
3 hours

Ed 416o Student Teaching: Secondary
9 to 15 hours
See "School of Education" for descriptions.

STUDIO INSTRUCTION COURSES

Lower Division Courses

MuP 190 Individual Lessons: Keyboard
2-4 hours any term to be arranged

MuP 191 Individual Lessons: Voice
2-4 hours any term to be arranged

MuP 192 Individual Lessons: Strings
2-4 hours any term to be arranged

MuP 193 Individual Lessons: Woodwinds
2-4 hours any term to be arranged

MuP 194 Individual Lessons: Brass
2-4 hours any term to be arranged

MuP 195 Individual Lessons: Percussion
2-4 hours any term to be arranged

MuP 196 Individual Lessons: Miscellaneous
2-4 hours any term to be arranged

MuP 290 Individual Lessons: Keyboard
2-4 hours any term to be arranged

MuP 291 Individual Lessons: Voice
2-4 hours any term to be arranged

MuP 292 Individual Lessons: Strings
2-4 hours any term to be arranged

MuP 293 Individual Lessons: Woodwinds
2-4 hours any term to be arranged

MuP 294 Individual Lessons: Brass
2-4 hours any term to be arranged

MuP 295 Individual Lessons: Percussion
2-4 hours any term to be arranged

MuP 296 Individual Lessons: Miscellaneous
2-4 hours any term to be arranged

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

MuP 390 Individual Lessons: Keyboard
2-4 hours any term to be arranged

MuP 391 Individual Lessons: Voice
2-4 hours any term to be arranged

MuP 392 Individual Lessons: Strings
2-4 hours any term to be arranged

MuP 393 Individual Lessons: Woodwinds
2-4 hours any term to be arranged

MuP 394 Individual Lessons: Brass
2-4 hours any term to be arranged

MuP 395 Individual Lessons: Percussion
2-4 hours any term to be arranged

MuP 396 Individual Lessons: Miscellaneous
2-4 hours any term to be arranged

MuP 490 Individual Lessons: Keyboard
(g) 2-4 hours any term to be arranged

MuP 491 Individual Lessons: Voice
(g) 2-4 hours any term to be arranged

MuP 492 Individual Lessons: Strings
(g) 2-4 hours any term to be arranged

MuP 493 Individual Lessons: Woodwinds (g)
2-4 hours any term to be arranged

MuP 494 Individual Lessons: Brass
(g) 2-4 hours any term to be arranged

MuP 495 Individual Lessons: Percussion (g)
2-4 hours any term to be arranged

MuP 496 Individual Lessons: Miscellaneous (g)
2-4 hours any term to be arranged

PHILOSOPHY

The Department of Philosophy offers an undergraduate program leading to the B.A. or B.S. degree and a minor program. The department also participates in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) degree program, offered through the Graduate School.

Students may concentrate in such areas as formal logic, philosophy of science, history of philosophy, logic and semantics, or value theory (ethics, political philosophy, philosophy of the arts).

The Department of Philosophy provides general education courses for students interested in broadening their intellectual horizons, developing their abilities for intellectual criticism, and enlarging their understanding of social and ethical values in contemporary society. Special colloquia and seminars are also offered through the University Honors Program.

Departmental requirements for the B.A. or B.S. degree—45 hours:

History of philosophy (Phl 301,302,303, 308,315,411,312)	12
Contemporary philosophy (Phl 331,333, 348,360,390,446,451,455,470,471,490, 491)	12
Symbolic logic (Phl 321,420, or 421)	4
Upper division value ethics (Phl 342,360, 365, or 441)	4
Seminar (Phl 407)	3
Electives in philosophy (any courses not used to satisfy the above requirements)	10

Departmental requirements for the minor—24 hours (including 16 upper division hours):

History of philosophy (Phl 301,302, or 303)	4
Concentration in a philosophical area	20

The undergraduate major program provides preparation for advanced study in many fields and professions, such as law and public service, and for graduate study in philosophy. The Department of Philosophy invites students to combine a serious study of philosophy with the study of another discipline, either through the liberal studies program or by earning concurrent degrees.

Lower Division Courses

Phl 101 Basic Logic
4 hours 3 ① 1 ①
Analysis of arguments, basic patterns of reasoning, logical relations, and logical fallacies. Intended to improve analytical, critical, and reasoning skkills. A basic, general education course.

Phl 105 Introduction to Philosophy
4 hours 3 ① 1 ①
An elementary, general introduction to philosophy. Not offered every year.

Phl 199 Special Studies
Terms and hours to be arranged

Phl 200 Philosophical Analysis
4 hours 3 ① 1 ①
Contemporary analytical techniques applied to basic philosophical problems in science, religion, literature, and politics. Not offered every year.

Phl 201 Problems of Philosophy
4 hours 3 ① 1 ①
An introductory study of central philosophical topics or figures such as Plato, Descartes, Nietzche, knowledge, human freedom. A basic, general education course designed to give an appreciation of philosophical issues and to develop the student's ability to analyze them.

Phl 205 Ethics
4 hours 3 ① 1 ①
Analysis of contemporary moral issues (e.g., abortion) and ethical arguments, including examination of student's own ethical views.

Phl 207 Political Philosophy
4 hours 3 ① 1 ①
The moral evaluation of political systems; criteria for evaluating the rights and obligations of citizens and governments. Human rights used as a unifying theme.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Phl 301,302,303
History of Western Philosophy
4 hours each 3 ① 1 ①

A study of the history of Western philosophy from the early Greeks to the nineteenth century. An essential general education course designed to give an appreciation and understanding of the Western philosophical tradition and the foundations of Western civilization. *Phl 301:* Greek and Roman philosophy. *Phl 302:* the rise of modern philosophy. *Phl 303:* Kant and nineteenth century philosophy. Prerequisite: 4 hours of philosophy recommended.

Phl 308 Asian Philosophy
4 hours 4 ①

Traditional and contemporary philosophies of India, China, and Japan and their significance for Western people. Prerequisite: 4 hours of philosophy recommended. Not offered every year.

Phl 315
History of American Philosophy
4 hours 3 ① 1 ①

A study of important topics, figures, or movements in American philosophy such as Edwards, James, Dewey, pragmatism. Prerequisite: 4 hours of philosophy recommended. Not offered every year.

Phl 320
Logical Criticism and Analysis
4 hours 3 ① 1 ①

Analysis of discourse and reasoning. Designed to improve the students analytic skills, especially those required for graduate work in medicine, law, and business. Prerequisite: upper division standing, appropriate placement, or Phl 101.

Phl 321 Deductive Logic
4 hours 3 ① 1 ①

Study of a formal system of symbolic logic, closely corresponding to the way reasoning is done in ordinary English and mathematics; uses and properties of formal systems. To improve student's ability to understand and use complex statements and to construct and evaluate proofs. Prerequisite: upper division standing, appropriate placement, or Phl 101.

Phl 331 Analytic Philosophy
4 hours 3 ① 1 ①

Examination of important twenthieth-century figures and topics, e.g., Moore, Russell, scepticism, logical positivism, and ordinary language philosophy. Prerequisite: 4 hours of philosophy recommended. Not offered every year.

Phl 333 Existentialism
4 hours 3 ① 1 ①

Examination of the philosophical writings of such thinkers as Kierkegaard, Nietzsche, and Sartre. Prerequisite: 4 hours of philosophy recommended. Not offered every year.

Phl 342 Contemporary Ethics
4 hours 3 ① 1 ①

Examination of significant developments and issues in twentieth-century moral philosophy. Prerequisite: Phl 205. Not offered every year.

Phl 348 Philosophy of Religion
4 hours 3 ① 1 ①

Study of problems of faith and reason, religious language, ideas of God, religious concepts of people and history. Prerequisite: 4 hours of philosophy recommended. Not offered every year.

Phl 360 Philosophy of the Arts
4 hours 3 ① 1 ①

Study of aestethic theories and concepts and the problems of art criticism and evaluation. Prerequisite: 4 hours of philosophy recommended. Not offered every year.

Phl 365
Law in Philosophical Perspective
4 hours 3 ① 1 ①

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, legal responsibility, liberty, and law. Four hours of philosophy recommended as prerequisite: Not offered every year.

Phl 390 Special Topics in Philosophy
4 hours each 3 ① 1 ①

Examination of the work of a contemporary philosopher or of a specific contemporary problem; e.g., Wittgenstein, determinism, perception, philosophy of mind. Four hours of upper division philosophy recommended. Not offered every year.

Phl 402 Independent Study

Phl 405 Reading and Conference (g)

Phl 407 Seminar (g)
Terms and hours to be arranged

Phl 411,412
Great Figures in Philosophy (g)
4 hours each 3 ① 1 ①

Study of the works of major philosophers such as Plato, Aristotle, Descartes, Hume, and Kant. Each course normally devoted to the work of a single figure. Prerequisite: 8 hours of philosophy recommended. Need not be taken in order.

Phl 420 Set Theory (g)
4 hours 3 ① 1 ①

An axiomatic development of set theory up to and including the axiom of choice, set algebra, theory of relations and functions, the natural number sequence, and transfinite numbers. Prerequisite: any one of Phl 221, CS 320, Mth 448, or any 400-level course in mathematics. Not offered every year.

Phl 421 Mathematical Logic (g)
3 hours 3 ①

Rigorous definition of a formal logic and investigation of its characteristics. Emphasis on the distinction and relation between semantic and syntactic methods (model theory and proof theory) and on the meta-mathematical analysis of axiomatic theories. Prerequisite: any one of Phl 420, Mth 448, CS 521, or 9 hours of 400-level mathematics or computer science. Not offered every year.

Phl 441 Classical Ethical Theories (g)
4 hours 3 ① 1 ①

Philosophical issues in ethics analyzed through the examination of such classical works as Aristotle's *Nichomachean Ethics.* Prerequisite: Phl 205. Not offered every year.

Phl 446 Philosophy of Education (G)
3 hours 3 ①

Examination of important figures and topics; e.g., Plato, Dewey, educational values. Prerequisite: 4 hours of philosophy recommended. Not offered every year.

Phl 451 Theory of Knowledge (g)
3 hours 3 ①

Examination of significant theories of knowledge; analysis of important concepts and problems, including rationalism, empiricism, skepticism, perception, induction, belief. Prerequisite: 8 hours of philosophy recommended. Not offered every year.

Phl 455 Philosophy of Language (g)
4 hours 4 ①

Examination of the contributions of important figures such as Bertrand Russell, the logical positivists, the ordinary language philosophers, and Chomsky; such basic topics as linguistic meaning and reference. Prerequisite: 8 hours of philosophy. Not offered every year.

Phl 470,471 Philosophy of Science (g)
3 hours each 3 ①

Examination of the nature and structure of scientific concepts, theories, and laws; revolutions in science and their causes; influences of science and philosophy on each other. Prerequisite: upper division standing in science or Phl 221. Need not be taken in order.

Phl 490
Topics in Contemporary Philosophy (g)
3 hours 3 ①

Examination of the work of a contemporary philosopher or of a specific contemporary problem; e.g., Wittgenstein, determinism, perception, philosophy of mind. Prerequisite: eight hours of upper division philosophy. Not offered every year.

Courses from other departments accepted for major credit:

Mth 494 Fundamentals of Elementary Mathematics (g)
3 hours 3 ①

See Mathematics in "College of Science" for course description.

POLITICAL SCIENCE

The Department of Political Science offers both major and minor programs; the major program leads to the B.A. or B.S. degrees. Course work in several subfields is offered, including American government, public policy, public law, public administration, political theory, political behavior, international politics, and comparative politics.

Either directly or after graduate study, graduates pursue careers in law, foreign service, management (local, state, and national government), international organizations, journalism, university teaching, research, and political office. Students planning to teach social studies at the secondary level may major in political science and must fulfill requirements for certification (see "School of Education").

Major program

Majors must complete 50 hours of political science, of which at least 35 must be in upper division courses, including PS 311 and one upper division course in political philosophy. Majors are advised to complete courses in several subfields. Students who plan to do graduate work in political science or public administration are urged to acquire basic competence in statistics and computer data processing.

Minor program

Students electing a minor in political science may choose general political science or one of four, specific options: American government and politics, law, international affairs, or public policy and administration. Students planning to minor in political science must do so at least one year or 45 credit hours prior to the date of graduation.

Students majoring or minoring in political science should consult regularly with their adviser to design programs

that best serve their educational and career objectives. Participation in either the major or minor program satisfies the University's general education social science requirements.

Lower Division Courses

PS 101,102 American National Government and Politics
3 hours each — 3 ① or 2 (1½)
Analysis and description of the American governmental system. *PS 101:* The Constitution, federalism, civil rights, and the political process. *PS 102:* Structure, powers, and function of the executive, legislative, and judicial branches of the national government. Recommended to be taken in order.

PS 103 State and Local Government
3 hours — 3 ① or 2 (1½)
Role, organization, and functions of government at the state and local level in the United States. Designed to complement PS 101,102, although PS 101,102 are not prerequisites. Satisfies teaching certification requirement for course work in state and local government.

PS 199 Special Studies
Terms and hours to be arranged
Section B, Great Decisions, 1 hour, Section E, Political Science Orientation, 1 hour, Section F, Elections, 1 hour, Section H, American Issues Forum, 1 hour; each graded P/N.

PS 201
Politics and Government: Explanation
3 hours — 3 ① or 2 (1½)
Introduction to selected concepts and techniques used to make sense of politics. Consideration of political decisions and calculations of individuals, groups, and governments, with emphasis on explanation of what actually happens.

PS 202
Politics and Government: Values
3 hours — 3 ① or 2 (1¼)
Introduction to selected concepts and techniques used to make sense of politics. Emphasis on different views of human nature in relation to political organization; role of cultural values in politics; basic premises of democratic and Marxist governments.

PS 203
Introduction to Comparative Politics
3 hours — 3 ① or 2 (1½)
Major concepts of comparative politics applied to various political settings; the United States, Western Europe, Communist regime, and developing countries.

PS 205 International Relations
5 hours — 5 ①
Nature of the international system and analysis of factors affecting the international environment.

PS 206 International Relations
3 hours — 3 ①
International system and factors affecting the international environment. A three-hour alternative to PS 205.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

PS 301 Governmental Institutions and Resource Policy
4 hours — 4 ①
Identification of the governmental institutions and organizations that make or affect natural resource policy decisions; analysis of responsibilities and activities. Major policy issues; institutional or organizational constraints on these issues.

PS 309 Legislative Politics
3 hours — 3 ①
Role and functions of legislators and legislative bodies and their vital position in a political system predicated upon the principle of popular sovereignty.

PS 310 Presidential Politics
3 hours — 3 ①
Office, powers, and politics of the American Presidency, with reference to other executive offices in American government; emphasis on the Presidency as of centripetal importance and effect in American politics.

PS 311 Introduction to Political Analysis
5 hours — 5 ①
For political science majors and other social science students interested in the theoretical problems of political analysis. Analyses of selected theoretical writings, concepts, and methodology, stressing various approaches to the study of politics.

PS 313 State Governments and Politics
3 hours — 3 ①
Importance of states in total governmental process; functions, including education, welfare, law enforcement, protection of natural resources, and regulation of business and labor; roles of individual citizens, pressure groups, political leaders, administrators, and legislators in shaping state government. Satisfies teaching certification requirement for course work in state and local gooovernment.

PS 317,318,319
American Constitutional Law
5 hours each — 5 ①
PS 317: the judicial process; powers of the courts, Congress, and President; nation-state relationship. *PS 318:* national powers, with emphasis upon commerce, tax, war, and treaty powers. *PS 319:* civil liberties; civil, political, and social rights of individuals. PS 101,102 recommended as prerequisite. Need not be taken in order.

PS 325 Political Parties and Elections
5 hours — 5 ①
Political parties and elections, the electorate and voting behavior, electoral system, exercise of the suffrage, extent and consequences of voter participation.

PS 326
Interest Groups and Public Opinion
3 hours — 3 ①
Links between people and government: public opinion, pressure groups, the media, protest, and political violence.

PS 329
The Politics of the Women's Movement
3 hours — 3 ①
Sources, ideas, and organization of the women's movement in the United States and its impact on public policy. Not offered every year.

PS 330 Asian Government and Politics
4 hours — 2 ② or 4 ①
Comparative analysis of contemporary Asian institutions; political tradition, process, stability and change, leadership, political integration, and interest formation.

PS 334 Public Policy Problems
5 hours — 5 ①
The substantive content, administrative problems, and political strategies in such areas and national programs as poverty and welfare, race and rights, jobs and automation technology, defense and foreign affairs.

PS 335,336 Current Problems in American Democracy
2 hours each — 2 ①
Domestic and foreign policy, organization and operation of American political system, individual and state in democratic society. Not offered every year.

PS 344
Political Systems of Western Europe
5 hours — 5 ①
Comparative analysis of contemporary institutions of governmental power in Western Europe; political tradition, process, stability and change, subsystems of leadership, political integration, and interest formation.

PS 346 The Soviet Political System
5 hours — 5 ①
Background, formation, and development of the Soviet political system; the sources, problems, and patterns of political power in the USSR today. Not offered every year.

PS 350 Classical Political Thought
5 hours — 5 ①
Major political theorists from the pre-Socratics through the Scholastics.

PS 351 Modern Political Thought
5 hours — 5 ①
Major political theorists from the Renaissance to the mid-nineteenth century.

PS 353,354 American Political Thought
3 hours each — 3 ① or 2 (1½)
Political values and theoretical systems in the American tradition. *PS 353:* the Puritans and the early tradition to the American Revolution. *PS 354:* the American Revolution to the present.

PS 360 Government and Politics of Latin America
5 hours — 5 ①
Basic institutional arrangements; major pressure groups, political parties, the military, and possibilities for revolution and/or reform.

PS 402 Independent Study

PS 403 Thesis

PS 405 Reading and Conference (g)

PS 406 Projects (g)
Section G, MU Field Training, 2 hours, Section H, ASOSU Field Training, 3 hours, Section P, Peer Advising, 2 hours; each graded P/N.

PS 407 Seminar (g)
Section B, Great Decisions, Sections F, Elections, Section H, American Issues Forum; each graded P/N.

PS 408 Workshop (g)
Terms and hours to be arranged
Graduate credit for PS 408 must not exceed 6 hours.

PS 410 Political Science Internship
(g) 1 to 12 hours
Supervised work experience in government programs or other public affairs organizations. Supplementary training, conference, reports, and appraisals. May be repeated for a maximum of 12 hours. Graded P/N.

PS 411,412 Public Administration (g)
4 hours each — 4 ①
PS 411: principles of public administration, administrative organization and procedures, public relations. *PS 412:* administrative functions, public personnel, and fiscal problems and practices. Prerequisite: PS 101,102. Need not be taken in order.

PS 413 Problems and Issues in Public Administration (g)
3 hours — 3 ①
Individual and group behavior in an administrative environment; change and adaptation, the administrator and policy development, reorganization, organizational research, application to current problems. Prerequisite: PS 101,102. Need not be taken in order.

PS 417
Concepts of International Relations (g)
3 hours 3 ①
Basic theories and approaches to international relations. Prerequisite: PS 205 or 206.

PS 418 American Foreign Policy (g)
3 hours 3 ①
Principles, purposes, processes of policy making; an analysis and evaluation of procedural and substantive aspects of American foreign policy. Prerequisite: PS 101,102 or 205 or 206.

PS 420 International Organization (g)
3 hours 3 ①
Interstate interaction and organization; historical, legal, structural, and theoretical analysis; the United Nations system. Prerequisite: PS 205 or 206.

PS 422 International Law (g)
3 hours 3 ①
Theories and historical development of international law, problems in development, classic cases. Prerequisite: PS 101, 102 or 205 or 206.

PS 423 Municipal Government (g)
3 hours spring 3 ①
Organization, functions, and problems of city governments. Satisfies teaching certification requirement for course work in state and local government. Prerequisite: PS 102.

PS 425 Electoral Politics
3 hours 3 ①
Treatment of selected aspects of electoral politics in the United States: nominations, elections, campaign finance, voting behavior. For advanced undergraduate and graduate students. Prerequisite: PS 101,102.

PS 426 Political Behavior (g)
3 hours 3 ①
Individual and group aspects; social and psychological factors in politics; consideration of available research on voting behavior, ideology, extreme belief and affiliation, leadership; participation, personality factors, public opinion, and group influences. Prerequisite or corequisite: PS 311.

PS 428
Psychological Dimensions of Politics (g)
4 hours 4 ①
Psychological bases, including needs and drives affecting political behavior, learning and political socialization, and rationality in politics. Prerequisite: course work in political science, psychology, or sociology.

PS 429 Women and the Law (g)
3 hours 3 ②
Position of women under the law, 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. Prerequisite: PS 317.

PS 438 Soviet Foreign Policy (g)
3 hours 3 ①
Principles, background, evolution, and processes of Soviet foreign policy, aspects of change and continuity in major areas of policy and doctrine. Prerequisite: PS 346. Not offered every year.

PS 443
Problems of International Relations (g)
3 hours 3 ①
Systematic treatment of selected problems and aspects of international relations. Prerequisite: PS 205 or 206.

PS 464 Problems and Issues of Contemporary Political Thought (g)
4 hours 4 ①
Major issues arising out of the philosophy of the nineteenth and twentieth centuries, political "isms" of modern world. Prerequisite: PS 202.

PS 480 Administrative Law (g)
4 hours 4 ①
Basic administrative law; control of administrative agencies, powers, limitations, and remedies. Prerequisite: PS 201.

PS 483 Contemporary Problems of American Constitutional Law (g)
3 hours 3 ①
Contemporary issues and problems in the area of public law. Prerequisite: PS 317 or 318 or 319.

PS 487 The Policy Process (g)
5 hours 5 ①
The decision-making process, models, and systems in selected major policy fields. Prerequisite or corequisite: PS 311.

PS 488 Topics in Political Science (g)
1 to 4 hours 1 to 4 ①
Topics of special or current interest not covered in other courses; for advanced undergraduates and graduate students. Topics vary; course may be repeated. Prerequisite: 5 upper division hours in political science.

PS 489
Politics of Environmental Policy (g)
4 hours 2 (1½), 1 hour to be arranged
Development and consequences of public policies related to managing the physical environment. Prerequisite: 6 hours of upper division political science or of natural resources discipline.

PSYCHOLOGY

The Department of Psychology offers a major program leading to a B.A. or B.S. degree in general psychology. Courses also meet the needs of students desiring a knowledge of psychology as a part of their general education or professional background, preparing for graduate study in psychology and related fields, or planning to secure entry-level jobs in human services occupations.

The department offers a minor for undergraduate students with majors in other disciplines. Students electing a minor in psychology may choose one of three options: counseling psychology; physiological psychology; or social and personality psychology.

The department also participates in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) degree program; see "Graduate School."

Departmental requirements

Common core: General Psychology (Psy 200 or Psy 201,202) and Experimental Psychology (Psy 221,321,322).

Area electives: (1) Social-Developmental (minimum of two courses): Psy 311,330, 334,335,412,445,466,480; (2) Experimental (minimum of two courses): Psy 350, 414, 415, 419, 451, 452, 460, 470, 471; (3) Personality, Counseling, Clinical (minimum of two courses): Psy 312,314, 435, 446, 462, 465, 481, 482, 484, 485; (4) Psychometrics (minimum of one course): Psy 421,423,424,442; (5) History and Systems (minimum of one course): Psy 411,426.

Additional requirements: one additional elective from any area listed above and statistics (minimum of 6 hours).

Psy 200 or 201, 202 are prerequisite to all courses except Psy 111. Statistics 311 is strongly recommended, where not required, for all upper division courses.

Lower Division Courses

Psy 99 Career Decision Making
3 hours 3 ① 2 (1½)
Designed for undergraduates who wish to explore career choices. Enables students to (a) examine the self in regard to theories of vocational choice; (b) participate in self-assessment through testing; (c) examine various occupations, disciplines, and lifestyles; and (d) develop decision making skills.

Psy 111 Personal Development
3 hours 3 ①
Self-understanding and development: emphasis upon attitudes, values, motivations, and emotional problems related to current college experiences. Format involves class and small group discussions and a variety of options. Open only to freshmen. Graded P/N.

Psy 199 Special Studies
Terms and hours to be arranged

Psy 200 General Psychology
5 hours 5 ①
Scientific study of human and animal behavior. Required for most other psychology courses, although Psy 201,202 is the recommended option for completing this requirement. With Psy 221, 311,312,314 or 321 constitutes a sequence in psychology; these courses need not he taken in order unless otherwise noted.

Psy 201,202 General Psychology
3 hours each 3 ①
Scientific study of human and animal behavior. Duplicates content of Psy 200 although 201,202 is the recommended option and sequence for completing General Psychology. With Psy 221, 311,312,314 or 321 constitutes a sequence in psychology. Must be taken in order.

Psy 221 Behavior Analysis
3 hours 2 ① 1 ②
Experimental course analyzing animal and human behavior according to the principles of operant conditioning and behavior modification. Practical applications of principles to therapy, education, interpersonal interaction, and child rearing. Course organized for self-pacing and independent study. Prerequisite: Psy 200 or 201,202.

Upper Division Courses

Courses numbered 400-499 and designated (g) may be taken toward a graduate minor.

Psy 311
Human Life Span Development
3 hours 3 ①
Psychological development of the individual from birth to old age; mechanisms of development, roles of biology and experience. Topics include cognition, social interaction, language, thought, learning, and abnormal development. Prerequisite: Psy 201.

Psy 312 Human Differences
3 hours 3 ①
Development of skills in recognizing and appraising differences among individuals and among groups. Use is made of case studies, autobiographies, readings, psychological measurements, and discussions. Integration of subjective and objective approaches. Prerequisite: Psy 201,202.

Psy 314 Human Adjustment
3 hours 3 ①
Impact of personal meanings and behavior strategies upon life adjustment; stress, frustration, anxiety, conflict, and defense; self-concept and personality dynamics. Optional opportunity to explore personal styles of adjustment through activity projects and workbooks/inventories. Prerequisite: Psy 201,202.

Psy 321,322,323
Experimental Psychology
4 hours each 3 ① 1 ③
Psy 321: Scientific method, statistics, experimental design, analysis of experimental literature, and research report writing. Psychological research techniques applied to problems of sensory psychology, especially audition. Prerequisite: Psy 201,202; St 311 or 451 (with at least a "C").

Psy 322: Fundamentals of psychological research: scientific method, experimental design, data collection, statistical analysis, interpretation of results, and report writing. Critical evaluation of published research on human performance and learning and laboratory experience. Prerequisite: Psy 321.

Psy 323: Survey of experimental approaches to personality and social psychology. Includes supervised experimental research with both humans and animals. Recommended for any student planning experimental or clinical work beyond the bachelor's degree. Prerequisite: Psy 221,321,322.

Psy 330 Psychology of Women
3 hours 2 (1½)
Survey of the theories, life cycles, and contemporary problems of women in a social context. Emphasis on factors relating to developing self-concept and behavior. Prerequisite: Psy 201,202.

Psy 334,335 Social Psychology
2 hours each 2 ①
Psy 334: animal relationships. Basic concepts: attitudes, social learning, social motivation, and social perception (including attribution). Social reactions: attraction (including affiliation), love and sex, agonism, and repulsion. *Psy 335:* group process and structure. Specific human interactions: play, humor, religion, aesthetics, and environmental construction. Prerequisite: Psy 201,202. Need not be taken in order.

Psy 350
Neuroanatomy of Human Behavior
3 hours 3 ①
Human neuroanatomy in relation to constraints which underlying structure places upon behavior and to how defects or alterations in structure change behavior. Topics include human neuroanatomy and neurology and basic neurophysiology. Prerequisite: Psy 201,202.

Psy 361 Group Dynamics
3 hours 2 ②
Factors influencing interpersonal and small group processes. Laboratory with some lecture and commentary used to develop awareness of interpersonal behavior. Prerequisite: Psy 200 or equivalent; upper division standing. Graded P/N.

Psy 401 Research (g)

Psy 402 Independent Study

Psy 403 Thesis

Psy 405 Reading and Conference (g)

Psy 406 Projects (g)

Psy 407 Seminar (g)

Psy 408 Workshop (g)
Terms and hours to be arranged

Psy 411 Psychological Foundations of Counseling (g)
3 hours 3 ①
Designed to help students understand implications of techniques and procedures of current counseling and therapy orientations through: development of current counseling approaches from the differing views of human learning and personal responsibility; assumptions on which the major approaches to counseling are based; and relationships between factors in the lives of theorists and their theories. May be used as an alternative to Psy 426. Prerequisite: Psy 311 or 314.

Psy 412 The Young Adult (g)
3 hours 3 ①
Life crises and developmental tasks unique to the period between adolescence and establishment of an adult life pattern. Identity, self-concept, alienation; impact on life planning of changes in attitudes toward work and marriage; special problems facing women and ethnic minorities. Prerequisite: one upper division social science course.

Psy 413 Advanced General Psychology (g) 3 hours 3 ①
Psychological theories and experimental literature in contemporary general psychology. Areas covered depend upon student interest and may include scientific method, perception, learning and higher conceptual processes, and social psychology. Application of psychological principles to the solution of interdisciplinary problems. Prerequisite: Psy 201,202.

Psy 414 Learning and Motivation (g)
3 hours 3 ①
Survey of learning and learning-related motivation. Consideration of concepts, principles, selected empirical data, and theories. Topics include classical and instrumental conditioning, verbal learning, factors which influence learning, and application of principles to practical situations. Prerequisite: Psy 321 or equivalent.

Psy 415 Perception (g)
3 hours 3 ①
Fundamental concepts of human sensation and perception, especially as applied to visual processes. Research findings and theories of perception in relation to information processing, decision processes, motivation, learning, memory, and underlying neurophysiological and biochemical mechanisms. Prerequisite: Psy 201,202,321, or 350.

Psy 419 Language and Thought (g)
3 hours 3 ①
Research and theories dealing with thought and language processes; problem solving, computer simulation, verbal learning in relation to thinking, concept formation, psycholinguistics, language acquisition, and the cultural factors involved in language and thought. Emphasis on a problem-solving approach. Prerequisite: Psy 321 or 413 or equivalent.

Psy 421 Psychological Assessment: Principles and Methods (g)
3 hours 3 ①
Applications of descriptive statistics and simple probability to tests and testing. Measurement concepts and theories, score transformations, reliability, validity, applications to examples, test construction theory and practice. Prerequisite: senior standing.

Psy 423 Psychological Assessment: Group Testing (g)
3 hours 3 ①
Application of measurement principles to group tests and testing; administration and scoring of tests; recording, interpretation, and use of results; sources, evaluation, and limitations of tests. Laboratory experience with tests of achievement, intelligence, aptitude, interest, and personality. Prerequisite: Psy 421. Offered alternate years.

Psy 424 Psychological Assessment: Individual Testing (g)
3 hours 1 ① 2 ②
Development of skill in the administration, scoring, and psychometric interpretation of one major individual psychometric test (Stanford-Binet or Wechsler); achievement of familiarity with other individually administered tests. Prerequisite: Psy 421.

Psy 426
History and Systems of Psychology (g)
3 hours 3 ①
Rise and development of major psychological concepts and methods, origins of the schools of psychology, and emphasis upon contemporary theory and applications of philosophy of science to psychology. Prerequisite: Psy 321 or 413.

Psy 435 Personality Theories (g)
4 hours 4 ①
Various theories of personality and specific applications; reading of original works; Freud, Adler, Lewin, Allport, social-psychological, stimulus-response and other theories. Prerequisite: Psy 201,202.

Psy 442
Attitude and Opinion Methodology (g)
3 hours 3 ①
Seminar format. Course content divided into two parts: (a) attitude theory and (b) scaling procedures. Theory topics: influence processes, attitude functions, consistency theory, and behavior theory of attitude development and maintenance. Scaling procedures focus on the unidimensional techniques of Thurstone, Likert, and Guttman; students jointly develop one of these scales. Prerequisite: Psy 201,202.

Psy 445 International Behavior (g)
3 hours 3 ①
Effect of perception of own and other nations' attitudes toward international affairs. Ideological and national loyalties, personal motive states, decision-making processes, and threat management-conflict resolution strategies. Laboratory focus upon simulation of inter-nation interaction and involvement with students engaged in cross-national education. Prerequisite: Psy 201,202.

Psy 446 Industrial Psychology (g)
3 hours 3 ①
Human relations in business, industry, the military, government, and other institutions; personnel selection, placement, and training; human engineering. Prerequisite: Psy 201,202. Offered alternate years.

Psy 451,452
Physiological Psychology (g)
3 hours each 2 ① 1 ③
Psy 451: basic neuroanatomy and neurophysiology of behavior. Physiological basis of motor and sensory systems. Lab includes introduction to stereotaxic surgery techniques. Use of physiological instrumentation, small computer, and control and analysis of research. Prerequisite: Psy 221,321, or biological science background. *Psy 452:* anatomical and physiological correlates of learning, motivation, and preception. Laboratory includes experimental study of brain/behavior relationships with small computer and basic histological techniques with brain tissues. Prerequisite: Psy 451.

Psy 460 Psychopharmacology (g)
3 hours 2 (1½)
Drug effects on brain and behavior. Research methods in psychopharmacology and hormone/behavior relationships. Prerequisite: upper division standing. Open to juniors with consent of instructor, seniors, and graduate students.

Psy 462 Behavior Deviations (g)
3 hours 3 ①
Historical development of current perspectives of deviant behavior with their implications for treatment. A critique of the concept of mental illness. The role of community and professionals in determining deviant behavior and the bases for decisions about treatment and hospitalization. Prerequisite: 3 hours upper division social science.

Psy 465 Psychopathology (g)
3 hours 3 ①
Survey of various forms of psychiatric disorders; theories regarding etiology and treatment. Special emphasis on research approaches to such disorders. Prerequisite: general psychology; a 300-level course in phychology; upper division standing.

Psy 466 Personal Values (g)
3 hours 3 ①
Review of theoretical-operational approaches to the role of values in the life of individuals, the structure of values and the development of values. Exploration of student values will precede analysis of scholarly writings and research. Prerequisite: Psy 312 or 314.

Psy 470 Animal Psychology (g)
3 hours 2 ① 1 ③
Lecture: Problems in animal behavior; relation of animal research to general psychological processes such as learning, perception, and motivation; application of experimental methods to species-specific behavior. *Laboratory:* Methods and techniques in the experimental study of animal behavior; classical and instrumental conditioning techniques; imprinting; and use of electrical and electronic systems of study of behavior. Prerequisite: Psy 221 or consent of instructor.

Psy 475 Selected Topics in Psychology (g) 1-3 hours
May be repeated for credit for a maximum of 9 hours.

Psy 480 Occupational Psychology (g)
3 hours 3 ①
Attitudes toward work and its meaning in the life of the individual; factors in vocational decision making; special problems for ethnic minorities and women; relationship of job choice to career development and lifestyle. Prerequisite: general psychology; one 300-level course in psychology; upper division standing.

Psy 481
Pre-practicum in Psychological Services (g) 3 hours 2 ① 1 ③
Orientation to issues, problems, and values related to the helping relationship. Students expected to observe in setting outside class, analyze taped counseling interviews, role-play interviews, and conduct interviews with volunteers. Class format includes working in small task groups of three or four students. Prerequisite: Psy 201,202.

Psy 482
Practicum in Psychological Services (g)
3 hours 2 ① 1 ③
May be repeated for credit for a maximum of 9 hours. *Section A:* counseling experience, under close supervision, with volunteers. Interviews taped and analyzed with supervisor and other practicum participants. Prerequisite: Psy 423, 481. *Section B:* counseling experience, under close supervision, with clients at selected human services agencies. Prerequisite: Psy 481 or equivalent. Consent of instructor required.

Psy 484 Behavior Modification (g)
3 hours 3 ①
Research on behavior modification and behavior therapy with children and adults, both normal and abnormal. Application of these techniques in educational and therapeutic programs in Oregon will be discussed with representatives from several agencies. Prerequisite: Psy 221 or consent of instructor.

Psy 485 Counseling and Psychotherapy (g) 3 hours 3 ①
Values and philosophical issues in counseling and psychotherapy. The social and institutional role of the counselor. Critical evaluation of theories. Current problems such as counseling with women and ethnic minorities. Prerequisite: Psy 311 or 314.

RELIGIOUS STUDIES

The Department of Religious Studies offers a major program leading to the B.A. or B.S. degree and a minor program which a student may pursue concurrently with a major in another academic discipline. Religious studies courses meet the University's general education requirements.

The department regards the study of religion as an essential part of liberal, humane learning and seeks to assist students in understanding the role religion plays in human existence. Special attention is given to contemporary religious movements and to non-Western religious thought. The instruction is nonsectarian and seeks an open analysis of all points of view.

Courses are designed to provide a general orientation to the field of religion for the undergraduate student as well as more advanced courses for those who wish to pursue professional careers where a study of religion would be useful, such as psychology, sociology, history, teaching, law, medicine, the ministry, and religious education.

The department participates in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) degree program. See "Graduate School" for details.

Major program—43 hours

Western Religious Thought (R 210,211, 212)	9
Old Testament (R 220) or New Testament (R 221)	5
History of Religions (R 300,301)	8
Biblical traditions (one of the following: R 320,325, or any relevant R 407)	3
Contemporary religious thought (one of the following: R 340,341,342,440,441 or any relevant R 407)	3
Religion and culture (one of the following: R 450,451,452,453,454 or any relevant R 407)	3
Upper division electives in religious studies	12

Minor program—24 hours

Students minoring in religious studies take 24 hours from at least two, but not more than three, of the following areas: biblical studies, religion and culture, history of religions, religion and philosophy, and Western religious thought. Fourteen of the 24 hours must be in upper division courses.

Lower Division Courses

R 100 Introduction to Religious Studies
4 hours 4 ①
Major religious perspectives concerning God, people, and the world; religious knowledge; evil; relation of religion to secular ideologies and value systems.

R 101
Introduction to the World Religions
5 hours 5 ①
Survey of the origin, thought, and lifestyle of the major religions: Hinduism, Buddhism, Taoism, Confucianism, Judaism, Christianity, and Islam. Course includes study of the contemporary and future prospects of religion.

R 199 Special Studies
Terms and hours to be arranged

R 210,211,212
Western Religious Thought
3 hours each 3 ①
History of the main Jewish and Christian traditions from the Old Testament to contemporary religious expressions. Need not be taken in order.

R 220 The Old Testament and Its Historical Background
5 hours 5 ①
Times and conditions which produced Old Testament, religion of Israel with critical survey of sources.

R 221 The New Testament and Its Historical Background
5 hours 5 ①
Time and conditions out of which New Testament writings came, problems that gave rise to Christian movement.

R 230
The American Religious Heritage
3 hours 3 ①
Development of main religious groups in America: Catholicism, Judaism, Protestantism; role of religion in American life.

R 250 Religious Ethics
3 hours 3 ①
Basic themes in religious ethics and their relevance to contemporary social issues.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

R 300,301,302 Religions of Mankind
4 hours each 4 ①
Religions that command a large following today. *R 300:* Primitivism, ancient Near Eastern religions, Greek religion, Hinduism. *R 301:* Buddhism, Confucianism, Taoism, Lamaism, Shintoism. *R 302:* Zoroastrianism, Judaism, Christianity, Mystery cults, Islam. Each term may he taken independently.

R 325 The First Three Gospels
3 hours 3 ①
An historical-critical examination of the traditions about Jesus in Matthew, Mark, and Luke. Prerequisite: R 221.

R 340,341,342
Contemporary Religious Thought
3 hours each 3 ①
Examination of the major religious problems and thinkers of the twentieth century. Each term may he taken independently.

R 402 Independent Study
Section A, Majors, graded P/N.

R 405 Reading and Conference (g)

R 407 Seminar (g)
Terms and hours to be arranged
Prerequisite: 3 hours of religious studies and upper division standing.

R 440
Process Philosophy and Religion (g)
3 hours 3 ①
Basic themes; God, creativity, time, evolution, and freedom; major attention to the thought of Whitehead. Prerequisite: 3 hours of religious studies or philosophy or upper division standing.

R 441 Existentialism and Religion (g)
3 hours 3 ①
Existentialist views of the self in relation to the world, other selves, and religious experience. Prerequisite: 3 hours of religious studies or philosophy, or upper division standing.

R 450 Religion and Society (g)
3 hours 3 ①
Relation of religion to society, social structures, and social processes. Prerequisite: R 100 or Soc 205 or upper division standing.

R 451
Religious Themes in Modern Literature
(g) 3 hours 3 ①
Exploration of various themes (human existence, God, the world, myth) treated by contemporary writers such as Herman Hesse, Thomas Mann, Graham Greene, Samuel Beckett, Fyodor Dostoyevsky. Prerequisite: R 100 or 212.

R 452 Religion and Science (g)
3 hours 3 ①
History of relations between religion and science, methods of science and religion, implications of scientific theories for religious thought. Prerequisite: R 100 or 212 or upper division standing.

R 453 Religion and Human Ecology
(g) 3 hours 3 ①
Religious and ecological concepts of people's relation in nature; human values and environmental problems; current quests for an environmental ethic and a theology of nature. Prerequisite: R 100 or upper division standing.

R 454 Religion and Psychology (g)
3 hours 3 ①
Human nature and behavior as seen by psychology and by religion; selfhood, motivation, conscience, freedom, faith, doubt; psychotherapy and religion.

R 461 Religions of Japan (g)
3 hours 3 ①
Role of Shintoism and Buddhism in Japanese life and culture. Prerequisite: R 301.

See also Eng 275, The Bible as Literature; Phl 348, Philosophy of Religion; Soc 461, Sociology of Religion.

RUSSIAN STUDIES

Although the certificate program in Russian Studies has been temporarily suspended, Russian language courses are offered by the Department of Foreign Languages and Literatures (see page 56).

For more information, contact the chair of the department.

SOCIOLOGY

The Department of Sociology offers undergraduate programs leading to B.A. and B.S. degrees. Courses meet the needs of (a) students majoring or minoring in sociology, (b) students selecting sociology course work as a part of other degree programs, and (c) students seeking a comprehensive understanding of human societies and behaviors.

Sociology may be used to satisfy the social science component of the University general education requirements for the baccalaureate degree.

The department participates in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) degree program. See "Graduate School" for details.

Major requirements

A sociology major must complete a minimum of 44 term hours of sociology courses, including: General Sociology (Soc 204), which is prerequisite to all other courses in the department; any additional course at the 200-level *or* Soc 312, 341, or 361; Methods of Social Research (Soc 328); and Sociological Theory (Soc 354). The remaining 30 hours of sociology electives may include 3 hours of statistics. (Additionally, Senior Proseminar (Soc 495) will be required of all majors graduating in June 1985 and thereafter.) Of the minimum 44 hours no more than 12 hours of 200-level course credit may apply *and* no more than 9 hours may be elected from Soc 401,402,405,406, and 409.

It is strongly recommended that sociology majors also take English Composition (Wr 222) or Technical Report Writing (Wr 327). Both courses may be applied toward the general education requirement for written or oral English communication.

A minimum GPA of 2.00 must be earned for all major courses.

Minor requirements

Undergraduate students may elect a minor in sociology to complement course work in their major discipline. A minimum of 27 credits is required for the minor, including: Soc 204; an additional 200-level course *or* Soc 312,341, or 361; and Soc 328 and/or Soc 354. At least 15 hours of the 27 must be in upper division courses. No more than 6 hours of the following may be counted toward the minor: Soc 401,402,405,406,409.

Lower Division Courses

Soc 204 General Sociology
3 hours 3 ①
Development and application of sociological concepts and perspectives concerning the structure and functioning of human groups. Includes attention to socialization, culture, organizations, communities, and societies.

Soc 205 Institutions and Social Change
3 hours 3 ①
Sociological study of the dynamic organizational nature of society through analysis of social change and of major social institutions such as family, education, religion, the economic system, and the political system. Prerequisite: Soc 204.

Soc 206 Social Problems
3 hours 3 ①
Basic sociological concepts applied to situations of social disorganization and problem areas such as crime, poverty, racism and sexism, population, urban decay, and environmental pollution. Prerequisite: Soc 204.

Soc 211
Deviant Behavior and Social Control
3 hours 3 ①
Research findings and theories of deviant behavior, social control, and treatment of deviance. Prerequisite: Soc 204.

Soc 220 Class, Sex, Race, and Age
3 hours 3 ①
Dynamics of social stratification and differentiation related to class, age, sex, and race, with emphasis on the consequences of discrimination. Prerequisite: Soc 204.

Upper Division Courses

Upper class standing is required for all 400 courses. Courses numbered 400-499 and designated (g) may be taken for graduate credit.

Soc 312 Sociology of the Family
3 hours 3 ①
Survey of the family as a social institution. Structures and functions of families in the United States, interdependence between the family and other institutions; forces for change in the family. Prerequisite: Soc 204.

Soc 328 Methods of Social Research
5 hours 3 ① 1 ②
Nature of social scientific method; quantitative data; hypotheses, measures, research designs; basic procedures and techniques of data collection and measurement. Prerequisite: 6 hours of sociology including Soc 204.

Soc 341 Population Trends and Policy
3 hours 3 ①
Quantity and quality of human populations; basic factors affecting growth rates and composition; trends, policies, and problems. Prerequisite: Soc 204.

Soc 354 Sociological Theory
3 hours 3 ①
Historical and philosophical foundations of sociological theory; the major schools of thought and their major contributors. Prerequisite: 6 hours of sociology including Soc 204.

Soc 361 Complex Organizations
3 hours 3 ①
Analysis of the structure and functioning of complex, bureaucratic organizations as social systems: internal and external dynamics, communication networks, leadership behavior, problems in organizational adaptation and change. Prerequisite: Soc 204.

Soc 401 Research

Soc 402 Independent Study

Soc 403 Thesis

***Soc 405 Reading and Conference (g)**

***Soc 406 Projects (g)**

Soc 407 Seminar (g)
Prerequisite: 6 hours of sociology including Soc 204; junior standing.

Soc 409 Practicum
Terms and hours to be arranged
Graded P/N.

Soc 411 Juvenile Delinquency (g)
3 hours 3 ①
Contemporary sociological theory and research, programs to reduce delinquency and treat delinquents. Prerequisite: 6 hours of sociology including Soc 204; junior standing.

Soc 412 Criminology and Penology (g)
3 hours 3 ①
Review of contemporary sociological research and writing on North American criminal justice system, types of crime, theories of criminality, corrections programs, and programs to reduce crime. Prerequisite: 6 hours of sociology including Soc 204; junior standing.

Soc 414 Sociology of Sex Roles (g)
3 hours 3 ①
Nature and consequences of social differentiation on the basis of sex, as revealed in patterns of socialization, culture, and social structure in human societies. Prerequisite: 6 hours of sociology including Soc 204; junior standing.

Soc 421 Social Change (g)
3 hours 3 ①
Major theories of the nature, types, causes, and consequences of social change. Political, social, psychological, and economic dimensions of modernization. Prerequisite: 6 hours of sociology including Soc 204; junior standing.

* Graduate credit for Soc 405 and 406, singly or combined, must not exceed 9 hours.

Soc 427
Social Movements and Revolution (g)
3 hours 3 ①
Necessary and sufficient social system conditions giving rise to social movements, with emphasis on radical political movements and the process of revolution. Organizational structure and ideologies of social movements. Prerequisite: 6 hours of sociology including Soc 204; junior standing.

Soc 429
Techniques of Social Research (g)
3 hours 3 ①
Student research projects to apply and evaluate the techniques and procedures of common means of data collection. Brief review of basic methodology. Prerequisite: Soc 328 or consent of instructor. Not offered every year.

Soc 430 Sociology of Small Groups (g)
3 hours 3 ①
Current research and theoretical works dealing with small group behavior from the standpoints of interactional processes, structure, and function. Prerequisite: 6 hours of sociology including Soc 204; junior standing.

Soc 434 Social Inequality (g)
3 hours 3 ①
Social bases for and significance of stratification and inequality in human societies, with emphasis on North America. Prerequisite: 6 hours of sociology including Soc 204; junior standing.

Soc 436 Collective Behavior (g)
3 hours 3 ①
Study of spontaneous group and individual behaviors resulting from previously unexperienced conditions calling for immediate action; mobs, riots, panics, crazes. Prerequisite: 6 hours of sociology including Soc 204; junior standing.

Soc 437 Sociology of Minority Relations (g) 3 hours 3 ①
Relations between racial, ethnic, and religious groups analyzed in sociological terms; factors causing changes in the relationships. Prerequisite: 6 hours of sociology including Soc 204; junior standing.

Soc 456 Industrial Sociology (g)
3 hours 3 ①
Analysis of the organization of work and technology in industrial societies. Prerequisite: 6 hours of sociology including Soc 204; junior standing.

Soc 459 Medical Sociology (g)
3 hours 3 ①
Social and cultural factors in the identification, course, and treatment of illness; analysis of selected health settings and professions. Prerequisite: 6 hours of sociology including Soc 204; junior standing.

Soc 461 Sociology of Religion (g)
3 hours 3 ①
Social patterns within U. S. religious groups, relation of religious groups to society, methodological problems in studying such groups. Prerequisite: 6 hours of sociology including Soc 204; junior standing.

Soc 468 Sociology of Urban Life (g)
3 hours 3 ①
Sociological study of the city and the urban region in terms of history, ecological patterning and change, social relationships, problems, and planning. Prerequisite: 6 hours of sociology including Soc 204; junior standing.

Soc 469 Sociology of Rural Life (g)
3 hours 3 ①
Sociological study of rural land use and settlement patterns, farming systems, rural communities, institutions, and linkages with the larger society. Prerequisite: 6 hours of sociology including Soc 204; junior standing.

Soc 471
Contemporary Sociological Theory (g)
3 hours 3 ①
A study of contemporary sociological theory relating to the principal areas of specialization in the field. Prerequisite: Soc 354; junior standing. Not offered every year.

Soc 473 Social Psychology (g)
3 hours 3 ①
Individuals in a social context; behavioral processes, causal factors, and results of interaction among persons and groups. Contemporary research design, problems, and findings pertinent to social psychology. Prerequisite: 6 hours of sociology including Soc 204; junior standing.

Soc 475 Community Organization (g)
3 hours 3 ①
Community intervention techniques; focus on theories guiding these techniques. Methodology and community structure as related to community practice and change. Prerequisite: 6 hours of sociology including Soc 204; junior standing.

Soc 480 Sociology of Aging (g)
3 hours 3 ①
Sociological examination of the forces that influence people as they age. Social structure, interaction, and social conditions of the older members of U.S. society. Prerequisite: 6 hours of sociology including Soc 204; junior standing.

Soc 490 Educational Sociology (g)
3 hours 3 ①
Contemporary research on schools, students, teachers, and social forces operating on the educational system; comparative and evaluation research on alternative educational programs; overview of the literature of educational critics. Prerequisite: 6 hours of sociology including Soc 204; junior standing.

Soc 495 Senior Proseminar (g)
3 hours 2 (1½)
Review and integration of prior sociology course work, with emphasis on incorporation of specialized topics into overall framework and perspective of the discipline; examination of sociological applications and career options. Prerequisite: senior or graduate standing; sociology major or minor. Required of sociology majors graduating in June 1985 and thereafter.

SPEECH COMMUNICATION

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.

Departmental requirements

A student majoring in speech communication completes a minimum of one lower division course in each of the department's four academic areas (a combined total of 12 hours). The four areas, their core programs and requirements for majors, follow:

Broadcast Media Communication (BMC). Majors must take a minimum of 60 credit hours. The core curriculum consists of BMC 241.262,267,363,366A, 367A,368,407, and six hours of 250/350. Students in the production/direction sequence must also take 366B,367B, and 467. An off-campus internship (BMC 410) is available to senior students selected as candidates by the faculty and chosen by the intern station.

Public, Group, and Interpersonal Communication (Sp). Majors must complete a minimum of 48 credit hours, including Sp 111,112,113,201, and an additional 27 upper division hours approved by an adviser.

Speech Pathology and Audiology (SPA). Students preparing to meet state certification with a basic teaching endorsement in speech impaired (see "School of Education") must complete a minimum of 60 credit hours and at least 230 clock hours of clinical work.

Theater Arts (TA). Majors must complete a minimum of 45 credit hours in theater courses, including TA 147,244, 247,248. Students may develop programs, with approval, in technical design, acting/directing, costuming (in cooperation with the Department of Clothing, Textiles, and Related Arts), or oral interpretation.

Individual studies. Students can combine elements from each of the four academic areas above by designing an individual studies program; e.g., students preparing for a career in public relations might select course work in broadcast media, theater, and public communication. The program requires 45 to 60 credit hours, with a minimum of 24 upper division hours.

Students in public, group, and interpersonal communication or in theater arts who are preparing to teach in public schools must meet additional requirements for an endorsement; see "School of Education."

Cocurricular speech activities open to all students, regardless of major or academic training, include the University theater, KBVR TV-FM, forensic activities (debate and individual events), and Model United Nations.

Research programs, both graduate and undergraduate, are open to students interested in one or more of the four adademic areas. The department participates in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) degree program. See "Graduate School" for details.

Lower Division Courses

SPA 90 Corrective Speech
1 hour any term, three terms 2 ①
For students having organic and/or functional speech disorders; group meetings of class, supplemented by clinical periods devoted to individual evaluation and treatment.

SPA 91 Speech for Foreign Students
2 hours 2 ①
To help foreign students acquire accepted standards of general American speech. Training in aural discrimination of component parts of speech and American speech rhythm, pronunciation, and enunciation.

Sp 111
Interpersonal Speech Communication
3 hours 3 ①
Basic concepts of informal, two-person interaction including situational, personal, linguistic, and cultural factors. Skill development aimed toward self-analysis, listening, role playing, and dealing with barriers to communication.

Sp 112 Informative Speaking
3 hours 3 ①
Creative speaker-audience communication with emphasis on expository public speaking.

Sp 113 Introduction to Persuasion
3 hours 3 ①
Introduction to public influence, with a focus on public speaking; rhetorical and psychological dimensions of persuasion, such as language, credibility, occasion, and situation; rights, responsibilities, and ethics of influence agents in an open society.

SPA 120 Voice and Articulation
3 hours 3 ①
Expressiveness, intelligibility, pronunciation, projection, quality; principles and techniques of improvement; physics and physiology of voice production; and introduction to phonetics.

TA 121,122 Interpretation
3 hours each 3 ①
Analysis and presentation of printed materials, emotional reactions that give color and interest, expressive vocal and bodily responses, and performance techniques for effective communication of literary and nonliterary written forms.

TA 147 Introduction to the Theater
3 hours 3 ①
Origins, history, nature, elements, and style of drama; function of artists and craftsmen in the theater.

Sp 160
Introduction to the Motion Picture
3 hours 2 ① 1 ②
The motion picture from prephotographic eras to the present; individuals responsible for major advances in theory and technique. Films viewed for discussion and analysis.

BMC 163
Introduction to Cinematography
3 hours 1 ③
History, techniques, and nature of cinematography. Students learn elemental aspects of photography and cinematography using 16mm film and equipment.

Sp 199 Special Studies
Terms and hours to be arranged

Sp 201 Analysis of Speech Communication Processes
3 hours 3 ①
Artistic, utilitarian, and therapeutic modes of speech communication; roles, strategies, rituals, and codes involved in speech communication behavior.

Sp 231 Conduct of Formal Meetings: Parliamentary Procedures
3 hours 3 ①
Planning and leading open forums; committee, business, and other public or organizational meetings. Parliamentary procedure.

TA 240
Creative Drama for Elementary Teachers
3 hours 3 ①
Creative dramatics in elementary classroom; principles and methods of developing original dramatization with children; storytelling, pantomime, improvisation as teaching methods.

BMC 241 Introduction to the Broadcast Mass Media
3 hours 3 ①
Nature and structure of American system of broadcasting: the government, the networks and stations, advertisers and agencies, and the public. Program types and methods of programming; social and cultural impact of the electronic mass media.

TA 244 Scenecrafts
3 hours 2 ① 2 ③
Constructing scenery and stage properties, practical experience in backstage procedures and scene painting.

TA 245 Stage Lighting
3 hours 3 ①
Fundamentals of electricity as used in stage lighting, color and light, light instruments and control systems, theory and practice of lighting stage productions. Prerequisite: TA 244.

TA 247 Stage Make-up
3 hours 3 ①
Basic principles and theory with laboratory experience in all phases of theatrical make-up.

TA 248,249 Fundamentals of Acting
3 hours each 3 (1½)
TA 248: Development of vocal and physical expression; theory and practice in individual and group exercises to heighten awareness, creativity, and imagination. *TA 249:* Emphasis on improvisation, character analysis, and characterization. Prerequisite: TA 248 or equivalent.

***Sp 250 Speech Workshop: Public Address and Forensics**
1-3 hours any term, to be arranged
Public speaking, public address and forensics, laboratory experience. Maximum of 6 hours. Consent of instructor prior to registration required.

***BMC 250**
Speech Workshop: Broadcast
1-3 hours any term, to be arranged
Practical experience, at beginning level, through programming and production of KBVR FM-TV: operations, production, performance, writing, photography, news, sports, promotion, writing, management. Maximum of 6 hours. Consent of instructor prior to registration required.

***TA 250 Speech Workshop: Theater**
1-3 hours any term, to be arranged
Acting, dramatic production; laboratory experience. Practical experience in performance, technical theater, or design. Maximum of 6 hours. Consent of instructor prior to registration required.

BMC 262 Beginning Broadcast
3 hours 2 ① 1 ②
Nature of broadcast media communication and beginning broadcast experiences in radio-TV writing, performance, and audio production.

BMC 267 Basic Television Operations
3 hours 2 ① 1 ②
Intensive experience in studio and control room operations and production tasks. Equipment operation and use. Laboratory experience includes serving as production personnel for TV productions.

Upper Division Courses
Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Sp 310 Argumentation
3 hours 3 ①
Concepts and processes of argumentation, cogency in oral communication, systems of logic, critical analysis of contemporary efforts to convince, construction and presentation of cases.

Sp 311 Interpersonal Speech Communication II
3 hours 3 ①
Review of theories of skills development in interpersonal communication. Prerequisite: Sp 111 or upper division standing.

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* A maximum of 12 hours may be earned in courses designated by an asterisk, with no more than 6 hours, at either sophomore or junior level, in either broadcasting, forensics, or theater.

Sp 313 Advanced Persuasion
3 hours 2 (1½)
Advanced theory and practice in persuasion. Study of the theory, chiefly Aristotelian, and modern behavioral scientific literature, focusing primarily on public communication. Practice and criticism in public presentation, including extemporaneous and manuscript style. Prerequisite: Sp 113.

Sp 317 Intercultural Communication
3 hours 1 ③
Perspectives, theories, and experiences in inter-, cross-, pan-cultural communication. Prerequisite: upper division standing.

Sp 319 Interviewing
3 hours 2 (1½)
Interview form in formal and informal, public and private settings. Focus on communication behaviors of the interviewer. Interviews as a means of collecting, presenting, and evaluating information, training, and selection. Goals styles, and tactics. Individually tailored assignments including case analysis, videotaped practice, role playing, presentation through the media. Prerequisite: upper division standing and instructor approval.

TA 321 Advanced Interpretation
3 hours 3 ①
Interpretative theory and programming, materials for oral interpretation, experimentation in presentational forms. Prerequisite: TA 122.

Sp 323 Group Discussion Processes
5 hours 3 ① 2 ②
Dynamics of discussion, group thinking, and decision making, interpersonal relations, types of leadership, study of discussion through laboratory practice and analysis. Prerequisite: Sp 111. Consent of instructor required.

Sp 325 Small Group Problem Solving
3 hours 2 (1½)
Theory and practice of small group problem solving; history and role of group problem solving in a democratic society. Experience with problems of fact, value, and policy.

Sp 327 American Image and Myth in Film: Rhetorical Perspectives
3 hours 1 ③
Film as a medium for creating, reflecting, and defining values, roles, styles, conflicts, problems, strategies, expectations, and institutions in American life. Methods of analysis and evaluation. Film as agent and artifact. Images of myths involving frontier, war, women, justice, America, and beauty reflected in film.

Sp 329
Persuasion, Propaganda, and Influence
3 hours 3 ①
Case studies, examples, and analyses of direct and indirect influences upon thought, belief, and action involving mass media of communication and including film, theater, radio, television, posters, art objects. Historical approach using film, tape, recordings, for student analysis and discussion.

TA 330,331,332 History of Theater Arts
3 hours each 3 ①
The rise and development of the composite arts of the theater in their cultural and social context. *TA 330:* origins to 1500. *TA 331:* 1500 to 1870. *TA 332:* 1870 to present. Prerequisite: TA 147. Must be taken in order. Offered alternate years.

Sp 340 History of the Motion Picture
4 hours 3 ① 1 ②
An examination of the "prehistory" and development of the technology of the motion picture and of the major movements in the cinema as art. Prerequisite: Sp 160 or consent of instructor.

TA 344 Playscript Analysis
3 hours 3 ①
Study of major approaches to playscript analysis and detailed application of these systems of analysis to the theatrical production process. Prerequisite: TA 147. Offered alternate years. Offered 1982-83.

TA 346 Scene and Stage Design
3 hours 2 ① 2 ③
Designs for stage productions including elements of color, mass, line, and lighting for various types of theater architecture and plays. Prerequisite: TA 147,244.

TA 348 Advanced Acting: Realism
3 hours 3 (1½)
Lectures, discussion, rehearsal, performance and criticism of scenes from plays in the style of realism.

TA 349 Advanced Acting: Romanticism
3 hours 3 (1½)
Lectures, discussion, research, rehearsal, performance, and criticism of scenes from plays in the style of romanticism (verse drama).

***Sp 350 Speech Workshop: Public Address and Forensics**
1-3 hours any term, to be arranged
Advanced work in public speaking, public address and forensics, laboratory experiences. Consent of instructor prior to registration required. Maximum of 6 hours. Prerequisite: 3 hours of SP 250.

***BMC 350**
Speech Workshop: Broadcast
1-3 hours any term, to be arranged
Practical experience at intermediate level, through programming and production of KBVR FM-TV: operations, production, performance, writing, photography, news, sports, promotion, management. Maximum of 6 hours. Consent of instructor prior to registration required.

***TA 350 Speech Workshop: Theater**
1-3 hours any term, to be arranged
Advanced work in acting and dramatic production; laboratory experience. Maximum of 6 hours. Consent of instructor prior to registration required.

TA 354 Fundamentals of Play Direction
3 hours 3 ①
History, theories, and techniques of directing; play selection and analysis, study of the audience. Practical experience is provided both in class and Laboratory Theater. Prerequisite: TA 147, 248.

BMC 355 Preparation and Adaptation of Drama for Television
3 hours 1 ③
Analysis and adaptation of dramatic material for television. Thinking in visual images; technical and dramatic requirements of the medium; treatment of brief to full-length material. Prerequisite: Wr 224; BMC 366 or consent of instructor.

BMC 360
Principles of Television Newsfilm
3 hours 1 ③
Use of film in the day-to-day operation of a TV newsroom. Discussion, including analysis of local TV newsfilm use. Students produce film for news stories using 16mm film and equipment. Prerequisite: BMC 163.

BMC 361
Professional Radio Announcing
3 hours 2 ① 1 ②
Theory and practice. The announcer and station operations and structure. Laboratory practice in the activities of the announcer: reading of copy, the musical program, the talk program, the interview, newscasting. Prerequisite: Sp 111; BMC 262.

* A maximum of 12 hours may be earned in courses designated by an asterisk with no more than 6 hours in either broadcasting, forensics, or theater.

BMC 362 Audio Production
3 hours 2 ① 1 ②
Creative use of sound. Nature of aural imagery. Interpretive and creative use of microphones, sound and music, and editing for creation of sound images. Production of short-form messages, actualities, sound tracks, feature programs, mini-documentaries. Prerequisite: BMC 262.

BMC 363 Broadcast Media Writing
3 hours 3 ①
Creative writing for the broadcast media. The aural/visual nature of media writing. Emphasis on conceiving and writing short-form messages, radio-TV-film narratives, news features, and mini-documentaries. Prerequisite: BMC 262.

BMC 366 Television Producing
4 hours, two terms 3 ① 1 ②
A two-part examination of the nature of television, principles of producing, tasks of the producer. Emphasis on threefold process of production. Steps of program development from idea through production. Special attention to contemporary techniques of electronic field production. *BMC 366A:* theory and conceptual materials. *BMC 366B:* practical experience through studio projects. Sections must be taken in order.

BMC 367 Television Directing
4 hours, two terms 3 ① 1 ②
Basic principles of television directing; shot theory, composition, editing, control room procedures. Examination of different directing formats; news-information, public affairs-discussion, nonscripted-scripted performance. Laboratory projects in each format. *BMC 367A:* theory and conceptual materials. *BMC 367B:* practical experience through studio projects. BMC 367A must be taken prior to BMC 367B.

BMC 368
Broadcast Media Programming
3 hours 3 ①
Philosophy, principles, and practices of broadcast media programming. Processes of program decision making. Contemporary issues in media programming. Emphasis on social and cultural effects of broadcasting. Prerequisite: BMC 241.

SPA 370 Phonetics
3 hours 3 ①
Science of speech sounds and application to speech and language development and oral communication.

SPA 371 Speech Science
3 hours 3 ①
Anatomy and physiology of peripheral and central mechanisms of speech and language; respiratory, phonatory, articulatory, auditory, and nervous systems; examination of key research pertaining to speech and language reception and expression.

BMC 373 Audio Performance
3 hours 2 ① 1 ②
Individual projects in audio performance formats, including short-form messages, news, narration, film sound tracks, slide/tape tracks, and interpretive audio formats. Prerequisite: BMC 262.

BMC 401 Research

BMC 402 Independent Study

BMC 403 Thesis

†BMC 405 Reading and Conference (g)

BMC 406 Projects

†BMC 407 Seminar (g)

†BMC 408 Workshop (g)
Terms and hours to be arranged

Sp 401 Research

Sp 402 Independent Study

Sp 403 Thesis

†Sp 405 Reading and Conference (g)

Sp 406 Projects

†Sp 407 Seminar (g)

†Sp 408 Workshop (g)
Terms and hours to be arranged

SPA 401 Research

SPA 402 Independent Study

SPA 403 Thesis

†SPA 405 Reading and Conference (g)

SPA 406 Projects

†SPA 407 Seminar (g)

†SPA 408 Workshop (g)
Terms and hours to be arranged

TA 401 Research

TA 402 Independent Study

TA 403 Thesis

†TA 405 Reading and Conference (g)

TA 406 Projects

†TA 407 Seminar (g)

†TA 408 Workshop (g)
Terms and hours to be arranged

BMC 410 Media Internship (g)
15 hours to be arranged
One-term residency in a radio or television station, government or private agency, or other nonbroadcast media users. The student observes and works in various departments of the station, then chooses major areas of interest for specialization. Primary areas are management-sales, programming-production news. Work is supervised and evaluated by station management, staff, and broadcast media faculty. Available to senior students selected as candidates by the faculty and chosen by the intern station. Criteria for selection include: intellectual abilities, talent, commitment, and professional promise.

Sp 412 Public Presentation and Lecture
3 hours 3 ①
Forms, styles, methods, and processes of public discourse; message construction and analysis; audience adaptation before and during performance; presentation techniques for public platform, classroom, briefing, speaking from manuscript, radio, and television situations. Individually adapted instruction and performance. Consent of instructor or graduate standing required.

Sp 414
Speech Communication in the Schools
(g) 3 hours 3 ①
History, philosophy, literature, and current practices in curricular and extracurricular speech programs of schools. Prerequisite: 9 hours of upper division speech communication courses.

Sp 416
Topics in Speech Communication (g)
1-3 hours to be arranged
An integrated series of lectures on contemporary theories, issues, research methods, problems, or applications of speech communication. Concentrated research and discussion of selected problems, theories, and issues. May be repeated for maximum of 3 hours. Prerequisite: 9 hours of speech or consent of instructor.

† Graduate credit for 405,407,408 courses, under any speech communication prefix, must not exceed more than 9 hours.

Sp 420 Meaning and Communication
(g) 3 hours 3 ①
Theory of speech as communication; barriers and pathologies of oral communication; character of meaning, logic, symbols, and values in oral communication; models of communication and their application to speech behavior. Prerequisite: Sp 111,201.

Sp 421 Collective Bargaining (g)
3 hours 1 ③
The process and practice of collective bargaining. Taught concurrently as Ec 421.

Sp 423 Communication and Leadership in Small Group Discussion Processes (g)
3 hours 3 ①
Theories of leadership and communication and their particular application to the formal and informal small group discussion process. Prerequisite: Sp 323; Psy 361.

Sp 424 Theory of Conflict and Conflict Management (g)
3 hours 3 ①
Intrapersonal, interpersonal, and intergroup conflict; causes and effects of conflict; social and psychological aspects of conflict behavior; decision making, force, suppression, and destruction; conflict development and areas of greatest social conflict. Prerequisite: Sp 323 or Psy 221 or Psy 361.

Sp 425 Theory and Criticism of Group Process Training (g)
3 hours 3 ①
For people who plan to work as trainers, facilitators, group leaders, teachers, etc. of various group process methods. Theory, philosophy, and procedures of various training approaches; strengths and weaknesses of these techniques; analytical examination of groups in action. Prerequisite: Sp 323. Consent of instructor required.

Sp 426 Small Group Behavior (g)
3 hours 3 ①
Field and laboratory research and developments in small group dynamics and processes. Prerequisite: Sp 323 or Psy 221 or Psy 361.

Sp 431 Methods of Research in Speech Communication (g)
3 hours 1 ③
Methods of study and research in speech communication. Recommended for advanced undergraduates considering graduate study in speech communication. Consent of instructor required.

Sp 432
Public Speech Communication Criticism
(g) 3 hours 3 ①
History and philosophy of rhetorical principles. Prerequisite: Sp 113.

Sp 435 Listening: Studies and Process
(g) 3 hours 2 (1½)
Methods and processes of human listening to speech communication behavior; study of research and methods of developing listening skills and abilities. Prerequisite: Sp 111 or 112 or 113; 3 additional hours in speech communication or speech and hearing science.

Sp 438 The Rhetoric of Revolutionaries and Reactionaries (g)
3 hours 3 ①
Speech criticism; great American speakers; relation of their speaking to the history of ideas, and to political, social, and religious movements. Prerequisite: Sp 432.

TA 444
Theory and Criticism of Theater Arts (g)
3 hours 3 ①
Major theories which have influenced and motivated theater practice in Western civilization throughout its development. Prerequisite: 6 hours of theater history or 6 hours of dramatic literature. Offered alternate years.

Sp 451 Instructional Uses of Television
(g) 3 hours 3 ①
Innovative and traditional instructional television programs as used in education, business, and government; designing effective instructional television materials based upon research findings involving learning theory and modern technology. Prerequisite: Sp 367.

TA 454 Advanced Play Directing
3 hours 3 ①
Studies of directing theories in nonproscenium production. Production of a play in laboratory experience. Offered alternate years. Prerequisite: TA 354.

BMC 460 Production Cinematography
3 hours 1 ③
Production techniques of short-form messages in television. Prerequisite: BMC 360.

TA 464 Theater Management (g)
3 hours 2 (1½)
Managerial theory and practices of theater operations, including organizational structure, financial practices, program promotion, and legal concerns. Prerequisite: 6 hours of upper division theater arts courses or equivalent; junior or senior standing.

TA 465 Theater and Auditorium Design and Planning (g)
3 hours 2 (1½)
A study of the major theories, forms, and concepts of theater and auditorium design, with emphasis on the relationship of the physical environment to the form and style of the productions. Prerequisite: TA 244. Offered alternate years.

BMC 467
Advanced Television Directing (g)
4 hours 2 ① 2 ②
Theory and practice of television directing; translation of concepts, ideas, emotions, and attitudes into visual and aural imagery; nature and structure of visual and aural imagery. Prerequisite: BMC 367.

SPA 470
Speech and Language Development (g)
3 hours winter 3 ①
Underlying cognitive (content), linguistic (form and structure), and communicative (use) processes and stages of competence and performance in children's receptive and expressive language development. Prerequisite: 6 hours of child psychology and/or development. Offered winter term of even-numbered years.

Sp 472 Experimental Phonetics (g)
3 hours 2 ① 1 ②
Techniques and methods in analysis, synthesis, perception, and measurement of voice and speech. Laboratory period required. Prerequisite: SPA 371.

SPA 481,482,483 Speech Pathology (g)
3 hours each 3 ①
Study of speech and language disorders from infancy through adulthood, including symptomatology, etiology, examination and evaluation, and intervention procedures. *SPA 481:* functional articulation and disorders of language. *SPA 482:* disorders of speech (voice, cerebral palsy, cleft palate). *SPA 483:* selected speech disorders (stuttering, cluttering, dysphasia). Prerequisite: SPA 370,371.

SPA 484,485,486
Clinical Methods in Speech Correction
(g) 3 hours each 3 ①
Practical experience in handling cases, including taking of case history, making diagnosis, and giving remedial treatment. Prerequisite: SPA 481,482.

SPA 487,488,489 Audiology (g)
3 hours each 3 ①
Auditory function, hearing impairment, and education or re-education of persons with hearing loss. *Fall:* fundamentals of acoustics, anatomy and physiology of the ear, types and causes of hearing loss, speech involvements. *Winter:* techniques and interpretation of auditory tests such as pure tone and speech audiometry. *Spring:* psychology of the acoustically impaired, speech and auditory training, school and vocational problems. Prerequisite: SPA 370,371. Must be taken in order.

SPA 490 Lip Reading (g)
3 hours 3 ①
Theories and methods of speech reading and auditory training; their part in education and rehabilitation of deaf and hard-of-hearing children and adults; lip reading methods.

SPA 491 Communication with the Hearing Impaired (g)
3 hours winter 3 ①
Techniques for facilitating individual communication; intensive training in use of the manual alphabet, language of signs, and cued speech. Prerequisite: 9 hours of audiology.

SPA 492 Aural Rehabilitation (g)
3 hours spring 3 ①
Organization of programs in schools, hospitals, geriatric centers, and speech and hearing centers; training programs utilizing individual and group hearing aids. Prerequisite: SPA 487,488, 489,490.

SPA 493 Principles and Techniques of Speech Correction (G)
3 hours 3 ①
Theoretical and practical aspects of the management of communicatively handicapped preschool and school-aged children in educational settings.

SPA 494 Practicum in Speech Pathology or Audiology (g)
1-9 hours to be arranged
Practicum in speech and language pathology or audiology. Prerequisite: 15 hours of speech pathology or audiology. Consent of instructor required.

SPA 495 Diagnostic Methods in Speech and Language Pathology (g)
3 hours 3 ①
Theory and methodology employed in the appraisal, evaluation, and diagnosis of speech and language disorders. Application of diagnostic procedures in a clinical setting. Prerequisite: concurrent enrollment in SPA 494 or consent of instructor.

WOMEN STUDIES

Women studies provides an interdisciplinary examination of the historical and contemporary role of women in social organizations. The certificate program, which may be taken concurrently with any major degree program, is open to all students. Similar to a minor, a certificate is an official notation on the transcript that the student has completed the requirements specified.

A certificate in women studies is relevant to students seeking careers in such areas as management, law, counseling, education, marketing, affirmative action programs, law enforcement, or civil rights programs. Students planning to attend graduate school will also find course work in women studies an enrichment of their base of knowledge and useful for advanced study.

Students interested in the women studies certificate program, or in the research conducted by the Office of Wo-

men Studies, should contact the director. The Office of Women Studies also sponsors the annual Women Studies Symposium.

In addition to the WS courses listed below, courses in women studies are offered by various departments on campus. A list of these courses is available at the Office of Women Studies.

Curriculum

To complete the certificate program, students are required to take 40 term hours, consisting of 27 hours of core courses, 6 hours of electives, and 7 hours in either the technical option or in the graduate study preparatory option.

Core Courses—27 hours

Survey of American Women Today (WS 219)	3
Women in U.S. History (Hst 363)	3
Working Women in America (WS 319)	3
The Politics of the Women's Movement (PS 329)	3
Women and the Law (PS 429)	3
Sociology of Sex Roles (Soc 414)	3
Psychology of Women (Psy 330)	3
Intro to Statistics (St 311,312)	6

Electives—6 hours chosen from the following: Seminar: Women in Management (BA 407W); Seminar: Civil Rights Laws in Education (Ed 407A or 407B); Seminar: Sex and Society (Soc 407D); Sociology of Aging (Soc 480); Seminar: Rhetoric of Feminism (Sp 407E); Projects: Women Studies Symposium (WS 406C); Seminar: Women Studies Research (WS 407R); Seminar: Issues in Women Studies (WS 407I).

Technical Option—7 hours

Intro to Bus Data Proc (BA 131)	4
Internship (sponsored by the appropriate department, 410)	3

Graduate Study Preparatory Option—7 hours

Thesis (WS 403)	7

Lower Division Courses

WS 199 Special Studies

Terms and hours to be arranged

Selected topics of contemporary relevance to research of women and women's roles. For students who seek an introduction to a specific realm of women studies.

WS 219

Survey of American Women Today

3 hours 3 ①

Multidisciplinary introduction to women's changing roles in all aspects of life. Overview of sex roles, socialization, and economic and political ideology.

Upper Division Courses

Courses designated (g) may be taken for graduate credit.

WS 319 Working Women in America

3 hours 3 ①

Women in the U.S. labor market: earnings and employment, discrimination, and occupational outlook. Prerequisite: Ec 115 or 213.

WS 402 Independent Study (g)

WS 403 Thesis (g)

WS 406 Projects (g)

WS 407 Seminar (g)

Terms and hours to be arranged

SCIENCE

FACULTY

As of January 1982

Thomas T. Sugihara, *Dean*
John D. Lattin, *Acting Associate Dean*
Francois A. Gilfillan, *Dean Emeritus*
Olaf A. Boedtker, *Head Adviser*

Professors Emeritus Decker, Hewson in atmospheric sciences; Hansen, J. Jensen, Roth, F. Smith, Vaughan in botany; Christensen, Decius, Freund, Gilfillan, Kurth, Logan, Mehlig, Norris, Reese, Scott, Williams in chemistry; Goheen in computer science; Crowell, Goulding, Oman, Ritcher, Thompson in entomology; Beer, Crews in general science; Heintzelman, Jensen in geography; Allison, Enlows, Packard in geology; Arnold, Goheen, Kaplan, Lonseth, Oberhettinger, Poole in mathematics; Anderson, Bollen, Elliker, Pilcher in microbiology; Brady, Yunker in physics; Dornfeld, Gordon, Hillemann, Krueger in zoology
Associate Professors Emeritus Bostwick in geology; Saunders in mathematics; Garman, Tatom, Vinyard in physics
Assistant Professors Emeritus Bakkum, Flood, Godard, Hermann, Overholser in mathematics; Church in physics

Atmospheric Sciences *Professors* Gates (department chairman), Deardorff, Murphy
Associate Professors Mahrt, Rao, Willis, Wolf
Assistant Professors Esbensen, Han, Katz, Kim, Pan, Schlesinger
Instructor Frank

Biochemistry and Biophysics *Professors* Mathews (department chairman), Anderson, Baisted, Beaudreau, Becker, Bishop, Buhler, Evans, Fang. Freed, Gamble, Isenberg, Johnson, Loomis, MacDonald, Morris, Parks, Reed, Terriere, Tinsley, Van Holde, Whanger, Wickman
Associate Professors Pearson, Schaup
Assistant Professors Schimerlik, Small

Botany and Plant Pathology *Professors* T. Moore (department chairman), Allen, Baker*, Bishop, Cameron, Chambers, Chilcote, Converse*, Corden, Franklin*, Hampton*, Hardison, Horner*, H. Jensen, Leach, Linderman*, McIntire, Phinney, R. Powelson, Quatrano, Rickson, Trappe*, Trione*
Associate Professors Armstrong, Brandt, Coyier*, Denison, E. Hansen, Klepper*, Koepsell, Mills, L. Moore, Nelson*, Spotts, Tingey*, Zobel
Assistant Professors Dooley*, M. Powelson
Senior Instructor Johnston
Instructors Obermire, Soeldner

Chemistry *Professors* D. Thomas (department chairman), Daniels, DeKock, Fredericks, Freeman, G. Gleicher, Hawkes, Hedberg, Krueger, Loveland, MacVicar, Marvell, Nibler, Parsons, Piepmeier, Schmitt, D. Shoemaker, Sugihara, Wang, White, Wickman, Yoke
Associate Professors Evans, Ingle, Schuyler, C. Shoemaker, Thies
Assistant Professors L. Thomas, Weller, Westall
Instructors Bennett, M. Gleicher, Pastorek

Computer Science *Professors* Tonge (department chairman), Krueger
Associate Professors Boals, Bregar, Cook, Cull, Lewis, Yates
Assistant Professors Bose, Cohen, Ecklund, Freiling, Moran
Instructors Bachelor, Beekman

Entomology *Professors* Eldridge (department chairman), Anderson, Berry, Brookes, Capizzi, Croft, Cummins*, Ferguson*, Hardy*, Krantz, Lattin, Martignoni*, Stephen, Terriere, Westigard*
Associate Professors AliNiazee, Burgett, Daterman*, Fisher, Kamm*, Ryan*, Wickman*, Zwick*
Assistant Professors Feyereisen, McEvoy, Miller, Schowalter

General Science *Professors* Willis (department chairman), Kimeldorf, Van Dyke
Associate Professors Craven, Farber, Johnson, Kelley, Lyford, Mix, Morris, Spenser, Worrest
Assistant Professor Jostes
Senior Instructor King
Instructors Reeve, Hellman

Geography *Professors* Highsmith, Northam
Associate Professors Maresh (department chairman), Frenkel, Muckleston, Nolan, Pease, Rosenfeld
Assistant Professors Jackson, Kimerling, Matzke

Geology *Professors* Yeats (department chairman), Boucot, Field, Johnson, Oles, Taubeneck
Associate Professors Dasch, Lawrence, Levi*, Niem, Taylor
Assistant Professor Demarest
Instructor Senechal

Mathematics *Professors* Schori (department chairman), Anselone, Ballantine, Bodvarsson, Brunk, Carlson, Carter, B. I. Fein, Firey, Flaherty, Guenther, Kas, J. W. Lee, Narasimhan, Petersen, Simons, J. W. Smith, K. T. Smith, Stalley, Wilson
Associate Professors Davis, Lindstrom, Musser, Newberger, Shaughnessy, Solmon
Assistant Professors Burger, Burton, Calderer, Coppola, B. Y. Fein, Finch, Garity, Jespersen, McGee, Moore, Murphy, Parks
Instructors Anderson, Bregenzer, Coffin, Hall, Jorgensen, J. P. Lee, Miller, Radder, Rehfuss, Stacy, Stehman, Thomas

Microbiology *Professors* Fryer (department chairman), Morita, Parks, Sandine, Seidler
Associate Professors Brown, Ferro, Leong
Assistant Professors Bottomley, Griego
Instructor Curran

Physics *Professors* Drake (department chairman), Burch, Cutler, Easterday, Fairchild, Fontana, Madsen, Nicodemus, Schecter, Swenson
Associate Professors Boedtker, Griffiths, Kocher, Krane, Landau, Stetz, Wasserman
Instructor Hall

Statistics *Professors* Faulkenberry (acting department chairman), Brunk, Calvin, Overton, Petersen, Pierce, Rowe, Seely, Thomas
Associate Professors Butler, Lindstrom, Ramsey
Assistant Professors Arthur, Birkes

Zoology *Professors* King (department chairman), Boucot, Conte, Dawson, Pritchard, Roberts, Storm
Associate Professors Bayne, Hisaw, Menge, Morris, Owczarzak
Assistant Professors Blaustein, Brownell, Hard, Lubchenco, Moore, Ruben, Shirk
Instructors Beatty, Loker

* Courtesy appointment

The College of Science at Oregon State University offers (1) liberal arts courses with majors in various fields of science leading to the Bachelor of Arts or Bachelor of Science degree; (2) professional education, which may include an undergraduate science major and from one to three or more years of graduate study, for students planning to enter an occupational field in science; and (3) elective and service courses for students in other schools.

Honors Program

The Honors Program provides opportunity for individual enrichment and achievement. For information regarding eligibility, application forms, organization of the program, and appointment of advisers, see "University Honors Program" on page 37.

Grouping of Departments

The departments of the College of Science have been informally divided into four sections:

Mathematical Sciences

The Departments of Computer Science, Mathematics, and Statistics aim (1) to provide a liberal training for students whose interests and capabilities enable them to pursue studies in these areas, (2) to stimulate the creativity through research of graduate students and more capable undergraduate students, and (3) to provide instruction for students from other departments whose training requires knowledge of the mathematical sciences.

Physical Sciences

The physical sciences provide core training for students who will major in the Departments of Physics, Chemistry, and Biochemistry and Biophysics. These departments aim to provide majors and nonmajors with the fundamental concepts of modern physical science. The departments provide the liberally educated scientist with the fundamentals necessary to seek employment or pursue advanced training in both basic and applied fields in all areas requiring a thorough understanding of physical concepts and techniques.

Biological Sciences

Undergraduate major programs are offered by the Departments of Biochemistry and Biophysics, Botany and Plant Pathology, Entomology, Microbiology, and Zoology. In addition, the five departments participate in an interdepartmental Biology Program. Students majoring in biology receive broader training that those choosing one of the more specialized departmental programs. Biology-oriented programs are available in the Department of General Science and in the science education program. All of these curricula require supporting work in mathematics and the physical sciences.

Both graduate and undergraduate level study opportunities are available in the above areas. In addition, a special program administered by the College of Science provides a graduate major or minor in genetics.

Earth Sciences

All branches of science are related in some way to the earth, but those specific departments which deal with the earth directly are grouped under the earth sciences: the Departments of Atmospheric Sciences, Geography, and Geology. Students interested in undergraduate and advanced training in these areas may choose from comprehensive course offerings.

Special Programs

Included under special programs are 1) interdepartmental studies such as general science, 2) preprofessional preparation, and 3) training for science teachers. The preprofessional programs, which are supervised by committees representing the departments concerned, are in dentistry, dental hygiene, medicine, medical technology, nursing, optometry, physical therapy, podiatry, and veterinary medicine.

Curricula in Science

Curricula are offered leading to the degree of Bachelor of Arts (B.A.), Bachelor of Science (B.S.), Master of Arts (M.A.), Master of Science (M.S.), and Doctor of Philosophy (Ph.D.). (See "Graduate School" for statement of requirements for advanced degrees.)

General notes concerning school and institutional requirements for B.A. and B.S. degrees follow:

a. In recognition of the need for a balanced general education for those planning professional careers in science, none of the curricula in the College of Science requires more than 60% of the course hours to be in areas of science and in no instance is more than 40% of the work required in a single area; thus, in addition to receiving a firm foundation in the basic sciences, the student has liberal opportunity to elect courses in other fields.

b. To graduate, each undergraduate must complete:

1. English Composition (Wr 121) or its equivalent .... 3 hours
2. Physical education, 3 hours activity courses ..... 3 hours
   Students over 30 years of age are not required to take physical education. Only one activity course per term is counted toward the three-term requirement. A total of 8 hours of activity courses may be elected above the regular requirement.
3. Written and oral English communication ..... 6 hours
   In addition to Wr 121 or equivalent, undergraduate courses chosen from a list of courses compiled by the University Curriculum Council (see page 00).
4. Humanities and/or arts ..... 12 hours
   Undergraduate courses numbered 100 or higher offered by American studies, architecture and landscape architecture, art, English (*Eng* prefix), foreign languages and literatures (except for first-year foreign language courses), history, music, philosophy, religious studies, and theater arts and motion picture/cinematography in speech communication.
5. Social sciences ..... 12 hours
   Undergraduate courses numbered 100 or higher offered by anthropology, economics, geography (*Geog* prefix), political science, psychology, and sociology.
6. Biological sciences ..... 6 hours
   At least two terms of a sequence or approved series for no less than 6 hours selected from a list of courses compiled by the College of Science.
7. Physical sciences ..... 9 hours
   At least two terms of a sequence or approved series for no less than 9 hours selected from a list of courses compiled by the College of Science.

c. For graduation, all students in the College of Science are required to maintain a minimum 2.00 GPA in their major field as well as to meet OSU institutional requirements. Some science curricula have requirements in excess of this minimum.

d. Unless otherwise indicated, terms and hours for research, thesis, reading and conference, and seminar are to be arranged.

WICHE Student Exchange Program

The Western Interstate Commission for Higher Education [WICHE] Professional Student Exchange Program has been developed to assist students in the 13 western states [Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming] to obtain 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.

Professional fields of study for which preprofessional programs are offered at OSU:

- ***Medicine***

3- or 4-year program; various degrees given

- ***Dentistry***

3-year program; various degrees given

- ***Dental Hygiene***

2-year program; degree given elsewhere

- ***Physical Therapy*** (science emphasis)

3- or 4-year program; degree in general science

- ***Physical Therapy*** (physical education emphasis)

2-, 3-, or 4-year program; degree given elsewhere

- ***Podiatry***

4-year program; degree in general science

- ***Nursing***

1-year program; degree given elsewhere

- ***Occupational Therapy***

2-, 3-, or 4-year program; degree given elsewhere

- ***Optometry***

3- or 4-year program; various degrees given

- ***Veterinary Medicine***

3- or 4-year program; various degrees given

Additional information and forms for application and certification may be obtained by writing to: certifying officer, WICHE Professional Student Exchange Program, P.O. Box 3175, Eugene, Oregon 97403.

Program on Gerontology

Administered through the School of Home Economics, the Program on Gerontology involves students and faculty in seven schools and fourteen departments throughout the University, including the College of Science. 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. Undergraduate students may elect an emphasis in gerontology; graduate students an integrated minor. For further information regarding the program, contact the director in the Department of Human Development and Family Studies, School of Home Economics.

Science Courses and Curricula

ATMOSPHERIC SCIENCES

The atmospheric sciences, the study of the phenomena of the atmosphere, include the familiar events of weather, the behavior of the upper atmosphere, the structure and variation of climate, and the various atmospheric processes affecting people's activities and welfare. A major in atmospheric sciences prepares students for careers in applying their knowledge of these phenomena to the operations of commercial, industrial, and governmental organizations, and lays the basis for subsequent graduate-level training with a research emphasis.

In view of the rapidly increasing need for scientific information on a broadening range of atmospheric problems, the undergraduate program is built around a systematic presentation of the basic methods of studying the atmosphere on local, regional, and global scales, and emphasizes the use of physical and dynamical tools. Building upon undergraduate preparation in mathematics, physics, and chemistry, the student receives a broad background in the scope, techniques, and applications of the atmospheric sciences, and training in meteorological observation, analysis, and prediction by modern synoptic and dynamical methods.

To broaden the professional training, the atmospheric sciences major includes upper division courses in oceanography, computer science and statistics, and the student may select from a number of advanced elective courses in the senior year. Undergraduate students may also participate in the Department of Atmospheric Sciences-National Weather Service Cooperative Education Program. Those preparing for graduate study are encouraged to select further electives in mathematics, physics, engineering, or related sciences, depending upon the intended graduate specialty.

The graduate program leading to the M.S. and Ph.D. degrees prepares the student for a career in research and university teaching or for high-level responsibility in government and business. Graduate study areas of particular strength are atmospheric dynamics and numerical modeling, atmospheric turbulence and the boundary-layer, atmosphere-ocean interaction, tropical meteorology, climate dynamics, atmospheric physics and air pollution, the analysis and prediction of meso-scale processess, atmospheric data analysis, and atmospheric radiation. Graduate study in these areas may be enhanced by participation in faculty-directed research projects in the air-sea interaction program, jointly sponsored by the Department of Atmospheric Sciences and the School of Oceanography, as well as by cooperative programs with other departments, or with the National Weather Service or other institutions.

Curriculum

The required courses listed below may be taken in any order and include: (a) 6 hours of communication skills (Sp 112 and Wr 327 recommended); (b) 12 hours of arts and humanities; (c) 12 hours of social sciences; (d) 6 hours of biological science.

Freshman Year

	Hours
Spec Stu: Fund of Weath (AtS 199A)	3
Mathematics (Mth 200,201,202) (Students without prerequisite math for Mth 200 should take Mth 110 in summer session preceding entry.)	12
Chemistry (Ch 201,202,203)	9
English Composition (Wr 121)	3
Physical education (1 activity each term)	3
Required courses and/or electives	21

Sophomore Year

Introduction to the Atmospheric Sciences (AtS 211,212)	8
Meteorological Observations and Instruments (AtS 213)	3
Calculus of Several Variables I, II (Mth 203,304)	7
Applied Differential Equations (Mth 321)	4
General Physics (Ph 211,212,213)	12
Required courses and/or electives	14

Junior Year

Spec Stu: Atmos Analysis Lab (AtS 199B)	3
Atmos Thermodynamics (AtS 309)	3
Atmos Dynamics (AtS 311,312)	8
Physical Climatology (AtS 320)	3
Atmos sciences electives (AtS 330,340, 420,455,460,470,480, or Oc 491)	6
Math Meth for Engin and Phys (Mth 481)	3
Computer science (CS 190 or 213)	3–4
Statistics (St 314)	3
Required courses and/or electives	18–19

Senior Year

Atmospheric Physics (AtS 411,412)	6
Weather Analysis and Prediction (AtS 430,431)	8
Numerical Weather Prediction (AtS 432)	4
Atmospheric sciences electives (AtS 320, 330,340,420,455,460,470, or 480)	9
Atmospheric Sciences Seminar (AtS 407)	3
Electives (Students preparing for graduate school should select an upper division sequence in mathematics, statistics, or physics in their senior year; Mth 481,482,483, St 451,452,454, or Ph 471,472,473 are recommended. Students wishing an additional year of mathematics in their junior year should postpone the biological or humanities sequence to the senior year and select from Mth 417,418,419,341,342 or 487, 488,489.)	18

Lower Division Courses

AtS 199 Special Studies

Terms and hours to be arranged

Section A, The Atmospheric Sciences, 1 hour, graded P/N.

AtS 211,212
Introduction to the Atmospheric Sciences
4 hours fall, winter 2 (1½) 1 ②
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 chemistry and physics; laboratory exercises to supplement lecture material. Prerequisite: Mth 202. Corequisite: Ph 211. Must be taken in order.

AtS 213 Meteorological Observations and Instruments
3 hours spring 2 ① 1 ②
Methods and principles of meteorological observations; basic principles of meteorological instrumentation, including surface, free-air, and remote systems; laboratory exercises in observation and data analysis. Prerequisite: AtS 212.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

AtS 300
Introduction to the Atmosphere
3 hours any term 3 ①
Descriptive treatment of typical atmospheric phenomena and fundamental concepts of the atmospheric sciences; physical basis of atmospheric processes and weather; weather systems of small, medium, and large scales; weather and human activity; applications to current and local weather. (Not to be taken for credit by atmospheric sciences majors.)

AtS 301
Atmospheric Sciences Laboratory
1 hour winter, spring 1 ②
Optional laboratory to accompany lectures of AtS 300. Exercises illustrate lecture material and introduce students to methods of atmospheric analysis. Prerequisite or corequisite: AtS 300.

AtS 309 Atmospheric Thermodynamics
3 hours 3 ①
Equations of state; the first and second laws of thermodynamics; thermodynamics of moist air; aerological diagrams; thermodynamic processes in the atmosphere; atmospheric statics; vertical stability. Prerequisite: AtS 212; Mth 321.

AtS 311,312
Atmospheric Dynamics
4 hours winter, spring 3 ① 1 ②
Basic equations of atmospheric motion; circulation and vorticity theorems; acoustic and gravity waves; the quasi-static equations; quasi-geostrophic motion; dynamics of cyclones: instability theory. Prerequisite: AtS 309; Ph 213; Mth 481. Must be taken in order.

AtS 320 Physical Climatology
3 hours fall 3 ①
Physical basis of climate; effects of topography, mountains, and oceans; analysis of global climates and their classification; climate in terms of the atmospheric general circulation; survey of climatic change. Prerequisite: AtS 213.

AtS 330 Micrometeorology
3 hours spring 3 ①
Atmospheric processes and structure near the ground; surface heat and moisture balance; influence of soil characteristics; biometeorology and applications to agriculture and forestry. Prerequisite: AtS 320. Offered alternate years. Offered 1982-83.

AtS 340 Applied Meteorology
3 hours winter 3 ①
Application of meteorological theory and data to problems of design, energy utilization, and waste disposal; agricultural, industrial, ecological, and human impacts of weather and climate. Prerequisite: AtS 213. Offered alternate years. Not offered 1982-83.

AtS 401 Research

AtS 403 Thesis

AtS 405 Reading and Conference

AtS 406 Projects

AtS 407 Seminar
1 hour each term
One-hour sections, graded P/N.

AtS 411
Physics of Clouds and Precipitation
3 hours fall 3 ①
Structure and morphology of clouds; cloud microphysics and precipitation mechanisms; cloud dynamics; severe storms; meso- and synoptic-scale organization of clouds. Prerequisite: AtS 213.

AtS 412 Atmospheric Radiation
3 hours winter 3 ①
Transfer of radiation through planetary atmospheres; spectroscopy; solar radiation; optical phenomena in the atmosphere; visibility. Prerequisite: AtS 213.

AtS 420 Solar Radiation and Meteorological Measurements (G)
4 hours spring 2 ① 1 ④
Spectral distribution of solar radiation; radiation and meteorological measurements and instruments; instrument siting, mounting, and protection; instrument response characteristics, calibration, and standardization; recorders and data logging systems; data processing techniques; precision radiometery; dispersive devices (filters, interferometers, and spectrometers); atmospheric turbidity measurements; photopolarimetry and skylight; reflection properties of natural surfaces; laboratory experience with solar radiation and meteorological instruments at the OSU Solar Radiation Measurement Facility. Prerequisite: Ph 203 or 213.

AtS 430,431 Weather Analysis
4 hours each 2 ① 1 ④
Principles of synoptic analysis of large- and meso-scale circulation systems, including fronts, extra-tropical cyclones, jet streams, thunderstorms, and gravity wave systems; basic techniques of numerical weather analysis; laboratory exercises in diagnosis, objective analysis, and prediction. Prerequisite: AtS 312. Must be taken in order.

AtS 432
Numerical Weather Prediction (G)
4 hours 2 ① 1 ④
Principles of dynamical weather prediction; meteorological approximations and filtering techniques; numerical methods in weather prediction; laboratory exercises in numerical weather prediction. Prerequisite: AtS 312.

AtS 440
Statistical Methods in Meteorology (G)
3 hours winter 3 ①
Extension and application of basic statistical methods to meteorological data. *Topics* include exploratory data analysis, probability distributions, parametric time series analysis, statistical inference, Bayesian statistics, and regression models. Issues such as intercorrelations among meteorological data and non-Gaussian distributions of meteorological variables receive special treatment. Statistical methods illustrated by analyzing actual sets of meteorological data. Prerequisite: St 452 or equivalent.

AtS 455 Tropical Meteorology (G)
3 hours winter 2 (1½)
Structure and dynamics of tropical phenomena including meso-scale convective systems, hurricanes, synoptic-scales waves, and monsoon, desert, and grade wind regimes. Interactions with middle-latitude circulations. Prerequisite: AtS 312,411. Offered alternate years. Not offered 1982-83.

AtS 460 The General Circulation (G)
3 hours fall 2 (1½)
Physical basis of the general atmospheric circulation; transports and global budgets of momentum, heat, and moisture; review of theoretical, numerical, observational, and laboratory studies of the general circulation. Prerequisite: AtS 312.

AtS 470 The Upper Atmosphere (G)
3 hours spring 2 (1½)
Phenomenology and photochemical theory of atmospheric ozone; structure and behavior of the stratosphere and mesophere; dynamical and radiative models of stratopheric oscillations, equatorial waves, and polar vortex breakdown. Prerequisite: AtS 312. Offered alternate years. Offered 1982-83.

AtS 480 Biometeorology (G)
3 hours spring 3 ①
Physical processes within the microclimatological environment; exchanges of water vapor, heat, and energy; budget analyses for deserts, forests, grasslands, marshes, field crops, and orchards; response mechanisms and strategies of flora and fauna to the changing microclimatological environment. Prerequisite: AtS 300; Mth 202; Ph 202. Offered alternate years. Not offered 1982-83.

Graduate Courses

Also see courses marked (*G*) above.

AtS 501 Research

AtS 503 Thesis

AtS 505 Reading and Conference

AtS 506 Projects
Terms and hours to be arranged

AtS 507 Seminar
1 hour each term
One-hour sections, graded P/N.

AtS 511 Atmospheric Physics
5 hours 3 (1⅔) 1 ②
Composition and structure; thermodynamics of dry and moist air; cloud morphology and microphysics; radiation in the atmosphere; atmospheric chemistry. Prerequisite: Ph 213; Mth 321.

AtS 512 Atmospheric Dynamics
5 hours 3 (1⅔) 1 ②
Conservation laws and governing equations; free oscillations; Ekman dynamics; scale analysis; geostrophic motions. Prerequisite: AtS 511.

AtS 513 Atmospheric Analysis
5 hours 3 (1⅔) 1 ②
Atmospheric diagnosis and analysis: global-scale, cyclone-scale, meso-scale, and micro-scale atmospheric systems. Prerequisite: AtS 512.

AtS 515,516,517
Advanced Atmospheric Dynamics
3 hours each 3 ①
Planetary atmospheres, classification of geostropic motions, geostrophic adjustment, stability with respect to nongeostrophic perturbations, steady circulations, vacillations, geostrophic turbulence. Prerequisite: AtS 312. Must be taken in order. Offered alternate years. Offered 1982-83.

AtS 520,521 Atmospheric Modeling
3 hours fall and winter 3 ①
Finite difference methods with applications to initial and boundary value problems; first- and second-order ordinary differential equations: the advection equation; methods for filtered equations and the primitive equations; design of general circulation models—the adiabatic, frictionless equations and parameterization of sub-grid scale processes. Prerequisite: AtS 312, 432. Offered alternate years. Not offered 1982-83.

AtS 530 Climate Dynamics
3 hours spring 3 ①
Dynamical basis of climate and climatic change; application of general circulation models to climate simulation and climatic change experiments; climate predictability; theory of simplified climate models and their application. Prerequisite: AtS 460,521. Offered alternate years. Not offered 1982-83.

AtS 540 Atmospheric Convection
3 hours winter 2 (1½)
Boussinesq and anelastic convection; one-dimensional plume theories; two-dimensional theories; Rayleigh convection; moist convection; interaction with large-scale flow. Prerequisite: AtS 431. Offered alternate years. Offered 1982-83.

AtS 545 Atmospheric Turbulence and Boundary Layer Theory
3 hours spring 3 ①
Fundamentals of atmospheric turbulence; turbulent heat and momentum transfer; turbulence energetics; buoyancy- and stress-driven mixed layers; Ekman instability; asymptotic matching; stably stratified, shear-driven turbulence; mixed layer growth and stable geophysical boundary layers. Prerequisite: AtS 431. Offered alternate years. Offered 1982-83.

AtS 555,556,557
Air Pollution Meteorology
3 hours each 3 ①
Influence of atmospheric conditions, source characteristics, chemical transformations, and removal processes on the transport and diffusion of air pollutants on various time and space scales; source, concentrations, and interactions of natural and anthropogenic trace gases, aerosol particles, and radioactivity in the troposphere and lower stratosphere; precipitation scavenging, dry deposition, and resuspension with applications to local, regional, and global air pollution problems. Prerequisite: AtS 413. Offered alternate years. Not offered 1982-83. Must be taken in order.

AtS 560,561
Atmospheric Radiative Processes
3 hours winter and spring 3 ①
Absorption, scattering, and emission by atmospheric gases and particulates; thermodynamics of blackbody radiation; approximations and solutions in radiative transfer theory; computation of fluxes and heating rates; radiative and optical properties of clouds; radiation and climate; radiative transfer in planetary atmospheres. Prerequisite: AtS 412. Offered alternate years. Offered 1982-83. Must be taken in order.

AtS 570 Atmospheric Data Analysis
3 hours fall 3 ①
Filtering of meteorological time series; space-time spectral analysis; objective analysis of meteorological fields. Prerequisite: St 521. Offered alternate years. Offered 1982-83.

AtS 575 Probabilistic and Statistical Weather Forecasting
3 hours spring 1 ③
Probabilistic and statistical methods used in operational weather forecasting; forecast verification and decision-analytic methods of assessing the value of forecasts; application of methods to selected data sets and examination of results of recent experimental and operational experience with several statistical procedures. Prerequisite: AtS 431 and St 452. Offered alternate years. Not offered 1982-83.

AtS 580
Advanced Applied Meteorology
3 hours 3 ①
Application of methods from statistics, economics, and operations research to the formulation of probabilistic and statistical models of meteorological and climatological data; the assessment of the economic impacts of weather and climate on man's activities; the selection of optimal strategies in weather/climate-sensitive decision making situations; and the determination of the economic and social value of weather/climate information. Case studies presentations; student projects in applied meteorology. Prerequisite: Mth 241,341; St 421. Offered alternate years. Offered 1982-83.

AtS 590 Selected Topics
Terms and hours to be arranged
Maximum of 12 hours may be used in a graduate program.

BIOCHEMISTRY AND 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 professions closely related to the health sciences or for further study at the graduate level. In consultation with their advisers, students can plan their programs to meet their particular needs. The department offers B.S., B.A., M.S., M.A., and Ph.D. degrees.

The undergraduate major in biochemistry and biophysics may emphasize either physical or biological sciences or preprofessional preparation for medicine, dentistry, clinical biochemistry, or veterinary medicine. Both undergraduate and graduate students have opportunities to participate in research guided by a vigorous and diversified faculty.

Requirements for graduation include 12 hours of humanities, 12 hours of social sciences, and 6 hours of communication skills in addition to Wr 121; see page 13 for the list of approved courses. Students are encouraged to exceed these minimums. At least one year of German, French, or Russian, or its equivalent by examination is also required. The remaining electives should include, but need not be limited to, advanced courses in the physical and biological sciences. Qualified seniors may elect graduate courses.

Curriculum

Freshman Year

	Hours
General Chemistry (Ch 204,205,206)	15
Mathematics (Mth 200,201,202)	12
English Composition (Wr 121)	3
Physical education (any 3 activity courses)	3
General Physics I (Ph 211)	4
Electives	11

Sophomore Year

General Biology (Bi 211,212,213) (Mb 302, 303 may be substituted for Bi 213)	15
Organic Chemistry (Ch 334,335,336)	9
Mathematics (Mth 203)	4
General Physics I (Ph 212,213)	8
Electives	12

Junior Year

Biochemistry (BB 490,491,492)	9
Experimental Chemistry I (Ch 361,362)	4
Genetics (Gen 311)	4
Physical Chemistry (Ch 440,441,442)	9
Electives	22

Senior Year

Biochemistry Lab (BB 493,494,495)	6
Biophysics (BB 481,482,483)	6
Electives	36

For a partial list of courses accepted for major credit in biochemistry-biophysics in addition to those listed below, see Biology *and* Genetics.

Lower Division Course

BB 100 The Molecules of Life
2 hours any term 2 ①
A brief introduction to molecular biology for nonspecialists. Subjects vary but have included biochemical basis of origin of life biochemical genetics, relations of biochemical aspects of memory and behavior, mutagenesis, bioenergetics and nutrition, and environmental biochemistry.

Upper Division Courses
Courses numbered 400-499 and designated (*g*) or (G) may be taken for graduate credit.

BB 331,332,333
Introduction to Molecular Biology
3 hours each 3 ①
Sequence course for students who desire a descriptive acquaintance with molecular biophysics. Emphasis on various aspects of molecular biology and quantitative approaches to biological problems. Prerequisite: Ch 106,203, or 206.

BB 350 Elementary Biochemistry
4 hours any term 4 ①
Service course for students desiring a short introduction to biochemistry. Prerequisite: Ch 332 or equivalent.

BB 401 Research

BB 405 Reading and Conference
Terms and hours to be arranged

BB 407 Undergraduate Seminar
1 hour
Open to majors in biochemistry and biophysics. Description of research programs on campus, summary of current developments in the field, and discussion of career and postgraduate study opportunities. Graded P/N.

BB 450,451,452 General Biochemistry
(g) 4,3,3 hours 4 ①, 3 ①, 3 ①
Sequence course for students with a limited background in physical chemistry. *BB 450,451:* proteins, amino acids, and enzymes; nucleic acids; carbohydrates, lipids, and related topics; metabolism. *BB 452:* special topics. Prerequisite: Ch 333 or equivalent.

BB 461 Biophysical Techniques (g)
3 hours winter 3 ①
Service course for students in other departments. Optical techniques for the study of macromolecular conformation; the basis of each technique, with emphasis on the practical use of these techniques and the interpretation of data obtained in studying molecules of biological origin. Prerequisite: general chemistry, general physics. Not offered every year.

BB 462 Biophysical Techniques (g)
3 hours spring 3 ①
Service course for students in other departments. Physical methods for the separation and characterization of biological macromolecules; emphasis on the practical use of these techniques and interpretation of data. Prerequisite: BB 350; Ch 106; Ph 203. Not offered every year.

BB 481,482,483 Biophysics (G)
2 hours each 2 ①
Sequence professional course covering quantitative properties of biological systems and biological phenomena using concepts derived from mathematics and physics. Prerequisite: Ch 442.

BB 490,491,492 Biochemistry (G)
3 hours each 3 ①
Sequence professional course to meet the requirements of majors in biochemistry and biophysics. Prerequisite: Ch 336. Corequisite: Ch 423,424, 425 or Ch 440,441,442.

BB 493,494,495
Biochemistry Laboratory (G)
2 hours each 2 ③
Laboratory to accompany BB 450,451,452 or BB 490,491.492. *Fall:* basic laboratory techniques. *Winter:* research techniques. *Spring:* radioisotope methodology.

Graduate Courses
See also courses marked (g) and (G) above.

BB 501 Research

BB 503 Thesis

BB 505 Reading and Conference

BB 507 Seminar
Terms and hours to be arranged

BB 550,551,552
Selected Topics in Biochemistry
3 hours each 3 ①
Nonsequence courses designed to acquaint student with recent advances in biochemistry. Topics: proteins every year. Alternate years: carbohydrates and lipids, intermediary metabolism, biological oxidations, nutrition, enzyme kinetics, cancer viruses, neuro-chemistry, membranes, nucleic acids, nucleotides. Prerequisite: BB 492 or permission of instructor.

BB 553 Plant Biochemistry
3 hours 3 ①
Chemical processes and metabolism in plant systems. Prerequisite: BB 492 or consent of instructor. Offered alternate years.

BB 564 Physical Methods in Biophysics and Biochemistry
3 hours winter 3 ①
Important techniques for studying biopolymers and biological systems. Prerequisite: BB 483. Not offered every year.

BIOLOGY

The College of Science offers an undergraduate degree in biology that provides professional training in biology and accommodates preprofessional programs in dentistry, medicine, optometry, medical technology, podiatry, and veterinary medicine. Students in these preprofessional programs can simultaneously complete requirements for entrance into the appropriate professional school and requirements for the biology degree.

A student may major in biology or in one of the larger biological subdisciplines in the Departments of Biochemistry and Biophysics, Botany, Entomology, Microbiology, and Zoology. The biology major allows areas of concentration in various biological disciplines. Among these are developmental biology, ecology, evolutionary biology, genetics, physiology, and marine biology. Students choose courses to complete a specific area in close consultation with a faculty member whose scientific expertise is directly within the area. Students who plan careers in such interdisciplinary areas as genetics, ecology, or marine biology should choose a curriculum specifically designed for their interest by selecting the appropriate area of concentration. Since graduate schools and employers often seek candidates trained in interdisciplinary but specialized areas, job opportunities in these areas will be improved for those holding a biology degree with a designated area of concentration.

Curricula

CORE PROGRAM

The required courses listed below may be taken in any order and include: (a) 6 hours of communication skills; (b) 12 hours of arts and humanities; (c) 12 hours of social science; (d) restricted electives (see "Suggested Areas of Concentration" or "Preprofessional Programs"). Foreign language, computer science, and philosophy of science courses are suggested.

Freshman Year

	Hours
General Chemistry (Ch 204,205,206)	15
English Composition (Wr 121)	3
Calculus (Mth 200,201)	8
Physical education (1 activity each term)	3
Required courses and/or electives	19

Sophomore Year

Organic Chemistry (Ch 331,332,333,337)	10
Biology (Bi 211,212,213)	15
General Physics (Ph 201,202,203)	12
Required courses and/or electives	11

Junior Year

General Biochemistry (BB 450,451)	7
Stat Meth for Resear (St 451)	4
Regres for Research (St 452)	4
Genetics (Gen 311)	4
Cell Biology (Bi 360)	5
General Ecology (Bi 370)	3
Ecological Methods (Bi 371)	3
General Microbiology (Mb 302,303)	5
Required courses and/or electives	13

Senior Year

History or Biology (HstS 415)	3
Required courses and/or electives	42

SUGGESTED AREAS OF CONCENTRATION

Nonpreprofessional students decide on an area of concentration, including individual programs, in consultation with program advisers. Below is a list of *suggested* areas and courses. Each student should decide which area and courses related to that area would be appropriate to his or her interests with the approval of an adviser. Students electing the marine biology concentration must take Bi 450,451 or marine biology courses at a marine station.

DEVELOPMENTAL BIOLOGY

Developmental Biology (Bi 425)	5
Approved electives	15–20

ECOLOGY

Evolution (Z 345)	3
Population Biology (Bi 483)	4
Approved electives	15–18

EVOLUTIONARY BIOLOGY

Evolution (Z 345)	3
Population Biology (Bi 483)	4
Genetics Laboratory (Gen 442)	2
Approved electives	11–14

GENETICS

Genetics Laboratory (Gen 411)	2
Genetics of Cells (Gen 421)	4
Genetics of Organisms (Gen 441)	4
Genetics of Populations (Gen 461)	5
Approved elective	3

MARINE BIOLOGY

Marine Biology (Bi 450)	8
Marine Biology Lab (Bi 451)	7
Approved electives	8–10

PREPROFESSIONAL PROGRAMS

The following preprofessional programs may be accommodated within the biology major.

DENTISTRY
Core program plus 32 hours of approved electives.

MEDICINE
Core program, plus General Psychology (Psy 201,202), Quantitative Chemistry (Ch 325), Comparative Vertebrate Embryology (Z 421), Comparative Vertebrate Histology (Z 461), and 16 hours chosen from the following list: Animal Physiology (Z 434), Vertebrate Physiology (Z 431,432), Developmental Biology (Bi 425), Parasitology (Z 450), Comparative Vertebrate Anatomy (Z 422), Pathogenic Microbiology (Mb 429,430), Pathogenic Microbiology Lab (Mb 431), Immunology and Serology (Mb 432), Immunology and Serology Lab (Mb 433), Virology (Mb 434), Virology Lab (Mb 435), Bacterial Viruses (Mb 458), Biophysics (BB 481,482,483), Physics of Sound Hearing, and Music (Ph 331), Physics of Light Vision, and Color (Ph 332), Genetics of Cells (Gen 421), Genetics of Organisms (Gen 441), Genetics of Populations (Gen 461).

MEDICAL TECHNOLOGY
Core program, plus Quantitative Analysis (Ch 234), Vertebrate Physiology (Z 431, 432), Pathogenic Microbiology (Mb 429,431), Immunology and Serology (Mb 432,433), plus 17 hours of approved electives.

OPTOMETRY
Core program, plus Speech (Sp 112 or 113), The Nature of Digital Computers (CS 101), English Composition (advanced—Wr 323), General Psychology (Psy 201,202), Human Development (Psy 311), Human Anatomy and Physiology, Elementary Human Anatomy Lab (Z 331,332,333,341,342,343), plus 20 hours of approved electives.

PODIATRY
Core program, plus Human Anatomy and Physiology, Elementary Human Anatomy Lab (Z 331, 332,333,341,342,343), Comparative Vertebrate Embryology (Z 421), Comparative Vertebrate Histology (Z 461), and Physiology (Z 431,432 or Z 434 or Z 435), plus 12 hours of approved electives.

VETERINARY MEDICINE
Core program plus Preveterinary Orientation (VM 50), English Composition (Wr 222) or Technical Report Writing (Wr 327), Informative Speaking (Sp 112), and restricted electives (27 hours).

NOTE: Students accepted by a professional school after three years must complete the following requirements before leaving OSU: (a) minimum of 144 hours; (b) 3 terms of physical education activities; (c) 9 hours of communication skills (with Wr 121 or equivalent); (d) 12 hours of social science; (e) 12 hours of humanities and/or arts; (f) all listed major and supporting courses (i.e., Mth 200, 201 and/or 210; 12 hours of physics; BB 450, 451; St 451,452; Mb 302,303; Bi 360,370,371; Gen 311; one term history of science. In lieu of the senior year on campus, the first year of professional school (48 hours) may be applied toward the baccalaureate degree in biology from OSU.

Approved courses with a Bi designator are accepted for major credit by the Departments of Biochemistry and Biophysics, Botany, Entomology, General Science, Microbiology, and Zoology.

Approved courses listed above carrying Bot, Z, Mb, Gen, HstS, or GS prefixes are accepted for major credit in biology.

Lower Division Courses

Bi 50 Premedicine Orientation
1 hour winter 1 ①
Choice of premedical courses; application to medical school; choice of medical school and prospects of admission; financing medical education; social aspects of medicine; alternative careers. Not available for credit towards degree in biological sciences. Graded P/N. VAN DYKE.

Bi 107 Introduction to Biology
1 hour fall, spring 1 ①
Summaries by professors and lecturers from the College of Science and others from on and off campus of their research and interests in biology and related fields; discussions. Open to all interested freshmen. May be repeated. Graded P/N. BECKER.

[1]Bi 211,212,213 Biology
5 hours each 3 ① 2 ②
Bi 211: plant and animal diversity; genetics and evolution. *Bi 212:* plant and animal anatomy and physiology; ecology. *Bi 213:* biochemistry; molecular biology and microbial systems; developmental biology. Prerequisite: Mth 110; corequisite: Ch 331.

Upper Division Courses
Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Bi 350 Comparative Animal Behavior
3 hours spring 3 ①
Concepts of behavior; sensory receptors, internal mechanisms, governing responses; learning and habituation; social organization and communication. Prerequisite: one year of biological science. BLAUSTEIN, STEPHEN.

Bi 360 Cell Biology
5 hours 4 ① 1 ②
Prokaryotic and eukaryotic cells, with emphasis on relationship between structural components and dynamic organization within the cells. Topics include nuclear compartment, structure of chromosomes, the cell cycle, mitosis, meiosis, the cytoplasmic compartment, the structural and functional diversity of membranes, the mitochondrion, chloroplast ribosomes, cell motility, self-assembly of organelles, and abnormal cells. Prerequisite: one year of biological science; Ch 331,332; BB 350 or equivalent. CONTE, HARD.

Bi 370 General Ecology
3 hours fall or spring 3 ①
The biology of ecosystems: energy, patterns of ecosystems and populations, interspecies interactions, diversity, and development. Prerequisite: BLAUSTEIN, LUBCHENCO, MCINTIRE, MENGE, MCEVOY.

Bi 371 Ecological Methods
3 hours fall or spring 1 ① 1 ④
Experimental design, data collection, analysis and synthesis in ecological studies; local ecosystems emphasized. Prerequisite: Bi 370. ANDERSON, MCEVOY.

Bi 425 Developmental Biology (G)
5 hours winter 3 ① 1 ① 1 ③
Cytoplasmic organization, activation, and control of gene expression, induction, cell association; differentiation, including hormone action and immune competence. Techniques of cell culture, enzyme induction, transplantation. Prerequisite: Gen 311; Bi 360 or Bot 331 or Z 431. MORRIS, QUATRANO.

Bi 450 Marine Biology (g)
8 hours (Marine Science Center)
Lectures on flora and fauna of the marine environment; introduction to microbes; physiological and biochemical characteristics and adaptations of marine organisms; ecological patterns and processes of marine populations, communities, and ecosystems. Prerequisite: Bi 211, 212,213 preferred, but one-year course in biology, zoology, botany, or microbiology acceptable; Bi 370 or consent of instructor. Must be taken concurrently with Bi 451. BECKER, OLSON.

[1] Credit toward graduation is granted for only one of the following combinations: Z 201,202; Bi 211,212,213; or GS 101,102,103. Bi 211, 212,213 is intended for biological science majors. Other biological sequences are available in the Departments of Biochemistry and Biophysics, Botany, Entomology, General Science, Microbiology, and Zoology.

Bi 451 Marine Biology Laboratory (g)
7 hours (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. BECKER, OLSON.

Bi 483
Introduction to Population Biology (G)
5 hours fall 4 ① 1 ②
Theoretical and empirical views of the structure of natural populations, emphasizing the integration of ecological, genetic, and behavioral approaches. Prerequisites: Gen 311; Bi 370. DAWSON, KING.

Graduate Course
See also courses marked (*G*) above.

Bi 570
Community Structure and Analysis
4 hours fall 3 ① 1 ③
Quantitative methods for the analysis of the taxonomic structure of biotic communities, including community concepts, estimation of community composition parameters, theoretical aspects of multivariate methods of analyzing species-importance data, computer analysis of data sets. Prerequisite: Bi 370 or St 435 or equivalent; St 452; one year of college math (through Mth 163 or 201). MCINTIRE.

BOTANY AND PLANT PATHOLOGY

The undergraduate major in botany is intended for students who wish to emphasize studies in plant science. It qualifies students for graduate work in various areas of botany and plant pathology, for positions with the state or federal government, or in industries that deal with plants and their products. Graduate programs help students qualify for teaching positions in colleges and universities or for research positions in industry or government.

In consultation with his or her academic adviser, each undergraduate botany 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 extensive and diversified research programs of the department's faculty also are available for undergraduate experience in research and for specialized graduate training. Undergraduate programs in botany may be general or may emphasize one of the fields of the graduate majors.

The graduate majors include plant anatomy, cytology, ecology, genetics, morphology, physiology, systematic botany, mycology, phycology, nematology, plant pathology, plant virology, forest pathology, and physiology of parasitism.

The program in pest management for plant protection is offered cooperatively by the Departments of Botany and Plant Pathology, Entomology, and other departments of the School of Agriculture. It provides education for the management of plant pests—especially pathogens, weeds, and insects. Students are helped to find summer employment providing practical experience in crop production, pest control, and/or pesticide regulation.

Curriculum

For courses listed in the required curriculum, equivalent courses taken at this or other institutions may be substituted. All such substitutions must be specifically approved by the student's academic adviser.

The required courses listed below may be taken in any order and include: (a) 6 hours of communication skills; (b) 12 hours of arts and humanities; (c) 12 hours of social sciences. Electives must include enough upper division hours to meet the graduation requirement of 60 upper division hours.

Freshman and Sophomore Years

	Hours
Biology (Bi 211,212,213) *or* General Zoology (Z 201,202), General Botany (Bot 201,202), and General Microbiology (Mb 302)	15–17
General Chemistry (Ch 104,105,106,107, or Ch 204,205,206)	15
Mathematics (Mth 162,163 *or* Mth 200 and 201 or 210)	8 or 12
Organic Chemistry and Biochemistry (Ch 331,332,333,337 *or* Ch 331,332, BB 350)	10
Systematic Botany (Bot 321)	4
English Composition (Wr 121)	3
Physical education (1 activity each term)	3
Required courses and/or electives	32–34

Junior and Senior Years

General Physics (Ph 201,202)	8
Genetics (Gen 311)	4
Required upper division biology alternatives (5 hour minimum): General Ecology (Bi 370,371), Cell Physiology (Bi 360), Genetics Laboratory (Gen 442), Developmental Biology (Bi 425), Microbiology (Mb 302,303,306,307)	5
Plant Anatomy (Bot 471)	4
Plant Physiology (Bot 331)	5
Plant Ecology (Bot 341)	4
Required courses and/or electives	66

PEST MANAGEMENT CURRICULUM

Freshman Year

	Hours
General Chemistry (Ch 104,105,106,107, or Ch 204,205,206)	15
Mathematics (Mth 161,162,163 *or* Mth 200 and 201 or 210)	8 or 12
English Composition (Wr 121)	3
Physical education (1 activity each term)	3
Electives (Principles of Wildlife Conservation, FW 251, recommended)	5–3
Required courses and/or electives	13

Sophomore Year

Organic Chemistry and Biochemistry (Ch 331,332,333,337 *or* Ch 331,332, BB 350)	10
Biology (Bi 211,212,213 *or* General Zoology Z 201,202), General Botany (Bot 201, 202), and General Microbiology (Mb 302)	15–17
Electives (Laboratory Techniques in Microbiology, Mb 303, recommended)	5–3
Horticulture Principles (Hort 201,202) or Principles of Crop Science (CrS 201)	3–6
Required courses and/or electives	7–14

Junior Year

General Physics (Ph 201,202)	8
General Ecology (Bi 370)	3
Intro Plant Pathology (Bot 330)	4
Plant Physiology (Bot 331)	5
Introduction to Insect Pest Management (Ent 311)	4
Weed Control (CrS 418)	5
Soils (Sls 210)	5
Genetics (Gen 311)	4
Systematic Botany (Bot 321)	4
Stat Meth for Resear (St 451)	4

Senior Year

Nematode Diseases of Plants (Bot 554)	4
Insect Pest Management *I,II,III* (Ent 442, 443,444)	12
Plant Breeding (CrS 415)	3
Extension Methods (EM 411)	3
Plant Anatomy (Bot 471)	4
Regress for Resear (St 452)	4
Economics (sequence including general, agricultural, and forest economics)	9
Pest management seminar (Bot 401—Research)	1
Required courses and/or electives	5

For courses accepted for major credit in botany in addition to those listed below, see Biology *and* Genetics. *Also refer to the list following the botany courses.*

Lower Division Course

Bot 201,202,[1]203 General Botany
4,4,3 hours
3 ① 1 ③; 3 ① 1 ③; 1 ① 1 ② 1 ③

Bot 201: phylogenetic survey of the plant kingdom, morphology; *Bot 202:* how plants get their food, grow, differentiate, and reproduce; seed plants; *Bot 203:* identification of native plants; use of taxonomic keys, floral morphology. Need not be taken in order.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (G) may be taken for graduate credit.

Bot 316 Aquatic Plants
4 hours fall 2 ① 2 ③

Ecology, taxonomy, and economic significance. Prerequisite: Bot 203 or equivalent. McINTIRE, JOHNSTON.

[1]Bot 321 Systematic Botany
4 hours spring 2 ① 2 ③

Vascular plants. Plant classification; collection and identification. Prerequisite: Bot 201,202 or Bi 211,212,213. CHAMBERS.

Bot 330 Introductory Plant Physiology
4 hours winter 3 ① 1 ③

Fundamental concepts of physiological processes. Service course for students majoring in forestry. Prerequisite: Bot 201,202, or equivalent. ZOBEL.

Bot 331 Plant Physiology
5 hours fall or spring 3 ① 2 ③

Physiological processes stressing modern concepts and areas of research. Prerequisite: Bot 202 or Bi 212 or 213; one year of college chemistry. ARMSTRONG.

Bot 341 Plant Ecology
4 hours fall or spring 2 ① 2 ②

Structure, methods of analysis, environmental relations, and dynamics of vegetation. Prerequisite: one year of general botany or biology, including Bot 203 or Bot 321. ZOBEL.

Bot 350 Introductory Plant Pathology
4 hours spring 3 ① 1 ③

Symptoms, causal agents, diagnosis and prevention of plant diseases, with emphasis on fungi, bacteria, nematode, and virus pathogens. Prerequisite: Bot 201,202 or Bi 213. M. POWELSON.

Bot 401 Research

Untitled sections only graded P/N.

Bot 403 Thesis

Bot 405 Reading and Conference

Untitled sections only graded P/N.

Bot 407 Seminar
Terms and hours to be arranged

Untitled sections only graded P/N.

[1]Bot 203 and Bot 321 cover somewhat similar subject matter; thus credit can be granted only for one or the other of these courses, not both.

Bot 411,412
Morphology of Nonvascular Plants (G)
5 hours fall, winter 3 ① 2 ②

Bot 411: structure, reproduction, and phylogeny of the algae. *Bot 412:* structure, reproduction, and phylogeny of lichens and bryophytes. Prerequisite: three terms of upper division biology. Need not be taken in order. PHINNEY.

Bot 413 Morphology of Vascular Plants (G) 4 hours spring 2 ① 2 ③

Structure, reproduction, and evolutionary history of vascular plants. Prerequisite: Bot 201,202 or Bi 211,212 or equivalent. Offered alternate years. Offered 1982-83. RICKSON.

Bot 414 Agrostology (G)
4 hours fall 2 ① 2 ②

Classification and identification of grasses, with emphasis on the relationships among tribes and genera; classical and modern approaches to classification. Prerequisite: Bot 321 or equivalent. CHAMBERS.

Bot 415 Forest Pathology (g)
3 hours winter 2 ① 1 ③

Disease in relation to forest development, protection, and harvest. Prerequisite: Bot 201,202; F 224. HANSEN.

Bot 421 Advanced Systematic Botany (G) 5 hours winter 2 (1½) 1 ②

Evolutionary approach: causes of plant variation; ecotypes; genetic isolation and hybridization; modes of speciation; aneuploidy, polyploidy, and apomixis; structural hybridity of chromosomes; breeding systems in plant populations; special techniques in botanical systematics. Prerequisite: Gen 311; Bot 321; or equivalents. CHAMBERS.

Bot 425 Plant Taxonomy (g)
3 hours spring 2 ③

Use of taxonomic keys; floral structure, relationships and diagnostic characteristics of vascular plants. Prerequisite: Bot 203 or equivalent. JOHNSTON.

Bot 431 Bioenergetics of Plants (G)
3 hours fall 3 ①

The function of membranes and various plant organelles such as the mitochondrion, glyoxysome, Golgi apparatus, endoplasmic reticulum. Topics include mechanisms of energy conversion and stabilization in association with the metabolic activities of plant organelles, and the utilization of energy by plants. Prerequisite: Bot 331 or Bi 360. Offered alternate years. Offered 1982-83. BISHOP.

Bot 432 Photobiology of Plants (G)
3 hours winter 3 ①

Detailed physiological and biochemical coverage of the photobiology of plants. Topics include: photosynthesis, whole cells and chloroplast reactions; phototaxis; photokinesis and photodinesis. Prerequisite: Bot 331 or Bi 360. BISHOP.

Bot 433 Hormonal Regulation of Plant Growth and Development (G)
3 hours spring 3 ①

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. Prerequisite: Bot 330 or 331. T. MOORE.

Bot 441,442,443
Advanced Plant Ecology (G)
3 hours each 2 ① 1 ③

Fall: environmental factors affecting plant growth. *Winter:* the plant community, its structure, development, classification, and interpretation. *Spring:* methods in vegetation sampling and analysis. Prerequisite: Bot 341 or equivalent. Need not be taken in order. ZOBEL.

Bot 450 Plant Pathology (G)
5 hours fall 3 ① 2 ③

Infectious and noninfectious plant diseases, nature of pathogens and pathogenesis, influence of environment, and principles of control. Prerequisite: either Bot 330 or 331 recommended. LEACH and staff.

Bot 451 Plant Disease Diagnosis (G)
3 hours summer to be arranged

Field trips and laboratory on plant disease identification and control. Prerequisite: Bot 350 or equivalent.

Bot 453
Epidemiology and Disease Control (G)
5 hours winter 3 ① 2 ③

Quantitative epidemiological analysis of plant diseases and relationship to disease control. Prerequisite: Bot 450 or equivalent. Offered alternate years. Offered 1982-83. R. POWELSON.

Bot 461 Biology of Fleshy Fungi (G)
4 hours fall 2 ① 2 ③

Structure, function, classification, and ecology of mushrooms, wood-rotting fungi, cup fungi, truffles, and other macrofungi. Prerequisite: two terms of upper division biology. DENISON.

Bot 462 Biology of Microfungi (G)
5 hours spring 3 ① 2 ③

Structure, function, classification, and ecology of yeasts, water molds, bread molds, Ascomycetes, endomycorrhizae, imperfect fungi, animal and plant pathogens, and other microscopic fungi. Prerequisite: three terms of upper division biology. Offered alternate years. Offered 1982-83. DENISON.

Bot 463 Plant Pathogenic Fungi (G)
4 hours spring 3 ① 1 ③

Biology and classification of fungi that cause plant disease. Economically important genera and species from those orders of fungi with significant pathogens of vascular plants. Prerequisite: Bot 450; Bot 461 or 462. Offered alternate years. Not offered 1982-83. DENISON.

Bot 470 Microtechnique (G)
4 hours fall 2 ④

Preparation of permanent microscope slides of plant materials emphasizing techniques of cytochemistry, histochemistry, and autoradiography. Prerequisite: Bot 202 or Bi 213 and two terms of upper division biology. RICKSON.

Bot 471 Plant Anatomy (g)
4 hours winter 2 ① 2 ③

Origin, structure, and development of the tissues of vascular plants. Prerequisite: Bot 201,202 or Bi 211,212. RICKSON.

Bot 472 Plant Cytology (G)
3 hours spring 2 (1½)

Cell ultrastructure; nucleus, nucleolus, golgi, cell wall, plastids, endoplasmic reticulum, microbodies, and other organelles. Prerequisite: Bot 202 or Bi 213 and two terms of upper division botany. Offered alternate years. Not offered 1982-83. RICKSON.

Bot 480 Marine Algae (G)
5 hours summer 5 ① 5 ⑦

Laboratory studies of the taxonomy and field investigations of the ecology of intertidal algae. Offered at the Marine Science Center. Prerequisite: three terms of upper division biology.

Bot 483 Phycology (G)
5 hours spring 3 ① 2 ③

Taxonomic and ecologic introduction to the algal flora, freshwater and marine. Lectures on classification; laboratory work in taxonomic identification and field observation of ecological relationships of the benthic and planktonic algae from numerous freshwater localities in Oregon and the more abundant marine algae of the rocky intertidal habitats of the Oregon coast. Prerequisite: Bot 411 or three terms of upper division biology. PHINNEY.

Bot 485 Taxonomy and Ecology of Marine and Estuarine Diatoms (G)
5 hours summer 5 ① 5 ⑦
Taxonomy and ecology of diatoms, with emphasis on natural history, including field trips along the Oregon coast and in selected estuaries; taxonomy, emphasizing cell wall morphology, characteristics of common genera; relevant literature, and approaches to species identification; and quantitative analysis of distributional patterns and estimation of community composition parameters. Prerequisite: senior or graduate standing; 3 terms of upper division biology. McINTIRE.

Bot 495 Genetics of Fungi (G)
3 hours 3 ①
Genetic analysis of selected fungi used as experimental genetic tools that are causal agents of disease in plants. Topics include: induction, isolation, and characterization of mutants; gene function; chromosome mapping; recombination and complementation; extra chromosomal inheritance; genetics of pathogenicity. Prerequisite: Gen 311; BB 451. Offered alternate years. Not offered 1982-83. MILLS.

Bot 496 Fungal Genetics Laboratory
(G) 2 hours winter 2 ②
Laboratory instruction in the genetic analysis of selected fungi. Topics include mutation, chromosome mapping, tetrad analysis, complementation, parasexuality, genetics of sexuality, and genetics of virulence. Prerequisite: Bot 495 or concurrent enrollment. Offered alternate years. Not offered 1982-83. MILLS.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

Bot 501 Research
Untitled sections only, graded P/N.

Bot 503 Thesis

Bot 505 Reading and Conference
Terms and hours to be arranged
Untitled sections only, graded P/N.

Bot 507 Seminar
1 hour each term
Untitled sections only graded P/N.

Bot 515 Forest Pathology
3 hours spring 2 ① 1 ③
Forest disease problems; organized to meet individual needs of students in plant pathology and forestry. Prerequisite: Bot 415 or Bot 450 or consent of instructor. Offered alternate years. Not offered 1982-83. HANSEN.

Bot 534 Mineral Metabolism
3 hours winter 2 ① 1 ③
Mineral elements in metabolic processes; ion accumulation in cells. Prerequisite: BB 450 or 490. EVANS.

Bot 535 Physiology of Plant Differentiation and Morphogenesis
3 hours fall 3 ①
The physiology and biochemistry of differentiating plant systems in the algae, bryophytes, and higher plants. Topics include: genetic control mechanisms of developmental processes, nucleocytoplasmic interactions of single cells, biochemical basis of tissue and organ differentiation and morphogenesis. Prerequisite: Bot 433 or Bi 425 and one term of graduate-level biochemistry. Offered alternate years. Not offered 1982-83. QUATRANO.

Bot 541 Plant Geography
3 hours winter 2 ① 1 ③
Origin, development, and distribution of major units of vegetation, with emphasis on western United States. Prerequisite: Bot 321,341,441.

Bot 551 Plant Virology
3 hours fall 2 ① 1 ③
Nature and properties; symptomology; transmission, inhibitors; purification; electron microscopy; serology; control. Prerequisite: Bot 450; six hours of upper division biology. Offered alternate years. Not offered 1982-83. ALLEN.

Bot 552 Bacterial Diseases of Plants
5 hours winter 2 ① 2 ④
Biology and identification of causal agents; symptoms, etiology, and control. Prerequisite: Bot 450; Mb 302,303. Offered alternate years. Offered 1982-83. L. MOORE.

Bot 554 Nematode Diseases of Plants
4 hours fall 2 ① 2 ②
Nematology, identification and biology of nematodes, symptoms and control. Prerequisite: Bot 450 or equivalent and 6 hours of upper division biology. Offered alternate years. Offered 1982-83. JENSEN.

Bot 560 Fungicides
3 hours winter 2 ① 1 ③
Chemical control of plant diseases, mode of action. Prerequisite: Bot 450 or equivalent; organic chemistry. Offered alternate years. Offered 1982-83.

Bot 564 Physiology of Fungi
5 hours spring 3 ① 2 ③
Fungus growth, reproduction, survival; their raw materials, metabolism, products; chemical and physical agents; variation. Prerequisite; plant physiology or equivalent; organic chemistry. Offered alternate years. Offered 1982-83. BRANDT.

Bot 566 Physiology of Parasitism
4 hours winter 2 ② 1 ④
Recent advances in specific fields in plant diseases. For advanced graduate students. Topics covered include: infection, tissue maceration, toxins, wilting, abnormal plant growth, and plant disease resistance. Prerequisite: Bot 433; BB 451 or equivalent. Offered alternate years. Offered 1982-83.

Bot 567 Electron Microscopy Laboratory in Botany
3 hours fall 2 ③
Botanical applications of the electron microscope, specimen preparation, and photographic techniques. Prerequisite: Z 566 and consent of instructor. SOELDNER.

Bot 580 Biological Micrography
3 hours winter 1 ① 2 ③
Applying optical research tools to various types of biological materials and problems. Prerequisite: graduate standing in biological science. PHINNEY.

Courses from other departments accepted for major credit:

Gen 421 Genetics of Cells (G)
4 hours spring 4 ①

Gen 573 Cytogenetics
4 hours winter 3 ① 1 ②
See Genetics for descriptions.

Sls 522 Plant-Water Relations
3 hours spring 3 ①
See Soil Science in "School of Agriculture" for description.

CHEMISTRY

The Department of Chemistry offers the degrees of Bachelor of Science, Bachelor of Arts, Master of Science, Master of Arts, 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, and oceanography, 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, consisting of general, organic, analytical, physical, and inorganic chemistry course work plus three years of laboratory work in chemistry, is normally completed by the end of the junior year, except for two terms of inorganic chemistry taken in the senior year. The remainder of the program consists of 15 term hours of approved career-supportive electives, of which at least six are to be in laboratory courses or research.

Students planning to do graduate work will normally do thesis research and take advanced courses in chemistry and closely related disciplines. Those intending to take employment after graduation may select from a wide variety of courses in many disciplines to fit their professional objectives and enhance employability.

The graduate majors are analytical chemistry, inorganic chemistry, organic chemistry, physical chemistry, and nuclear and radiation chemistry. An undergraduate major in chemistry may emphasize one of the graduate majors or biochemistry.

The facilities, faculty, and curricular offerings of this department are approved by the American Chemical Society. Graduates who have fulfilled all departmental requirements are eligible for certification by the chairman of the department to become members of the society after two years of professional experience.

Curriculum

Chemistry majors may not use any S/U courses to meet Department of Chemistry or College of Science requirements. (First-Year German and the two terms of biological sciences must be taken graded.)
The required courses listed below may be taken in any order and include: (a) 12 hours of arts and humanities; (b) 12 hours of social sciences; (c) First-year German (Ger 101,102, 103); (d) two terms of an approved biological science.

Freshman Year	*Hours*
General Chemistry (Ch 204,205,206)	15
Calculus (Mth 200,201,202)	12
General Physics (Ph 211)	4
English Composition (Wr 121)	3
Physical education (1 activity course each term)	3
Required courses and/or electives	8–11
Sophomore Year	
Organic Chemistry (Ch 334,335,336)	9
Experimental Chemistry I (Ch 361,362, 363)	7
Analytical Chemistry I (Ch 320)	3
Calculus of Several Variables (Mth 203)	4
Applied Differential Equations (Mth 321)	4
General Physics (Ph 212,213,214)	12
Technical Report Writing (Wr 327)	3
Required courses and/or electives	6
Junior Year	
Analytical Chemistry II (Ch 422)	3
Physical Chemistry (Ch 440,441,442)	9
Experimental Chemistry II (Ch 461,462, 463)	9
Required courses and/or electives	27–30

Senior Year

Inorganic Chemistry (Ch 411,412)	6
Approved career supportive electives (must be approved by the student's adviser and the Chemistry Department by the end of winter term of the junior year)	15
Required courses and/or electives	27

Lower Division Courses

[1]Ch 104,105,106 General Chemistry
5,4,4 hours
5 ①; 3 ① 1 ③; 3 ① 1 ③
A nonterminal service course for students who have had no previous training in chemistry and for those whose college aptitude test scores indicate a need for a more elementary introduction to chemistry. This sequence and Ch 107 will allow students to take advanced laboratory courses in chemistry. Must be taken in order.

Ch 107 General Chemistry Laboratory
2 hours fall 2 ③
Laboratory work to complete the instruction given in Ch 104,105,106 and to prepare students for more advanced laboratory training in chemistry. Prerequisite: Ch 106.

[1]Ch 201,202,203 General Chemistry
3 hours each 3 ①; 2 ① 1 ③; 2 ① 1 ③
Service course covering basic principles of general chemistry. Prerequisite: one year of high school chemistry and acceptable college aptitude scores. This sequence and Ch 207 will allow students to take advanced laboratory courses in chemistry. (Ch 104 will be accepted in lieu of high school chemistry as a prerequisite for this sequence; however, see footnote). Must be taken in order.

Ch 204,205,206 General Chemistry
5 hours each 4 ① 1 ④
Professional course for students majoring in chemistry, pharmacy, and related sciences. Prerequisite: one year of high school chemistry and acceptable college aptitude scores. (Ch 104 will be accepted in lieu of high school chemistry as a prerequisite for this sequence; however, see footnote). Must be taken in order.

Ch 204H,205H,206H
General Chemistry, Honors
5 hours each 3 ① 2 ③
Honors course for students majoring in chemistry and related sciences. Placement by adviser based on college aptitude scores, mathematics background, and previous chemistry training. Must be taken in order.

Ch 207 General Chemistry Laboratory
2 hours fall 2 ③
Laboratory to complete the instruction given in Ch 201,202,203 and to prepare students for more advanced laboratory training in chemistry. Prerequisite: Ch 203.

Ch 213
Organic Compounds and Reactions
4 hours spring 4 ①
Descriptive survey of classifications of organic compounds and selected reactions, nomenclature, properties, and applications. Not a professional course in organic chemistry. Restricted to majors in Schools of Agriculture and Forestry. Prerequisite: Ch 202 or 205 or corequisite: Ch 106. Credit may not be given for both Ch 213 and Ch 331 or Ch 334. Ch 213 is not intended to substitute for any stated prerequisite for other courses.

[1]Ch 234 Quantitative Analysis
4 hours any term 2 ① 2 ③
Service course on classical and instrumental analytical techniques for students in the life sciences. Prerequisite: Ch 206, or corequisite: Ch 107 or 207.

[1] Certain courses cover somewhat similar subject matter, and credit cannot be granted for duplication. For any sequence or combination of general chemistry courses the terminal course being Ch 203, a maximum of 9 term hours is allowed; the terminal course being Ch 206, a maximum of 15 term hours is allowed. Credit cannot be granted for both Ch 234 and Ch 325.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Ch 316 Nuclear Reactor Chemistry
4 hours fall 3 ① 1 ③
Basic principles of nuclear and radiation chemistry as applied to nuclear reactors. Processing of reactor fuels, corrosion, waste disposal and treatment, analysis of low-level radioactivity.

Ch 320 Analytical Chemistry I
3 hours spring 3 ①
First course of a two-course professional sequence (Ch 320,422) for majors in chemistry. Determination of the composition of simple and complex mixtures. Sample preparation, separations, optical and electrical instruments, optimization of instrumental and other variables, and treatment of data. Prerequisite: Ch 206 or 107 or 207.

Ch 325 Quantitative Chemistry
4 hours winter and spring
1 ② 1 ② 1 ③
Equilibrium and stoichiometric calculations and a limited range of analytical chemistry skills appropriate to the life sciences. Recommended for premedical, predental, and preveterinary students. Prerequisite: Ch 206 or 107 or 207.

Ch 331,332,333 Organic Chemistry
3 hours fall and winter, 2 hours spring
3 ① 3 ① 2 ①
Service course covering aliphatic and aromatic chemistry. Prerequisite: Ch 106,203, or 206. Must be taken in order.

Ch 334,335,336 Organic Chemistry
3 hours each 3 ①
Professional course designed to meet the requirement of majors in chemistry and chemical engineering. Prerequisite: Ch 106 or Ch 203 or 206. Must be taken in order.

Ch 337 Organic Chemistry Laboratory
2 hours 2 ③
A laboratory course in organic chemistry for nonmajors. Prerequisite: Ch 107 or 206 or 207; Ch 332 or 335.

Ch 361,362,363
Experimental Chemistry I
2 hours each first and second terms; 3 hours third term 2 ④
First integrated laboratory course for majors in chemistry and related disciplines, covering experimental techniques of analytical, inorganic, organic, physical, and radiochemistry. Prerequisite: Ch 206 or 107 or 207; major in chemistry or biochemistry or consent of instructor. Corequisite: Ch 334,335,336,320, or equivalent. Must be taken in order.

Ch 401 Research

Ch 403 Thesis

Ch 405 Reading and Conference

Ch 407 Seminar
Terms and hours to be arranged

Ch 411,412,413 Inorganic Chemistry
(G) 3 hours each 3 ①
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, organometallic reactions and catalysis, and bioinorganic chemistry. Prerequisite: three years of college chemistry. Ch 411 prerequisite to Ch 412 or Ch 413.

Ch 416 Nuclear Chemistry (G)
3 hours 3 ①
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. Corequisite: Ch 440 or Ph 311.

Ch 419 Radioactive Tracer Methods
(G) 4 hours fall 2 ① 2 ③
Radiochemistry, radioisotopes, radioactivity, radiotracer methods as research tool in physical and biological science. Prerequisite: two years of college chemistry.

Ch 421 Analytical Chemistry (g)
4 hours winter 2 ① 2 ③
Professional course for majors in chemical engineering. Electrical, optical, and mechanical instruments assembled and applied to quantitative chemical measurements. Prerequisite: Ch 206.

Ch 422 Analytical Chemistry II (g)
3 hours 3 ①
Second course of a two-course professional sequence (Ch 320,422) for majors in chemistry. Determination of the composition of simple and complex mixtures. Sample preparation, separations, assembly and use of optical and electrical instruments, optimization of instrumental and other variables, and treatment of data. Prerequisite: Ch 320.

Ch 423,424,425
Introduction to Physical Chemistry
(g) 3 hours each 3 ①
Service course covering thermodynamics, electrochemistry, solutions, kinetic theory of gases, chemical kinetics, elements of chemical theory, crystal structure, surfaces, and macromolecules. Prerequisite: Mth 201 or equivalent; one year of college chemistry; one year of college physics. Must be taken in order.

Ch 426 Chemical Microscopy (G)
3 hours spring 1 ① 2 ③
Theory and use of microscope in microscopic measurements, quantitative analysis of mixtures, identification of organic compounds, optical crystallization phenomena, etc. Prerequisite: three years of college chemistry; college physics.

Ch 428 Instrumental Analysis (g)
4 hours fall 2 ① 2 ③
Service course for the nonspecialist outside the field of chemistry covering a broad spectrum of analytical instrumentation. Prerequisite: senior or graduate standing.

Ch 433 Structure Determination by Spectral Methods (G)
3 hours spring 3 ①
Use of ultraviolet, infrared, optical rotatory dispersion, circular dichroism, nuclear magnetic resonance, and mass spectra for determination of structures and stereochemistry of complex organic molecules. Prerequisite: Ch 336,442.

Ch 440,441,442 Physical Chemistry
(g) 3 hours each 3 ①
Thermodynamics, electrochemistry, solutions, kinetic theory of gases, chemical kinetics, quantum theory and statistical mechanics, molecular structure, and spectroscopy. Prerequisite: Mth 203; Ph 213. Must be taken in order.

Ch 448,449
Colloid and Surface Chemistry (G)
3 hours each 3 ①
Physical chemistry of interfaces. Thermodynamics, lyophobic and lyophilic colloids, electrokinetics and membrane phenomena, methods of surface science, topics in catalysis. Prerequisite: three years of college chemistry. Need not be taken in order.

Ch 450
Introductory Quantum Chemistry (G)
3 hours fall 3 ①
Elementary wave mechanics and matrix mechanics of atoms and molecules. Quantum basis of chemical structure. Prerequisite: Mth 203; Ph 213.

Ch 461, 462, 463
Experimental Chemistry II
3 hours each 1 ① 1 ③ 1 ④
Second integrated laboratory course for majors in chemistry and related disciplines, covering experimental techniques of analytical, inorganic, organic, physical, and radiochemistry. Prerequisite: Ch 320,336,363. Corequisite: Ch 440, 441,442,422, or equivalent. Must be taken in order.

Ch 467 Molecular Spectroscopy (G)
3 hours 2 ① 1 ③
Infrared, Raman, electronic, N.M.R. and E.S.R. spectroscopy; identification and analysis applications, determination of molecular structures and other molecular parameters. Prerequisite: Ch 442.

Ch 468 Chemical Kinetics (G)
3 hours 3 ①
Reaction rates, experimental methods, elementary processes, complex inorganic reactions, complex organic reactions, catalysis, general theories, and potential energy surfaces. Prerequisite: Ch 442.

Ch 469 Electrochemistry (G)
3 hours 3 ①
Theoretical electrochemistry of solutions. Electrolytic transport, thermodynamics of cells, electrode kinetics. Prerequisite: Ch 442. Not offered every year.

Ch 480,481
Survey of Physical Chemistry (G)
3 hours each 3 ①
An elementary introduction to modern concepts of molecular structure and the properties of molecules for advanced chemistry students not majoring in physical chemistry. Prerequisite: Ch 442. Must be taken in order.

Ch 482,483 Thermodynamics (G)
3 hours each 3 ①
Ch 482: Chemical thermodynamics. *Ch 483:* Statistical thermodynamics. Recommended to be taken in order. Prerequisite: Ch 442.

Graduate Courses
See also courses marked (*g*) and (**G**) above.

Ch 501 Research
Graded P/N.

Ch 503 Thesis

Ch 505 Reading and Conference

Ch 507 Seminar
Terms and hours to be arranged
Section A, analytical chemistry, *Section B*, inorganic/physical chemistry, and *Section D*, nuclear and radiation chemistry, are each 1 hour and all graded P/N.

Ch 511,512,513
Selected Topics in Inorganic Chemistry
3 hours each 3 ①
Nonsequence courses designed to acquaint the advanced graduate student with recent advances in fields such as spectroscopy and magnetism, chemistry of coordination compounds, kinetics and mechanisms of inorganic reactions, acid-base theory and reactions in nonaqueous solvents, and chemistry of the less familiar elements. Prerequisite: Ch 413 or consent of instructor. Need not be taken in order. Not offered every year.

Ch 515
Experimental Nuclear Chemistry
3 hours spring 1 ① 2 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. Prerequisite: Ch 416 or Ch 419 or Ch 528.

Ch 520 Spectrochemical Analysis
3 hours fall 3 ①
Theoretical concepts and methodology of spectrochemical measurements, components of spectrometers, atomic, molecular, mass and x-ray spectroscopy. Prerequisite: Ch 442; Ch 320 or equivalent.

Ch 521 Analytical Electrochemistry
3 hours winter 3 ①
Study of current, voltage, time relationships in electrochemical cells to elucidate the composition and nature of chemical systems and electrochemical reactions. Prerequisite: Ch 442; Ch 422 or equivalent.

Ch 522 Chromatography
3 hours spring 3 ①
Theory, instrumentation, and practice of all forms of chromatography and ancillary and related techniques; handling and interpretation of chromatographic data. Prerequisite: senior standing.

Ch 524 Chemical Instrumentation I
3 hours fall 1 ① 2 ③
Critical studies of the principles and performance of electronic instrument systems for chemical measurements. Prerequisite: Ch 422 or consent of instructor.

Ch 525 Chemical Instrumentation II
3 hours winter 1 ① 2 ③
Critical studies of the principles and performance of chemical measurement systems, with emphasis on data acquisition and storage. Prerequisite: Ch 524 or consent of instructor.

Ch 526 Advanced Instrumental Analysis
3 hours spring 1 ① 2 ③
Laboratory applications of modern instrumental analysis with emphasis on spectrochemical and electrochemical methods. Critical study of principles and performance. Prerequisite: Ch 520, 521, or consent of instructor.

Ch 527
Advanced Radiotracer Methodology
3 hours 1 ① 2 ③
Radiotracer experiments, synthesis and degradation of labeled compounds; advanced instruments for radioactivity measurement; tritium as a radiotracer; liquid scintillation mechanism; recent advancement. Prerequisite: three years of college chemistry. Not offered every year.

Ch 528 Activation Analysis
3 hours winter 2 ① 1 ③
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-, gamma-ray detectors, and use of multichannel analyzers. Prerequisite: Ch 419 or senior standing in chemistry or physics, or graduate standing in biological science or earth science.

Ch 530,531,532,533
Advanced Organic Chemistry
3 hours each 3 ①
Molecular orbital bonding theory, orbital symmetry, reaction mechanisms, stereoisomerism, conformational analysis, and advanced methods of synthesis. Prerequisite: Ch 336,442. Recommended to be taken in order.

Ch 536,537,538
Selected Topics in Organic Chemistry
3 hours each 3 ①
Nonsequence courses designed to acquaint student 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. (Consult department for specific information regarding a given term.) Topics include: theoretical organic chemistry, recent advances in reaction mechanisms, advanced synthesis, free radical reactions, organic sulfur chemistry. Prerequisite: Ch 532 or equivalent. Need not be taken in order. Not offered every year.

Ch 540,541,542
Advanced Physical Chemistry
3 hours each 3 ①
Ch 540: Quantum mechanics and electronic structure of atoms and simple molecules. *Ch 541:* Vibrational and rotational dynamics and spectroscopy. *Ch 542:* Classical and quantum statistical mechanics with ensemble theory. Should be taken in order. Prerequisite: Ch 450. Not offered every year.

Ch 543,544,545
Selected Topics in Physical Chemistry
2 hours each 2 ①
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, magnet resonance, photoelectron, Mössbauer effect), physical chemistry of condensed phases (ionic, molecular and liquid crystals, critical phenomena, mass transport), theoretical chemistry (chemical bonding, scattering theory, group theory, dynamics). Need not be taken in order. Not offered every year.

Ch 547,548,549 Solid State Chemistry
2 hours each 2 ①
Elementary crystallography; free-electron, band, and valence-bond theories; thermodynamics of perfect, imperfect, and impure crystals; equilibria involving lattice defects; dislocations, ionic diffusion and conduction; dependence of physical properties of crystals upon chemical constitution. Prerequisite: Ch 442 or graduate standing in physics or engineering. Must be taken in order. Not offered every year.

Ch 563,564,565
Selected Topics in Analytical Chemistry
2 hours each 2 ①
Nonsequence courses designed to acquaint the advanced graduate student with recent advances in analytical chemistry. Prerequisite: Ch 522 or 526. Need not be taken in order. Not offered every year.

Ch 566,567,568 Selected Topics in Nuclear and Radiation Chemistry
2 hours each 2 ①
Nuclear structure and nuclear models, nuclear reactions and nuclear fission, cosmochemistry, radiation and photochemistry. Prerequisite: Ch 416,540. Need not be taken in order. Not offered every year.

COMPUTER SCIENCE

Computer science is concerned with the representation, storage, manipulation, and presentation of information. The program of study at OSU emphasizes computer languages, theory of computation, numerical analysis, computer design, analysis of algorithms, software systems, information-based systems, artifical intelligence, and simulation.

The facilities and resources of the OSU Computer Center and the Department of Computer Science Student Computing Laboratory provide computational and basic research support for the study of computers and computer systems.

The B.A. and B.S. degree programs provide a broad background in computer science together with specialization in one branch of the field. Advanced degree programs help in preparation of teachers and researchers for universities, laboratories, and industries. See "Graduate School" for M.S., M.A., and Ph.D. degree requirements.

To supplement the major in computer science, a concentrated set of courses in a related area, such as mathematics, statistics, electrical and computer engineering, business administration, or oceanography, is strongly recommended.

Curriculum

The required courses listed below can be taken in any order and include: (a) 6 hours of communication skills; (b) 12 hours of arts and humanities; (c) 12 hours of social sciences. Electives should be 15 upper division hours.

Freshman Year	Hours
Computer Science (CS 211,212)	8
Mathematics (Mth 200,201,202)	12
Approved courses in biological sciences	9
English Composition (Wr 121)	3
Physical education (1 activity each term)	3
Humanities sequence	9
Electives	4
Sophomore Year	
Computer Science (CS 213,215)	8
Mathematics (Mth 241)	4
English Composition (Wr 222)	3
Approved courses in physical science	9
Social science sequence	9
Required courses and/or electives	15
Junior Year	
Computer Science (CS 317,318,319,324, 325,326)	21
Mathematics (Mth 358)	3
English Composition (Wr 327)	3
Required courses and/or electives	21
Senior Year	
Computer Science senior sequence	9
Upper division computer science electives	12
Electives	27

Requirements

Lower Division: a year of calculus, a term of linear algebra, several introductory computer science courses.

Upper Division: At least 45 hours of upper division (300-level or higher) computer science-related courses, including CS 317,318,319,324, 325,326; Mth 358; and a senior sequence in one of the following special areas.

Programming: CS 411,412,413 *or* 414,415,416 (required); CS 431,432; Mth 359; St 417 (optional)

Numerical Analysis: Mth 311,341,359,451,452, 453 (required); Mth 342 (optional)

Theory of Computation: CS 521,522,523 (required); CS 551,552,554,555 (optional); EE 570,522,523 (optional)

Computer Architecture: EE 371,373,473,474, 475 (required); CS 315; EE 570,571,572,575, 576 (optional)

A student must have a GPA of over 2.00 in the required senior sequence and in upper division computer science-related courses.

Students transferring from other departments must complete CS 211,212,215, Mth 200,201, 202 with a GPA of 3.00 or better. Students with a GPA of 2.50 to 3.00 on these courses will be admitted as majors on a space-available basis.

The biological science requirement may be reduced to 5 hours by petition for students taking B.S. or B.A. degrees in both computer science and a second department if they had a year of biology in high school.

Lower Division Courses

CS 101
The Nature of Digital Computers
4 hours 3 ① 1 ①
The historical development of digital computers, how computers work, an introduction to a conversational language, programs and flow charts, algorithms, social and technological implications of computers. Prerequisite: Mth 95 or placement in Mth 101 or higher. (Not for computer science majors). Normally offered only fall term.

CS 190 Self-Study Introductory FORTRAN Progamming
3 hours any term
A nine-lesson introduction to FORTRAN programming. No formal class meetings; consulting assistance and materials available in the Mathematical Sciences Learning Center. Graded P/N.

CS 211
Introduction to Computer Science
4 hours 3 ① 1 ①
Algorithms, flow charts, and basic programming concepts; model of a computer; programming in a conversational language; discussion of capabilities, limitations, and abuses of computers; computer applications.

CS 212
Techniques for Computer Programming
4 hours 3 ① 1 ①
Study of data and their representation in a computer system; control structures and their use in design and implementation of computational algorithms. Emphasis on program construction and style. Prerequisite: CS 211.

CS 213 Introduction to Symbolic Language Programming: FORTRAN
4 hours 3 ① 1 ①
Computer applications and FORTRAN. Prerequisite: CS 211 or previous programming instruction.

CS 215 Computer Organization
4 hours 3 ① 1 ①
Logical organization, computer hardware, introduction to machine language programming. Prerequisite: CS 212.

CS 217
Introduction to COBOL Programming
4 hours 4 ①
Applying the ANSI COBOL language to commercial problems usually characterized by the need to process large files of data. Thorough treatment of language elements, file structures, and I/O considerations. Prerequisite: CS 212.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

CS 312
Assembly Language Programming
4 hours 3 ① 1 ①
Assembly language programming for a typical computer. Prerequisite: CS 215.

CS 314 Programming Languages and Structured Programming
3 hours 3 ①
Programming languages including ALGOL, PASCAL, SNOBOL, and LISP, in the context of developing well-structured computer programs, with emphasis on the expression of algorithms and the definition of suitable data structures. Prerequisite: CS 317.

CS 315
System Software for Microprocessors
4 hours 3 ① 1 ②
Design and implementation of software for a typical microcomputer. Assembly language and high-level language used to program applications in control, data processing, and input/output. Prerequisite: CS 215,317.

CS 317,318,319
Data Structures and Programming
4 hours each 4 ①
CS 317: linear lists; arrays, stacks, queues, storage management. Prerequisite: CS 212. *CS 318:* strings, trees, lists; dense and linked representations; binary trees, traversal algorithms; recursion; programming techniques. Prerequisite: CS 317. *CS 319:* searching and sorting algorithms; symbol tables and hashing; files, access methods and organization. External sorting. Prerequisite: CS 318.

CS 324,325,326
Theoretical Computer Science
3 hours each 3 ①
CS 324: logic set theory, functions and relations, induction, graphs, and Boolean functions. Applications of these structures to computer science, including proof of correctness, representation of structures and graph algorithms. Prerequisite: Mth 241; CS 212. *CS 325:* recurrence relations, combinatorics, recursive algorithms, analysis of algorithms, finite automata. Examples including searching, sorting, and transitive closure. Prerequisite: CS 324. *CS 326:* models of computation including Turing machines; formal grammars. Unsolvability, reducibility, complete problems. Prerequisite: CS 325.

CS 371,372 Applications Programming
3 hours 3 ①
CS 371: analysis of design, development, testing, and documentation of a large program. Prerequisite: *for CS 371,* CS 317; *for CS 372,* CS 371, actual design, development, testing, and documentation of a large problem. Must be taken in order.

CS 401 Research

CS 405 Reading and Conference

CS 406 Projects

CS 407 Seminar
Terms and hours to be arranged

CS 410 Occupational Internship
1-12 hours to be arranged
Planned and supervised training experience at selected governmental, industrial, or business placement sites. Prerequisite: junior standing in computer science; 2.75 GPA overall, 3.00 in major; approval of faculty cooperative education coordinator. Graded P/N.

CS 411,412,413
Assemblers and Compilers (G)
3 hours each 3 ①
CS 411: supporting routines for assemblers and compilers including lexical processing, conversion of constants, table management, expression evaluation. Prerequisite: CS 312 and CS 319. *CS 412:* finish implementation of assembler. Internal representations of programs (quadruples, Polish postfix, trees). Implement pure interpreter or code generation. Prerequisite: CS 411. *CS 413:* implement parsers, using methods such as operator precedence, recursive descent. (LR (k)). Finish implementation of compiler or interpreter. Introduction to META compiler-writing language. Prerequisite: CS 412.

CS 414,415,416 Operating Systems and Systems Programming (G)
3 hours each 3 ①
CS 414: PDP-11 architecture, overview of UNIX, the C programming language, linking loaders, process management and memory management. Prerequisite: CS 319. *CS 415:* resource sharing in MULTICS, concurrent processing, deadlock prevention. Prerequisite: CS 414. *CS 416:* case studies of UNIX and other operating systems at the implementation level. Prerequisite: CS 415.

CS 420 Graph Theory with Applications to Computer Science (g)
3 hours 3 ①
Directed and undirected graphs; paths, circuits, trees, coloring, partitioning, vector spaces, and matrices of graphs. Computer representation, graph algorithms, applications. Prerequisite: CS 213, Mth 241, CS 324. Offered alternate years. Not offered 1982-83.

CS 430 Data Base Management (G)
3 hours 3 ①
Design of data base system; relational, hierarchical, and network approaches. Security and integrity of data bases. Prerequisite: CS 319.

CS 431,432 Data Systems Analysis (G)
3 hours each 3 ①
Role of systems analysis, data systems development and design, equipment selection and application, data systems implementation. Prerequisite: CS 215,217. Must be taken in order.

CS 441 Computer Graphics (G)
3 hours 3 ①
Display devices, graphics software, interactive graphics, three-dimensional graphics. Prerequisite: CS 319.

CS 481,482,483
Selected Topics in Computer Science
3 hours 3 ①
Topics of special and current interest not covered in other courses. Can be repeated for credit. Need not be taken in order.

Graduate Courses
See also courses marked (g) and (G) above.

CS 501 Research

CS 503 Thesis

CS 505 Reading and Conference

CS 506 Projects

CS 507 Seminar
Terms and hours to be arranged

CS 511,512,513 Software Systems
3 hours each 3 ①
CS 511: Programming systems and language. Topics include software specification, design, languages, style and reliability. Prerequisite: CS 413 or consent of instructor. *CS 512:* Virtual systems. Contemporary operating systems, including theoretical and practical analyses. Prerequisite: CS 415,511. *CS 513:* Systems organization. Integration of ideas from CS 511 and 512 and how they impact the logical design of computer systems. Prerequisite: CS 512.

CS 521,522,523 Theory of Computation
3 hours each term 3 ①
CS 521: general computability; models of computation, Turing machines, recursive functions, register machines, Post processes; noncomputable sets and functions; nondeterministic computation; universal machines; diagonal arguments. *CS 522:* finite state machines; limitations; constructions; regular sets; Kleene's theorem; algorithms for reduction and identification; experiments; Krohn-Rhodes decomposition. *CS 523:* Chomsky hierarchy of grammars and acceptors; normal forms for context-free grammars; closure and nonclosure results, ambiguity, and decision problems; iteration theorem. Must be taken in order. Consent of instructor required.

CS 531,532,533 Artificial Intelligence
3 hours each term 3 ①
CS 531: overview of artificial intelligence. Introduction to LISP as a programming language for symbolic processing. Introduction to the concepts of search algorithms; game playing and problem solving as tree search; Alpha-Beta tree pruning; first-order predicate calculus as a representation language; theorem proving as a problem-solving technique. Prerequisite: CS 319. *CS 532:* representation of knowledge. Introduction to the problems involved in recognition and story understanding. Frame systems and semantic nets as formalisms for these problems; concept of procedural attachment; Rule-based systems as an approach to real-world problems. Overview of natural language processing. Augumented transition networks as a parsing scheme; conceptual dependency as a representation for utterance. *CS 533:* selected advanced topics in artificial intelligence. Content varies from year to year. Sample topics include problem-solving strategies, knowledge engineering, computer vision, natural language processing, applications of artificial intelligence and specialized systems. Projects: requires development of a LISP-based system connected with topic under consideration. Must be taken in order.

CS 541,542,543
Information-based Systems
3 hours each term 3 ①
CS 541: design and implementation of database systems; review of relational, hierarchical, and network models; interface of a model for file structures; query processing; security in data base systems; introduction to data base machine architectures. Prerequisite: CS 319,430. *CS 542:* data modeling and semantics; introduction to the problems of consistency in data base systems; data-oriented data models: the entity relationship model, CSDL model. Problems of model compatibility; problems of interface to the user; simple natural language processing; augmented transition networks; LIFER grammar. Prerequisite: CS 541. *CS 543:* distributed information systems; design and construction of computer networks; topology selection, message processor design; routing algorithms and flow control; network protocols at link level; end-to-end and host-to-host protocols; distributed data base systems; file allocation, deadlock prevention; controlling the concurrency of distributed processing; query optimization in a distributed environment. Prerequisite: CS 542.

CS 551,552,553
Algorithmic Theory and Applications
3 hours each term 3 ①
CS 551: nonnumeric algorithms; comparison of algorithms; design techniques; algorithms for sorting, set operations, and graph problems; data structures; lower bounds. *CS 552:* numeric algorithms; matrix multiplication; fast transforms; integer and polynomial arithmetic; arithmetic complexity. *CS 553:* hard problems; provably hard problems; reducibilities; NP-complete problems; approximation algorithms; probabilistic algorithms. Consent of instructor required. Offered alternate years. Not offered 1982-83.

CS 554 Formal Languages
3 hours 3 ①
Advanced work in formal languages and grammars. Prerequisite: CS 523. Offered alternate years. Offered 1982-83.

CS 555 Cybernetics
3 hours 3 ①
Study of control and communication in the animal and the machine. Consent of instructor required. Offered alternate years. Offered 1982-83.

CS 581,582,583 Selected Topics
3 hours each 3 ①
Topics of special and current interest not otherwise covered. Can be repeated for credit. Graduate standing and consent of instructor required. Need not be taken in order.

Courses from other departments accepted for major credit:

EE 371,373
Switching and Coding Systems
4 hours each 4 ①

EE 473,474,475 Computer Engineering: Organization, Design, Applications (G)
4 hours each 4 ①

EE 570
Switching Systems and Automata I
4 hours 4 ①

EE 571,572
Switching and Automata II
3 hours each 3 ①

EE 575,576 Computer Systems
3 hours each 3 ①

EE 579
Selected Topics in Computer Systems
3 hours 3 ①
See Electrical and Computer Engineering in "School of Engineering" for descriptions.

Mth 358,359
Introduction to Numerical Calculus
3 hours each 3 ①

Mth 451,452,453 Numerical Calculus
(G) 3 hours each 3 ①

Mth 487,488,489
Numerical Methods for Scientists (g)
3 hours each 3 ①

Mth 551,552,553 Numerical Analysis and Approximation Theory
3 hours each 3 ①
See Mathematics for descriptions.

St 417
Introduction to Modeling and Simulation
(G) 3 hours

St 418
Introduction to Simulation Languages
(G) 3 hours

St 419 Advanced Topics in Modeling and Simulation (G)
3 hours
See Statistics for descriptions.

DENTISTRY AND DENTAL HYGIENE

DENTISTRY

The College of Science offers a three-year predental curriculum which satisfies the requirements for admission to the School of Dentistry at the Oregon Health Sciences University, as well as to most other dental schools. Students who hope to enroll in dental school after completion of this three-year curriculum (135 hours minimum) should be careful to include all the nonscience University and College of Science requirements in their program; they may then qualify for a bachelor's degree from OSU after one year of dental school. However, most students do not enroll in dental school until after the completion of four years of undergraduate instruction.

The baccalaureate degree program in predentistry leads to a general science degree. Many students may wish to declare another major such as biology, microbiology, or zoology, so that they will gain a background suitable for an alternative vocation should plans to enter dental school change. With this in mind, students should consult with an appropriate departmental adviser as soon as feasible, and select electives that will satisfy the requirements in the chosen major.

The chief adviser for predentistry is Donald MacDonald, professor of biochemistry and biophysics.

Curriculum

The required, nonscience course work must include 6 hours of communication skills, 12 hours of arts and humanities, and 12 hours of social sciences. A list of courses which can be used to satisfy these requirements is available from the College of Science.

Freshman Year	*Hours*
General Chemistry (Ch 204,205,206)	15
Calculus (Mth 200, 201 or 210)	8
Other mathematical science	4
English Composition (Wr 121)	3
Physical education (1 activity each term)	3
Aspects of Dentistry (Ho 250)	1
Required courses and/or electives	15

Sophomore Year	
Organic Chemistry (Ch 331,332,333,337)	10
Biology (Bi 211,212,213)	15
Required courses and/or electives	23

Junior Year	
Biochemistry (BB 350 or BB 450,451)	4–7
Comparative Vert Embryology (Z 421)	5
Genetics (Gen 311)	4
General Physics (Ph 201,202,203)	12
Required courses and/or electives	20–23

Senior Year

Students who spend their senior year at Oregon State should plan their program in consultation with their predental adviser or appropriate departmental adviser of another declared major. Those in the predental program should select courses so as to acquire some proficiency in a major field of interest within the sciences. The following is a list of suggested upper division science courses from which to select hours to complete the school requirement for 24 upper division hours in science: Histology (Z 461), Cell Biology (Bi 360), Physiology (Z 431,432 *or* Z 434,435), General Microbiology (Mb 302,303), Microbial Physiology (Mb 550), Eccology (Bi 370), Developmental Biology (Bi 425), Radiation Biology (GS 450, 453,454), Introduction to Statistics (St 311, 312), X-ray Science (GS 461,462,463), Introduction to Molecular Biology (BB 331,332, 333), Quantitative Chemistry (Ch 325).

DENTAL HYGIENE

Students normally attend OSU for two years prior to entering the School of Dentistry at the Oregon Health Sciences University for professional training. Upon completion of dental hygiene certification, a bachelor's degree is awarded by the School of Dentistry. The following curriculum includes prerequisites for admission to dental school and provides ample opportunity to satisfy the lower division requirement for a block of 36 hours divided between science, social science, and arts and letters (humanities). The curriculum is not a rigid framework and courses listed (with the exception of Psy 201,202) can be readily switched between freshman and sophomore years.

The chief adviser for predental hygiene students is R. W. Thies, associate professor of chemistry.

Curriculum

Freshman Year	Hours
English composition (Wr 121)	3
General Chemistry (Ch 104,105,106)	13
Informative Speaking (Sp 112)	3
General Sociology (Soc 204)	3
Physical education activity	3
Personal Health (H 160)	2
Courses in humanities*	6
Electives	15

Sophomore Year	
English composition	3
Biological science sequence (GS 101,102, 103 or Z 201,202,203)	9–12
General Psychology (Psy 201,202)	6
Human Development (Psy 311)	3
Human Nutrition (FN 225)	4
Courses in humanities	6
Electives	14–17

Junior and Senior Years (at dental school)	
Dental hygiene program	102

ENTOMOLOGY

Entomology courses help students gain an understanding of the life processes of insects, their role in the ecosystem, the diversity of insect life, means of population regulation, and recognition characters of the main groups. The Department of Entomology offers programs leading to undergraduate and graduate degrees.

* May include courses in English, speech, religious studies, philosophy, music and art, but *not* history.

The undergraduate major in entomology is intended for students who wish to emphasize the study and management of insects. Two options are offered: (1) general entomology and (2) pest management. Both curricula are designed to qualify students for graduate study in entomology, or for employment with state or federal government or industries dealing with insects and their management.

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 biology; students in pest management develop more advanced knowledge in entomology and agriculture-related fields.

In consultation with an academic adviser, each undergraduate entomology major prepares a course of study that consists of a minimum set of required background, interests, and career objectives.

The Department of Entomology is a component of the Agricultural Experiment Station, which has many research facilities available for students and staff —such as the entomology farm, compartmented greenhouses, an aquatic insect laboratory, and forest insect research laboratory. In addition to the OSU faculty, state and federal entomologists stationed in this vicinity may be consulted in their fields of specialization. The Systematic Entomology Laboratory has more than 2,500,000 specimens of insects and mites.

Excellent opportunities for graduate study and research are available leading to the M.A., M.S., and Ph.D. degrees. Training in applied entomology emphasizes traditional areas of strength at OSU and includes agricultural entomology, integrated pest management, aquatic entomology, forest entomology, insect physiology, insect toxicology, insect ecology, insect biosystematics, medical entomology, apiculture, and pollination biology.

Curricula

[1]Required Courses

Freshman and Sophomore Years	Hours
General Chemistry (Ch 104,105,106 or Ch 204,205,206)	15
Organic Chemistry (Ch 331,332,337)	8
Biochemistry (BB 350)	4
Mathematics (Mth 200,210 or Mth 161,162,163)	8–12
Biology (Bi 211,212,213)	15
Insect Biology (Ent 314)	4
English Composition (Wr 121)	3
[2]Approved courses in arts and humanities	12
[2]Approved courses in social science	12
[2]Approved courses in communication skills	6
Physical education (3 terms)	3
[3]Electives	6–10

GENERAL ENTOMOLOGY OPTION

Junior and Senior Years	Hours
Insect Physiology (Ent 416)	4
Systematic Entomology (Ent 452,453, 454)	12
Required upper division entomology alternative courses (choose 8 hours): Ent 433,440,442,443,461,486	8
Comparative Animal Behavior (Bi 350)	3
Cell Biology (Bi 360)	5
General Ecology (Bi 370)	3
Ecological Methods (Bi 371)	3
Developmental Biology (Bi 425)	5
Genetics (Gen 311)	4
Invertebrate Zoology (Z 451 or 452)	5
Plant Physiology (Bot 331)	5
Stat Meth for Resear (St 451)	4
Regres for Resear (St 452)	4
Physics (Ph 201,202)	8
[3]Electives	19

PEST MANAGEMENT OPTION

Junior and Senior Years	
Introduction to Insect Pest Management (Ent 311)	4
Insect Pest Management I, II, III (Ent 442,443,444)	12
Systematic Entomology (Ent 453,454)	8
Required upper division entomology alternative courses (choose 8 hours): Ent 416,423,430,440,461,486	8
Comparative Animal Behavior (Bi 350)	3
General Ecology (Bi 370)	3
Ecological Methods (Bi 371)	3
Genetics (Gen 311) or Plant Genetics (CrS 412)	3–4
Crop Production (CrS 201) or Horticulture Principles (Hort 201,202)	3–8
Plant Breeding (CrS 415)	4
Weed Control (CrS 418)	5
Plant Pathology (Bot 350)	4
Statistical Methods (St 451,452)	8
Agricultural Business Management (AREc 211)	5
Extension Methods (EM 411)	3
[3]Electives	10–16

For courses accepted for major credit in entomology in addition to those listed below, see Biology *and* Genetics. *Also refer to the note following the entomology courses.*

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Ent 311 Introduction to Insect Pest Management
4 hours fall 2 ① 2 ②
Recognition, biology, and management of injurious and beneficial insects; insects and human welfare. BERRY.

Ent 312 Apiculture
3 hours winter 3 ①
The biology and commercial management of the honey bee, *Apis mellifera* L.; relationship of honey bees to current agricultural production; and problems of pesticide usage, disease, and changing agricultural systems. Prerequisite: one year of college biology. BURGETT.

Ent 314 Insect Biology
4 hours spring 2 ① 2 ②
Study of insects with emphasis on biology, ecology, classification, morphology, physiology, and control. BROOKES.

[1] 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.

[2] University and college requirements in these areas may be satisfied during any of the four years.

[3] Electives must include enough upper division courses (300- or 400-level) to meet University graduation requirement of 60 upper division hours.

Ent 401 Research
Terms and hours to be arranged
Work on approved problems carried on in library, laboratory, or field.

Ent 403 Thesis

Ent 405 Reading and Conference

Ent 407 Seminar
Terms and hours to be arranged
Graded P/N.

Ent 416 Insect Physiology (G)
4 hours fall 3 ① 1 ③
Structure and function of the appendages and principal organ systems; nerve transmission, locomotion, digestion, excretion, respiration, and reproduction. Prerequisite: Ent 311 or 314; Bi 213. BROOKES.

Ent 421 Environmental Physiology of Insects (G)
3 hours winter 3 ①
Environmental factors affecting physiological responses of insects. Nutrition and host specificity; photoperiod, temperature, and humidity; chemical substances affecting behavior. Prerequisite: Ent 314; Bi 213 or consent of instructor. BROOKES.

Ent 423 Forest Entomology (G)
3 hours fall 2 ① 1 ③
Bark beetles, sawflies, Lepidoptera, and Homoptera injurious to forest trees. Prerequisite: one years of forestry or biological science. SCHOWALTER.

Ent 425 Forest Insect Dynamics (G)
3 hours winter 2 ① 1 ③
Insect-host interaction, especially pheromones, and host's susceptibility to resistance. Prerequisite: Ent 423 or equivalent. Offered alternate years. Not offered 1982-83. SCHOWALTER.

Ent 430 Arthropod Transmission of Plant Pathogens (G)
3 hours winter 2 ① 1 ③
Mechanisms of transmission, vector ecology, pathogen epidemiology of the major arthropod borne-plant pathogen associations. Prerequisite: Ent 311 or 314. Offered alternate years. Not offered 1982-83.

Ent 433 Aquatic Entomology (G)
4 hours spring 2 ① 2 ②
Biology, ecology, collection, and identification of aquatic insects. Prerequisite: upper division standing. ANDERSON.

Ent 435 Medical and Veterinary Entomology (G)
3 hours winter 3 ①
Arthropod pests of man and domestic animals, including biology of pests, disease transmission mechanisms, epidemiology of important arthropod-borne diseases, recognition of important pests, and prevention and control of pest-related problems. Prerequisite: Ent 311 or 314. ELDRIDGE.

Ent 440 Insect Toxicology (G)
3 hours 3 ①
Technical and legal aspects of insecticides and other pesticides, mode of action, biochemistry, and comparative metabolism of insecticides, pest resistance, and other environmental aspects of pesticides. Prerequisite: BB 350 or equivalent. TERRIERE.

Ent 442
Insect Pest Management I (G)
4 hours fall 3 ① 1 ③
Scope, ecological aspects, economics, and use of biological and microbial control in pest management. Prerequisite: Ent 311 or 314; Bi 370. MILLER.

Ent 443
Insect Pest Management II (G)
4 hours winter 3 ① 1 ③
Use of insecticides, behavior-modifying chemicals, legislation, host-plant resistance, cultural controls, and genetics in pest management. Prerequisite: Ent 442. ALINIAZEE.

Ent 444
Insect Pest Management III (G)
4 hours spring 2 ① 2 ③
Quantification in pest management including sampling, monitoring, and prediction; population dynamics (dispersion, dispersal, life histories), environmental effects, and systems approach. Prerequisite: Ent 443; Bi 370,371; St 452.

Ent 452,453,454
Systematic Entomology (G)
4 hours each 2 ① 2 ②
Taxonomy, nomenclature, literature, phylogeny, and distribution of insects. Prerequisite: Ent 311 or 314. Need not be taken in order. LATTIN.

Ent 461 General Acarology (G)
4 hours spring 2 ① 2 ②
Taxonomy of mites and ticks, collection and preservation. Consent of instructor required. Prerequisite: Ent 314. Offered alternate years. Not offered 1982-83. KRANTZ.

Ent 486 Biological Control (G)
3 hours winter 3 ①
Use of biotic agents in control and population regulation of insect pests and weeds; case-history examples of biocontrol. Prerequisite: Ent 311 or 314; Bi 370,371. MILLER.

Graduate Courses
See also courses marked (G) above.

Ent 501 Research

Ent 503 Thesis

Ent 505 Reading and Conference

Ent 507 Seminar
Terms and hours to be arranged
One-hour sections. Graded P/N.

Ent 516,517,518
Selected Topics in Entomology
1, 2, or 3 hours to be arranged
Economic, medical and veterinary, aquatic, forest, and systematic entomology; insect physiology and toxicology; biological control; pest management. Need not be taken in order.

Ent 520 Insect Ecology
5 hours winter 3 ① 2 ③
Influence of climate and weather; adaptive responses to unfavorable conditions; functional classification and adaptive syndromes associated with major trophic groups; population dynamics and structure; role of arthropods in both natural and managed terrestrial ecosystems. Laboratories emphasize analysis of arthropod populations using live organisms and computer simulaton. Prerequisite: Bi 370,371; St 451,452. Offered alternate years. Offered 1982-83. MCEVOY.

Ent 521 Evolutionary Insect Biology
3 hours winter 3 ①
Distributional patterns exhibited by insects, other animals, and plants from early geological time to present and significance in evolution; genetic and systematic views on formation of specific and infraspecific categories. Prerequisite: systematic entomology, zoology, or botany; Gen 311; Bi 370 or equivalent. Students who have not had genetics must have consent of instructor. Offered alternate years. Not offered 1982-83. STEPHEN.

Ent 582 Principles of Systematics
3 hours fall 3 ①
History, principles, trends in International Code as applied to zoological sciences; species; infraspecific and superspecific categories; type method. Prerequisite: systematic entomology, zoology, or botany; genetics. Students who have not had genetics must have consent of instructor. Offered alternate years. Offered 1982-83. STEPHEN.

GENERAL SCIENCE

The Department of General Science offers *undergraduate* curricula which allow considerable flexibility and emphasize the interdisciplinary approach to science. A basic core of introductory science sequences is taken during the first two years, followed by a selection of major options in *biological science, physical science, earth science* or *radiation health* during the last two years. Most of the science course work is selected from the offerings of other departments. A more detailed bulletin describing the undergraduate curricula is available from the department.

Although the curricula in general science are not intended to prepare students for graduate majors in science departments which offer complete undergraduate programs, they are appropriate as preparation for graduate work in interdisciplinary fields which do not offer undergraduate majors, such as oceanography, and for students interested in fields that involve two or more of the traditional physical and/or biological sciences, such as radiation biology. In addition, all majors are strongly urged to carry a *minor* concentration in another school (such as business, engineering, liberal arts) which will enhance their employment opportunities in a science-related area.

Graduate programs are of two types: (1) interdisciplinary programs in *biological or physical science* in which course work is selected mainly from the offerings of other departments but research projects are supervised by faculty in general science. These programs provide preparation for teaching at the college level or professional research in interdisciplinary areas such as environmental science. (2) specific professional areas in which the course work is taught by faculty in this department. These include *radiation biology* and *radiation health*, which are offered in conjunction with the Radiation Center. Brochures describing these programs may be secured from the departmental office.

Curriculum

The required courses listed below can be taken in any order and include: (a) 6 hours of communication skills; (b) 12 hours of humanities and/or arts; (c) 12 hours of social sciences.

Freshman Year	*Hours*
General chemistry	9–15
Approved mathematics	12
Gen Science Orientation (GS 107)	1
English Composition (Wr 121)	3
Physical education	3
Required courses and/or electives	14–20

Sophomore Year

General physics (Students in the biological science major option should take organic chemistry here and postpone general physics to the junior year.) 12–15
General biology (Students in the earth science major option should take general geology in the sophomore year and postpone general biology until the junior year.) 12–15
Required courses and/or electives 19–25

Junior Year

Approved upper division courses in major option 12
Senior Seminar (GS 407A) 1
Required courses and/or electives 35

Senior Year

Approved upper division courses in major option 12
History of science 9
Required courses and/or electives 27

For courses accepted for major credit in general science in addition to those listed below, see Biology *and* Genetics.

GENERAL SCIENCE COURSES

Lower Division Courses

[1]GS 101,102,103 General Biology
4 hours each 3 ① 1 ②
GS 101: Ecology and population biology. *GS 102:* Genetics evolution and behavior. *GS 103:* Cellular structure and function, physiology, reproduction, and development. For majors in fields other than the biological sciences. May be taken in any order.

GS 104,105,106 Physical Science
4 hours each 3 ① 1 ②
Concepts and principles integrated from physics, chemistry, and the earth sciences; emphasizes an understanding of the nature of science as a human endeavor; utilizes inquiry-type laboratory activities. For nonscience majors, but not appropriate for students with more than one term of previous college course work in chemistry, physics, or geology. May be taken in any order.

GS 107 General Science Orientation
1 hour fall 1 ①
Orientation to OSU's science curricula for freshmen and transfer students. Nature and scope of science; science as a profession. Graded P/N.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (G) may be taken for graduate credit.

GS 331 Bioecology
3 hours spring 2 ① 1 ③
Plants and animals in their life processes and their reaction upon the environment, human relations and bioeconomics. Many field trips required. Prerequisite: one year of biological science and junior standing.

GS 332 Biogeography
3 hours winter 3 ①
Plant and animal distribution, faunas and floras, biogeographic areas. Prerequisite: one year of biological science.

GS 401 Research

GS 403 Thesis

GS 405 Reading and Conference

GS 407 Seminar
Terms and hours to be arranged
One-hour sections graded P/N.

[1] Credit toward graduation is granted for only one of the following combinations: Z 201,202, 203; or Bi 211,212,213; or GS 101,102,103.

GS 433 Biophotography (g)
3 hours winter 2 ① 1 ③
Photographic techniques used in micro-, macro-, and telephotography of living organisms; covers cameras, lenses, meters, filters, films, exposure, and composition; laboratory involves both black and white and color developing and printing. Prerequisite: 2 years biological science; basic microscope skills.

GS 441 Radioecology (G)
3 hours winter 3 ①
Radionuclides in the environment: their measurement and identification, uptake and transfer through food chains. Effect of radiation on natural populations of plants and animals. Prerequisite: GS 450 or 451 or Ch 419 or equivalent.

GS 450 Biology and Radiation (g)
2 hours fall 2 ①
Biological phenomena directly associated with the major divisions of the electromagnetic radiation spectrum and responses derived from radiation interactions with living matter. Prerequisite: one year of biological science and one year of either physics or chemistry; senior standing.

GS 451
Introductory Radiation Biophysics
(G) 4 hours 3 ① 1 ③
Physics of radiation for biologists. Prerequisite: one year each of general physics, biology, and calculus. Offered on demand only.

GS 452 Biology of Aging (g)
3 hours 2 (1½)
Aging as a biological process; concepts and characteristics of the aging process; manifestations of aging at different levels of biological organization; approaches and techniques used to identify aging processes; attempts to modify life span; age as a variable in biological investigations; implications for behavior and social interaction. Prerequisite: senior or graduate standing; at least one year of biological science.

GS 453
Advanced Radiation Biology (G)
3 hours spring 3 ①
Cellular, morphological, and physiological aspects of biological injury from ionizing radiation with major emphasis on vertebrates. Acute and chronic effects considered; immune, blood-forming, gastro-intestinal, and metabolic systems stressed. Prerequisite: 2 years of biological science (especially zoology); GS 450 or 451 or 461.

GS 454 Advanced Radiation Biology Laboratory (G)
1 hour spring 1 ③
Experimental problems demonstrating principles underlying radiation biology phenomena. To be taken concurrently with GS 453.

GS 460 Radiation Health (G)
3 hours spring 3 ①
Practical aspects of health physics: radiation monitoring and protection, decontamination, radioactive waste disposal, and licensing regulations. Prerequisite: GS 450 or 451 or 461 or Ch 419 or equivalent.

GS 461 Machine Sources of X-rays
(G) 3 hours fall 2 ① 1 ③
X-ray machines and systems used in medical, industrial, and research applications. Prerequisite: one year each of college physics and college mathematics.

GS 462 X-ray Measurements (G)
3 hours winter 2 ① 1 ③
Instrumentation and procedures used in measurement of X-rays from medical, industrial, and research machines and systems. Prerequisite: GS 461.

GS 463 X-ray Applications (G)
3 hours spring 2 ① 1 ③
Use of X-rays in medicine, industry, and research. Prerequisite: GS 462. Offered on demand only.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

GS 501 Research

GS 503 Thesis

GS 505 Reading and Conference

GS 507 Seminar
Terms and hours to be arranged
All one-hour sections graded P/N.

GS 541T Bioecology
3 hours summer

GS 551,552,553
Selected Topics in Radiation Biology
3 hours each 3 ①
Advanced theoretical discussion in the special fields of radiation effects on the central nervous system and behavior, freshwater and terrestrial radioecology, electrophysiological instrumentation, late effects of radiation, radiation dosimetry, ultraviolet effects. Topics determined by demand and staff available. Prerequisite: GS 453 or equivalent. Need not be taken in order.

HISTORY OF SCIENCE COURSES

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (G) may be taken for graduate credit.

HstS 311,312 Science and Society
3 hours each 3 ①
Sociological history of science from 1600 to the present. Development of science in relation to other social institutions and the intellectual context of that development. Prerequisite: one year of college science. Need not be taken in order.

HstS 313 History of Technology
3 hours 3 ①
Development of technology from the industrial revolution to the 20th century; emphasis on interactions of technology with both science and society in the U.S. Prerequisite: one year of college science.

HstS 314 Technology and Change
3 hours 3 ①
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. Prerequisite: junior standing recommended.

HstS 411,412,413
History of Science (G)
3 hours each 3 ①
HstS 411: Scientific thought from ancient civilizations to the post-Roman era. *HstS 412:* Origins of modern science in the sixteenth and seventeenth centuries. *HstS 413:* Development of modern science in the eighteenth and nineteenth centuries. Prerequisite: senior standing; at least one science sequence. Need not be taken in order.

HstS 414,415 History of Biology (G)
3 hours each 3 ①
Key ideas concerning the living world. *HstS 414:* problems in pre-Darwinian biology and relationship of biology to the physical sciences. *HstS 415:* theory of evolution and the foundations of modern biology. Prerequisite: senior standing; one year of biological science. Need not be taken in order.

HstS 417 History of Medicine (g)
3 hours spring 3 ①
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. Prerequisite: upper division standing; at least one year of biological science.

HstS 421,422,423
Classics of Science (G)
2 hours each 2 ①
Each student examines in depth at least one influential scientific work and presents his or her findings for class discussion. Topics may be either analysis of written works or reconstruction of classic experiments. Prerequisite: senior standing; one year of laboratory science. Need not be taken in order.

Graduate Courses

See also courses marked (g) and (G) above.

HstS 501 Research

HstS 503 Thesis

HstS 505 Reading and Conference

HstS 507 Seminar
Terms and hours to be arranged
One-hour sections graded P/N.

HstS 521,522,523
Topics in the History of Science
3 hours each 3 ①
Advanced treatment of 19th century physical thought, 19th century biological thought, the Newtonian revolution. Topics determined by demand; not all topics given any one year. Prerequisite: HstS 423 or 411,412,413. Need not be taken in order.

Courses from other departments accepted for major credit:

NE 430 Nuclear Fuel Cycle (g)
3 hours 3 ①

NE 461
Radiation Protection Engineering (g)
3 hours 3 ①

NE 465
Nuclear Rules and Regulations (g)
3 hours 1 ② 1 ②

NE 521
Reactor Environmental Problems
3 hours winter 3 ①
See Nuclear Engineering in "School of Engineering" for descriptions.

Oc 331 Introduction to Oceanography
3 hours 3 ①

Oc 471 Physical Limnology (g)
3 hours 3 ①

Oc 490 Principles of Biological Oceanography (g)
3 hours 3 ①

Oc 491 Principles of Physical Oceanography (g)
3 hours 3 ①

Oc 492 Principles of Geological Oceanography (g)
3 hours 3 ①

Oc 493 Principles of Chemical Oceanography (g)
3 hours 3 ①
See "School of Oceanography" for descriptions.

Phl 470,471 Philosophy of Science (g)
3 hours each 3 ①
See Philosophy in "College of Liberal Arts" for description.

GENETICS

Administered by the College of Science, the University program in genetics provides an integrated course of study leading to the graduate degrees of M.S. and Ph.D. 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 chairman of the program.

Genetics may also be used as an area of emphasis in the degree programs of various College of Science 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 three core courses in genetics (Gen 421,441, 461) will prepare a student for graduate study.

To supplement the courses listed below, many departments offer courses in specialized or applied aspects of genetics.

Lower Division Course

Gen 111 Human Heredity and Society
3 hours winter 3 ①
Introduction to genetics for nonbiologists. Emphasis on application of genetic knowledge to human society, especially present and future political, ethical, and humanitarian problems. DAWSON.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Gen 311 Genetics
4 hours fall or spring 4 ①
Concepts involved in the structure, transmission, and action of genetic material and its behavior in populations. Prerequisite: one year of chemistry and one year of biology, botany, or zoology. ROBERTS, DAWSON.

Gen 401 Research

Gen 405 Reading and Conference
Terms and hours to be arranged

Gen 411 Genetics Laboratory (G)
2 hours winter 2 ③
Experiments demonstrating Mendelian principles, crossing-over, mutation and other attributes of genetic material. Prerequisite: Gen 311. ROBERTS.

Gen 421 Genetics of Cells (G)
4 hours spring 4 ①
Current concepts of molecular and cell genetics, with emphasis on the molecular structure of genetic material and its mode of replication, molecular models for recombination, control of gene expression, and molecular evolution. Prerequisite: Gen 311; BB 451. MILLS, PEARSON.

Gen 441 Genetics of Organisms (G)
4 hours winter 3 ① 1 ②; 1 hour to be arranged
Transmission genetics of eukaryotes; chromosome structure, behavior, and action; genetic control of organismal development; use of genetic techniques in the dissection of eukaryotic physiology and behavior. Prerequisite: Gen 311. Corequisite: BB 451. ROBERTS.

Gen 461 Genetics of Populations (G)
5 hours fall 4 ① 1 ③
Genetics of quantitative traits, nature and extent of genetic variation, and the effects of selection and other evolutionary forces on the genetic composition of populations. Prerequisite: Gen 311; Mth 201. DAWSON, HOHENBOKEN.

Graduate Courses

See also courses marked (g) and (G) above.

Gen 501 Research
Graded P/N.

Gen 503 Thesis

Gen 505 Reading and Conference

Gen 507 Seminar
Terms and hours to be arranged
Graded P/N.

Gen 573 Cytogenetics
4 hours winter 3 ① 1 ②
Effects of variations in chromosome structure and number. Prerequisite: Gen 441. Offered alternate years. Offered 1982-83. MOK.

Gen 591 Selected Topics in Genetics
3 hours any term 3 ①
Advanced treatment of topics of special interest in one or more areas of genetics. May be repeated for credit. Consent of instructor required. Not offered every year.

GEOGRAPHY

The Department of Geography is a joint department of the College of Science and the College of Liberal Arts. Courses designated *Geog* are in Liberal Arts and those designated *Ggs* are in Science. Degrees are issued through the College of Science which has major programs leading to the B.A., B.S., M.A., M.S., and Ph.D.

The undergraduate major is designed to provide a liberal education and preparation for either employment or graduate study. The core stresses the organizing concepts of geography, tools and methods of research, and substantive background in physical, resource, and economic geography. Through electives a student may develop particular interests in a variety of supportive fields. In addition, internships are available for interested seniors.

Graduate programs offer major emphasis in the topical fields of physical geography and resource geography. Minors are offered in economic geography.

Curriculum

Students must take 12 hours of approved courses in humanities and/or arts and 12 in social sciences (recommended for the freshman and sophomore years below). Electives taken in the junior and senior years may be included in the minimum of 60 upper division hours required for graduation.

Freshman Year	*Hours*
English Composition (Wr 121)	3
Approved courses in physical or biological sciences	9–12
Approved courses in humanities, arts, and social sciences	12
Approved course in mathematics	4
Economic Geography (Geog 207)	3
Introduction to Physical Geography (Ggs 227)	5
Physical education	3
Electives	6–9

Sophomore Year

Approved courses in communication skills	3
Approved courses in humanities, arts, and social sciences	12
Maps and Map Interpretation (Ggs 261)	3
Approved courses in biological or physical sciences	9–12
Cultural geography	6
Electives	12–15

Junior Year

Approved courses in communication skills	3
Physical Geography (Ggs 327,328,329)	12
Cartography (Ggs 360)	4
Techniques of Field Research (Ggs 462)	4
Statistics	6–8
Electives	17–19

Senior Year

Geographic Photointerpretation (Ggs 413)	3
Resource geography	12
Economic geography	9
Seminar: Applied Geography (Ggs 407)	1
Approved upper division cluster other than geography	9
Electives	15

Lower Division Courses

Ggs 199 Special Studies
Terms and hours to be arranged

Ggs 227
Introduction to Physical Geography
5 hours 4 ① 1 ②
An integrated study of the major subsystems of the natural environment, their nature, expression, and spatial distribution.

Ggs 261 Maps and Map Interpretation
3 hours 2 ① 1 ②
Evolution of maps; map sources; use and interpretation of topographic maps, thematic maps, and navigation charts; map evaluation.

Upper Division Courses
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Ggs 327,328,329 Physical Geography
4 hours each 3 ① 1 ②
Systematic analysis of the characteristics, classifications, distributions, and spatial relations of the earth's physical-biotic subsystems. *327:* landforms; *328:* climate; *329:* vegetation. Prerequisite for each course: Ggs 227. Also taught as G 327, Geomorphology. Geography majors take *Ggs* prefix. Need not be taken in order.

Ggs 360 Cartography
4 hours 1 ① 3 ②
Design, compilation, and drafting of maps; choosing suitable materials, layout, symbols, and lettering. Prerequisite: Mth 102; Ggs 261.

Ggs 401 Research

Ggs 403 Thesis

Ggs 405 Reading and Conference

Ggs 407 Seminar
Terms and hours to be arranged
Senior seminar section (1 hour) is graded P/N.

Ggs 410 Internship
Terms and hours to be arranged
Precareer professional experience off campus under joint faculty and agency supervision. Maximum of 15 hours credit. Prerequisite: senior geography major standing and consent of instructor. Graded P/N.

Ggs 413 Geographic Photointerpretation
(G) 3 hours 1 ① 2 ②
Identification, analysis, and interpretation of landscape elements from aerial photographs; use in geographic analysis and planning. Prerequisite: 18 hours of geography including one year of physical geography.

Ggs 414 Geographic Remotc Sensing
(G) 3 hours 1 ① 2 ②
Analysis of recent advances in remote sensing techniques, with emphasis on practical applications. Theory, production, manual interpretation, and digital analysis of multispectral, electro-optical, and non-imaging sensors. Prerequisite: Ggs 413.

Ggs 420 Geography of Resource Use
(G) 3 hours 3 ①
Functional concept of resources, institutions affecting resource use, role of resources; survey and inventory of supply and use of major resources. Prerequisite: 12 hours of upper division geography.

Ggs 421 Ecological Principles of Resource Use (G)
3 hours 3 ①
Natural resources in the context of ecological systems and principles for understanding of resource use, abuse, repair, and protection; survey of problems and solutions related to major natural resources. Prerequisite: 12 hours of upper division geography.

Ggs 424 Water Resource Geography
(G) 3 hours 3 ①
Geographic 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 economics. The spatial consequences of various water uses. Prerequisite: 12 hours of upper division geography.

Ggs 426 Geography of Land Use (G)
3 hours winter 3 ①
Development of a conceptual framework for land use study; analysis of land use trends, problems, and land supply in the U.S.; land use principles. Prerequisite: 12 hours of upper division geography.

Ggs 461 Map Design (G)
4 hours 2 ① 2 ②
Graphic elements of map design; problems in designing maps for lithographic, ozalid, and xerox reproduction. Prerequisite: Ggs 360 and 12 hours of upper division geography.

Ggs 462 Field Research Techniques
(G) 4 hours 1 ① 2 ③
Field data gathering techniques; data recording, organization and integration. Prerequisite: Ggs 360 and 12 hours of upper division geography.

Ggs 463 Applied Cartographic Design
(G) 3 hours 1 ① 2 ②
Principles and methods in designing single- and multi-color maps for reproduction. Practical experience in production techniques, scribing, color separation, color proofing, tint screening, registry, photographic aspects of map construction. Prerequisite: Ggs 360,461.

Ggs 464 Automated Geographic Data Handling (G) 3 hours 2 ① 1 ②
Principles and procedures involved in automated map production and geographic data handling systems. Prerequisite: senior or graduate standing in geography; CS 211; or equivalent experience.

Graduate Courses
See also courses marked (G) above.

Ggs 501 Research

Ggs 503 Thesis

Ggs 505 Reading and Conference

Ggs 507 Seminar

Ggs 508 Workshop
Terms and hours to be arranged

Ggs 515 The Science of Geography
3 hours 1 ③
Geography as a modern discipline and fundamental research science; conceptual structure, traditions, and trends. Prerequisite: graduate standing and 18 hours of upper division geography.

Ggs 520 Geography of Outdoor Recreation Resources
3 hours 3 ①
Problems in recreation geography, including development and use of outdoor resources, patterns of travel and tourism, and recreational impact on environments. Prerequisite: Ggs 420, 421.

Ggs 521 Biotic Resource Geography of the United States
3 hours 3 ①
Geographic analysis of forest and fishery resources with emphasis on research problems and frontiers. Prerequisite: Ggs 420,421.

Ggs 522 Agricultural Geography of the United States
3 hours 3 ①
Applications of principles and methods of ecological-resource geography to study of U.S. agriculture; disaggregate analysis of variables, aggregate analysis of spatial systems, research problems. Prerequisite: Ggs 420,421.

Ggs 523
Mineral and Energy Geography
3 hours 3 ①
Geographic analysis of mineral and energy resources, industries, and commodities; institutional processes and external relationships in mineral development. Prerequisite: Ggs 420,421.

Ggs 524 Water Resources Geography of the United States
3 hours 3 ①
Geographic analysis of water resources and water developments; institutional processes; multiple, conflicting, and complimentary uses; research problems. Prerequisite: Ggs 420,421.

Ggs 529 Topics in Resource Geography
3 hours 2 ① 1 ②
Fundamental problems with stress upon methods of analysis. Topics vary; number may be repeated with consent of major professor. Prerequisite: Ggs 462,561 and appropriate topical background.

Ggs 531 Climatology
3 hours 2 ① 1 ②
Climatology in geography; data sources, dynamics and thermodynamics of climatic systems, employment in typology with special reference to North America. Prerequisite: Ggs 328.

Ggs 532 Landforms Geography
3 hours 2 ① 1 ②
Contemporary trends; the growth of landforms geography, modern research and theories, sources of data, and analytical methods. Includes one-day field trips. Prerequisite: Ggs 327.

Ggs 533 Ecological Biogeography
3 hours 2 ① 1 ②
The ecosystem as an analytical and unifying concept in biogeography, classification and analysis of natural communities in biogeography. Prerequisite: Ggs 329.

Ggs 539 Topics in Physical Geography
3 hours 2 ① 1 ②
Fundamental problems with stress upon methods of analysis. Topics vary; number may be repeated with consent of major professor. Prerequisite: Ggs 462,561, and appropriate topical background.

Ggs 559 Land Use Topics

3 hours 2 ① 1 ②

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. Prerequisite: consent of instructor and major professor; graduate standing.

Ggs 561 Quantitative Research Techniques

3 hours 1 ① 2 ②

Quantitative applications in geography, with emphasis on analysis of variance, regression, correlation, and spatial simulation. Prerequisite: St 451, 452.

GEOLOGY

The Department of Geology offers undergraduate majors in geology for students interested in either a liberal arts degree or a professional major. The undergraduate curriculum permits students to take electives in other fields.

At the graduate level, majors include areal geology, economic geology, geochemistry, geophysics, igneous petrology, invertebrate paleontology, metamorphic petrology, micropaleontology, palynology, sedimentary petrology, stratigraphy, structural geology. A field course of at least 9 hours is prerequisite to candidacy for an advanced degree.

Curriculum

Freshman Year	*Hours*
Principles of Geology (G 211,212,213, or G 201,202,205 plus 203,204,206)	12
General Chemistry (Ch 104, 105, 106 or Ch 204,205,206)	13–15
Mathematics (Mth 95,101,102 by placement or Mth 110,200,201 by adviser consent)	12
English Composition (Wr 121)	3
Approved courses in humanities and arts or social sciences	6
Physical education	3
Electives	0–3

Sophomore Year	
Introductory Crystallography (G 312)	4
Mineralogy (G 313)	4
Lithology (G 314)	4
General Physics (Ph 201,202,203 or Ph 211,212,213)	12
Mathematics (Mth 200,201; Mth 202 recommended)	8–12
Approved courses in communication skills	3
Approved courses in humanities and arts or social sciences	9
Electives	0–4

Junior Year	
Descriptive Structural Geology (G 321)	5
Principles of Invertebrate Paleontology (G 343)	4
Approved upper division geology	4
Biological sciences	6–8
Approved courses in communication skills	3
Approved courses in humanities and social sciences	9
Electives (Mth 203,321 suggested)	14–17

Senior Year	
Stratigraphy and Sedimentation I (G 430)	4
Introductory Geochemistry (G 481)	3
Stress and Deformation (G 461)	4
Approved upper division geology	12
Electives	25

The following is the recommended curriculum for two-year transfer students. The first two years are taken at another institution and the last two at Oregon State. The numbers represent term hours.

Freshman Year

General chemistry—9-12; mathematics (algebra, trigonometry)—8; English composition—3; communication skills—6; humanities and social sciences—12; physical education—3; electives—4-7.

Sophomore Year

Biological science—9-12; mathematics (calculus)—8; physical and historical geology—12; humanities and social sciences—12; electives—4-7.

Junior Year

General Physics (Ph 201,202,203)—12; Introductory Crystallography (G 312)—4; Mineralogy (G 313)—4; Lithology (G 314)—4; Descriptive Structural Geology (G 321)—5; Principles of Invertebrate Paleontology (G 343)—4; approved upper division geology—4; electives—11.

Senior Year

Same as senior year above.

An approved field course of at least 9 term hours is required for graduate training.

Lower Division Courses

[1]G 200 Contemporary Geology

3 hours 3 ①

Selected current topics in earth sciences; topics vary. Continental drift, earthquakes, energy, mineral and water resources, volcanoes, geologic hazards, space geology, life of the past, G 203 recommended to be taken concurrently.

[1]G 201,202 Geology

3 hours each 3 ①

Introduction to geology for nonscience majors. Minerals and rocks; slope, stream, glacier, wind, and ground water processes; origin of land forms; geologic time; plate tectonics and continental drift; rock deformation and earthquakes; volcanoes; mineral and energy resources. Recommended to be taken in sequence. G 203, 204 recommended to be taken concurrently.

G 203,204 Geology Laboratory

1 hour each 1 ②

Laboratory study to accompany G 200,201,202. Field trips may be required (transportation fee charged). Previous or concurrent registration in appropriate lecture course recommended.

G 205 Historical Geology

3 hours 3 ①

Evolution of the planet Earth, its continents and ocean basins, with particular reference to North America. Ecology of evolving fossil flora and fauna with geologic time. For students who do not have a background in science or mathematics. G 206 recommended to be taken concurrently. OLES.

G 206 Historical Geology Laboratory

1 hour 1 ②

Laboratory study to accompany G 205. Field trips may be required (transportation fee charged). Previous or concurrent registration in G 205 recommended.

G 211,212,213 Principles of Geology

4 hours each 3 ① 1 ②

Introductory course in physical and historical geology for students with strong science background. Corequisite: first year of general chemistry; Mth 102. Recommended to be taken in sequence. Field trips may be required (transportation fee charged).

G 221 Basic Geology

3 hours spring 2 ① 1 ③

Physical geology including laboratory study of minerals, rocks, and topographic and geologic maps. Restricted to forest engineering and civil engineering majors. Field trips may be required (transportation fee charged). NIEM.

[1] Credit may not be obtained for both G 200 and G 201.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (G) may be taken for graduate credit.

G 300 Rocks and Stars: A Tour of the Universe

3 hours 3 ①

Popular cosmology and geology; from the "big bang" to Bach and beyond. Orgin and evolution of the universe; recent geological results from the solar system; earliest history of earth; origin and early evolution of life. DASCH.

G 312 Introductory Crystallography

4 hours fall 2 ① 2 ②

Principles of crystal geometry, morphology, structure, and X-ray diffraction with application to mineralogy. Corequisite: trigonometry; first-year general chemistry. TAYLOR.

G 313 Mineralogy

4 hours winter 2 ① 2 ②

Origins, characteristics, classification, and identification of minerals. Prerequisite: G 312. TAYLOR.

G 314 Lithology

4 hours spring 2 ① 2 ②

Petrogenesis, classification, and hand-specimen identification of igneous, sedimentary, and metamorphic rocks. Prerequisite: G 313. TAUBENECK.

G 321 Descriptive Structural Geology

5 hours 4 ① 1 ②

Descriptive geometry and interpretation of geologic structures in three dimensions through geologic maps, cross-sections, field data. Trigonometry and stereonet analysis. Folds, joints, faults, metamorphic fabrics, plutons, salt domes. Field trips required (transportation fee charged). Prerequisite: Mth 102; G 202,205 or G 212. YEATS, LAWRENCE.

G 323 Photogeology

4 hours spring 2 ① 2 ③

Identification of landforms controlled by stratigraphy, structure, and erosional processes; geologic mapping of structures and stratigraphic units by stereoscopic viewing of aerial photographs; emphasis on use of aerial photographs by the field geologist. Prerequisite: G 313,321; prerequisite or corequisite: G 314. OLES.

G 327 Geomorphology

4 hours 3 ① 1 ②

Processes that develop the major terrestrial landforms of the earth. Description, distribution, and Quaternary history of major landforms. Field trips may be required (transportation fee charged). Prerequisite: G 202,205 or G 212 or Ggs 227. Also taught as Ggs 327, Physical Geography (first term of three-term sequence). LAWRENCE, ROSENFELD.

G 343 Principles of Invertebrate Paleontology

4 hours winter 2 ① 2 ③

A conceptual approach: study of fossils as single specimens, as species, and as members of higher categories into which species are grouped; application of fossil study to problems of biology and geology. Prerequisite: G 213.

G 352 Geology of Oregon

3 hours 3 ①

Evolution of Oregon landforms, rocks, and structures through geologic time. Prerequisite: one term physical geology. TAYLOR.

G 400 Field Trips

Participation in field trips not a part of any course. Students may prepare guides for trips. Faculty sponsor and participant must be prearranged.

G 401 Research

Independent, original research projects guided by faculty conferences and resulting in a brief written report. Faculty sponsor must be prearranged.

G 403 Thesis
Independent, original study that culminates in a senior thesis. Faculty sponsor must be prearranged.

G 405 Reading and Conference
Independent reading in a specialized topic guided by and discussed in faculty conferences. Faculty sponsor must be prearranged.

G 407 Seminar
Terms and hours to be arranged
Section T, Talks, 1 hour, graded P/N.

G 412,413,414 Petrography (G)
4 hours each 2 ① 2 ③
Microscope used in identification of minerals and in rock classification. Prerequisite: G 312, 313,314. Must be taken in sequence. ENLOWS.

G 415 X-ray Mineralogy (G)
4 hours 3 ① 1 ③
Theory and technique of x-ray diffraction applied to identification, structure, and composition of minerals. Prerequisite: G 313. SENECHAL, TAYLOR.

G 416,417
Rock-Forming Minerals (G)
3 hours each 2 ① 1 ③
Identification, structure, phase petrology of silicate, carbonate, and other important mineral groups. Prerequisite: G 412,415,481. Offered alternate years. G 417 offered 1982-83. TAYLOR.

G 421 Economic Geology (G)
4 hours 3 ① 1 ②
Genesis of metallic mineral deposits including consideration of importance, distribution, utilization, exploration, and contemporary problems. Field trips may be required (transportation fee charged). Prerequisite: G 314. FIELD.

G 423 Regional Depo-tectonics (G)
3 hours 3 ①
Evolution of major sedimentary belts of the geosynclines, shelves, and cratonic areas. Timing and coordination of orogenic, epeirogenic, and eustatic events. Prerequisite: G 213. Offered alternate years. Not offered 1982-83. JOHNSON.

G 424 Biostratigraphy (G)
4 hours spring 2 ① 2 ③
Use of fossils in chronology and age determination. Faunal sequences and zonal hierarchies in light of evolutionary, paleoecologic, and paleobiogeographic principles. Prerequisite: G 343. JOHNSON.

G 430
Stratigraphy and Sedimentation I (G)
4 hours 3 ① 1 ③
Historical background; stratigraphic column; environmental, tectonic factors; correlation; field, laboratory procedures. Field trips may be required (transportation fee charged). Prerequisite: G 314,321,343. OLES.

G 431
Stratigraphy and Sedimentation II (G)
4 hours 3 ① 1 ③
Environments of deposition; interpretation of sedimentary structures in terms of environmental analysis; transport agents, paleoslopes, position in sequence. Field trips may be required (transportation fee charged). Prerequisite: G 430. OLES.

G 440 Hydrogeology (G)
3 hours spring 3 ①
Geological factors controlling occurrence and distribution of groundwater, methods of exploration and development. Prerequisite: G 202, 212,221. Offered alternate years. Offered 1982-83.

G 441 Engineering Geology (g)
4 hours 3 ① 1 ②
Geology applied to engineering problems such as foundation stability, dam locations, nuclear plant siting, earthquake hazard, landslides, and subsurface waste disposal. Field trips may be required (transportation fee charged). Prerequisite: Mth 201; G 202,212 or 221.

G 450 Forest Geomorphology (G)
3 hours spring 3 ①
Relationships among forest vegetation, forestry practices, and geomorphic processes affecting hillslopes and stream channels. Prerequisite: G 200 or 221. SWANSON.

G 461 Stress and Deformation (G)
4 hours 4 ①
Stress and strain, rheology of earth materials, theory of faulting and folding, experimental rock deformation, mechanics of diapirism and intrusion, isostasy, mechanics of plate tectonics. Prerequisite: G 321; Mth 201. LAWRENCE.

G 463 Geophysics (G)
4 hours fall 3 ① 1 ②
Principles of geophysics, including gravity, earthquakes, elasticity and seismic waves, the earth's interior, heat flow and convection, plate tectonics, geomagnetism, and paleomagnetism. Prerequisite: G 212; Mth 201; Ph 203. DEMAREST.

G 480,490 Field Geology
6 hours each
Small area studied intensively in eight-week summer camp. Must be taken concurrently. Prerequisite: G 314,321,323.

G 481 Introductory Geochemistry (G)
3 hours winter 3 ①
Principles of geochemistry applied to problems of earth history. Prerequisite: G 314; Ch 203; Mth 201. DASCH.

Graduate Courses
See also courses marked (g) and (G) above.

G 500 Field Trips
1-4 hours
Participation in field trips not part of another course. Students may prepare guides for trips. Faculty sponsor and participants must be arranged.

G 501 Research

G 503 Thesis

G 505 Reading and Conference

G 507 Seminar
Terms and hours to be arranged
Section T, Talks, 1 hour, graded P/N.

G 512,513,514 Petrology
3 hours each
Petrogenesis of igneous and metamorphic rocks. Prerequisite: G 414. Must be taken in sequence. Offered alternate years. Not offered 1982-83. TAUBENECK.

G 520,521,522 Economic Geology
3 hours each 2 ① 1 ③
Origin and occurrence of metallic and nonmetallic ore deposits including fossil fuels. Field trips required. Prerequisite: G 312,313,314,414. Must be taken in sequence. G 520,521 offered 1982-83. FIELD.

G 523,524,525 Sedimentary Petrology
4 hours each 2 ① 2 ③
Laboratory analysis of sedimentary rocks. Corequisite: G 412,413,414. Must be taken in sequence. Offered alternate years. Offered 1982-83. NIEM.

G 526,527 Sedimentation
3 hours each 3 ①
Interdependence between tectonism and sedimentation, depositional environment and composition, textures and structures of geosynclinal and nongeosynclinal sediments. Prerequisite: G 525. Must be taken in order. Offered alternate years. Not offered 1982-83. NIEM.

G 530 Epeirogeny and Eustacy
2 hours 1 ②
A brief review of older literature produced by prominent tectonicians (e.g., Stille, Bucher, Umbgrove), followed by examination of the initial effects of developing plate tectonic theory on concepts of epeirogeny-eustacy during the 1960s. Added emphasis on the relatively large literature of the 1970s. JOHNSON.

G 540 Paleoecology
3 hours winter 3 ①
Development of an ecologic framework from data available to the geologist-paleontologist. Prerequisite: one year of invertebrate paleontology or zoology or biologic oceanography. BOUCOT.

G 541 Paleobiogeography
3 hours fall 3 ①
Provincialism, cosmopolitanism, vicariance, and faunal barriers applied to a study of Phanerozoic biogeography. Prerequisite: one year of invertebrate paleontology or zoology or biologic oceanography. Offered alternate years. Not offered 1982-83. BOUCOT.

G 542 Evolution and the Fossil Record
3 hours spring 3 ①
Evaluation of evidence from morphology, taxonomy, community history, historical biogeography, and cladistics. Prerequisite: one year of invertebrate paleontology or zoology or biologic oceanography or biogeography. Offered alternate years. Offered 1982-83. BOUCOT.

G 552 Experimental Rock Deformation and Faulting
3 hours 2 ① 1 ③
Techniques and equipment of experimental rock deformation, mechanics of shear and tensile failure of earth materials; relation between experimental fractures and natural faults and joints; analytical theories of faulting. Prerequisite: G 461 and Mth 202, G 412 recommended. Offered alternate years. LAWRENCE.

G 554 Volcanology
4 hours spring 3 ① 1 ②
Volcanic activity, form and structure of volcanoes, petrogenesis of volcanic rocks. Prerequisite: G 414. TAYLOR.

G 560,561,562 Fundamental Problems
3 hours each 3 ①
Interior of the earth, basin deposition and case histories, igneous and metamorphic processes in continental evolution. Need not be taken in order. Offered alternate years. Offered 1982-83. TAUBENECK.

G 571
Tectonics of the Western Cordillera
3 hours 3 ①
Regional structural geology and tectonic evolution of western North America from Mexico to Alaska, 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 trips may be required (transportation fee charged). Prerequisite: G 321. Offered alternate years. Not offered 1982-83. YEATS, LAWRENCE.

G 572 Regional Tectonics
3 hours 3 ①
Regional structural geology and tectonic evolution of a selected region of the world such as South Asia, the North Atlantic margins, the Alps, and Mediterranean, Africa, or the western Pacific. Prerequisite: G 321. Offered alternate years. Not offered 1982-83. LAWRENCE, YEATS.

G 573 Neotectonics
3 hours spring 3 ①
Tectonics of the present day as based on surface geology, geodesy, seismicity, heat flow, and crustal structure, concentrating on plate boundaries within continents and on continental margins. Prerequisite: G 321; G 463 recommended. Offered alternate years. Not offered 1982-83. YEATS.

G 575
Metamorphic Structures and Tectonics
4 hours 3 ① 1 ②
Varieties of foliation and lineation, analysis of metamorphic fabrics at micro- to macro-scales, universal stage and oriented sample laboratory techniques, superimposed and polyphase deformations, relation of fabric to metamorphic facies and tectonicces. Prerequisite: G 321; prerequisite or corequisite: G 414. Offered alternate years. Offered 1982-83. LAWRENCE.

G 578 Interpretation of Geologic Maps
1 hour 1 ①
Development of ability to perceive geologic problems and develop working hypothesis by the scientific method, by use of geologic maps. YEATS.

G 580 Graduate Field Geology
Terms and hours to be arranged
Advanced field problems assigned to meet the requirements of the graduate student.

G 581 Geochemistry of the Weathered Crust, Hydrosphere, and Atmosphere
3 hours 3 ①
Major surficial chemical reservoirs; surficial chemical processes of weathering and diagenesis; chemistry of rain and river water; chemistry, origin, and evolution of seawater; chemistry, origin, and evolution of the atmosphere. Prerequisite: Ch 425; G 314. Offered 1982-83. DASCH.

G 582 Geochronology and Isotope Geochemistry
3 hours 3 ①
Origin and distribution of stable and radioactive nuclides; radioactive decay; measurement of cosmic and geologic time by radioactive decay; geologic applications of major geochronologic systems; theory of stable isotope fractionation; geologic applications of stable isotope measurements to problems of earth history. Prerequisite: Ch 425; G 314. Not offered 1982-83. DASCH.

G 583 Earth's Mantle and Igneous Metamorphic Processes
3 hours 3 ①
Nucleosynthesis; distribution of the elements; meteorites and the chondritic model for earth; homogeneous vs. heterogeneous accumulation of the earth; geochemistry of major igneous and metamorphic processes. Prerequisite: Ch 425; G 314. Not offered 1982-83. DASCH.

MATHEMATICAL SCIENCES

An undergraduate degree in mathematical sciences is offered jointly through the Departments of Computer Science, Mathematics, and Statistics. Administration is by the Mathematical Sciences Program Committee composed of members from each of the three participating departments. Members of this committee also serve as advisers to students. Advisers are contacted and information about the program is obtained through any one of the three department offices. The Departments of Computer Science and Mathematics each also separately offers undergraduate degrees. The Department of Statistics offers graduate degree programs only.

The major in mathematical sciences allows concentration in applied mathematics, computer science, mathematical statistics, applied statistics, and operations research. 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 core of courses. Areas of specialization are developed in the junior and senior years.

Curriculum

The required courses listed below include 6 hours of communication skills in addition to Wr 121; 12 hours of humanities and/or arts; 12 hours of social sciences; one year of approved biological science; and one year of approved physical science.

Freshman Year	Hours
Calculus (Mth 200,201,202)	12
English Composition (Wr 121)	3
Physical education (1 activity each term)	3
Intro to Computer Science (CS 211)	4
Techniques for Computer Programming (CS 212)	4
Required courses and/or electives	22
Sophomore Year	
Calculus of Several Variables (Mth 203)	4
Linear Equations and Matrices (Mth 241)	4
Intro to Symbolic Lang Prog (CS 213)	4
Computer Organization (CS 215)	4
Required courses and/or electives	32
Junior Year	
Advanced Calculus (Mth 311)	3
Linear Algebra (Mth 341)	3
Intro to Numerical Calculus (Mth 358)	3
Data Struct and Prog (CS 317,318,319)	12
Oper Resear Methods (St 471)	3
Intro to Math Statistics (St 421,422,423)	9
Electives	15
Senior Year	
Senior Sequence	9
Computer Simulation (St 417)	3
Operations Research Methods (St 471)	3
Mathematical sciences electives	6
Electives	30

Requirements

Lower Division: Mth 200,201,202,203,241; CS 211,212,213,215.

Upper Division: Mth 311,341,358; CS 317,318, 319; St 417,471,421,422,423.

Mathematical Sciences Electives—two additional courses chosen from among those listed under senior sequences or Mth 312,313,321,342,345, 359,361,362,411,412,413,481; CS 312,324,325, 326,420,430,431,432,441; St 417 or 418,419, 435,441,452,453,454,461.

Senior Sequence chosen from among: Applied Mathematics (Mth 417,418,419); Numerical Calculus (Mth 451,452,453); Probability (Mth 464,465,466); Systems Programming (CS 411, 412,413); Applied Statistics (St 456,457,458); Operations Research (St 474,475,476).

Suggested Areas of Concentration

Below are several examples of areas of concentration, with suggested electives and supporting courses listed first (a slash mark separates those recommended for the junior year from those for the senior year). The senior sequence for each area follows.

Actuarial Mathematics: Mth 359,362 / St 456, 457,458,476. Senior sequence — Mth 464,465, 466.

Mathematical Statistics: Mth 312,313,464,465, 466/Mth 411,412,413. Senior sequence—St 456, 457,458.

Applied Statistics: Mth 359 / St 435,441,454, 461. Senior sequence—St 456,457,458.

Operations Research: Mth 363,464,465,466 / Mth 468,469; St 417 or 418,419,474,475,476; CS 420. Senior sequence—St 477,478,479.

Programming: Mth 359; St 417 or 418,419; CS 312,324,325,326/CS 430,431,432; CS 411, 412,413; CS 414,415,416; CS 441. Senior sequence—CS 411,412,413 or 414,415,416.

Statistics and Computing: Mth 359,418; CS 324,325,326 / CS 430,431,432,441. Senior sequence—St 456,457,458.

Numerical Analysis: Mth 312,313,359 / Mth 417,418,419 or Mth 411,412,413. Senior sequence—Mth 451,452,453.

MATHEMATICS

The department offers programs leading to the B.S., M.A., M.S., and Ph.D. degrees in mathematics. Courses of study are offered in all the principal branches of pure and applied mathematics. A program is also offered in mathematics education leading to an M.A. or an M.S. degree with a teaching emphasis. Interdisciplinary programs with other departments are strongly encouraged. In particular, possibilities exist for joint programs with computer science, statistics, and numerous other departments within the College of Science and the Schools of Agriculture, Business, Engineering, Forestry, and Oceanography.

The department also offers special career programs leading to the B.S. and M.S. degrees, designed for men and women seeking careers in industry, business, or government. A distinctive feature of these programs is a mathematical internship, which provides University credit for on-the-job training and experience. Other features include a strong emphasis on mathematical modeling, real-world problem seminars, and effective course combinations which generally involve a minor outside of mathematics. An option in actuarial mathematics is also available at the undergraduate level. For further information, contact the departmental Career Programs Committee.

Pamphlets describing the undergraduate and graduate programs are available upon request. Special brochures describing the mathematical internship and a pamphlet on the M.S. career program are also available.

Curriculum

The required courses listed below can be taken in any order and include: (a) 6 hours of communication skills; (b) 12 hours of humanities and/or arts; (c) 12 hours of social sciences.

Freshman Year	Hours
Mathematics (Mth 200,201,202)	12
Approved courses in biological sciences	9
English Composition (Wr 121)	3
Physical education (1 activity each term)	3
Required courses and/or electives	21
Sophomore Year	
Mathematics (Mth 203,304,341,342)	13
Approved physical science courses	9
Required courses and/or electives	26

Junior Year

Upper division mathematics (including Mth 311,312,313)	18
Required courses and/or electives	30

Senior Year

Approved senior mathematics sequence	9
Upper division mathematics	3
Upper division electives	24
Free electives	12

Recommended as preparation for graduate study: Mth 411,412,413 / 434,435,436 / 440,447,448. Substitutions allowed for students in science and mathematics education and those receiving concurrent degrees. A GPA of 2.00 or higher required in both senior sequence and all upper division mathematics courses.

Lower Division Courses

Mth 95 Intermediate Algebra I
4 hours 4 ①
Review of elementary algebra. Exponents, simultaneous linear equations and inequalities, factoring quadratics, fractional expressions, and equations. This course presupposes some high school algebra. Prerequisite: appropriate placement score.

Mth 101 Intermediate Algebra II
4 hours 4 ①
Equations and inequalities, functions and their graphs, exponential and logarithm functions, complex numbers, polynomials, mathematical induction, binomial theorem. Prerequisite: Mth 95 or appropriate placement score.

Mth 102 Trigonometry
4 hours 4 ①
Trigonometric functions for general angles, solution of triangles, addition formulas, trigonometric equations, graphs. Prerequisite: placement or Mth 101.

Mth 110 Calculus Preparation
4 hours 4 ①
Review of algebra, trigonometry, elementary functions, and elementary analytic geometry. Strongly recommended for students with minor deficiencies in these areas. Prerequisite: placement by adviser.

Mth 121,122
Mathematics in Our Culture
4 hours fall and winter 4 ①
Introduction to mathematics for the nontechnical student: possibilities and limitations in its use; mathematical formulation of real problems; historical development of basic mathematical concepts; contemporary mathematics. Need not be taken in order.

Mth 161,162,163
Mathematics for the Biological, Management, and Social Sciences
4 hours each 4 ①
Topics from symbolic logic, probability, algebra, analytic geometry, and elementary calculus; applications in business, biology, and the social sciences. Prerequisite: for Mth 161, 162: Mth 95; for Mth 163: Mth 101. Need not be taken in order.

Mth 190 Freshman Honors
1 hour each term, 3 terms 1 ①
Consent of instructor required.

Mth 191,192,193
Mathematics for Elementary Teachers
3 hours each 2 ① 2 ①; 2 ① 2 ①; 3 ①
Arithmetic as a logical structure, informal geometry, and applications of elementary mathematics. Must be taken in order.

Mth 200,201,202 Calculus
4 hours each 4 ①
Differentiation and integration of functions of one variable, maxima and minima, applications to physics and other sciences, infinite series, improper integrals. Prerequisite: placement or Mth 110. Must be taken in order. Mth 210 is not adequate preparation for Mth 202.

Mth 203
Calculus of Several Variables I
4 hours 4 ①
Partial differentiation, multiple integration. First of a two-term sequence with Mth 304. Prerequisite: Mth 202.

Mth 210 Calculus
4 hours 4 ①
For students in the life sciences; examples and applications chosen from such areas. Differentiation of exponential and logarithmic functions and uses for these functions. Special integrals. Differential calculus of several variables. Students who want more than 8 hours of calculus should take the Mth 200-203 sequence. Mth 210 is not adequate preparation for Mth 202. Prerequisite: Mth 200.

Mth 241 Linear Equations and Matrices
4 hours 4 ①
Vectors in R^n, matrices, systems of linear equations, and determinants. Prerequisite: Mth 110 or Mth 200 placement.

Mth 290 Sophomore Honors
1 hour each term, 3 terms 1 ①
Consent of instructor required.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (G) may be taken for graduate credit.

Mth 304
Calculus of Several Variables II
3 hours 3 ①
Line and surface integrals, complex numbers and functions. Prerequisite: Mth 203.

Mth 311,312,313 Advanced Calculus
3 hours each 3 ①
Foundations of one variable calculus including uniform convergence, uniform continuity, and interchange of limits. An introduction to functions of two and three variables: differentiation, chain rule, inverse and implicit function theorems, and Riemann integration. Examples and applications. Prerequisite: for Mth 311: Mth 203: for Mth 312: Mth 311 and either Mth 241 or 341.

Mth 321 Applied Differential Equations
4 hours 4 ①
First order linear and nonlinear equations and second order linear equations. Introduction to Laplace transforms and higher order linear equations. Solution methods and applications to science and engineering. Prerequisite: Mth 203.

Mth 333
Fundamental Concepts of Topology
3 hours 3 ①
Open and closed sets, continuity, compactness, connectedness, winding number, fixed point theorems in the plane.

Mth 337,338 Geometry
3 hours each 3 ①
Euclidean geometry, Hilbert's axioms, non-Euclidean geometries. Prerequisite: Mth 202. Must be taken in order.

Mth 341,342 Linear Algebra
3 hours each 3 ①
Mth 341: Vector spaces, linear transformations and matrices, systems of linear equations. *Mth 342:* Determinants, characteristic roots and vectors, similarity, inner-product spaces and their transformations. Prerequisite: Mth 202 or 241. Must be taken in order.

Mth 345 Combinatorial Mathematics
3 hours 3 ①
Permutations and combinations, generating functions, linear recurrence relations, the principle of inclusion and exclusion, graph theory, trees, circuits, and cut sets. Prerequisite: Mth 202 or 241 or 341.

Mth 346 Theory of Numbers
3 hours 3 ①
Integers, Euclid's algorithm, diophantine equations, prime numbers, and congruences. Prerequisite: Mth 202 or 241 or 341.

Mth 358,359
Introduction to Numerical Analysis
3 hours each 3 ①
Solutions of equations in one unknown, curve fitting, interpolation, numerical differentiation and integration, list sorting, table look-up. Prerequisite: Mth 202; CS 212 or 213. Must be taken in order.

Mth 361 Introduction to Probability
3 hours 3 ①
Combinatorial problems, continuous distributions, expectation, laws of large numbers. Prerequisite: Mth 163 or 200.

Mth 362 Finite Differences
3 hours 3 ①
Difference techniques used in finite integration and series summation, solution of difference equations. Prerequisite: Mth 200.

Mth 363
Linear Programming and Games
3 hours 3 ①
Optimization subject to linear constraints, zero-sum two-person games, industrial and economic problems. Prerequisite or corequisite: Mth 241 or 341.

Mth 390 Junior Honors
1 hour any term, 3 terms 1 ①
Enrollment in College of Science Honors Program or consent of instructor required.

Mth 391 Problem Solving for Elementary Teachers 3 hours 3 ①
Emphasis on problem solving, especially in the spirit of George Polya; problems from such diverse areas as number theory, combinatorics, geometry, probability, and the real number system solved. Prerequisite: Mth 192; Mth 101 or equivalent.

Mth 392
Introduction to Modern Algebra
3 hours 3 ①
Topics in groups, rings, and fields. Intended primarily for prospective secondary teachers. Prerequisite: Mth 201.

Mth 401 Research

Mth 403 Thesis

Mth 405 Reading and Conference

Mth 407 Seminar
Terms and hours to be arranged

Mth 410 Occupational Internship
3-12 hours to be arranged
Planned and supervised training experience at selected government, industrial, or business placement sites. Prerequisite: junior standing in mathematics; cumulative 3.00 GPA in mathematics; adviser approval. Must be followed by a one-hour post-internship seminar. Consult departmental head adviser.

Mth 411 Metric Spaces in Analysis (G)
3 hours 3 ①
Topological concepts, norms and inner products, examples in R^n and function spaces, approximation of functions, contraction mappings and fixed points. Applications to differential and integral equation. Prerequisite: Mth 313,341.

Mth 412
Introduction to Lebesgue Integration (G)
3 hours 3 ①
Lebesgue measure and integration in one or several variables; dominated and monotone convergence theorems; Fatou's lemma; L^p spaces; Fubini's theorem. Applications such as Fourier analysis and probability. Prerequisite: Mth 411.

Mth 413 Multidimensional Analysis
(G) 3 hours 3 ①
Differentiation of mappings between Euclidean spaces; Jacobian matrices; inverse and implicit function theorems; curves and surfaces; extremal problems. Multiple integrals; change of variables theorem; surface area; integration on surfaces. Prerequisite: Mth 412.

Mth 417 Tensor Analysis (G)
3 hours 3 ①
Tensor algebra and calculus, differentiation and integration on surfaces, divergence and Stokes' theorems. Selected applications to topics such as continuum mechanics, electromagnetic theory, and relativity. Prerequisite: Mth 322 or Mth 313 and 341.

Mth 418 Complex Functions (G)
3 hours 3 ①
Analytic functions, differentiation and integration, Cauchy's theorem and integral formula, Taylor series, residues, conformal mapping. Applications to elasticity and fluid mechanics. Prerequisite: Mth 313 or 322.

Mth 419 Integral Transforms and Generalized Functions (G)
3 hours 3 ①
Fourier and Laplace transforms; introduction to generalized functions; applications to differential equations and physical problems. Prerequisite: Mth 418.

Mth 427 Integral Equations (G)
3 hours 3 ①
Volterra and Fredholm integral equations, integral equations of the first kind, Hilbert-Schmidt theory, numerical methods, applications. Prerequisite: Mth 313 or equivalent; linear algebra. Normally offered alternate years.

Mth 428
Ordinary Differential Equations (G)
3 hours 3 ①
Existence and uniqueness theory systems, boundary value problems, stability. Prerequisite: Mth 427. Normally offered alternate years.

Mth 429 Variational Problems (G)
3 hours 3 ①
Minimization of integrals, theory of the first and second variation, Euler-Lagrange equations, theory of fields, direct methods. Prerequisite: Mth 428. Normally offered alternate years.

Mth 434,435,436 Differential Geometry
(G) 3 hours each 3 ①
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. Prerequisite: Mth 313,341. Must be taken in order. Normally offered alternate years.

Mth 440 Topics in Number Theory
(G) 3 hours 3 ①
Selected topics in number theory. Prerequisite: Mth 346 or 392 or 447 or 492.

Mth 446
Topics in Linear Algebra (G)
3 hours 3 ①
Abstract vector spaces, rational and Jordan canonical forms, spectral theorems. Prerequisite: Mth 342.

Mth 447,448 Abstract Algebra (G)
3 hours each 3 ①
Groups, rings and ideals, polynomials and unique factorization rings, modules and vector spaces, fields. Prerequisite: Mth 342 or 392. Must be taken in order.

Mth 451,452,453 Numerical Analysis
(G) 3 hours each 3 ①
Mth 451: Matrix problems, theory and programming of numerical techniques. *Mth 452:* Ordinary differential equations: theory and programming of numerical techniques. *Mth 453:* Partial differential equations: theory and programming of numerical techniques. Prerequisite: CS 213; Mth 341,359. Must be taken in order.

Mth 464,465,466 Theory of Probability
(G) 3 hours each 3 ①
Random variables, central limit theorem; distributions of standard statistics; Markov chains, continuous and discontinuous stochastic processes. Prerequisite: Mth 313; Mth 241 or Mth 341. Must be taken in order.

Mth 468,469
Mathematical Programming (G)
3 hours each 3 ①
General concepts and algorithms of linear programming and distribution. Integer, quadratic, and dynamic programming. Kuhn-Tucker conditions. Prerequisite: Mth 363 or equivalent; Mth 203. Must be taken in order.

Mth 471,472,473
Principles of Continuum Mechanics (G)
3 hours each 3 ①
Axioms; concepts of strain, motion, stress; thermodynamics of continuous media; construction of constitutive equations for real materials. Applications to problems in fluid dynamics, elasticity, and plasticity. Prerequisite: Mth 313 or 322. Must be taken in order. Normally offered alternate years.

Mth 481,482,483
Mathematical Methods for Engineers and Physicists (g)
3 hours each 3 ①
Linear algebra and its application to the solution of linear systems of differential equations, power series methods, Fourier series and tie solution of partial differential equations, complex variables, numerical methods. Prerequisite: for Mth 481, Mth 321; for Mth 482, Mth 304, Mth 481; and for Mth 483, Mth 482.

Mth 487,488,489
Numerical Methods for Scientists (g)
3 hours each 3 ①
Finite differences; interpolation, numerical integration, linear systems, polynomials, differential equations. Primarily for advanced students in physical or engineering science. Prerequisite: Mth 321 or 6 hours of upper division mathematics. Must be taken in order.

Mth 491,492,493
Mathematics for Secondary Teachers
(g) 3 hours each 3 ①
Mth 491: foundations of arithmetic. *Mth 492:* foundations of algebra. *Mth 493:* geometry with transformations. Prerequisite: 3 hours of upper division mathematics. Mth 491 should be taken before Mth 492.

Mth 494
Foundations of Elementary Mathematics
(g) 3 hours 3 ①
Logical development of selected portions of arithmetic, algebra, and geometry. Prerequisite: 3 hours of upper division mathematics.

Mth 495
History of Elementary Mathematics (g)
3 hours 3 ①
Arithmetic, algebra, and geometry from ancient times into the modern era. Prerequisite: 3 hours of upper division mathematics.

Mth 496 History of the Calculus (G)
3 hours 3 ①
Areas, volumes, rates from early Greek mathematics to modern times. Prerequisite: 6 hours of upper division mathematics.

Graduate Courses
See also courses marked (g) and (G) above.

Mth 501 Research

Mth 503 Thesis

Mth 505 Reading and Conference

Mth 507 Seminar
Terms and hours to be arranged

Mth 510 Occupational Internship
3-12 hours to be arranged
Planned and supervised training experience at selected government, industrial, or business placement sites. Prerequisite: graduate standing in mathematics and adviser approval. Must be followed by a one-hour post-internship seminar.

Mth 511,512,513
Theory of Analytic Functions
3 hours each 3 ①
Interchange of limits, analytic functions of a complex variable, continuation, conformal mapping, integral functions. Prerequisite: Mth 413 or Mth 417,418,419. Must be taken in order.

Mth 514
Abstract Measure Theory and Integration
3 hours 3 ①
Measures and outer measures, measurable functions and integration, convergence theorems, Lp, spaces. Example and additional topics, e.g. absolute continuity and Radon-Nikodym's theorem or product measures and Fubini's theorem. Prerequisite: Mth 413.

Mth 515 Normed Linear Spaces and Linear Operators
3 hours winter 3 ①
Linear analysis: Banach and Hilbert spaces, dual spaces, continuous operators, compact operators; applications to analysis. Prerequisite: Mth 413.

Mth 516 Topics in Linear Analysis and Measure Theory
3 hours spring 3 ①
Function spaces and their duals: spaces of measures, operator representations. Further topics, such as spectral theory, ergodic theory and nonlinear operators. Prerequisite: Mth 514, 515.

Mth 524,525,526
Differential and Integral Equations of Mathematical Physics
3 hours each 3 ①
Partial differential equations of physics, including those of potential theory, wave propagation, and heat flow, treated by means of generalized functions, variational principles, L_2 methods, and integral equations. Prerequisite: 9 hours of senior-level analysis or consent of instructor. Must be taken in order.

Mth 527,528,529
Partial Differential Equations
3 hours each 3 ①
Advanced theory, including existence proofs. Prerequisite: Mth 513. Must be taken in order. Normally offered alternate years.

Mth 531 General Topology
3 hours 3 ①
Topological spaces and maps. Separation axioms, compactness, convergence, extension theorems, metrizability and compactification. Prerequisite: Mth 411.

Mth 532 Fundamental Groups
3 hours 3 ①
Definition and basic properties of the fundamental group functor, with applications to the theory of covering spaces. Prerequisite: Mth 447, 531.

Mth 533 Simplicial Homology
3 hours 3 ①
Simplicial complexes, chain complexes, and homology; Brouwer and Lefschetz, fixed-point theorems. Prerequisite: Mth 411.

Mth 534,535,536 Algebraic Topology
3 hours each 3 ①
Simplicial and singular homology, products, and cohomology; applications to fixed-point and separation theorems. Topics selected from homotopy, manifold and obstruction theory. Prerequisite: Mth 533. Must be taken in order. Normally offered alternate years.

Mth 537,538,539
Differential Geometry of Manifolds
3 hours each 3 ①
Differentiable manifolds, connections in linear bundles, Riemannian manifolds and submanifolds. Selected topics, such as variational theory of geodesics, harmonic forms, and characteristic classes. Prerequisite: Mth 342,411. Must be taken in order. Normally offered alternate years.

Mth 541,542,543 Modern Algebra
3 hours each 3 ①
Advanced theory of matrices, finite groups, rings, and fields. Galois theory of equations; associative linear algebras, nonassociative algebras, group representations. Prerequisite: Mth 448. Must be taken in order. Normally offered alternate years.

Mth 551,552,553 Numerical Analysis and Approximation Theory
3 hours each 3 ①
Theory and algorithms for approximations in normed spaces and applications to differential, integral and algebraic equations. Optimization, fixed points, eigenvalues. Prerequisite for Mth 551,552: Mth 413,453; for Mth 553: Mth 515, 552. Normally offered alternate years.

Mth 554,555,556
Mathematical Modeling
3 hours each 3 ①
Mathematical treatment of problems of current interest in the physical and biological sciences and technology. Prerequisite: Mth 419 or 429; FORTRAN or PASCAL.

Mth 565,566
Advanced Probability Theory
3 hours each 3 ①
A theoretical course, based on measure theory. Prerequisite: Mth 514. Must be taken in order.

Mth 571,572,573
Mechanics of Fluids and Solids
3 hours each 3 ①
One of the following topics treated each year: boundary layers, rotating fluids, magnetohydrodynamics, porous media, liquid crystals, nonlocal theory of fluids, fractures. Sequence may be repeated once for credit. Consent of instructor required. Must be taken in order. Normally offered alternate years.

Mth 581,582,583 Functional Analysis
3 hours each 3 ①
Topological vector spaces, generalized functions, operator theory. Prerequisite: Mth 516. Must be taken in order. Normally offered alternate years.

Mth 593
Topics in Mathematics Education
3 hours 3 ①
May be repeated for credit. Consent of instructor required.

Mth 594
Selected Topics in Applied Mathematics
3 hours 3 ①
May be repeated for credit. Consent of instructor required.

Mth 595 Selected Topics in Algebra and Number Theory
3 hours 3 ①
May be repeated for credit. Consent of instructor required.

Mth 596 Selected Topics in Geometry
3 hours 3 ①
May be repeated for credit. Consent of instructor required.

MEDICINE AND MEDICAL TECHNOLOGY

MEDICINE

The College of Science offers a premedical curriculum preparing for entrance into standard medical schools.

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. Most students apply during the summer preceding their senior year for admission to medical school after graduation; however, a very few outstanding students are admitted after their junior year and use some medical courses to complete the science requirements for their B.S. degree from OSU.

A member of the premedical committee is assigned to each student as an adviser. The chief adviser for premedicine is Henry Van Dyke, professor of biology.

Premedical Program

The curriculum prescribed below satisfies the entrance requirements for most medical schools in the United States and elsewhere, and, in particular, satisfies those of the School of Medicine, Oregon Health Sciences University.

Students interested in podiatric medicine should consult the podiatry section on page 108.

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.
The required courses listed below can be taken in any order and must include: (a) 6 hours of communication skills in addition to Wr 121; (b) 12 hours of arts and humanities; (c) 12 hours of social sciences. The two terms of psychology required by the premedical curriculum will be counted toward the 12 hours of social sciences.

Freshman Year	*Hours*
English Composition (Wr 121)	3
General Chemistry (Ch 204,205,206)	15
Mathematics (Mth 200,210)	8
Physical education (1 activity each term)	3
Required courses and/or electives	19
Sophomore Year	
Organic Chemistry (Ch 331,332,333,337)	10
General Physics (Ph 201,202,203)	12
Biology (Bi 211,212,213)	15
General Psychology (Psy 201,202)	6
Selected required courses and/or electives	6
Junior Year	
Biochemistry (BB 450,451)	7
Quantitative Chemistry (Ch 325)	4
Comparative Vertebrate Embryology (Z 421)	5
Genetics (Gen 311)	4
Required courses and/or electives	28

Senior Year
Students should plan their senior year in consultation with a premedical adviser. Graduation in premedicine requires a total of 41 hours in courses numbered 300 or above offered in the College of Science.

Choice of Major
Most premedical students major in premedicine and are awarded a degree in general science. However, the above course work may be combined with the requirements of many other majors, such as biochemistry, biology, chemistry, engineering, mathematics, microbiology, music, pharmacy, physics, and zoology.

MEDICAL TECHNOLOGY

The medical technology program at OSU is mainly a three-plus-one program. That is, a student spends three academic years on campus followed by a twelve-month internship at either a hospital or medical school unit accredited by the American Society of Clinical Pathologists. Upon the satisfactory completion of the internship, OSU awards the student a baccalaureate degree in medical technology.

Other students may elect the four-plus-one program. Here, a baccalaureate degree, in a discipline such as microbiology, is earned prior to or after completing the internship. In this case, a student spends the senior year in the appropriate department, where all requirements have to be met. Students working toward a general science degree are not required to transfer to the Department of General Science. Next, the student enters a twelve-month internship and when finished can earn a baccalaureate degree in medical technology.

The chief adviser for medical technology is Fred Hisaw, associate professor of zoology.

Medical technology majors interested in obtaining a biology or microbiology degree before entering the internship program should see the Biology and Microbiology sections.

Curriculum

The required courses listed below can be taken in any order and include: (a) 6 hours of communication skills; (b) 12 hours of humanities and/or arts; (b) 12 hours of social sciences.

Freshman Year	*Hours*
General Chemistry (Ch 204,205,206)	15
English Composition (Wr 121)	3
General Zoology (Z 201,202,203)	9
Mathematics (Mth 102 or Mth 200)	4
Physical education (1 activity each term)	3
Required courses and/or electives	14
Sophomore Year	
General Microbiology (Mb 302,303)	5
Organic Chemistry (Ch 331,332,337)	8
Biochemistry (BB 350)	4
General Physics (Ph 201,202,203)	12
Required courses and/or electives	19
Junior Year	
Quantitative Analysis (Ch 234)	4
Pathogenic Microbiology (Mb 429,431)	5
Physiology (Z 431,432)	8
Immunology and Serology (Mb 432,433)	5
Required courses and/or electives	26
Senior Year	
(Medical School)	
Medical technology	50

Ch 340, Elementary Physical Chemistry; CS 101, The Nature of Digital Computers; and BA 101, Introduction to Business, are recommended electives.

METEOROLOGY

See Atmospheric Sciences in "College of Science."

MICROBIOLOGY

Microbiology deals with the forms and activities of bacteria, yeasts, molds, and viruses. Undergraduate students may elect a major in this field, either for a liberal arts degree or as preparation for professional service in microbiology and allied fields. The first two years of the microbiology curriculum provide a thorough background in chemistry, biology, and liberal arts. During the third and fourth years students may specialize in some area of microbiology.

Many specialized fields of microbiology are available to the student and research worker. These include fundamental aspects such as the physiology, systematics, structure, or genetics of microorganisms; the applications of microbiology concerned with soil fertility, marine environments, food and dairy production and processing, industrial fermentation and biotransformation processes, sanitation, immunology, and human, animal, and plant diseases. Undergraduate studies in these areas will prepare students for admission to graduate programs in microbiology and for positions as health officers, sanitarians, and biotechnicians for private industry and government.

The Department of Microbiology also 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 microbial physiology and genetics; industrial, food dairy, soil, freshwater, and marine microbiology; immunology; and pathogenic microbiology, including bacteria and viruses.

Curriculum

Freshman Year	*Hours*
Microbiology Orientation (Mb 107)	1
General Chemistry (Ch 204,205,206)	15
Mathematics (Mth 200,201 or 210)	8
Approved mathematical sciences	4
Approved humanities and/or arts	9
English Composition (Wr 121)	3
Physical education	3
Electives	5

Sophomore Year	
Organic Chemistry (Ch 331,332,333,337) (BB 350 substitutes for Ch 333)	10
Biology (Bi 211,212)	10
Quantitative Analysis (Ch 234)	4
General Microbiology (Mb 302,303)	5
Approved courses in communication skills	3
Approved social sciences	9
Electives	9

Junior Year	
Advanced General Microbiology (Mb 306, 307)	5
Systematics Microbiology (Mb 420)	3
Pathogenic Microbiology (Mb 429,431)	5
General Physics (Ph 201,202,203)	12
Elementary or General Biochemistry (BB 350 or BB 450,451)	4–7
Approved courses in communication skills	3
Approved humanities and/or arts	3
Approved upper division microbiology	4
Electives, upper division	6
Approved courses in social science	3

Senior Year	
Approved upper division microbiology	11
Seminar (Mb 407)	2
Electives, upper division (mathematics, foreign language, chemistry, and biology for those planning for advanced studies in microbiology)	35

Lower Division Courses

Mb 107 Microbiology Orientation
1 hour fall — 1 ①

Lecture-discussion course to acquaint undergraduate students in microbiology with various fields and with staff members working in different areas of microbiology. Graded P/N.

Mb 130 Introductory Microbiology
3 hours any term — 2 ① 1 ②

Microbiology applied to everyday living. Relationships of microorganisms to sanitation, foods, water, soil, industry, and medicine. Science elective for students in agriculture, home economics, engineering, and liberal arts.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

With the approval of the department's head adviser, a maximum of six upper division hours in biology (Bi) and/or biochemistry and biophysics (BB) and/or Phr 505 is allowed for microbiology credit.

Mb 302 General Microbiology
3 hours any term — 3 ①

Emphasis on growth, cytology, physiology, genetics, and the role of microorganisms in nature. Prerequisite: one year of chemistry.

Mb 303 General Microbiology Laboratory
2 hours any term — 2 ①

Laboratory methods in microbiology. Prerequisite or corequisite: Bi 213 or Mb 302.

Mb 304 Applied Microbiology
3 hours winter — 2 (1½)

Application of microbiology to foods, water, soil, industry, and medicine. Prerequisite: Mb 303.

Mb 306 Advanced General Microbiology
3 hours — 2 (1½)

Structure, function, metabolism, and physiology of procaryotes. Prerequisite: Mb 303; BB 350 or 451 or equivalent.

Mb 307 Advanced General Microbiology Laboratory
2 hours — 2 ③

Laboratory on structure and physiology of procaryotes. Prerequisite or corequisite: Mb 306.

Mb 401 Research

Mb 403 Thesis

Mb 405 Reading and Conference
Terms and hours to be arranged

Mb 407 Seminar
1 hour fall and spring

One-hour sections graded P/N.

Mb 410 Public Health Laboratory Methods Internship
10 hours summer

Covers enteric bacteriology, tubercular sputum cultures, syphilis serology, fluorescent antibody methods, food poisoning and food infection analysis, water analysis, virology, mycology, and phenylketonuria. Given at the Oregon State Public Health Laboratory in Portland, full time, 5 days a week for the 8-week summer term. Prerequisite: Mb 302,303,429,431. Limited to two students selected by a screening committee. Applications and information available from the department.

Mb 420 Systematic Microbiology (G)
3 hours winter — 3 ①

Nomenclature and classification, methods in conventional and molecular taxonomy, biology of groups of bacteria. Prerequisite: Mb 303.

Mb 421 Systematic Microbiology Laboratory (G)
2 hours winter — 2 ②

Methods in taxonomy and enrichment cultures. Prerequisite or corequisite: Mb 420.

Mb 429 Pathogenic Microbiology (G)
3 hours fall — 3 ①

Bacteria pathogenic for humans, emphasizing morphological, physiological and disease-producing properties; methods of isolation and identification. Prerequisite: Mb 303; two years of chemistry. Must be taken in order.

Mb 430 Pathogenic Microbiology (G)
3 hours winter — 2 (1½)

Continuation of material covered in Mb 429 emphasizing other microorganisms pathogenic for humans and the principles of diagnostic microbiology. Prerequisite: Mb 429. Must be taken in order.

Mb 431 Pathogenic Microbiology Laboratory
(G) 2 hours fall — 2 ③

Prerequisite: Mb 429 or concurrent enrollment.

Mb 432 Immunology (G)
3 hours winter — 2 (1½)

Theory and applications of immunity in infectious diseases and of serological reactions in diagnosis of disease. Prerequisite: Mb 429; BB 350 or 450.

Mb 433 Immunology Laboratory
(G) 2 hours winter — 2 ③

Laboratory exercises to accompany Mb 432. Prerequisite: Mb 431.

Mb 434 Virology (G)
3 hours spring — 2 (1½)

Properties of viruses, serological reactions, cultivation. Emphasis on animal viruses, including the major groups and their relation to disease. Prerequisite: Mb 429,432; BB 350 or 450,451.

Mb 435 Virology Laboratory (G)
2 hours spring — 2 ③

Laboratory experiments to accompany Mb 434. Not offered every year.

Mb 440 Food Microbiology (G)
3 hours winter — 2 (1½)

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. Prerequisite: Mb 303 or equivalent.

Mb 441 Food Microbiology Laboratory
(G) 2 hours winter — 2 (2½)

Laboratory techniques to accompany Mb 440. Prerequisite or corequisite: Mb 440.

Mb 442 Dairy Microbiology (G)
2 hours spring — 2 ①

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. Prerequisite: Mb 302.

Mb 443 Dairy Microbiology Laboratory (G)
2 hours spring — 2 ②

Laboratory techniques to accompany Mb 442. Prerequisite or corequisite: Mb 442.

Mb 446 Industrial Microbiology (G)
2 hours fall — 2 ①

Microbial culture technique for the production of cells, enzymes, metabolites, cultured dairy products, alcoholic beverages, solvents, fermented foods, organic acids, waste utilization and pollution control. Prerequisite: Mb 303 and one year of organic chemistry.

Mb 447 Industrial Microbiology Laboratory (G)
2 hours fall — 2 ②

Laboratory techniques to accompany Mb 446. Prerequisite or corequisite: Mb 446.

Mb 448 Microbial Ecology (G)
3 hours fall 3 ①
Soil and freshwater as a microbial ecological system including relationship to nutrient cycle, effects on microbial activity on plant and animal life. Prerequisite: Mb 302.

Mb 449
Microbial Ecology Laboratory (G)
2 hours fall 2 ③
Laboratory studies to accompany Mb 448. Prerequisite or corequisite: Mb 448.

Mb 450 Marine Microbiology (G)
3 hours fall 3 ①
Ecology, function, and importance of microorganisms in the marine environment; microbiology of sedimentary processes, low temperature, hydrostatic pressure, and salinity effects on marine microorganisms. Prerequisite: Mb 303 or equivalent or Oc 551.

Mb 454 Microbial Genetics (G)
3 hours spring 3 ①
Principles of microbial genetics and their application to modern microbiological problems. Prerequisite: Gen 311 or consent of instructor; BB 350 or BB 450, 451 or equivalent.

Mb 458 Bacterial Viruses (G)
3 hours winter 3 ①
Basic virology with emphasis on bacteriophage. Structure, replication, host-cell interactions, and genetics of bacteriophages. Prerequisite: Mb 303 or equivalent and Mb 306; BB 451 or equivalent.

Mb 490 Spore-Forming Bacteria (G)
3 hours spring 3 ①
Physiology of sporulation and germination in bacteria, emphasizing the metabolic control of cellular differentiation, structure of spores, and mechanisms of heat resistance. Prerequisite: BB 350 or 451; Mb 303. Not offered every year.

Mb 492 Diseases of Fish (G)
3 hours spring 3 ①
Diagnosis, prevention, and treatment of the economically important disease agents of fish, emphasizing microbiology, parasitology, pathology, immunology, and serology. Prerequisite: two years of biology.

Mb 493
Diseases of Fish Laboratory (G)
2 hours spring 2 ③
Prerequisite or corequisite: Mb 492.

Graduate Courses
See also courses marked (G) above.

Mb 501 Research

Mb 503 Thesis

Mb 505 Reading and Conference

Mb 507 Seminar
Terms and hours to be arranged
One-hour section graded P/N.

Mb 510 Food Surveillance Methods Internship
6 hours any term 2 ⑧
Law enforcement related to microbial methods, sanitary inspection, and sampling of foods and food operations. USDA animal surveillance, standard methods for microbiological examination of dairy and food products. Given at Oregon State Department of Agriculture, Salem, two full days per week. Prerequisite: Mb 302, 303; Mb 440,441 and/or Mb 442,443. Limited to no more than two students selected by a screening committee. Applications and information available from the department.

Mb 550 Microbial Physiology
3 hours fall 3 ①
Regulation of cell metabolism; coding, structures, and functions. Prerequisite: BB 452 or equivalent; Mb 307 or equivalent. Need not be taken in order.

Mb 552 Microbial Physiology
3 hours winter 3 ①
Control and mechanism of macromolecular synthesis in microorganisms. Prerequisite: BB 452 or equivalent; Mb 307 or equivalent. Need not he taken in order.

Mb 554 Microbial Genetics Laboratory
4 hours spring 2 ④
Genetic principles and laboratory instruction in microbial genetics; experimental procedures and modern techniques. Prerequisite: BB 451; Mb 454 or concurrent enrollment.

Mb 562
Selected Topics in Microbiology
3 hours summer 3 ①
Nonsequence course designed to acquaint the student with recent advances. Topics vary and may include radiation microbiology, aerobic and anaerobic spore formers, photosynthetic and autotrophic bacteria, relation of structure to function in bacteria, microbial nutrition. Prerequisite: Mb 307 or equivalent. Not offered every year.

Mb 564
Selected Topics in Soil Microbiology
3 hours winter 3 ①
Recent advances and developing problems in soil microbial ecology, with critical evaluation of current literature. Prerequisite: Mh 449. Not offered every year.

NURSING

Oregon State offers a prenursing curriculum designed to meet general requirements for admission into baccalaureate nursing programs. Many students stay at OSU for two years although some are accepted into a B.S.N. program after one year. The advisers, Maryann Phillips, Debbie Hallander, and Joy Mills, maintain close contact with the nursing programs at the Oregon Health Sciences University in Portland and the University of Portland. In addition, a nursing information center is maintained by the advisers through the Counseling Center. The center contains catalogs from many of the nursing programs in the Northwest.

Students planning to attend an out-of-state school must themselves establish contact early in their freshman year with the school in question. Completion of the freshman year courses with a 2.50 GPA or above does not guarantee admission into a B.S.N. program.

Freshman Year	*Hours*
English Composition (Wr 121)	3
General Chemistry (Ch 104,105,106)	13
General Psychology (Psy 201,202)	6
Human Life-Span Development (Psy 311)	3
Human Nutrition (FN 225)	4
General Sociology (Soc 204)	3
Intermediate Algebra (Mth 95 or 101)	4
Approved humanities	9
Physical education	3

OPTOMETRY

The curriculum prescribed below satisfies the entrance requirements of the fifteen accredited optometry schools in the United States. However, satisfactory completion of the curriculum provides no guarantee of admission to any such institution. Individual applicants are accepted on a competitive basis and are usually admitted at the end of their junior year. Satisfactory completion of the first year at any one of the accredited optometry schools may be counted in lieu of the fourth year of undergraduate residence. A maximum of 48 hours taken during the first year of optometry school will apply toward a bachelor of science degree in general science from OSU. Preoptometry majors interested in working toward a biology degree should see Biology, page 86.

The chief adviser for preoptometry is C. A. Kocher, associate professor of physics.

Freshman Year	*Hours*
Mathematics (Mth 102,200,201 or Mth 200,201,202)	12
General Chemistry (Ch 204,205,206 or Ch 104,105,106,107)	15
Humanities and social science	9
English Composition (Wr 121)	3
Physical education (3 terms)	3
Electives	6
Sophomore Year	
Organic Chemistry (Ch 331,332,333,337)	10
Biology (Bi 211,212,213)	15
General Physics (Ph 201,202,203 or Ph 211,212,213)	12
Speech (Sp 112 or 113)	3
English literature	3
Humanities or social science	3
Electives	2
Junior Year	
English Composition (Wr 323)	3
General Microbiology (Mb 302)	3
General Microbiology Lab (Mb 303)	2
Genetics (Gen 311)	4
Light, Vision, and Color (Ph 332)	3
Hum Anat and Phys (Z 331,332,333,341, 342,343)	12
General Psychology (Psy 201,202)	6
Biochemistry (BB 450,451)	7
Statistical Methods (St 451)	4
Computer Science (CS 101 or 211)	4
Senior Year	
At any accredited optometry school (first-year optometry program)	48

Students who undertake a four-year program should plan their senior year in consultation with a preoptometry adviser. Of the 48 hours to be taken during the senior year, a minimum of 36 hours must be selected from the following courses or approved equivalents: Biophysics (BB 331,332,333), Biochemistry (BB 450,451, 452), General Ecology (Bi 370), Developmental Biology (Bi 425), Population Biology (Bi 483), Physical Chemistry (Ch 423,424,425), History of Science (HstS 411,412,413), Biology and Radiation (GS 450), Biology of Aging (GS 452), Applied Microbiology (Mb 304,305), Advanced General Microhiology (Mb 306,307), Pathogenic Microbiology (Mb 430,431), Immunology and Serology (Mb 432,433), Virology (Mb 434,435), Applied Differential Equations (Mth 321,322,323), Neuroanatomy of Human Behavior (Psy 350), Perception (Psy 415), Physiological Psychology (Psy 451), Comparative Vertehrate Emhryology (Z 421), Vertebrate Physiology (Z 431,432), Parasitology (Z 456), Comparative Histology (Z 461). Applicants to the professional program at Pacific University should complete 18 hours in the humanities and 18 hours in the social sciences.

PHYSICAL THERAPY

The College of Science offers a preparatory program designed to meet the general requirements for admission to the following physical therapy schools: California School of Medicine, San Francisco; California State Universities at Long Beach and Northridge; Children's Hos-

pital, Los Angeles; Loma Linda University, Loma Linda, California; Stanford University Medical School, Palo Alto, California; University of Southern California, Los Angeles; University of Colorado Medical School, Denver; Pacific University, Forest Grove, Oregon; University of Utah, Salt Lake City; University of Washington Medical School, Seattle.

In many cases, students who plan to attend the schools listed above do not need to pay full private school or out-of-state tuition rates. An interstate cooperative, the Western Interstate Commission for Higher Education (WICHE), provides the opportunity for students from member states to obtain training not available in their home states without having to pay higher tuition rates. The Student Exchange Program is open to those from Alaska, Arizona, Hawaii, Idaho, Montana, Nevada, Oregon, and Wyoming.

For further information concerning interstate agreements write to: Comissioner, State of Oregon, Western Interstate Commission for Higher Education, P.O. Box 3175, Eugene, Oregon 97401.

Satisfactory completion of the OSU curriculum provides no guarantee of admission to a school of physical therapy. Individual applicants are accepted on a competitive basis and are usually admitted after their junior or senior year. Students who complete the four-year prephysical therapy program earn a baccalaureate degree in general science.

The chief adviser for physical therapy is G. T. Evans, associate professor of chemistry.

Curriculum

The required courses listed below are 12 hours of approved arts and humanities; 6 hours of approved communication skills; and 4 hours of mathematical science.

Freshman Year	Hours
General Chemistry (Ch 104,105,106)	13
General Sociology (Soc 204)	3
Mathematics (Mth 101,102)	8
English Composition (Wr 121)	3
Physical education (1 activity each term)	3
Pretherapy (PE 132)	2
Required courses or electives	14

Sophomore Year	
Organic Chemistry (Ch 331,332,333,337)	10
General Physics (Ph 201,202,203)	12
General Biology (GS 101,102,103)	12
General Chemistry (Ch 107)	2
General Psychology (Psy 201,202)	6
Required courses or electives	6

Junior Year	
Hum Anat and Phys (Z 331,332,333,341, 342,343)	12
Psychopathology (Psy 465)	3
Communicable and Noncommunicable Diseases (H 320)	3
Community Health (H 321)	3
Human Development (Psy 311)	3
Kinesiology (PE 323)	3
Physical Practicum (PE 333,334)	4
Required courses or electives	15

Senior Year	
Human Adjustment (Psy 314)	3
Neuroanatomy of Human Behavior (Psy 350)	3
Perception (Psy 415)	3
Therapeutic Physical Ed (PE 443)	3
Experimental Psychology (Psy 321,322)	8
Statistics (St 331)	3
Adapted Physical Ed (PE 444)	3
Physiology of Exercise (PE 433)	3
Philosophical Basis of Human Movement (PE 211)	3
Psychological Basis of Human Movement (PE 311)	3
Required courses or electives	13

A pretherapy program with somewhat less emphasis on science and more emphasis on physical education is offered through the School of Health and Physical Education.

PHYSICS

Physics is the study of the fundamental structure of matter and the interactions of its constituents. Physicists are concerned with the continuing development of concepts needed for a precise description of nature and with experiments to test such concepts.

For students of the arts and letters, the study of physics provides an introduction to modern ideas about the most fundamental and elemental aspects of nature. For students in all scientific and technical fields, physics is a basic and indispensable tool. Students majoring in physics may prepare for careers in teaching, research, industry, or government.

The department offers two different approaches to the study of physics at the undergraduate level: one stressing more detailed and advanced preparation for graduate study in experimental and theoretical physics, and the other providing the fundamental ideas of physics as a science for students planning to do graduate work in one of the allied fields (biophysics, geophysics, atmospheric physics, chemical physics, physical oceanography) or to go into high school physics teaching or science administration. The program is flexible so that the student may follow either plan, or a combination of the two, in accordance with his or her interest or aptitude.

Recommended preparation for undergraduate physics majors includes one year each of chemistry and physics and four years of mathematics through analytic geometry. Students who enter without this preparation may be delayed in their progress toward graduation. One year of biology and two to three years of a foreign language, preferably French or German, are also recommended.

Curriculum

Undergraduate majors: physics (with emphasis, if desired, in one of the allied fields—atmospheric physics, biophysics, geophysics, physical oceanography, or science administration).

Graduate majors: experimental or theoretical studies in the areas of atomic physics, solid state physics, nuclear and intermediate energy physics.

The required courses listed below can be taken in any order and include: (a) 6 hours of communication skills; (b) 12 hours of arts and humanities; (c) 12 hours of social sciences.

Freshman Year	Hours
General Physics I (Ph 211,212)	8
Calculus (Mth 200,201,202)	12
General Chemistry (Ch 204,205,206)	15
English Composition (Wr 121)	3
Physical education (1 activity each term)	3
Required courses and/or electives	7

Sophomore Year	
General Physics I (Ph 213,214)	8
Physics II (Ph 323)	4
Calculus of Several Variables (Mth 203, 304)	8
Applied Differential Equations (Mth 321)	4
Approved sequence in biological sciences	9
Required courses and/or electives	14
Electives	9

Junior Year	
Approved courses in physics	12–21
Approved electives	9–0
Required courses and/or electives	27

Senior Year	
Approved courses in physics	12–21
Approved electives	18–9
Electives	18

Graduation Requirement in Physics:

Students interested in pure physics and planning to do graduate work in physics are required to take Ph 416,424,425,426,430,431, 432,433,434,435,451,452,474,475 and 476. Recommended are additional courses in mathematics or computer science and foreign languages.

Students interested in atmospheric physics, biophysics, geophysics, or physical oceanography are required to take Ph 416,424,425,430,431, 432,433,434,435, and 474. Approved electives to make up the balance of credits required for graduation in physics are nine term hours. These are to be selected in consultation with an adviser from approved courses in atmospheric sciences, biochemistry and biophysics, chemistry, geophysics, geology, and oceanography. Additional elective courses in various speciality areas are also recommended.

Curriculum In Engineering Physics:

Students electing the program in engineering physics should register in the School of Engineering.

Permission from the instructor is required to take sequence courses out of order.

Lower Division Courses

Ph 104 Descriptive Astronomy
3 hours 2 ① 1 ②
Descriptive treatment. Historical development, motion of stars and planets, the constellations, the solar system, stellar population and evolution, the death of stars, pulsar and black holes, galaxies, and cosmological theories. Outside observation and indoor projects.

Ph 111,112
Concepts and Fundamentals of Physics
4 hours each 3 ① 1 ②
Selected topics illustrate attempts to describe the simplest aspects of nature, the scientific method, and the contribution of physics to culture and society. Prerequisite: one year of high school algebra. Not intended for premedical or predental students. Must be taken in order.

Ph 199 Special Studies
Terms and hours to be arranged
One-hour section graded P/N.

Ph 201,202,203 General Physics
4 hours each 3 ① 1 ②
Application of physical principles to many fields. Fundamental concepts; dynamics, vibrations and waves, electricity, magnetism and light, modern topics in physics. Laboratory work accompanies lectures. Prerequisite: Mth 101, 102 or Mth 110 or equivalent. Must be taken in order.

Ph 205,206 Astronomy
4 hours each 3 ① 1 ②
History, laws, and tools of astronomy; composition, motion, and origin of the planets; population and evolution of the stars; origin and evolution of the universe; cosmological models and tests. A laboratory is used for demonstrations, experiments, and projects, as well as observation, both visual and radio. Must be taken in order.

Ph 211,212,213,214
General Physics with Calculus
4 hours each 3 ① 1 ③
Mechanics, heat, sound, wave motion, electricity and magnetism, optics, and modern physics. Quantum theory, atomic, nuclear, and solid state physics. Laboratory measurements of properties of atomic systems. For students in engineering and the natural sciences; uses the rudiments of calculus. Prerequisite: Mth 200. Corequisite: Mth 201 for Ph 211, Mth 202 for Ph 212. Must be taken in order.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Ph 313 Energy Alternatives
3 hours 3 ①
Exploration of the challenges and opportunities posed by dwindling resources; physical and technological basis of our current energy alternatives; emphasis on new or controversial technologies, such as nuclear and solar power; overview of resource availability, patterns of energy consumption, and current government policies. Prerequisite: upper division standing.

Ph 321,322,323 Physics II
3 hours each 3 ①
Waves and oscillations, quantum physics, introduction to atomic, nuclear and particle physics, statistical and thermal physics. Prerequisite: Ph 213. Need not be taken in order.

Ph 331 The Physics of Sound, Hearing, and Music
3 hours 2 ① 1 ③
Basic physics of wave motion, acoustics, music and musical instruments, hearing and the ear, voice and speech, noise pollution and abatement. Prerequisite: junior standing and one year of university science.

Ph 332
The Physics of Light, Vision, and Color
3 hours 2 ① 1 ③
Basic physics of light, optical instruments (lenses, telescopes, microscopes), the eye and visual perception, colors, photography, environmental lighting, lasers. Prerequisite: junior standing and one year of university science.

Ph 401 Research

Ph 403 Thesis

Ph 405 Reading and Conference

Ph 407 Seminar
Terms and hours to be arranged
Departmental seminar (1 hour) graded P/N.

Ph 411
Introduction to Laser Physics (g)
3 hours 2 ① 1 ③
Descriptions of laser media; theory of optical resonators; examples and applications. Prerequisite: Ph 213, Mth 202, or consent of instructor.

Ph 416,417 Advanced Laboratory (G)
2 hours winter, spring 2 ③
Laboratory exercises in solid state physics, atomic physics, nuclear physics. Prerequisite: Ph 430,434. Need not be taken in order.

Ph 424,425,426 Mechanics (g)
3 hours each 3 ①
Kinematics, dynamics of particles and rigid bodies; generalized coordinates; relativity. Prerequisite: Ph 213; Mth 304,321. Must be taken in order.

Ph 431,432,433
Electromagnetic Theory and Optics (g)
3 hours each 3 ①
Electromagnetic theory, principles and applications of geometrical and physical optics. Prerequisite: Ph 213; Mth 304,321. Must be taken in order.

Ph 434
Electrical and Magnetic Measurements
(g) 1 hour winter 1 ②
Applications of electromagnetic theory to electric and magnetic measurements in the laboratory. Prerequisite: Ph 431 and concurrent enrollment in Ph 432.

Ph 435 Optics Laboratory (g)
1 hour spring 1 ②
Applications of electromagnetic theory to geometrical and physical optics. Interference, diffraction, coherence. Prerequisite: Ph 432 and concurrent enrollment in Ph 433.

Ph 440 Electronics (g)
3 hours 1 ① 2 ③
Thermionic and solid state electronic devices and circuits. Prerequisite: Ph 214; Ph 434 or Engr 221.

Ph 441,442,443
Methods in Mathematical Physics (g)
3 hours each 3 ①
Some mathematical methods applied to classical and modern topics in physics including mathematical treatment of symmetry principles, action principles, and motion equations of physical systems. Prerequisite: Ph 214 or 323. Need not be taken in order. Not offered every year.

Ph 451,452 Thermal Physics (g)
3 hours each 3 ①
Fundamental concepts and laws of thermodynamics, entropy and other characteristic functions, kinetic theory of gases, classical and quantum statistical mechanics. Prerequisite: Ph 214 or 323. Must be taken in order.

Ph 471,472,473
Selected Topics in Classical Physics (g)
4 hours each 4 ①
Mathematical treatment of classical theories; Lagrangian and Hamiltonian mechanics, Maxwell's equations, electromagnetic theory and physical optics; kinetic theory and statistical thermal physics. Prerequisite: Ph 213; Mth 304,321. Must be taken in order. Not offered every year.

Ph 474,475,476
Selected Topics in Modern Physics (g)
3 hours each 3 ①
Quantum mechanics; application to atomic structure and atomic processes, properties, and interactions of atomic nuclei; structure and properties of the solid state; behavior of fundamental particles. Prerequisite: senior standing in physics or graduate standing in chemistry or engineering. Consent of instructor required. Must be taken in order.

Graduate Courses

Also see courses marked (*g*) and (*G*) above.
Graduate courses are given only when warranted by demand. The dates are given when courses are offered alternate years.

Ph 501 Research

Ph 503 Thesis

Ph 505 Reading and Conference

Ph 507 Seminar
Terms and hours to be arranged
Section A, Departmental Seminar, *Section B*, Nuclear Physics, *Section D*, Atomic Physics, and *Section F*, Solid State Physics, are each 1 hour and all graded P/N.

Ph 515 Relativity
3 hours 3 ①
Application of Lorentz transformation theory to mechanics and electrodynamics; general relativity. Prerequisite: Ph 522.

Ph 517,518,519 Quantum Mechanics
3 hours each 3 ①
Transformation theory, quantum mechanical equations of motion and their solutions, transition probabilities, illustrative applications. Prerequisite: Ph 426,476; or equivalent. Usually taken in sequence.

Ph 521,522 Dynamics
3 hours each 3 ①
Lagrangian and Hamiltonian mechanics, canonical transformations, Hamilton-Jacobi theory, continua. Prerequisite: Ph 426. Usually taken in sequence, followed by Ph 515.

Ph 531,532 Electromagnetic Theory
4 hours each 4 ①
Mathematical treatment of classical theories of electricity, magnetism, and radiation. Prerequisite: graduate standing in physics or consent of instructor. Usually taken in sequence, followed by Ph 563.

Ph 551,552,553
Quantum Physics of Solids
3 hours each 3 ①
Band theory and methods; Fermi gas; theory of metals; particle interactions, quasi particles; optical and transport properties of metals and semiconductors; theory of magnetism and superconductivity. Corequisite: Ph 574. Usually taken in sequence. Not offered every year.

Ph 557,558,559
Statistical Thermophysics
3 hours each 3 ①
Statistical mechanics, kinetic theory, thermodynamics. Prerequisite or corequisite: Ph 521. Usually taken in sequence.

Ph 563 Physical Optics
4 hours 4 ①
Abbé theory of diffraction, matrix methods in geometrical optics, Stokes' parameters, coherence. Prerequisite: Ph 532.

Ph 567,568,569
Advanced Quantum Theory
3 hours each 3 ①
Quantization of scalar and vector fields. Applications to the physics of solid state, electrodynamics, and elementary particles. Prerequisite: Ph 519. Usually taken in sequence. Not offered every year.

Ph 571,572,573 Nuclear Physics
3 hours each 3 ①
Nuclear forces, elements of nuclear structure, and models of complex nuclei; nuclear scattering and reactions; electromagnetic transitions; alpha and beta decay; subnuclear particles. Prerequisite: Ph 519. Usually taken in sequence. Not offered every year.

Ph 574
Selected Topics in Theoretical Physics
3 hours 3 ①
Topics vary from year to year. May be repeated for credit. Prerequisite: Ph 519. Not offered every year.

Ph 584,585,586 Atomic Interactions
3 hours each 3 ①
Elastic and inelastic scattering; structure of atoms, molecules, and ions; spectra; transition probabilities. Prerequisite: Ph 519. Usually taken in sequence. Not offered every year.

PODIATRY

A Doctor of Podiatric Medicine (D.P.M.) specializes in treatment of the human foot and leg. It is one of the few medical specialties for which an M.D. degree is not a prerequisite. Instead, a four-year postbaccalaureate training program leads to the D.P.M. degree. In Oregon, the student must then take the qualifying examination administered by the State Board of Podiatric Examiners before being licensed to practice.

There are five colleges of podiatric medicine in the United States. Prospective podiatrists may complete their training at either the California, Illinois, New York, Ohio, or Pennsylvania College of Podiatric Medicine. The curriculum outlined below will satisfy entrance requirements to most of these; however, it has been designed specifically in cooperation with the California school to meet those requirements. The OSU curriculum does not fulfill the Pennsylvania requirement for 78 hours in general education unless electives are chosen with this intention.

Further information can be obtained at the College of Science office.

Curricula

Required courses must include: (a) 6 hours of communication skills in addition to Wr 121; (b) 12 hours of arts and humanities; and (c) 12 hours of social science to fulfill college and University requirements. The biology electives should include 14 hours selected from Elementary Human Anatomy (PE 321,322), 6 hours; Comparative Vertebrate Histology (Z 461), 5 hours; Physiology (Z 331,332), 6 hours; Comparative Vertebrate Embryology (Z 421) 5 hours.

To graduate in prepodiatry, a student must complete a total of 42 hours of course work in the College of Science numbered 300 or above, including the biology electives and the specific courses listed below. Science electives should be chosen accordingly, but are not necessary when graduating in other majors.

Freshman Year

	Hours
General Chemistry (Ch 204,205,206, or Ch 204H,205H,206H, or Ch 104,105, 106,107)	15
Intermediate Algebra (Mth 101)	4
Trigonometry (Mth 102)	4
English Composition (Wr 121)	3
Physical education (any three activity courses)	3
Required courses and/or electives	19

Sophomore Year

Organic Chemistry (Ch 331,332,333,337)	10
Biology (Bi 211,212,213)	15
Science electives	12
Required courses and/or electives	11

Junior Year

Biochemistry (BB 450,451)	7
General Physics (Ph 201,202,203)	12
Biology electives and science electives	15
Required courses and/or electives	14

Senior Year

Biology electives and science electives	8
Required courses and/or electives	40

Choice of Major

Students may register in prepodiatry and receive a B.S. degree in general science on completion of the above curriculum. They may also choose to graduate in another discipline, such as biology, by combining departmental requirements with the prepodiatry curriculum.

SCIENCE AND MATHEMATICS EDUCATION

Preparation for prospective teachers of biological, physical, integrated, earth, and mathematical sciences (grades 5-12) is offered by the Department of Science and Mathematics Education. The department is jointly sponsored by the College of Science and the School of Education; a student seeking a science and/or mathematics teaching credential may enroll in either the College of Science or the School of Education and earn a B.A. or B.S. degree.

Students preparing to teach science and/or mathematics may major in, receive a degree in, science education or in one of the sciences, general science, or mathematics. Consultation with advisers in the Department of Science and Mathematics Education is recommended before the final choice of major is determined. The combination of subjects to be taught and the scope of preparation influence the choice of major college or school.

For a description of the program, see "School of Education."

Summer Courses for Secondary School Science Teachers

The courses below are for high school teachers of science and mathematics. They do not prepare for science research. Graduate standing is prerequisite to all these courses which are applicable toward the M.S. in science education for high school science and mathematics teachers. These courses are not applicable toward a graduate major in one of the special sciences. For full descriptions see the Summer Term Bulletin.

AtS 592T Meteorology for Teachers
3 hours summer
Fundamental concepts of the atmospheric sciences and descriptions of typical atmospheric phenomena; the physical basis of atmospheric processes and weather; weather systems on small, medium, and large scale; anthropogenic influences on the atmosphere; applications to current and local weather.

AtS 595T
Selected Topics in Atmospheric Sciences
3 hours summer 3 ①
Methods for teaching atmospheric science; preparation of demonstrations, exercises, and teaching aids; sources of teaching materials; exercises to illustrate concepts and methods of the atmospheric sciences; examination of topics of popular interest to students. Prerequisite: AtS 592T.

Bot 521T Taxonomy and Field Botany
3 hours summer

Bot 530T Plant Physiology
3 hours summer

Bot 540T Plant Ecology
3 hours summer

Bot 572T Morphology and Anatomy of Seed Plants 3 hours summer

Ent 555T Natural History of Insects
3 hours summer

GS 541T Bioecology
3 hours summer

Ggs 590T American Resources and their Conservation
4 hours summer 4 ①

G 517T Geology for Teachers
3 hours summer

G 530T Historical Geology
3 hours summer

G 550T Rocks and Minerals
3 hours summer

G 552T Geology of Northwest
3 hours summer

Mth 567,568,569T
Topics in Geometry for Teachers
3 hours each, summer 3 ①

Mth 590T
Selected Topics for Science Teachers
4 hours summer 4 ①

Mth 591,592T Selected Modern Topics for Mathematics Teachers
3 hours each, summer 3 ①

Ph 520T Astronomy
3 hours summer
Descriptive treatment. Historical development, motion of the stars and planets, the constellations, the solar system, stellar population and evolution, the death of stars, pulsars and black holes, galaxies, and cosmological theories. Outside observation.

Ph 581T Modern Physics
3 hours summer

Ph 582T Modern Physics
3 hours summer

Ph 583T Modern Physics
3 hours summer

Ph 590,591,592T
Recent Advances in Modern Physics
4 hours each, summer 3 ① 1 ②

Z 541T Heredity
3 hours summer

Z 554T Invertebrate Zoology
3 hours summer

Z 556T Collection and Preparation of Zoological Materials
3 hours summer

Z 560T Cells and Tissues
3 hours summer

Z 577T Ornithology
3 hours summer

Z 578T Field Natural History
3 hours summer

STATISTICS

The Department of Statistics offers undergraduate service courses, as well as graduate courses and programs leading to

the M.A., M.S., and Ph.D. degrees in statistics and operations research or to a minor for an advanced degree in other fields. Specialization is available in theory of statistics, operations research, biometry, or applied statistics. Students planning to major in statistics at the graduate level should have a minimum of mathematics through calculus and upper division work in statistics.

Upper Division Courses
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

St 311,312 Principles of Statistics
3 hours each 3 ①
St 311: design of experiments; descriptive statistics; chance variability; sampling; confidence intervals for percentages and averages; tests of significance. Prerequisite: sophomore standing. *St 312:* two-sample tests; t-tests; chi-square tests; nonparametric tests; correlation and regression. Prerequisite: St 311. Must be taken in order.

St 314 Principles of Statistics for Physical Scientists
3 hours 3 ①
Applications of common probability distributions, expectation, sampling distributions and statistical inference, one- and two-sample problems, regression analysis. Prerequisite: Mth 202.

St 401 Research

St 405 Reading and Conference

St 406 Projects

St 407 Seminar
Terms and hours to be arranged

St 415
Statistical Computing Packages (G)
1 hour 1 ①
Introduction to uses of statistical computing packages, including SPSS, BMDP, SAS, SIPS, and Minitab. Prerequisite: St 452.

St 417 Introduction to Modeling and Simulation (G)
3 hours 3 ①
Discrete and continuous models, including differential systems methods; numerical integration and difference equations; pseudo-random numbers; analysis of simulation experiments. Prerequisite: Mth 202; FORTRAN programming ability.

St 418 Introduction to Simulation Languages (G)
3 hours 2 (1½)
Philosophy and use of simulation languages with emphasis on GASP IV. Prerequisite: Mth 202; FORTAN programming ability.

St 419 Advanced Topics in Modeling and Simulation (G)
3 hours 2 (1½)
Design of simulation experiments; problems of validation and verification of simulation experiments; empirical and mechanistic modeling methods; parameter estimation methods. Student projects emphasized. Prerequisite: St 417 or 418.

St 421,422,423
Introduction to Mathematical Statistics
(g) 3 hours each 3 ①
St 421: Probability theory, random variables, expectation, central limit theorem, joint distributions, random sampling (can be used as a self-contained probability course). *St 422:* Concepts of inference, estimation theory and applications, confidence intervals, theory and applications of hypothesis testing, Bayesian inference. *St 423:* Regression analysis, chi square tests, analysis of variance, distribution-free methods, sequential sampling. Prerequisite: Mth 202. Must be taken in order.

St 435 Quantitative Ecology (G)
3 hours 3 ①
Statistical and mathematical models in ecological theory and application, quantitative theories of communities and populations, theory and practice of sampling and analyzing ecological data, parameter estimation. Prerequisite: St 452.

St 441 Sampling Methods (G)
3 hours 3 ①
Simple and stratified random sampling; systematic sampling; cluster sampling; survey methods for human and other biological populations, land areas, and mobile populations; sources of error; estimation procedures. Prerequisite: St 312 or 423 or 451.

St 444 Survey Methods (g)
3 hours 3 ①
Survey design; sampling; questionnaire design; interviewing; data processing; data analysis; general methodology. Prerequisite: St 311 or 451.

St 451
Statistical Methods for Research Workers
(G) 4 hours 3 ① 1 ②
Descriptive statistics; probability; discrete and continuous distributions (Poisson, binomial, normal, t, F, chi squared); estimation; hypothesis testing and confidence intervals; two-sample comparisons. Prerequisite: Mth 95.

St 452
Regression for Research Workers (G)
4 hours 3 ① 1 ②
Simple and multiple regression analysis using the computer; stepwise techniques for model selection; partial correlation; examination of residuals. Prerequisite: St 451.

St 453 Experimental Design and Analysis for Research Workers (G)
3 hours 3 ①
Analysis of variance; experimental design; randomized blocks and Latin squares; covariance analysis; factorial experiments; variance components. (Students in some disciplines may find St 441 or St 454 more suitable than St 453). Prerequisite: St 452.

St 454 Applied Multivariate Analysis
(G) 3 hours 3 ①
Application of multivariate techniques to the analysis of biological and behavioral data. Multivariate regression and analysis of variance, principal components; discriminant analysis; canonical correlation. Prerequisite: St 452.

St 456 Statistical Methods for Mathematical Scientists (G)
4 hours 3 ① 1 ②
Data description, random sampling, sampling distributions, confidence intervals and hypothesis testing for one- and two-sample problems involving means and proportions, paired comparisons; contingency tables. Prerequisite: Mth 211, 241; St 421,422,423. St 456,457,458 must be taken in order.

St 457
Regression for Mathematical Scientists
(G) 4 hours 3 ① 1 ②
Simple and multiple regression including indicator variables, weighted least squares, nonlinear models, and regression models for binary data.

St 458 Experimental Design and Analysis for Mathematical Scientists (G)
4 hours 3 ① 1 ②
Principles of designed experimentation, design and analysis of completely randomized, randomized block, and Latin square experiments. Aspects of factorials, quantitative treatments, covariates, slit-plotting, and repeated measure.

St 461 Stochastic Processes in Biology
(G) 3 hours 3 ①
Generating functions, Markov chains, epidemic processes, birth and death processes, competition and predation, compartment models. Prerequisite: St 421 or 544.

St 471 Operations Research Methods
(g) 3 hours 3 ①
Operations research methods for applications, including linear programming, network analysis, PERT, CPM, Markov chains, dynamic programming, and queueing theory. Prerequisite: Mth 202.

St 474 Inventory Analysis (G)
3 hours 3 ①
Mathematical models for deterministic and stochastic inventory systems. Prerequisite: Mth 464 or St 421. Not offered every year.

St 475 Queues (G)
3 hours 3 ①
Mathematical models of stochastic service systems including single and many server queues. Prerequisite: St 421 or Mth 464. Not offered every year.

St 476 Reliability Models (G)
3 hours 3 ①
Stochastic models for the failure of complex systems, statistical evaluation of reliability, optimum maintenance inspection, and repair policies. Prerequisite: Mth 464 or St 421. Not offered every year.

Graduate Courses
See also courses marked (g) and (G) above.

St 501 Research

St 503 Thesis

St 505 Reading and Conference

St 506 Projects

St 507 Seminar
Terms and hours to be arranged
Section R, Research, 1 hour, graded P/N.

St 520 Stationary Processes
3 hours 3 ①
Theory of stationary stochastic processes in time and space. Representations by correlation, spectra, and partial correlation; Hilbert spaces of random variables; processes with orthogonal increments; stochastic integrals; sample function problems; level crossings and exceedance measures; stationary point processes. Prerequisite: St 564. Offered alternate years. Offered 1982-83.

St 521 Time Series Analysis
3 hours 3 ①
Principles of analysis of serially correlated data series in both time and frequency domains. Includes filtering, smoothing, spectral analysis, and frequency response studies. Prerequisite: St 452, Mth 313.

St 531 Advanced Experimental Design
3 hours 3 ①
Foundation of experimental inference, factorial experiments, incomplete blocks, designs for response surfaces, sequential designs. Prerequisite: St 453 or 543.

St 532 Sampling Theory
3 hours 3 ①
The basic sampling model for probability selection, basic sampling methods, generalization of the basic model, common applications of the general theory, analytic surveys. Prerequisite: St 441 or 421 or 544.

St 534 Statistical Concepts in Genetics
3 hours 3 ①
Quantitative inheritance, genetic relationships among relatives, estimation of genetic parameters, multiple trait selection. Prerequisite: St 452; Gen 461. Not offered every year.

St 536 Systems Ecology
3 hours 3 ①
Current systems models and modeling concepts in ecological research; general systems theory. Prerequisite: St 435 or Mth 322.

St 541,542,543 Statistical Methods
4 hours each 3 ① 1 ②
St 541: data description, random sampling, sampling distributions, cconfidence intervals, and hypothesis testing for one- and two-sample problems involving means and proportion, paired comparisons; contingency tables. *St 542:* simple and multiple regression including indicator variables, weighted least squares, nonlinear models, and regression models for binary data. *St 543:* principles of designed experimentation and analysis of completely randomized, randomized block, and Latin square experiments. Aspects of factorials, quantitative treatments, covariates, split-plotting, and repeated measure. Prerequisite: Mth 203; previous statistics course. Must be taken in order.

St 544,545,546 Theory of Statistics
3 hours each 3 ①
Probability theory, distributions of random variables, limiting distributions, sufficiency, point and interval estimation, hypothesis testing, analysis of variance, nonparametric inference. Prerequisite: Mth 203. Must be taken in order.

St 551 Linear Models
4 hours 4 ①
Least squares estimation, best linear unbiased estimation, parametrizations, multivariate normal distributions, distribution of quadratic forms, testing linear hypotheses, simultaneous confidence intervals. Prerequisite: St 543,546; Mth 341.

St 552,553 General Linear Hypothesis
3 hours each 3 ①
Advanced topics in general linear model theory, including classification models and mixed models. Prerequisite: St 551. Offered alternate years. Not offered 1982-83.

St 554,555 Statistical Inference
3 hours each 3 ①
Likelihood methods and exact methods in multiparameter models, generalized regression models, loglinear models for enumerative data, censored and grouped data, robust estimation, jackknifing, Bayesian methods, simple time series methods. Application of methods to real data sets. Prerequisite: St 551.

St 564 Measure-theoretic Probability
3 hours 3 ①
General theory of probability measures and random variables. Prerequisite: Mth 411.

St 565,566 Advanced Probability
3 hours each 3 ①
Limit theorems, conditional probability and conditional expection, martingales, stochastic processes. Prerequisite: St 564. Offered alternate years. Not offered 1982-83.

St 571,572,573 Operations Research
3 hours each 3 ①
St 571: formulation and solution of linear programming problems. Development of the simplex method and related pivot algorithms, duality, post optimality analysis and extensions of linear programming. *St 572:* topics in mathematical programming, including transportation problems, constrained optimization and nonlinear programming, probability methods and models, including conditional expectation, Poisson processes, and birth and death processes. *St 573:* queueing models, dynamic programming, Markov chains, and Markov decision processes. Prerequisite: Mth 203; 6 hours of upper division matrix algebra and/or probability. Must be taken in order.

St 574,575 Advanced Topics in Mathematical Programming
3 hours each 3 ①
Theory and techniques of nonlinear optimization; special topics in mathematical programming. Prerequisite: Mth 312,341; St 573. Must be taken in order. Offered alternate years.

St 577,578 Probabilistic Models in Operations Research 3 hours each 3 ①
Theory of operations research models of a predominately probabilistic nature; stochastic processes, especially Markov processes and renewal theory; such topics as the theory of queues, Markov decision processes, optimal stopping problems, and the control of continuous time processes. Prerequisite: St 561 or 573. Must be taken in order. Offered alternate years.

St 582,583
Advanced Theory of Statistics
3 hours each 3 ①
Structure of probability spaces; decision theoretic approach to estimation and hypothesis testing including admissibility, completeness, Bayes and minimax procedures, sufficiency, unbiasedness, invariance, uniformly most powerful tests; inrequisite: St 546,564. Must be taken in order. Offered alternate years. Offered 1982-83.

St 591,592,593 Special Topics
3 hours each 3 ①
Topics of special and current interest not covered in other courses. Need not be taken in order. Not offered every year.

Courses from other departments accepted for major credit:

Mth 464,465,466 Theory of Probability
(G) 3 hours 3 ①
See Mathematics for descriptions.

VETERINARY MEDICINE

The College of Science offers an undergraduate program to prepare students intending to pursue careers in veterinary medicine. Specifically, the program satisfies the entrance requirement for the OSU School of Veterinary Medicine.

Each year, 28 residents of Oregon and 8 residents from the WICHE compact states (Alaska, Arizona, Hawaii, Montana, Nevada, New Mexico, Utah, and Wyoming) begin their professional training on the OSU campus. Additional details and information regarding application and professional education may be found in the "Veterinary Medicine" section of this catalog.

Applicants are accepted on a competitive basis; satisfactory completion of the preveterinary curriculum outlined below provides no guarantee of admission to the D.V.M. program.

Before receiving a Doctor of Veterinary Medicine (D.V.M.) degree, one must earn a baccalaureate degree. If a student is accepted into the OSU School of Veterinary Medicine or another veterinary medical program at the end of his or her junior year, the first year of professional study may apply towards the requirements for a bachelor's degree from Oregon State University. During this year a maximum of 48 hours can be used to satisfy requirements for a degree in general science or biology, both of which are offered by the College of Science.

Qualifying for one of these bachelor's degrees at Oregon State in conjunction with a preveterinary program requires completing all requirements for senior standing, all College of Science requirements, and prior to veterinary school admission, 144 hours including: 9 hours of communication skills; 12 hours of arts and humanities; 12 hours of social sciences; and 3 hours of physical education. These specific hours comprise the general education requirements all degree candidates at OSU must fulfill.

Those interested in the veterinary medical profession should consult an adviser about admission criteria in addition to academic requirements. The chief adviser for preveterinary medicine is D. E. Mattson, associate professor of veterinary medicine.

Curricula

Preveterinary Medicine

Recommended courses for fulfilling the preveterinary requirements (physical and biological science courses must be taken for a letter grade):

	Hours
General Chemistry (Ch 104,105,106, 107 *or* 204,205,206)	15
Organ Chemistry (Ch 331,332,333,337)	10
Mathematics (Mth 101,102 plus elective in mathematics, statistics, or computer science)	12
General Physics (Ph 201,202,203)	12
Biology (Bi 211,212,213 *or* Z 201,202, 204 plus Bot 202)	13–15
Biochemistry (BB 350 or 450,451)	3–4
Animal Nutrition (AnS 311)	3
Applied Animal Nutrition (AnS 211 or 313 *or* P 411)	3–4

Biology with Preveterinary Medicine

For a degree in biology, in conjunction with a preveterinary major, the following curriculum is suggested:

The required courses listed below may be taken in any order and include: (a) 9 hours of communication skills; (b) 12 hours of humanities and/or arts; (c) 12 hours of social sciences. Students are encouraged to specialize in a suggested area of concentration as listed in the biology degree program; a total of 60 term hours of upper division courses are required for graduation.

Freshman Year

General Chemistry (Ch 204,205,206)	15
Mathematics (Mth 102,200,201)	12
English Composition (Wr 121)	3
Speech (Sp 112)	3
Orientation to the Vet Med Profession (VM 50)	1
Physical education (3 terms)	3
Required courses and/or electives	11

Sophomore Year

Organic Chemistry (Ch 331,332,333,337)	10
Biology (Bi 211,212,213)	15
English Composition (Wr 222 or 327)	3
General Physics (Ph 201,202,203)	12
Required courses and/or electives	8

Junior Year

General Biochemistry (BB 450,451)	7
Cell Biology (Bi 360)	5
Ecological Methods (Bi 371)	3
General Ecology (Bi 370)	3
Genetics (Gen 311)	4
History of Biology (HstS 415)	3
General Microbiology (Mb 302,303)	5
Stat Meth for Resear (St 451)	4
Regres for Resear (St 452)	4
Required courses, electives, and suggested areas of concentration	10

Senior Year

First year in the OSU veterinary program or completion of all core courses listed above plus requirements from the College of Science and courses in suggested areas of concentration (see biology program)	48

ZOOLOGY

The science of zoology covers the entire spectrum of animal and human biology from cells and molecules to the ecosystem. A modern zoology curriculum must therefore provide both broad exposure to basic science and the flexibility to develop expertise in a more specialized area. Undergraduate majors in zoology at Oregon State University may select either Track II, an interdisciplinary curriculum designed for students planning employment directly after graduation, or Track I, a curriculum designed for students planning postbaccalaureate study. Zoology majors in Track I can simultaneously meet requirements for the bachelor's degree and entry to a professional school. Those who are admitted to schools of medicine, dentistry, optometry, or veterinary medicine after their junior year at OSU may use appropriate professional course work to complete their degree in zoology.

To broaden the scope of career opportunities, Track II allows students to prepare for vocations in areas such as environmental affairs, laboratory technology, elementary or secondary education, scientific journalism, conservation or field biology, biomedical illustration, computer science, business management, or for further academic work of an interdisciplinary nature, especially in areas related to health or the environment. Departmental requirements are flexible so that the student may follow either track, or a combination of the two, in accordance with his or her interest and needs.

The department offers B.A., B.S., M.A., M.S., and Ph.D. degrees. Opportunities exist for studies at field stations in coastal locations and elsewhere. In consultation with advisers, students can plan programs to meet their particular needs.

Graduate study. Areas of particular strength include cell structure and function, ecological and evolutionary biology, physiology, and genetics. Information on the graduate faculty and program is available from the department office.

Curricula

Both tracks have a minimum set of required courses, plus a set of electives compatible with the student's background, interests, and career objectives. Courses that must be included in the electives are: (a) Wr 121 plus six hours of communication skills, (b) twelve hours of arts and humanities, and (c) twelve hours of social sciences. Students in each track begin by taking a common core of courses. Areas of specialization are developed in the junior and senior years. Students uncertain about a choice of tracks are advised to start in Track I. Biology 211,212, and 213 may be used in either track to substitute for courses in general zoology and general botany during the freshman year. The following schedule of courses is one possible sequence. Variations will be common from one student to the next and should be made in consultation with the zoology faculty adviser.

TRACK I: GRADUATE AND PROFESSIONAL PREPARATION

Freshman Year

General Zoology (Z 201,202) and one term of General Botany (Bot 201 or 202)	10
General Chemistry (Ch 104,105,106,107 or Ch 204,205,206)	15
Mathematical science (math, statistics, or computer science)	8
English Composition (Wr 121)	3
Physical education	1
Electives	11

Sophomore Year

Evolution (Z 345)	3
Ecology (Bi 370)	3
Organic Chemistry (Ch 331,332)	6
General Physics (Ph 201,202,203)	12
Mathematical science	4
Communication skills (Wr 327)	3
Physical education	2
Electives	15

Junior Year

Elementary Biochemistry (BB 350) or General Biochemistry (BB 450,451)	4–7
Genetics (Gen 311)	4
Cell Biology (Bi 360)	5
Animal Physiology (Z 434)	4
Developmental Biology (Bi 425)	5

During the remaining 72-75 term hours of the junior and senior years, students may switch to Track II, or elect one of the following choices: (a) cell and developmental biology, (b) organismal biology, or (c) population biology and ecology.

Cell and Developmental Biology

Calculus (Mth 201, may be taken in sophomore year)	4

Select four courses from the following:

Comparative Vertebrate Embryology (Z 421)	5
Comparative Vertebrate Histology (Z 461)	5
Photobiology of Plants (Bot 432)	3
Hormonal Regulation of Plant Growth (Bot 433)	3
Biochemical Adaptations (Z 437)	3
Genetics of Cells (Gen 421)	4
Immunology and Serology (Mb 432)	3

Select two courses from the following:

Microtechnique (Z 462)	4
Genetics Laboratory (Gen 411)	2
Immunology and Serology Lab (Mb 433)	2
Biophysical Techniques (BB 461)	3
Biophysical Techniques (BB 462)	3
Biochemistry lab (BB 493,494, or 495)	2
Quantitative Analysis (Ch 234)	2
General Microbiology Lab (Mb 303)	2

Select three hours of Research (Z 401), Seminar (Z 407), or Reading and Conference (Z 405)	3
Electives	42–52

Organismal Biology

Invertebrate Zoology (Z 451,452)	10
Vertebrate Biology (Z 371)	5

Select one course from each of the following three groups:

Behavior

Sociobiology (Z 348)	3
Comparative Animal Behavior (Bi 350)	3

Morphology-Anatomy

Comparative Vertebrate Embryology (Z 421)	5
Comparative Anatomy (Z 422)	5
Comparative Vertebrate Histology (Z 461)	5

Physiology

Physiological Ecology (Z 423)	4
Comparative Physiology (Z 435)	5
Biochemical Adaptations (Z 437)	3

Select three hours of Research (Z 401), Seminar (Z 407) or Reading and Conference (Z 405)	3
Electives: Courses dealing with the biology of various taxa are particularly appropriate; e.g., Ornithology (Z 471), Mammalogy (Z 472), Herpetology (Z 473)	41–46

Population Biology and Ecology

Introduction to Population Biology (Bi 483)	5
Calculus (Mth 201, may be taken in sophomore year)	4

Select three courses from the following:

Sociobiology (Z 348)	3
Physiological Ecology (Z 423)	4
Comparative Animal Behavior (Bi 350)	3
Genetics of Populations (Gen 461)	5
Paleoecology (G 540)	3
Advanced mathematics course (e.g., Mth 202,203,241,321,341, or 342)	4
One of the following statistics courses (Stat 421,422,423,451,452,453)	4
One of the following computer science courses (CS 211 or 213; each 4 hours)	4

Select one of the following field courses:

Ecological Methods (Bi 371)	3
Marine Invertebrate Eccology (Z 351)	5
Select three hours of Research (Z 401). Seminar (Z 407), or Reading and Conference (Z 405)	3
Electives: Courses dealing with the biology of various taxa are particularly appropriate; e.g., Ornithology (Z 471), Mammalogy (Z 472), Herpetology (Z 473), Entomology (Ent 314), Invertebrate Zoology (Z 451, 452), Vertebrate Biology (Z 371)	42–51

TRACK II: INTERDISCIPLINARY BACHELOR'S DEGREE

Freshman Year

General Zoology (Z 201,202) and one term of General Botany (Bot 201 or 202)	10
General Chemistry (Ch 104,105,106,107 or Ch 204,205,206)	15
Mathematical sciences (math, statistics, or computer science)	8
English Composition (Wr 121)	3
Physical education	1
Electives	11

Sophomore Year

General Microbiology (Mb 302), or a second term of General Botany (Bot 201 or 202)	3
Evolution (Z 345)	3
Ecology (Bi 370)	3
Organic Chemistry (Ch 331,332)	6
Mathematical science	4
Communication Skills (Wr 327)	3
Physical education	2
Electives	24

Junior Year

Genetics (Gen 311)	4
Cell Biology (Bi 360) and Animal Physiology (Z 434); *or* Comparative Physiology (Z 435) *or* Physiological Ecology (Z 423)	4–8
Comparative Vertebrate Embryology (Z 421) *or* Developmental Biology (Bi 425)	5
Marine Invertebrate Ecology (Z 351) *or* Ecological Methods (Bi 371)	3–5
Comparative Vertebrate Anatomy (Z 422) *or* Comparative Vertebrate Histology (Z 461)	4–5
Electives to develop expertise in an interdisciplinary area (adviser approval required)	21–28

Senior Year

At least two courses from Vertebrate Biology (Z 371), Invertebrate Zoology (Z 451,452)	10–15
Electives to develop expertise in an interdisciplinary area (adviser approval required)	33–38

For courses accepted for major credit in zoology in addition to those listed below, see Biology *and* Genetics.

Lower Division Courses

Z 201,202 General Zoology

3 hours **2** ① **1** ③

Z 201,202: Principles of animal biology. (Credit toward graduation is granted for only one of the following combinations: Z 201,202; Bi 211, 212,213; or GS 101,102,103.) Need not be taken in order.

Z 203 Natural History of Animals: Invertebrates
3 hours 2 ① + 2 weekend field trips
Introduction to the natural history of animal associations. Emphasis on interdependence of species in nature through the use of various examples.

Z 204
Natural History of Animals: Vertebrates
3 hours 2 ① 1 ③
Introduction to the natural history of the vertebrates. Emphasis on everyday problems of animal life; e.g., rhythms of nature, behavior, feeding specializations, coloration, migration, and special environmental problems.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Z 311 Zoological Literature
1 hour winter 1 ①
Use of journals, reference works, bibliographic sources in zoological research. Graded P/N. LEWIS.

Z 327 Vertebrate Structure
5 hours spring 3 ① 2 ②
Gross and histological architecture of vertebrate organ systems with a developmental, comparative, functional, and evolutionary perspective. Prerequisite: one year of biology or Z 202. Not offered 1982-83.

Z 331,332,333
Human Anatomy and Physiology
3 hours each 2 ① 1 ②
Anatomy and major functional aspects of the human body, including neural and/or hormonal mechanisms of regulation of each organ system. Laboratory exercises emphasize functional aspects. Students needing a more detailed approach to anatomy should enroll concurrently in Z 341,342,343. May be taken in any order. PRITCHARD.

Z 341,342,343
Elementary Human Anatomy Laboratory
1 hour each 1 ②
Designed to supplement material presented in Z 331,332,333. May be taken in any order. PRITCHARD.

Z 345 Evolution
3 hours spring 2 ②
Patterns and mechanisms, including elementary population genetics, selection, and speciation. Origin and history of life. ROBERTS.

Z 348 Sociobiology
3 hours 2 ① 1 ①
Systematic study of the biological basis of social behavior in animals from an evolutionary perspective. Prerequisite: Z 201,202, or Bi 211, 212, or GS 101,102, or equivalent. BLAUSTEIN.

Z 351 Marine Invertebrate Ecology
5 hours spring 3 ① 2 ②
Littoral marine invertebrates from an ecological perspective, emphasizing biological characters of the environment. Prerequisite: one year of biology or zoology. LUBCHENCO, MENGE.

Z 371 Vertebrate Biology
5 hours fall 3 ① 2 ②
Structure, classification, evolution, natural history, and identification of vertebrates. Prerequisite: one year of biology. STORM.

Z 401 Research

Z 403 Thesis

Z 405 Reading and Conference
Terms and hours to be arranged
Reading and reports on special topics.

Z 407 Seminar
1 hour any term
Section F, Freshman Seminar, is graded P/N.

Z 421
Comparative Vertebrate Embryology
(G) 5 hours fall 3 ① 2 ③
Descriptive, experimental, and evolutionary approach to the comparative study of early development of vertebrates. Prerequisite: Bi 213 or Z 202. MORRIS.

Z 422 Comparative Vertebrate Anatomy
(G) 5 hours winter 3 ① 2 ③
Descriptive, experimental, and evolutionary approach to the comparative study of development and anatomy of all organ systems of vertebrates. Prerequisite: one year of biology or zoology. RUBEN.

Z 423 Physiological Ecology (G)
4 hours fall 2 (1½) 1 ②
Comparative environmental physiology of vertebrates with emphasis on adaptations to the various aspects of the physical environment such as temperature, water, ions, and gases. Consideration given to interactions between physiology and environment that influence the local and geographic distribution of animals. Prerequisite: Bi 211,212,213 or equivalent. RUBEN.

Z 431,432 Vertebrate Physiology (G)
5 hours each, fall, winter 3 ① 2 ②
Cellular and organismic physiology of higher vertebrates. *Z 431:* General principles of pH buffers, catalysis, cell and tissue physiology. *Z 432:* Organ systems and interrelationships, homeostasis. Prerequisite: organic chemistry and Bi 213 or Z 202, or Bi 360 for Z 432. Need not be taken in order. Lab fee of $10 for Z 432 only. HISAW.

Z 434 Animal Physiology (G)
4 hours spring 4 ①
Introductory course for zoology and biology majors. Focus on concepts of physiological regulation in each of the major organ systems (cardiovascular, respiratory, gastrointestinal, renal), using the mammal as a reference. Emphasis throughout placed on basic mechanisms of regulation (nervous, hormonal) for the various systems which collectively provide an optimal, stable internal environment. Prerequisite: one year introductory zoology or biology, and Bi 360. BROWNELL.

Z 435 Comparative Physiology (G)
5 hours spring 3 ① 2 ③
Physiological regulation in both vertebrates and invertebrates, primarily at the tissue and organ system of organization; ecological and evolutionary aspects emphasized. Prerequisite: organic chemistry and two years of biology. PRITCHARD.

Z 436 Physiological Methods (G)
2 hours spring 1 ③ 1 ③
Designed to support Z 434. A series of experiments to acquaint the student with some standard physiological measurement systems and illustration of physiological regulation mechanisms described in Z 434. Prerequisite or corequisite: Z 434. BROWNELL.

Z 437 Biochemical Adaptations (G)
3 hours spring 3 ①
The molecular and metabolic aspects of adaptation in animals. Prerequisite: BB 450,451. BROOKES, CONTE, VAN HOLDE.

Z 451,452 Invertebrate Zoology (G)
5 hours fall and winter 2 (1½) 2 ③
Biology of larval and adult invertebrates; diversity of form, behavior, ecology, and physiology in an evolutionary context. Prerequisite: one year of biology or zoology. Recommended to be taken in order. BAYNE, LUBCHENCO.

Z 453
Integrative Mechanisms in Invertebrates
(G) 3 hours spring 2 ① 1 ③
A study of hormonal systems, mechanisms of defense against disease, and pheromonal communication in invertebrates. Prerequisite: Z 452 or equivalent. Not offered every year. BAYNE.

Z 456 Parasitology (G)
4 hours winter 3 ① 1 ③
Morphology, life cycles, physiological adaptations, evolution, and distribution of parasitic animals. Prerequisite: two years of biology.

Z 461
Comparative Vertebrate Histology (G)
5 hours fall 3 ① 3 ②
Comparative microscopic study of tissues and organs, emphasizing evolutionary relationships and functional adaptations. Prerequisite: two years of zoology. OWCZARZAK.

Z 462 Microtechnique (G)
4 hours winter 1 ① 3 ③
Preparation of histological, embryological, and cytological specimens for microscopic study. Prerequisite: two years of biology. OWCZARZAK.

Z 471 Ornithology (G)
4 hours spring 3 ① 1 ④
Current developments in research and theory concerning avian systematics, evolution, ecology, behavior, physiology, and distribution, with emphasis on field studies. Prerequisite: Z 371. STORM.

Z 472 Mammalogy (G)
3 hours winter 2 ① 1 ③
World families and distribution of mammals; population biology, life histories, current literature. Prerequisite: Z 371. Offered alternate years. STORM.

Z 473 Herpetology (G)
4 hours spring 3 ① 1 ④
World families and distribution of amphibians and reptiles; population biology, life histories, current literature. Prerequisite: Z 371. STORM.

Graduate Courses

See also courses marked (G) above.

Z 501 Research
Graded P/N.

Z 503 Thesis

Z 505 Reading and Conference

Z 507 Seminar
Terms and hours to be arranged
One-hour sections only graded P/N.

Z 527 Differentiation and Growth
3 hours fall 3 ①
Current investigations and theories of development with emphasis on tissue interactions in the control of differentiation and growth. Prerequisite: Z 421 or Bi 425 and BB 350. MORRIS.

Z 537 Endocrinology
3 hours winter 3 ①
Influence of endocrine glands on the physiology of the animal body, with special reference to mammals. Prerequisite: physiology and organic chemistry. SHIRK.

Z 538 Endocrinology Laboratory
3 hours winter 3 ③
Laboratory work to supplement Z 537. Prerequisite: Z 537. SHIRK.

Z 539 Selected Topics in Physiology
3 hours 2 ① 1 ③
Topics vary. May be repeated for credit. Prerequisite: Z 435 or equivalent. BROWNELL, CONTE, MOORE.

Z 541 Neurobiology
3 hours winter 3 ①
Structure and function of vertebrate and invertebrate nervous systems: biophysical properties of excitable membranes; synaptic transmission and neurohormonal communication; reactor physiology and sensory integration; motor systems; cellular mechanisms of behavior and simple learning; development of structure and synaptogenesis; electrophysiological methods. Prerequisite: Z 434. BROWNELL.

Z 554
Selected Topics in Invertebrate Zoology
3 hours 2 ① 1 ③
Topics vary. May be repeated for credit. Prerequisite: Z 451 or 452. BAYNE, GONOR, LUBCHENCO, MENGE, PRITCHARD.

Z 561,562,563 Biology of the Cell
3 hours each 3 ①
Structure and physico-chemical properties of cellular components, cellular replication and differentiation, chromosomal organization and evolution. Need not be taken in order.

Z 565
Selected Topics in Cellular Biology
3 hours 1 ① 2 ③
Advanced laboratory training and theoretical discussions of special topics; tissue culture every winter; optical methods in cell biology fall term of alternate years. Prerequisite: advanced standing in biological sciences; consent of instructor. CONTE, HARD, OWCZARZAK.

Z 566 Electron Microscopy
3 hours fall 3 ①
Biological applications of the electron microscope, including discussion of basic principles of electron optics and standard preparation techniques. Prerequisite: elementary physics; biochemistry; graduate standing in biological science. OWCZARZAK.

Z 567 Electron Microscopy Laboratory
3 hours spring 3 ②
Prerequisite or corequisite: Z 566. Knowledge of photographic techniques desirable. Consent of instructor required. OWCZARZAK.

Z 571
Organization of Natural Communities
5 hours fall 2 ② 1 ①
Theory and analysis of multispecies associations. Emphasis on extent to which existing ecological and evolutionary theory is supported by natural phenomena. Course is process oriented and considers how biotic and physical mechanisms interact to regulate community organization and stability in a variety of habitats (marine, freshwater, terrestrial). Prerequisite: Bi 483; St 452; Mth 113. Consent of instructor required. MENGE, LUBCHENCO.

Z 581 Zoogeography
3 hours winter 2 ① 1 ②
Distribution of animals, general principles, faunal areas of world and of North America. Prerequisite: Bi 370. Offered alternate years. STORM.

Z 582 Behavioral Ecology
4 hours winter 2 (1½) 1 ①
Behavior of organisms and populations and influences of behavioral considerations upon current theory in ecology and population biology, with emphasis on social organization. Prerequisite: Bi 483. Offered alternate years. BLAUSTEIN.

Z 585
Selected Topics in Vertebrate Ecology
3 hours 1 ① 2 ③
Advanced training in field and laboratory methods and discussion of current problems. Consent of instructor required. RUBEN, STORM.

Z 588 Population Biology
4 hours spring 3 ① 1 ②
Behavioral, ecological, and genetic approaches to the structure of populations; emphasis on the theoretical and experimental and on current problems. Prerequisite: Bi 483; Gen 461; Z 582. DAWSON, KING.

AGRICULTURE

FACULTY

As of January 1982

Administration

Ernest J. Briskey, *Dean*

Instruction
Orrin E. Smith, *Associate Dean and Director, Resident Instruction*
Roger K. Fendall, *Assistant Dean and Head Adviser*
Gerald Kling, *Assistant Director of Resident Instruction*

Research
John R. Davis, *Associate Dean and Director, Agricultural Experiment Station*
Wilson H. Foote, *Associate Director*
Robert E. Witters, *Associate Director*
V. Van Volk, *Assistant Director*

Extension
Henry A. Wadsworth, *Associate Dean and Director, Extension Service*
Fred Hagelstein, *Assistant Director (Agriculture)*
Patricia Coolican, *Assistant Director (Family Living)*
Alberta Johnston, *Assistant Director (County Programs)*
Duane Johnson. *Acting Assistant Director (4-H Youth)*

International Agriculture
Ludwig Eisgruber, *Associate Dean and Director, International Agriculture*
Steve Beese, *Associate Director*
Dillard Gates, *Yemen Program Director*

Agricultural Communications
Gwil Evans, *Director*

Fiscal and Personnel Services
Richard Craig, *Director*

Professors Emeritus Abbott, Allyn, A. W. Anderson, D. E. Anderson, N. Anderson, R. Anderson, Apple, Bailey, Bain, Baron, Bennion, Bernier, Berry, Bierman, Binder, Black, Blanch, Bogart, Bollen, Bond, E. Brown, G. Brown, Bullis, Burkhart, Cain, Carpenter, Cate, Cheney, Chilcote, Clark, Clevenger, Compton, Conklin, Cook, Cooney, Cordy, Cox, Cropsey, Crowell, Dickinson, Doudoroff, Ebert, Elliker, Ewalt, Farrell, Fisher, Fletcher, Fluent, Foster, Frazier, Frizzell, Funk, Gavin, Gentner, Goulding, Grimes, Groder, Gross, Gurton, Haag, F. Hall, P. Hall, E. Hansen, H. Hansen, Harward, Hauser, Henderson, Hill, Hilty, Hochhalter, Hoecker, Hoffman, Hollands, Holthouse, Horrell, Howel, Huber, Inskeep, Jendrzejewski, Jenkins, Jensen, Jossy, Kiesow, Kolshorn, Krueger, Kuhn, Landers, Landforce, Lear, Lee, Long, Lundbom, Mackey, Mallalieu, Marks, Marsh, McArthur, McCarty, McKenzie, Mehlig, Mikesell, Milleville, Miller, Minnick, Monroe, B. Moore, Morgan, Mosher, Mumford, Muth, Myers, Neugart, Newell, Nibler, Novotny, Oman, Ottaway, Oveson, Perry, Petersen, Pilcher, Price, Ralston, Rampton, Rasmussen, Rawlings, Reynolds, Richardson, Ritcher, Roberts, Rodgers, Rosenstiel, Ross, Roth, Roy, Rudd, Sager, Salisbury, Sander, Saul, Sawyer, Scales, Schallig, Scheel, Schroeder, Schultz, Scullen, Seat, Shannon, Shaw, Sidor, Sinnard, Sitton, Skinner, C. Smith, F. Smith, H. Smith, W. Smith, Sprowls, Sterling, Stevely, Stevenson, Storvick, Strawn, Taskerud, Taylor, Ten Pas, Thienes, Thomas, Thompson, Torvend, Vaughan, Vertrees, von Borstel, Wales, Walrod, Warren, Webster, Werth, Weswig, Willrich, Wilster, Wolfe, Winters, Wood, Woodring, Workman, Wright, Yang, Yearick, Youngberg, Zundel

Agricultural Chemistry *Professors* Freed (department head), Beaudreau, Buhler, Dost, Fang, Likens, Morris, Seyb, Terriere, Tinsley, Wagner, Whanger, Witt
Associate Professors Chiou, Dienzer, Gillett, Miller, Norris
Assistant Professors Adams, Rohrmann
Research Associates Campbell, Carpenter, Deeney, Galinski, Karchesy, Lorusso, Miranda, Pearson, Porter, Reed, Ridlington, Wang
Senior Instructors Kiigemagi, Montgomery

Agricultural Education *Assistant Professors* Oades (department head), Cole
Instructor Eichler

Agricultural Engineering and Agricultural Engineering Technology *Professors* Miner (department head), Booster, Brooks, H. J. Hansen, Kirk, Long, Matson, Shearer
Associate Professors H. E. Hansen, Hellickson, Kolbe, Moore
Assistant Professors Cuenca, English

Agricultural and Resource Economics *Professors* Nelson (acting department head), Becker, Brokken, Brown, Conklin, Edwards, Gum, Hueth, Johnston, Luke, Smith, Stevens, Stults, Wyckoff
Associate Professors Adams, Langmo, Mackey, Miles, Miller, Obermiller, O'Connor, Oliveira, Rettig, Schmisseur, Weber
Assistant Professors Buccola, Burt, Cornelius, Dawson, Gustafson, Martin, Thomas, Vesterby
Instructors Ahearn, Holst, Kuntz

Animal Science *Professors* Adams, Cheeke, Church, England, Frischknecht, Hohenboken, Oldfield, Stormshak, Wu
Associate Professors Kennick, Swanson
Assistant Professors Claypool, Holtan, Kellems, Weber
Senior Instructor Adair
Instructor Koler

Botany and Plant Pathology *Professors* T. Moore (department head), Allen, Baker*, Bishop, Cameron, Chambers, Converse*, Corden, Franklin*, Hampton*, Hardison, Horner*, Jensen, Leach, Linderman*, MacSwan, McIntire, Phenney, R. Powelson, Quatrano, Rickson, Trappe*, Trione*
Associate Professors Armstrong, Brandt, Coyier*, Denison, E. Hansen, Klepper*, Koepsell, Mills, L. Moore, Nelson*, Spotts, Tingey*, Zobel
Assistant Professors Dooley*, Powelson
Senior Instructor Johnston
Instructors Obermire, Soeldner

Crop Science *Professors* Moss (department head), Appleby, D. Chilcote, Ching, Cowan, Fendall, Foote, Frakes, Goetze, Grabe, Haunold, Kronstad, Lee, McGuire, Metzger, Youngberg
Associate Professors Bolton (on leave), Brewer, Calhoun, Hardin, Jolliff, McCuistion, Mosley, Witters
Assistant Professors Bates, Burrill, Glenn, Gutbrod, Hannaway
Senior Instructors Brewster, Danielson, Hagen
Instructors Boulger, Cook, Kelley, Scott, Verhoeven, Vollmer

Entomology *Professors* Eldridge (department head), Anderson, Berry, Brookes, Capizzi; Cummins*, Ferguson*, Hardy*, Krantz, Lattin, Martignoni*, Stephen, Terriere, Westigard*
Associate Professors AliNiazee, Burgett, Daterman*, Fisher, Kamm*, Ryan*, Wickman*, Zwick*
Assistant Professors Feyereisen, McEvoy, Miller, Schowalter

* Courtesy appointment

Research Associates Beckwith*, Campbell*, Moldenke, Ryker, Sartwell*, Sower*, Torgersen*

Fisheries and Wildlife *Professors* Tubb (department head), Bond, Breese, Cummins, Horton, Schoaning, Tyler, Verts, Warren, Weber, Wick
Associate Professors Anthony, Coblentz, Crawford, deCalesta, Everest, Garton, Glass, Hall, Henny, Jarvis, Kistner, Lannan, Li, McNeil, Meslow, Olson, Schreck, Sedell, Thomas
Assistant Professors Bernard, Curtis, Gregory, Liss, Lichatowich, Snow
Research Associates Dahm, Patt

Food Science and Technology *Professors* Kifer (department head), Anglemier, Bodyfelt, Crawford, Law, Lee, Libbey, McGill, Montgomery, Scanlan, Sinnhuber, Wrolstad
Associate Professors Badenhop, Beavers, Hendricks, Krumperman, Nixon, Pawlowski, Selivonchick, Wyatt, Yu
Assistant Professors Bailey, Griffith, Heatherbell, Varseveld
Research Associates Eisele, Meyers

Horticulture *Professors* Weiser (department head), Baggett, Chaplin, Crabtree, Fuchigami, Garren, Lombard, Mack, Stebbins, Thompson, Westwood
Associate Professors Breen, J. Green, Lagerstedt, Lawrence, Mansour, D. Mok, M. Mok, Potter, Richardson, Stang, William
Assistant Professors Cook, Proebsting
Instructors A. Green, Hay, Robbins

Microbiology *Professors* Fryer (department head), Morita, Parks, Sandine, Seidler
Associate Professors Brown, Ferro, Leong
Assistant Professors Bottomley, Griego, Rohovec
Instructor Curran

Poultry Science *Professors* Arscott (department head), Fischer, Harper, Petersen (courtesy)
Associate Professor Nakaue
Research Assistant Goeger

Rangeland Resources *Professors* Krueger (department head)
Associate Professors Buckhouse, Bedell, Eddleman, Sharrow, Vavra
Assistant Professors Haferkamp, Miller

Soil Science *Professors* Warkentin (department head), Allmaras, Boersma, Gardner, Huddleston, Jackson, Simonson, Volk, Vomocil, Young
Associate Professors Fredriksen, Moore, Ramig, Rickman
Assistant Professors Baham, Bottomley, Childs, Christensen, Kling, Rasmussen
Instructor Douglas

Statistics *Professors* Faulkenberry (acting department head), Brunk, Calvin, Mason, Overton, Petersen, Pierce, Rowe, Seely, Thomas
Associate Professors Butley, Lindstrom, Ramsey
Assistant Professors Arthur, Birkes, Kanarek

Agricultural Communications
Associate Professors Calvert, Floyd, Kingsley
Assistant Professors Johnson, Gentle
Instructors Duncan, King

Branch Experiment Stations
Professors Allmaras, Lund, Mellenthin, Pumphrey, Raleigh, Rohde, Ticknor, Westigard
Associate Professors Facteau, Martin, Ramig, Rydrych, Sneva, Spotts, Stanger, Turner, Vavra, Yungen, Zwick
Assistant Professors Buettner, Carter, Chen, Haferkamp, Hemphill, Lanka, Nelson, Rickman
Senior Instructor Kolding
Instructors Douglas, Rasmussen

Laboratory for Nitrogen Fixation
Professor Evans (head)
Research Associates Cantrell, Lepo, Purohit

Energy Extension
Associate Professor Owen Osborne (program leader)
Assistant Professors Patterson, Wheeler

4-H Youth
Associate Professors Abell, Andersen, Sawer, Snider
Assistant Professor Boldt

Marine Advisory Program
Professors H. Horton (head), Smith, Wick
Associate Professors Bergeron, Giles, Hilderbrand, Jacobson, Panshin
Assistant Professors Carter, Faudskar, Good, Heikkila, Mate, Osis, Waldvogel

Western Regional Rural Development Center
Professor Youmans (program leader)

Extension Area Supervisors
Professors Brog, Zinn

Extension Field Staff
Professors D. Adams, Bluhm, Bunch, D. Burkhart, Burr, L. Cannon, Fitch, M. Hamilton, Hickerson, Huber, Kerr, Leffel, Maxwell, Parsons, Roberts, W. Schroeder, Vandehey, Watkinson, Wilsox, Wills, Young
Associate Professors Bonham, Brookhyser, Brougher, K. Brown, Burkhart, Burridge, Campbell, C. Cannon, Christensen, Conner, G. Cook, Day, R. L. Fletcher, Friedemann, Friedrichsen, Hamilton, Hart, Harvey, Hathaway, Isley, Killingsworth, Knothe, LeSueur, Logan, Lowrie, Lunner, Markgraf, Massie, McNeilan, Mitchell, Passon, Poole, Rackham, Rauen, Schneider, Sheets, G. M. Shibley, R. Smith, G. Thompson, Todd, Woodard, Zimmerman
Assistant Professors Baker, Barnard, Beck, Best, Bondi, Bottoms, Brock, Bubl, J. Burt, Carr, Carter, Chamberlain, Christy, Clement, Costa, Darnell, Dickens, Douglas, Erickson, R. A. Fletcher, Gamroth, Gingrich, D. Green, Greenlund, Hall, L. Hamilton, W. Hamilton, Hawkins, Hinman, Holroyd, Howell, Jacks, C. Landgren, Maddy, McCarthy, McCowen, G. Mitchell, M. Mitchell, Mobley, Nordheim, P. Oester, Paulsen, Phipps, Pirelli, Price, Riggert, Rogers, Ross, Rumsey, Schauber, G. A. Shibley, Shumway, Spiesschaert, Stoltz, Strode, Tiger, Topielec, Torbeck, Valencia, Whitlow, Willett, Yost
Instructors P. Adams, Albrandt, Brenneman, Burtner, Broome, Chan, Henderson, Husted, Koch, S. Landgren, Macnab, Madden, McAllister, Mumford, Otley, Pahl, Stevens, Stewart, Tullis, Turrell, Wallace, C. Williams, Wilson

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The School of Agriculture performs three vital functions—instruction, research, and Extension—which are closely tied to the human and natural resources of the state of Oregon and which support the economic development of the Pacific Northwest. The school also coordinates several international agricultural programs.

In *Resident Instruction* the school is dedicated to helping each student reach his or her potential capacity. The faculty realize the importance of individual aims and abilities and through course work, counseling, and extracurricular activities try to help each student discover and develop social, aesthetic, and ethical values as well as professional competence.

In cooperation with the College of Science, resident instruction is offered in the Departments of Botany and Plant Pathology, Entomology, Microbiology, and Statistics.

The *Agricultural Experiment Station* conducts extensive scientific research in the agricultural, biological, social,

and environmental sciences, and provides services and technical assistance to the agricultural and related industries of the state. Specific programs contribute to expanding income and employment, improving the nutrition and quality of food for the consumer of agricultural products, improving the economics and environment of rural communities, providing information for a more efficient management of Oregon's natural resources, and improving the quality of its environment.

The *Extension Service* provides informal educational opportunities and information to homemakers, business people—including farmers, fishers, and foresters—community leaders, and youth throughout the state. It has an office in each county and a staff of specialists located on the campus.

Major programs emphasize (1) efficient use of Oregon's agricultural resources to improve farm family income and improve the quality of the environment; (2) improving the use of Oregon's forest resources to achieve maximum benefit from Oregon timberland for use in forest products, recreation, wildlife production, and watershed protection; (3) improving family living through the efficient use of the family's economic and human resources; (4) utilizing ocean resources in a practical, managed way, for the economic, recreational, scientific, and aesthetic benefit of people; (5) assisting the youth of Oregon to realize their full potential and to develop into responsible citizens through 4-H programs and related activities; (6) helping Oregon communities to become more desirable places to live through improved utilization of the economic, social, and human resources available; (7) encouraging more efficient use of energy and adoption of renewable energy sources.

The *Office of International Agriculture*, established in 1975, coordinates and expedites research and noninstructional international agricultural programs such as the dryland and weed research projects sponsored by the U.S. Agency for International Development. OIA serves as contact point for international agricultural visitors and as liaison with international bodies such as the Consortium for International Development, a composite of western universities that includes OSU.

High School Preparation

Advances in technology and science in agriculture make the study of physical, biological, and social sciences and communications a vital necessity. 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; and social studies, 3 units.

Individual Counseling

Every 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 of similar interests. Initial or early counseling is based upon the student's high school record and all 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.

University Honors Program

The Honors Program in this school is coordinated with the programs in other schools and administered by the director of the University Honors Program (see page 37). Information concerning eligibility and application forms may be obtained from the director.

Job Opportunities

The diverse professional and occupational areas in agriculture include production, processing, and marketing of food and fiber; outdoor recreation; and efficient utilization of human and natural resources. Opportunities have expanded in variety, interest, and challenge in research, Extension, teaching, communication, production, sales, and services. Curriculum options allow specialization in business, technical, or scientific aspects in preparation for these areas.

Graduation Requirements

To be eligible for a Bachelor of Science (B.S.) degree, a student must complete a minimum of 192 term hours including these requirements:

1. University requirements listed on page 13.

2 Courses in agriculture: 36 hours including 24 at upper division level;

3. One year of college-level inorganic chemistry, mathematics through Mth 101, or 161, and an additional year of college-level physical science electives;

4. One year of college-level biological science;

5. Satisfactory completion of a comprehensive examination in the use of the English language;

6. Departmental requirements as listed on the following pages.

Through the Graduate School, advanced degrees of Master of Agriculture (M.Agr.), Master of Science (M.S.), and Doctor of Philosophy (Ph.D.) are also offered.

Work performance and personal conduct are evaluated and students are expected to maintain ethical, professional, and academic standards. Failure to meet such standards as judged by the faculty may be grounds for terminating a student's enrollment in a department or in the school.

Agriculture Courses and Curricula

AGRICULTURE, GENERAL

General agriculture is a program designed for (1) students desiring programs of study not currently available in any of the agriculture subject matter departments—such as those involving a minor in journalism or in recreation, (2) students wishing to pursue two or more areas of specialization, or (3) students who have not selected a departmental major. For those students who are undecided but who are emphasizing certain subject matter areas, programs may be developed with a general agriculture adviser using the minimum requirements of at least one of the subject matter curricula involved. Completion of a general agriculture program leads to the B.S. degree.

Curriculum

Freshman Year	Hours
English Composition (Wr 121)	3
General Chemistry (Ch 104,105,106 or Ch 201,202,203)	9-13
Mathematics (through Mth 101 or 161)	4–12
Agriculture and Man (Ag 100)	3
Animal Science (AnS 121) or Poultry Science (P 121)	3
Prin of Wildlife Conservation (FW 251)	3
Food and Man (FST 112)	3
Physical education	3
Sophomore Year	
Biological science (Bot 201, 202, 203 or Z 201,202,203 or GS 101,102,103)	9-12
Economics (Ec 115 or 213,214)	4-8
Accounting (BA 217 or 211,212)	4-8
Communications electives	3
Humanities and/or arts	3
Soils (Sls 210)	5
Crop Production (CrS 201,202)	6
Agric Engineering Survey (AET 211)	3
Agribusiness Management (AREc 211)	5
Pass English comprehensive exam	
Junior Year	
Business Law (BA 226)	4
Rangeland Resources (Rng 341)	3
Agricultural Marketing (AREc 311)	5
Computer Applications (AE 356)	3
Poultry Science (P 121) or Animal Science (AnS 121)	3
Horticulture elective	3
Communications electives	3
Humanities and/or arts electives	to total 12 hours min
Social science electives	to total 12 hours min
Physical science electives	1 term
Upper division electives	10-12
Senior Year	
Upper division agric electives	to total 24 hrs min
Seminar (AET 407)	1
Seminar (departmental elective)	1
Social science electives	to total 12 hours min
Upper division electives	to total 60 hrs min
Electives	to total 192 hrs min

Lower Division Courses

Ag 100 Agriculture and Man
3 hours winter 3 ①
A perspective of agriculture in society. Basic principles of agricultural production relative to managing soils, crops, livestock, and natural resources. Overview of agribusiness and the factors that influence markets, prices, and government policies. Problems and challenges concerning the agricultural industry.

Ag 199 Special Studies
Terms and hours to be arranged
Ag 199B. 1 hour, is graded P/N.

AGRICULTURAL CHEMISTRY

The Department of Agricultural Chemistry offers upper division and graduate courses in applied chemistry with particular emphasis on the chemical aspects of environmental problems.

Many pollution problems involve the distribution of some chemical in the environment. The definition and solution of such problems require the application of fundamental chemical concepts. Course work in this area provides a valuable applied perspective for chemistry majors and is useful for students in engineering or the biological sciences whose interests are in resource management or environmental science.

Upper Division Courses

Courses numbered 400-499 and designed (g) or (G) may be taken for graduate credit.

AC 401 Research

AC 405 Reading and Conference
Terms and hours to be arranged

AC 410 Chemical Analysis of Environmental Pollutants (g)
3 hours winter 1 ① 2 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. Prerequisite: Ch 428.

AC 415 Environmental Physical Chemistry (g)
3 hours fall 3 ①
Concepts of physical chemistry which define the behavior of a chemical in the environment; thermodynamics of solution processes and surface phenomena as applied to the movement of chemicals in soil, air, and water; partitioning in biological systems; photochemical processes. Prerequisite: Ch 340. Not offered every year.

AC 420 Comparative Metabolism of Foreign Compounds (g)
3 hours spring 3 ①
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. Prerequisite: BB 450,451. Not offered every year.

AC 425 Chemistry of Air Pollution (g)
3 hours spring 2 ① 1 ③
Chemistry, formation, and behavior of air pollutants; sampling and analysis of air contaminants; biological and chemical effects of air pollutants on people and their environment. Prerequisite: Ch 203 and senior or graduate standing. Not offered every year.

AC 430 Chemical Behavior in the Environment (g) 3 hours 3 ①
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. Prerequisite: Ch 106,331; senior standing.

Graduate Courses

See also courses marked (g) and (G) above.

AC 501 Research

AC 505 Reading and Conference

AC 507 Seminar
Terms and hours to be arranged

AGRICULTURAL EDUCATION

The Department of Agricultural Education is a joint department within the Schools of Agriculture and Education. It offers professional preparation for prospective teachers of vocational agriculture and for those people entering fields requiring leadership training plus a technical agricultural background. For requirements, graduate credit, and course listing see "School of Education."

AGRICULTURAL ENGINEERING TECHNOLOGY

The curriculum in agricultural engineering technology (AET) is offered by the Department of Agricultural Engineering, which is jointly administered by the Schools of Agriculture and Engineering. For other curricula see "School of Engineering."

The AET curriculum provides a broad course of study with opportunities for some specialization. Students acquire a background in the agricultural sciences, business, communicative and manipulative skills, and basic engineering principles. This course of study qualifies them for work of a technical nature in many phases of industry and in public and self-employment.

For a B.S. degree in AET, either of the two following options is recommended. Full consideration will be given for comparable course work taken in a community college or other college and to advanced placement for students with specialized skills that may be acceptable in place of recommended courses.

BUSINESS OPTION

Freshman Year	Hours
English Composition (Wr 121)	3
General Chemistry (Ch 201,202,203)	9
Mathematics (Mth 101,162,163)	12
Ag Engin Orient (AE 101,102)	4
Special Studies (AE 199)	3
General Biology (GS 101,102,103)	12
Graphics (GE 115)	3
Physical education	3

Sophomore Year

Principles of Economics (EC 213,214)	8
Animal or Poultry Science (AnS 121 or P 121)	3
Soils (Sls 210)	5
General Physics (Ph 201,202)	8
Speech (Sp 112)	3
Plane Surveying (CE 226)	3
Financial and Managerial Accounting (BA 211,212)	8
Agricultural Business Management (AREc 211)	5
Quantitative Business Methods (BA 235)	4
Introduction to Management (BA 338)	4

Junior Year

Journalism or Tech Report Writing (J 111 or Wr 327)	3
Computer Applications (AE 356)	3
Statics and Strength of Materials (AET 421)	3
Dynamics of Solids and Fluids (AET 422)	3
Heat Energy Processes (AET 423)	3
Engine Theory and Operation (AET 312)	3
Soil Water and Plant Growth (Sls 311)	3
Agricultural Processing (AET 371)	3
Operations Management (BA 311)	4
Marketing (BA 312)	4
Finance (BA 313)	4
Social science elective	4
Seminar (AE 407)	1
Humanities and/or arts elective	6

Senior Year

Irrigation Methods and Equipment (AET 321)	3
Farm Buildings (AET 361)	3
Farm Implements (AET 391)	3
Seminar (AE 407)	1
Farm Electricity (AET 331)	3
Land Drainage (AET 319)	3
Management Processes (BA 302)	4
Business and Environment (BA 495)	4
Humanities and/or arts elective	6
Electives	15

TECHNOLOGY OPTION

Freshman Year	*Hours*
English Composition (Wr 121)	3
General Chemistry (Ch 201,202,203)	9
Animal or Poultry Science (AnS or P 121)	3
Mathematics (Mth 102,110,200)	12
Ag Engin Orient (AE 101,102)	4
Special Studies (AE 199)	3
General Biology (GS 101,102,103)	12
Graphics (GE 115)	3
Physical education	3

Sophomore Year

Soils (Sls 210)	5
General Physics (Ph 201,202)	8
Speech (Sp 112)	3
Principles of Economics (Ec 213)	4
Agricultural Business Management (AREc 211)	5
Plane Surveying (CE 226)	3
Basic Accounting and Financial Anal (BA 217)	3
Humanities and/or arts electives	6
Social science elective	3
Electives	7

Junior Year

Journalism or Tech Report Writing (J 111 or Wr 327)	3
Principles of Crop Science (CrS 201)	3
Crop Science Lab (CrS 202)	1
Computer Applications (AE 356)	3
Agricultural Processing (AET 371)	3
Engine Theory and Operation (AET 312)	3
Soil Water and Plant Growth (Sls 311)	3
Statics and Strength of Materials (AET 421)	3
Dynamics of Solids and Fluids (AET 422)	3
Heat Energy Processes (AET 423)	3
Seminar (AE 407)	1
Social science electives	5
Electives	13

Senior Year

Farm Buildings (AET 361)	3
Farm Implements (AET 391)	3
Business Law (BA 226)	4
Seminar (AE 407)	1
Irrigation Methods and Equipment (AET 321)	3
Farm Electricity (AET 331)	3
Land Drainage (AET 319)	3
Humanities and/or arts electives	6
Electives	20

Lower Division Courses

AET 211
Agricultural Engineering Survey
3 hours any term 1 ① 2 ②

Mechanics, hydraulics, soil conservation, and electricity applied to farm problems. Field trips may be required. Prerequisite: Mth 95 or equivalent. LONG.

AET 221 Agricultural Mechanics
4 hours any term 2 ① 2 ②

Procedures and practices in the agricultural mechanics shop including safety, hand, and power tools, hot and cold metal working, arc and oxyacetylene welding, and concrete and wood construction. Field trips may be required. HANSEN.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

AET 312
Engine Theory and Operation
3 hours 2 ① 1 ③

Engine construction, operational theories and principles, lubrication, fuels and oils, emissions, and preventive maintenance; small engine overhaul, measurements, operation, and storage. Field trips may be required. HANSEN.

AET 319 Land Drainage
3 hours 2 ① 1 ③

Surface and subsurface drainage systems; ponds and earth dams; erosion control. Field trips may be required. Prerequisite: Sls 210. STAFF.

AET 321
Irrigation Methods and Equipment
3 hours fall 2 ① 1 ③

Sprinkler and gravity irrigation systems; irrigation pumps; wells. Field trips may be required. Sls 311 recommended as prerequisite. CUENCA.

AET 325 Instructional Analysis in Agricultural Mechanics
3 hours spring 2 ① 1 ③

Analysis and self-development of competencies in agricultural mechanics with emphasis on preparation to teach vocational agriculture. HANSEN.

AET 326 Sprinkler Irrigation
3 hours spring 3 ①

Operational principles of sprinkler irrigation equipment, application of irrigation water, frost protection, and temperature control. Sls 210 recommended as prerequisite. SHEARER.

AET 331 Farm Electricity
3 hours winter 2 ① 1 ③

Fundamentals, electrical codes, electrical motors, and use of electricity in agriculture. Field trips may be required. Prerequisite: AET 211 or equivalent. MATSON.

AET 361 Farm Buildings
3 hours spring 1 ① 2 ②

Buildings services, economical utilization, materials and types of construction, and creative farmstead planning. Field trips may be required. HELLICKSON.

AET 371 Agricultural Processing
3 hours fall 2 ① 1 ③

Processing and handling agricultural materials. Field trips may be required. Prerequisite: Ph 201. BOOSTER.

AET 391 Farm Implements
3 hours fall or spring 2 ① 1 ③

Power farming implements; operation, maintenance, adjustments, calibration and use. Field trips may be required. Prerequisite: Mth 95 or equivalent. BOOSTER.

AET 401 Research

AET 405 Reading and Conference

AET 406 Projects
Terms and hours to be arranged

AET 421
Statics and Strength of Materials
3 hours fall 2 ① 1 ②

Statics and strength of materials and their applications in agricultural technology. Field trips may be required. Prerequisite: Ph 202. LONG.

AET 422
Dynamics of Solids and Fluids
3 hours winter 2 ① 1 ②

Dynamics of solids and fluids and their applications in agricultural technology. Field trips may be required. Prerequisite: AET 421. STAFF.

AET 423 Heat Energy Processes
3 hours spring 2 ① 1 ②

Fundamentals of heat energy process and their applications in agricultural technology. Field trips may be required. Prerequisite: Ph 202. BOOSTER.

AET 425
Developments in Agricultural Mechanics
(G) 1-3 hours to be arranged

Selection, principles of operation, maintenance, adjustment, and application of equipment and materials used in mechanized agriculture, with emphasis on development of instructional units for vocational-technical programs. Selected course areas of emphasis may be chosen from (a) agricultural machinery; (b) agricultural structures; (c) concrete construction; (d) welding fabrication; (e) electricity in agriculture; (f) tractor power; (g) metal construction; (h) small gas engines; (i) soil and water control. Prerequisite: AET 325 or equivalent. HANSEN.

AET 441 Food Engineering
3 hours winter 3 ①

Mechanics of solids and fluids fundamental to food plant operations. Field trips may be required. Prerequisite: Mth 200; Ph 202; FST 223. KIRK.

AET 442 Food Engineering
3 hours spring 2 ① 1 ②

Electricity and thermodynamics applied to problems in food plant management. Field trips may be required. Prerequisite: AET 441. KIRK.

AET 443 Food Engineering (G)
4 hours winter 3 ① 1 ②

Therodynamics and heat transfer applied to the processing of food. Field trips may be required. Prerequisite: AET 442. KIRK.

AET 482
Rural Water and Waste Systems (g)
3 hours 3 ①

Planning and design for camps, parks, and homes in rural areas. Field trips may be required. Prerequisite: senior standing. STAFF.

Graduate Courses

See also courses marked (g) and (G) above.

AET 501 Research

AET 505 Reading and Conference

AET 506 Projects

AET 507 Seminar
Terms and hours to be arranged

AGRICULTURAL AND RESOURCE ECONOMICS

The curriculum in agricultural and resource economics is planned to develop the skills of students in applying the analytic tools of economics to rural problems. Areas of study include farm management and production economics, mar-

keting and prices, natural resource economics, economics of rural development, and marine economics. International implications and policy analysis are explored in each of these study areas. The department offers the B.S., M.S., and Ph.D. degrees, and participates in the M.Agr. and the M.A.I.S. degree programs.

The undergraduate curriculum permits flexibility by providing for a large number of elective courses. With the help of a faculty adviser, a student can select from a broad range of electives and take many courses in related fields of interest.

Curriculum—192 hours

Agriculture

	Hours
Agricultural Business Management (AREc 211)	5
Agricultural Marketing (AREc 311)	5
Applied Economic Analysis (AREc 312,313)	8
Public Policy in Agriculture (AREc 411)	4
Seminar	2
Electives (upper division) in agricultural and resource economics	6
Electives in agriculture	16

Communications

English composition	3
Informative Speaking (Sp 112)	3
Communication elective	3

Social Sciences

Principles of Economics (Ec 213,214)	8
Macroeconomic Theory and Policy (Ec 475)	4
Social science electives	6

Business

Financial Accounting (BA 211)	4

Humanities and/or Arts

Approved electives	12

Biological and Physical Sciences

Biology	12
General Chemistry	9
Mathematics (Mth 163 or 200)	4
Statistics	8

General and Electives

Physical education	3
Other electives	66

Research and reading and conference courses provide opportunity for independent study in a particular area. Detailed information on M.S. and Ph.D. programs and course offerings is available upon request.

Lower Division Courses

AREc 211
Agricultural Business Management
5 hours fall, spring 3 ① 2 ①
Agriculture as a business; the decision-making process; tools of decision making; acquiring, organizing, and managing land, labor, and capital resources; reasons for success and failure. Prerequisite: sophomore standing in agriculture. BECKER.

AREc 231
Applied Economics for Rural Areas
3 hours spring 2 ① 1 ②
Identification of issues of economic importance to rural areas: agricultural production and the world food situation, urban-rural ties, use of natural resources, the human problem in rural areas, and provision of public services in rural communities and regions. Development of an economic framework for analysis of rural area issues.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit. See also courses in the Department of Economics (College of Liberal Arts) which may be taken as part of a graduate major in agricultural and resource economics.

AREc 311 Agricultural Marketing
5 hours winter 3 ① 1 ②
Marketing functions; economics of agricultural markets; marketing firms and their services; price determining forces; marketing problems; cooperatives. Prerequisite: Ec 213. MARTIN.

AREc 312,313
Applied Economic Analysis
4 hours fall and winter 4 ①
Profits as affected by product mix, input combinations, and level of output; consumer behavior; markets and prices for agricultural commodities and factors; prices in non-perfectly competitive markets; economic efficiency. Prerequisite: Ec 214; Mth 163 or 200; St 311, 312, or 451; St 452 previously or concurrently. Must be taken in order.

AREc 401 Research

AREc 405 Reading and Conference

AREc 407 Seminar
Terms and hours to be arranged
Sophomore, junior, and senior seminars, 1 hour each, graded P/N.

AREc 408 Workshop (g)
Terms and hours to be arranged
Workshops may be offered on a variety of subjects including income tax management, taxation, and other subjects traditionally falling within the field of agricultural and resource economics.

AREc 411 Public Policy in Agriculture
(g) 4 hours spring 2 ②
Economic principles applied to agricultural adjustment; agricultural price and income policies established by state and federal agencies. Prerequisite: Ec 214.

AREc 413 Economics of Marine Firms
(g) 3 hours spring 1 (2½)
An overview of the economics of marine firms; the economic, natural, and institutional environment within which the marine firm operates; methods of economic analysis; and a discussion of financial management tools. Prerequisite: one course in economics. Offered alternate years. Not offered 1982-83. SMITH.

AREc 414 Farm Management (G)
5 hours fall 3 ① 1 ③
Application of economic principles and concepts to issues of farm planning and organization under conditions of certainty and uncertainty; management decision tools of budget, cash flows, and records as applied in a farm simulation environment. SCHMISSEUR.

AREc 431 Agricultural Finance (G)
3 hours spring 3 ①
Financial principles and applications; capital investment analysis, financial intermediaries and arrangements in agriculture. Prerequisite: Ec 214. BURT.

AREc 440 Livestock Economics (g)
3 hours fall 3 ①
Economic and financial phases; cost-price relationships; market structure; problems and prospects in Pacific Northwest. Prerequisite: senior standing. O'CONNOR.

AREc 461 Land and Water Economics
(g) 3 hours winter 3 ①
Economic principles affecting natural resource use, benefits, and costs of development and conservation and their distribution among uses and users; policy issues in natural resource management. Prerequisite: Ec 214 or equivalent.

AREc 462 International Agricultural Development (G)
3 hours winter 3 ①
Supply and demand for agricultural resources and products; population pressure on land; economic principles governing value and use of resources; institutional factors. Prerequisite: Ec 214.

AREc 471 Managerial Economics (G)
3 hours winter 2 (1½)
Business policies and economic decision-making tools; risk management and analysis in decision making; business strategy; marketing; finance and human resources applied to agribusiness. Prerequisite: AREc 313 or equivalent. Consent of instructor required.

AREc 481
Natural Resources Policy (G)
3 hours spring 3 ①
Public decision making in natural resource use and development; analysis of public investments and social control over resource use. Prerequisite: AREc 313 or 461. STEVENS.

Graduate Courses

See also courses marked (g) and (G) above.

AREc 501 Research

AREc 503 Thesis

AREc 505 Reading and Conference

AREc 507 Seminar
Terms and hours to be arranged

AREc 508 Workshop
Terms and hours to be arranged
Application of agricultural and resource economics to problems of agricultural marketing, policy, finance, farm management, and natural resources.

AREc 510
Advanced Farm Management
9 hours summer (6 weeks) 5 ④ 1 ④
Economic principles, concepts, and procedures basic to management competence; farm record analysis, farm organization; developing material for teaching and counseling farmers. Offered alternate years. Not offered summer 1983. Consent of instructor required. BECKER.

AREc 531,532
Product and Factor Markets
3 hours fall and winter 3 ①
The market, household, and firm under perfect and imperfect competition; economic problems of production, distribution, and resource allocation in agriculture. Prerequisite: AREc 313 or equivalent. EDWARDS.

AREc 535 Advanced Production and Consumption Economics
3 hours fall 3 ①
Price and output determination in product and factor markets, application to price and output problems in agriculture and natural resource markets. Prerequisite: AREc 532; Mth 201.

AREc 536 Advanced Production and Consumption Economics
3 hours winter 3 ①
Income distribution under competitive and imperfectly competitive conditions; problems of agriculture and natural resource development. Prerequisite: AREc 535,567.

AREc 539 Efficiency and Welfare
3 hours spring 3 ①
Theory of economic options and analysis of technical and institutional conditions for failure of their achievement, criteria for social decision making. Prerequisite: AREc 532. HUETH.

AREc 544,545
Aggregate Economic Analysis
3 hours 3 ①
Interrelationships between agricultural, nonagricultural, and public sectors; effects of monetary, fiscal, and resource supply policies on income and employment in the agricultural sector; effects of changes in the agricultural sector on aggregate economic activity. Prerequisite: AREc 532; Ec 476. Need not be taken in order.

AREc 551 Economics of Natural Resource Development
3 hours fall 3 ①
Welfare economics and benefit-cost analysis. Allocation of natural resources over time and among uses. Optimum and multiple use concepts. Prerequisite: AREc 539 or equivalent.

AREc 552
Economics of Rural Development
3 hours spring 3 ①
Application of economic analysis to selected issues in rural development: structure of rural economics, occupational mobility, and migration in rural areas; economics of providing rural public services and rural land conversion. Prerequisite: AREc 532 or equivalent. Offered alternate years. Not offered 1982-83. WEBER.

AREc 553
Analysis of Agricultural Policies
3 hours winter 2 (1½)
The formation of agricultural policy in the context of national economic policy; evaluation of past, current, and prospective policies. Prerequisite: AREc 539. Offered alternate years. Offered 1982-83.

AREc 554 Agricultural Marketing
3 hours winter 3 ①
Objectives: costs and organization; margins, transportation, advertising, and cooperative theory; problems, research, and progress. Prerequisite: AREc 532. Offered alternate years. Offered 1982-83.

AREc 555
Agricultural Production Economics
3 hours fall 3 ①
Theoretical production, cost, and revenue relationships with application to the firm under conditions of certainty. Prerequisite: AREc 531; Mth 203. Offered alternate years. Not offered 1982-83.

AREc 556
Decision-Making Theory and Application
3 hours spring 3 ①
Theory and application of firm-level decision making under conditions of risk and uncertainty. Prerequisite: AREc 531; Mth 203. Offered alternate years. Offered 1982-83.

AREc 557 Marine Economics
3 hours spring 3 ①
Economic aspects of marine resource use and management. Theory of common property resources. Valuation of commercial and recreational fishing. Economic analysis of issues in coastal zone management. Prerequisite: AREc 539,567, or equivalent. May be taken concurrently. Offered alternate years. Offered 1982-83.

AREc 560 Research in Agricultural and Resource Economics
2 hours fall 1 ②
Identification and conceptualization of research issues in agricultural and resource economics; selection of procedures and methods for resolution of research problems; organization and communication of findings. Prerequisite: one term economic theory and one term intermediate statistics. All three courses may be taken concurrently.

AREc 562 Research Methodology
3 hours winter 3 ①
Logic, theory, and statistics in economic research. EDWARDS.

AREc 567 Applied Econometrics
3 hours spring 2 (1½)
Mathematical and statistical analysis applied to problems of specification, estimation, and interpretation of practical economic problems. Prerequisite: St 452; Mth 201.

AREc 568 Econometrics
3 hours fall 3 ①
Mathematics and statistics applied to problems in specification, estimation, and verification of economic relationships. Prerequisite: St 421; AREc 567; Mth 241. Offered alternate years. Offered 1982-83. BROWN.

AREc 585,586
Mathematical Economics
4 hours winter and spring 4 ①
Application of mathematics to economics. Prerequisite: Mth 203. Must be taken in order. Offered alternate years. Offered 1982-83.

ANIMAL SCIENCE

Programs in animal science provide up-to-date information on methods of rearing domestic livestock and of producing meat, milk, wool, fur, and other animal products. Essential to this information is knowledge generated in genetics, nutrition, and physiology. Study in these areas provides the core around which various curricula leading to the B.S. degree in agriculture can be developed.

Increasing demands for livestock products by a rapidly expanding human population mean potential employment for well-trained individuals in such areas as farm, ranch, feedlot operation; meat, 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; 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, meat science, animal nutrition, and animal physiology.

Curriculum

CORE COURSES (required of all students)

Animal Science
Animal Science (AnS 121)
Principles of Animal Breeding (AnS 378)
Animal Nutrition (AnS 311)
Reproduction of Domestic Animals (AnS 316)
Applied Animal Nutrition (AnS 313)
Seminar (AnS 407)
Two or three production courses (from AnS 420, 421,422,423,424)

Other Agriculture
Crop Production (CrS 201,202) and Soils (Sls 210)

Communications, 12-18 hours including:
English Composition (Wr 121,222)
Informative Speaking (Sp 112)

Health Education
First Aid and Emergency Care (H 386)

Social Science, 12 hours

Humanities and/or Arts, 12 hours

Physical Education
Three terms of activity courses

Students majoring in animal science may select one of five different options emphasizing different aspects of animal agriculture. The *animal production/management option* gives students a background for making decisions in the production and management of livestock enterprises. It combines thorough grounding in the basic sciences and animal science with less intense training in crops, soils, veterinary medicine, and business.

The *dairy production management option* is designed specifically for students whose primary interest is in dairy management and production. Requirements are similar to those for the animal production/management option except for specific courses relevant to dairy operations.

The *business option* is intended for students who desire an understanding of business principles as applied to the complex operation of livestock production and related enterprises. The curriculum includes about 36 hours in business administration, economics, and agricultural economics. When coupled with a good background in animal science, this combination is desirable for students pursuing careers in agriculture or related industries.

The *science option* is designed 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 continued study in animal science.

The *preveterinary medicine option* is designed for students interested in fulfilling requirements for admission to the OSU School of Veterinary Medicine. This option allows students who are admitted to the school, 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 agriculture.

Lower Division Courses

AnS 121 Animal Science
3 hours fall, winter 3 ①
Principles of modern livestock production.

AnS 122 Animal Science Laboratory
1 hour fall, winter 1 ②
Prerequisite or corequisite: AnS 121.

AnS 199 Special Studies
Terms and hours to be arranged
Graded P/N.

AnS 211 Feeds and Feeding
3 hours spring 3 ①
Feedstuffs, ration formulation, and feeding practices used in the production of domestic animals. Prerequisite: AnS 121.

AnS 221 Introductory Horse Science
3 hours fall 2 ① 1 ②
An introduction to horses, their history, breeds, functions, and basic nutritional, reproductive, and health management. Prerequisite: AnS 121 or consent of instructor.

AnS 231 Livestock Evaluation
2 hours winter and spring 2 ③
Visual appraisal of market and breeding classes of beef cattle, sheep, and swine. Live animal and carcass comparisons. Prerequisite: AnS 121.

Upper Division Courses
Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

AnS 311 Animal Nutrition
3 hours any term 3 ①
Comparative nutrient metabolism and digestive physiology; consequences of nutritional deficiencies. Prerequisite: Ch 106; Ch 226 recommended to be taken concurrently.

AnS 313 Applied Animal Nutrition
4 hours winter 3 ① 1 ①
Feedstuff composition, nutrient requirements of livestock, ration formulation, feed processing, and feeding recommendations. Prerequisite: AnS 311.

AnS 316
Reproduction in Domestic Animals
4 hours winter and spring 4 ①
Male and female reproductive systems; fertility complex and factors affecting it. Prerequisite: AnS 121, Z 202, or GS 103.

AnS 320 Evaluation of Dairy Cattle
2 hours spring 2 ②
The phenotypic and genotypic evaluation of dairy cattle including classification and performance records. Prerequisite: AnS 378.

AnS 327
Applied Physiology of Reproduction
4 hours fall 2 ① 2 ②
Principles and practices of semen collection, artificial insemination, pregnancy diagnosis, estrous synchronization, and superovulation. Prerequisite: AnS 316.

AnS 351 Meats
3 hours fall and spring 1 ① 2 ②
Slaughter, cutting, packing house and retail markets, sanitation, inspection of meat, and grading. Prerequisite: junior standing.

AnS 352 Wholesale and Retail Meat
3 hours winter 2 ① 1 ②
Operations and economics of the wholesale and retail meat industry. Prerequisite: AnS 351.

AnS 378 Principles of Animal Breeding
4 hours 3 ① 1 ②
General genetics, inbreeding, crossbreeding and selection, and their manipulation in the improvement of livestock production. Prerequisite: AnS 121.

AnS 401 Research
Terms and hours to be arranged
Graded P/N.

AnS 405 Reading and Conference
Terms and hours to be arranged
Graded P/N.

AnS 407 Seminar
1 hour fall, winter, or spring 1 ②
Section B, which meets winter term, is for sophomores.

AnS 410 Animal Science Internship
1-6 hours to be arranged
Off-campus, occupational work experience supervised by the department. Graded P/N.

AnS 411 Ruminant Nutrition (G)
3 hours fall 3 ①
Practical nutrition of ruminant animals. Prerequisite: AnS 313; Ch 226 recommended.

AnS 420 Horse Production (g)
4 hours spring 3 ① 1 ②
Nutrition, reproductive physiology, breeding programs, and health programs as they relate to horse production, management, and training. Prerequisite: AnS 313,316,378.

AnS 421 Dairy Production (g)
4 hours fall 3 ① 1 ②
Nutrition, breeding, reproduction, and management of dairy cattle. Prerequisite: AnS 313, 316,378.

AnS 422 Sheep Production (g)
4 hours winter 3 ① 1 ②
Nutrition, breeding, reproduction, and management of sheep. Prerequisite: AnS 313,316,378.

AnS 423 Swine Production (g)
4 hours fall 2 ① 2 ②
Nutrition, breeding, reproduction, and management of swine. Prerequisite: AnS 313,378.

AnS 424 Beef Production (g)
4 hours spring 3 ① 1 ②
Nutrition, breeding, reproduction, and management of beef cattle. Prerequisite: AnS 313,316, 378.

AnS 430
Dairy Management Techniques
2 hours spring 2 ②
Development of advanced practical herdsman techniques through laboratory discussions and immediate application. Prerequisite: AnS 421.

AnS 432 Physiology of Lactation (G)
3 hours spring 3 ①
Physiological and environmental factors affecting mammary gland development and function. Offered alternate years. Offered 1982-83.

AnS 478 Animal Improvement (G)
5 hours winter 5 ①
Genetics, breeding systems, and selection principles.

Graduate Courses
See also courses marked (*g*) and (*G*) above.

AnS 501 Research
Graded P/N.

AnS 503 Thesis

AnS 505 Reading and Conference

AnS 507 Seminar
Terms and hours to be arranged

AnS 513 Monogastric Animal and Poultry Nutrition
5 hours spring 2 ② 1 ①
Nutrient requirements of domestic animals and poultry. Emphasis on digestion, metabolism, and function of nutrients. Prerequisite: graduate standing. Offered alternate years as P 513.

AnS 541 Topics in Animal Endocrinology and Physiology
3 hours winter 3 ①
Recent advances in the endocrinology and physiology of domestic and laboratory animals. Prerequisite: Z 537; BB 452 or 492.

AnS 550,551,552
Topics in Animal Nutrition
3 hours each 3 ①
Recent advances. Different topic each term. Prerequisite: AnS 411 or 313. Need not be taken in order.

AnS 570 Topics in Animal Breeding
3 hours spring 3 ①
Designed to acquaint students with recent advances in animal breeding. Prerequisite: AnS 478 or equivalent.

AnS 573 Physiology of Reproduction in Domestic Animals
4 hours spring 4 ①
Anatomy and physiology of reproductive organs; role of neuroendocrine systems, hormones, and environmental factors in reproductive processes. Prerequisite: AnS 316 or equivalent; BB 451. Offered alternate years. Not offered 1982-83.

AnS 578 Livestock Genetics
4 hours spring 4 ①
Quantitative genetics as applied to selection and mating systems for improvement of livestock populations. Prerequisites: St 452; P 442. Offered alternate years. Offered 1982-83.

BOTANY AND PLANT PATHOLOGY

The undergraduate major in botany is intended for students who wish to emphasize studies in plant science. It qualifies students for graduate work in various areas of botany and plant pathology, for positions with the state or federal government, or in industries that deal with plants and their products. Graduate programs help students qualify for teaching positions in colleges and universities or for research positions in industry or government.

In consultation with his or her academic adviser, each undergraduate botany 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 extensive and diversified research programs of the department's faculty also are available for undergraduate experiences in research and for specialized graduate training. Undergraduate programs in botany may be general or may emphasize one of the fields of the graduate majors.

The graduate majors include plant anatomy, cytology, ecology, genetics, morphology, physiology, systematic botany, mycology, phycology, nematology, plant pathology, plant virology, forest pathology, and physiology of parasitism.

The program in pest management for plant protection is offered cooperatively by the Departments of Botany and Plant Pathology, Entomology, and other departments of the School of Agriculture. It provides education for the management of plant pests—especially pathogens, weeds, and insects. Students are helped to find summer employment providing practical experience in crop production, pest control, and/or pesticide regulation.

Degrees in botany and plant pathology are granted through the College of Science; see "College of Science" for curricula and course descriptions.

CROP SCIENCE

Crop science instruction is involved primarily with the production and improvement of 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 soils, physics, chemistry, botany, and genetics as the student deals with theories and practices of crop management and improvement.

Undergraduate curricula are flexible enough to provide for the student's individual professional needs and interests and for a broad-based general education by allowing electives in other schools throughout the University. Graduates in crop science are prepared for careers in business, industry, farming, research, agricultural chemicals 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, and commercial firms dealing in the processing and sale of farm products, chemicals, and seed. Counselors provide curricular guidance and aid in professional extracurricular activities, career decisions, and job placement.

M.S., M.Agr., and Ph.D. degree programs allow students to study under the guidance of internationally known scientists in cereal breeding and genetics, dryland cereal production, forage crop breeding and genetics, forage and pasture management, industrial crops, seed production and technology, seed physiology, crop physiology, and weed control. Oregon's unusual diversity of crops, soils, and climates and the facilities of the Agricultural Experiment Station make possible a wide range of research.

For the B.S. degree the following core courses are required along with at least one of the options listed below.

Curriculum

CORE COURSES

Crop Science	*Hours*
Orien and Career Planning (CrS 199)	1
Principles of Crop Science (CrS 201)	3
Crop Science Lab (CrS 202)	1
Senior Seminar (CrS 407)	1
Plant Gen (CrS 412) or Genetics (Gen 311)	3
Plant Growth and Culture (CrS 413)	3

Communications

To qualify for junior standing in crop science, a student must pass the School of Agriculture Comprehensive English Examination.

Informative Speaking (Sp 112)	3
English Composition (Wr 121,222,323)	9
Technical Report Writing (Wr 327)	3
Elective	3

Other Agriculture

Agric Business Management (AREc 211)	5
Soils (Sls 210)	5
Soil Fertility (Sls 324)	3
Soils elective (upper division)	3

Biological Science

General Botany (Bot 201,202)	8
General Botany (Bot 203) or Systematic Botany (Bot 321)	4
Pathology (Bot 350)	4
Plant Physiology (Bot 331)	5
Entomology (Ent 311 or 314)	4

Two of the following: Aquatic Plants (Bot 316), 4 hours; Plant Ecology (Bot 341), 4 hours; Agrostology (Bot 414), 4 hours; General Ecology (Bi 370), 3 hours; Anatomy (Bot 471), 4 hours

Physical Science

Trigonometry (Mth 102)	4
General Chemistry (Ch 201,202) or (Ch 104,105,106)	6–13
General Chemistry (Ch 203) or Organic Chemistry (Ch 213)	3–4
Organic Chemistry (Ch 213 or Ch 331)	4
Organic Chemistry (Ch 213 or Ch 332) and Elementary Biochemistry (BB 350) *or* General Physics (Ph 201) and Agricultural Engineering Technology (AET 211)	7–8

General Institutional Requirements

Physical education electives	3
Humanities electives	12
Social science electives, to include Principles of Economics (Ec 213)	12

CROP PRODUCTION OPTION

Electives may be chosen from other School of Agriculture departments such as agricultural and resource economics, horticulture, animal science, soil science, to integrate all these disciplines into a well-rounded agriculture degree.

Core courses plus:

Crop Science

At least 2 of the following courses: Cereal Crops (CrS 322), 4 hours; Pasture Production and Management (CrS 324), 3 hours; Seed Production (CrS 414), 3 hours; Weed Control (CrS 418), 5 hours

Electives (CrS) 11-13

Other Agriculture

Animal Nutrition (AnS 311)	3
Electives (consult department for recommendations)	33-35

BUSINESS OPTION

In our modern economy, the relationship of crop science to business is probably one of the most important components. After completing the core courses, students may choose to take business courses to supplement their agricultural training.

Core courses plus:

Crop Science

At least 7 hours from the following: Cereal Crops (CrS 322) 4 hours; Pasture Production and Management (CrS 324), 3 hours; Seed Production (CrS 414), 3 hours

At least 2 courses from the following: Seed Biology (CrS 330), 3 hours; Seed Technology (CrS 332), 3 hours; Weed Control (CrS 418), 5 hours

Other Agriculture

Agricultural Marketing (AREc 311) or Marketing (BA 312) ..... 5 or 4

Business

Financial Accounting (BA 211)	4
Managerial Accounting (BA 212)	4
Business Law (BA 226)	3
Quant Business Methods (BA 235)	4
Management Processes (BA 302)	4
Marketing (BA 312), or Agricultural Marketing (AREc 311)	5 or 4
Finance (BA 313)	4
Real Estate Law (BA 414)	3

Social Science

Principles of Economics (Ec 214)	4

Electives (consult department for recommendations) 1-12

PEST MANAGEMENT OPTION

Elective hours may be used to include courses in entomology, nematology, weeds, and plant pathology, integrating all of these disciplines toward a specific goal of crop pest management.

Core courses plus:

Crop Science

Plant Breeding (CrS 415)	4
Weed Control (CrS 418)	5

At least 7 hours from the following: Cereal Crops (CrS 322), 4 hours; Pasture Production and Management (CrS 324), 3 hours; Seed Production (CrS 414), 3 hours

NOTE: Beyond the minimum requirements, students may use electives to take crop science courses.

Other Agriculture

Prin of Wildlife Conservation (FW 251)	3

Biological Science

Systematic Botany (Bot 321)	3
Insect Pest Management I (Ent 442)	4
Insect Pest Management II (Ent 443)	4

Electives (consult department for recommendations) 29-35

SCIENCE OPTION

Students may elect courses in the College of Science, such as entomology, botany, or chemistry to augment their agricultural discipline.

Core courses plus:

Crop Science

At least 2 of the following: Cereal Crops (CrS 322), 4 hours; Pasture Production and Management (CrS 324), 3 hours; Seed Production (CrS 414), 3 hours

Plant Breeding (CrS 415)	4
Weed Control (CrS 418)	5

Other Agriculture

Animal Nutrition (AnS 311)	3

Biological Science

Two of the following courses (in addition to those in the core curriculum): Aquatic Plants (Bot 316), 4 hours; Plant Ecology (Bot 341), 4 hours; General Ecology (Bi 370), 3 hours; Agrostology (Bot 414), 4 hours; Plant Anatomy (Bot 471), 4 hours

Physical Science

Students will have taken BB 350 or Ph 201 in the core curriculum.

Elementary Biochemistry (BB 350)	4
Mathematics for Biological Management, and Social Sciences (Mth 162,163) *or* Calculus Preparation (Mth 110) and Calculus (Mth 200)	8
General Physics (Ph 201,202,203)	12
Statistical Methods (St 451)	4

Electives (consult department for recommendations) 6–18

SEED TECHNOLOGY OPTION

The specialized field of seed technology involves all aspects of seed production, harvesting, processing, testing, storage, and marketing to provide farmers with improved high-quality seeds.

Core courses plus:

Crop Science

Seed Biology (CrS 330)	3
Seed Technology (CrS 332)	3
Seed Production (CrS 414)	3
Plant Breeding (CrS 415)	4
Weed Control (CrS 418)	5

Other Agriculture

Agricultural Marketing (AREc 311)	5
Plant Propagation (Hort 311)	4

Business

Financial Accounting (BA 211)	4
Business Law (BA 226)	4

Electives (consult department for recommendations) 17-22

Lower Division Courses

CrS 199 Special Studies
Terms and hours to be arranged
Graded P/N.

CrS 201 Principles of Crop Science
3 hours fall and spring 3 ①
Fundamental principles, concepts, and illustrative facts; planting, culture, rotation, production, hazards, quality, and improvement of agronomic crops.

CrS 202 Crop Science Laboratory
1 hour fall and spring 1 ②
Prerequisite or corequisite: CrS 201.

Upper Division Courses
Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

CrS 322 Cereal Crops
4 hours winter 3 ① 1 ②
Production, distribution, adaptation, ecological relationships, morphological and taxonomic relationships, markets, utilization, and quality aspects. Prerequisite: CrS 201 or Hort 201 or junior standing.

CrS 324
Pasture Production and Management
3 hours spring 2 ① 1 ②
Cultivated forage species, varieties, and mixtures; pasture establishment, production, and grazing management; hay and silage production. Prerequisite: CrS 201.

CrS 330 Seed Biology
3 hours winter 2 ① 1 ②
Seeds and man; seed development; physiology of germination, dormacy, longevity, and deteriorization; seed quality. Prerequisite: CrS 201 or Bot 201,202.

CrS 332 Seed Technology
3 hours spring 2 ① 1 ②
Factors affecting seed quality, measurements of seed quality, effect of quality on marketing; laws pertaining to seed; multiplication systems providing quality seed stack; storage as it relates to seed quality and crop and weed identification. Prerequisite: CrS 330.

CrS 401 Research

CrS 403 Thesis

CrS 405 Reading and Conference
Terms and hours to be arranged

CrS 407 Seminar
1 hour winter 1 ①
Junior seminar, 1 hour, graded P/N.

CrS 412 Plant Genetics (G)
3 hours fall 3 ①
Theories and principles; polyploidy; qualitative and quantitative inheritance. Prerequisite: CrS 201 or Hort 201; Bot 202.

CrS 413 Crop Growth and Culture
(G) 3 hours winter 3 ①
Physiological aspects of crop growth; relationships to management practices and productivity. Prerequisite: Bot 331.

CrS 414 Seed Production (G)
3 hours spring 2 ① 1 ②
Management practices required for specialized seed production; physiological aspects; biological characteristics of varieties; hybrid seed; seed processing. One Saturday field trip. Prerequisite: CrS 201; senior standing.

CrS 415 Plant Breeding (G)
4 hours winter 3 ① 1 ②
An introduction with emphasis on genetic and cytological principles used in plant improvement. Prerequisite: CrS 412 or equivalent.

CrS 418 Weed Control (G)
5 hours fall 4 ① 1 ③
Principles of weed control by cultural, biological, and chemical means; weed identification; introduction to herbicides and factors influencing their use. Prerequisite: one year of biological science; one course in organic chemistry. Field trip.

Graduate Courses
See also courses marked (*g*) and (*G*) above.

CrS 501 Research

CrS 503 Thesis

CrS 505 Reading and Conference
Terms and hours to be arranged

CrS 507 Seminar
1 hour each term 1 ①

CrS 511 Physiology of Crop Yield
3 hours spring 3 ①
Concepts of crop growth and production in relation to environmental and physiological factors and their interactions; current literature. Prerequisite: CrS 413; Bot 433,441 or equivalent courses. Not offered every year.

CrS 515 Plant Breeding
3 hours spring 3 ①
Genetic and cytogenetic principles, methodologies and theories in improvement of cereal and forage crops; current literature. Prerequisite: CrS 415; St 452.

CrS 516 Field-Plot Technique
5 hours winter 4 ① 1 ②
Experiment procedures, methods, and techniques; application to field-crop research; interpretation of results.

CrS 518 Herbicide Science
4 hours winter 4 ①
Classification and structures of herbicides; physiological effects; mode of action; factors influencing herbicide performance. Prerequisite: CrS 418; Bot 331. Offered alternate years.

CrS 520 Conservation Cropping
2 hours winter 2 ①
Crops and cropping systems which make efficient use of moisture, protect against soil losses due to wind and water erosion, and maintain soil structure and organic matter under rainfed climatic conditions. Emphasis on dryland agricultural production systems. Prerequisite: CrS 201; senior standing.

CrS 522 Crop Seed Physiology
3 hours winter 3 ①
Metabolic changes and affecting factors during seed development, storage, and germination. Prerequisite: Bot 331,431; BB 350. Offered alternate years.

ENTOMOLOGY

Entomology courses help students gain an understanding of the life processes of insects, their role in the ecosystem, the diversity of insect life, mean of population regulation, and recognition characters of the main groups. The Department of Entomology offers programs leading to undergraduate and graduate degrees.

The undergraduate major in entomology is intended for students who wish to emphasize the study and management of insects. Two options are offered: (1) general entomology and (2) pest management. Both curricula are designed to qualify students for graduate study in entomology, or for employment with state or federal government or industries dealinng with insects and their management.

Students enrolled in either option complete the same core requirements during their freshman an dsophomore years. During the junior and senior years, emphasis for students in general entomology is placed on the development of more advanced knowledge in entomology and biology; students in pest management develop more advanced knowledge in entomology and agriculture-related fields.

In consultation with an academic adviser, each undergraduate entomology major prepares a course of study that consists of a minimum set of required background, interests, and career objectives.

The Department of Entomology is a component of the Agricultural Experiment Station, which has many research facilities available for students and staff —such as the entomology farm, compartmented greenhouses, an aquatic insect laboratory, and forest insect research labortatory. In addition to the OSU faculty, state and federal entomologists stationed in this vicinity may be consulted in their fields of specialization. The Systematic Entomology Laboratory has more than 2,500,000 specimens of insects and mites.

Excellent opportunities for graduate study and research are available leading to the M.A., M.S., and Ph.D. degrees. Training in applied entomology, emphasizes traditional areas of strength at OSU and includes agricultural entomology, integrated pest management, aquatic entomology, forest entomology, insect physiology, insect toxicology, insect ecology, insect biosystematics, medical entomology, apiculture, and pollination biology.

Degrees in entomology are granted through the College of Science; see "College of Science" for curricula and course descriptions.

EXTENSION EDUCATION

Extension Education is jointly sponsored by the Schools of Agriculture, Education, and Home Economics. The program is designed to supplement students' major course work by offering support skills that will help them understand the Extension Service of the Land and Sea Grant university system. Emphases include how to plan, design, and conduct informal educational programs.

Upon approval of the major department, Extension Education may be used as a minor for master's or doctoral programs in the School of Agriculture, or as one of the three components of the Master of Agriculture program. For course listings, see "School of Education."

FISHERIES AND WILDLIFE

This department prepares students for professional careers in fisheries and in wildlife as biologists, managers, consultants, and administrators with state and federal agencies, land- and water-using industries, and public health organizations. Course work leading to the B.S., M.Agr., M.S., and Ph.D. degrees is offered.

Students may elect a major of fisheries science or wildlife science.

The fisheries science major is designed for students planning to enter graduate

study or the research and management fields of commercial and game fisheries. One term of full-time enrollment at the Marine Science Center in Newport is required for the B.S. degree in fisheries science.

The wildlife science major emphasizes the ecological requirements of wild birds and mammals in relation to multiple-use principles of land and water management. It also orients the student for graduate study and research.

Students planning to transfer to one of these curricula should focus on courses in general zoology, general botany or biology, wildlife conservation, 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, a game farm, refuges, experimental streams and ponds, and the Marine Science Center at Newport. Research by the Oregon Department of Fish and Wildlife and by Cooperative Wildlife and Fishery Research Units is of basic value to the instructional programs.

Graduate programs leading to the M.Agr., M.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, parasites, and diseases. Advanced study in wildlife science is oriented towards resource management and can involve almost any bird or mammal species presenting management problems in the Northwest. Research emphasis may be placed on population dynamics and utilization, life history and ecology, population control, food habits and nutrition, and behavior. Opportunities exist for work with both terrestrial and marine species.

Fisheries Science Curriculum*

Freshman Year

Orientation to Fisheries and Wildlife (FW 107)	1
Prin of Wildlife Conserv (FW 251)	3
English Composition (Wr 121)	3
General Zoology (Z 201,202,203 or 204)	9
General Botany (Bot 201,202)	8
Mathematics (Mth 200 or 163)	4
Communications electives	3
Physical education activity	2
Electives	15

Sophomore Year

Economic Ichthyology (FW 313,314)	9
General Chemistry (Ch 201,202,203 or 104,105,106)	9–13
Informative Speaking (Sp 112)	3
Technical Report Writing (Wr 327)	3
Principles of Economics (Ec 213)	4
General Physics (Ph 201,202)	8
Physical education activity	1
Electives	11

Junior Year

Statistical Methods (St 451,452)	8
Intro to Population Dynamics (FW 320 or 431)	4
Organic Chemistry (Ch 331)	3
Aquatic Plants (Bot 316) or Systematic Botany (Bot 321)	4
General Ecology (Bi 370)	3
Invertebrates (one from Ent 433, Z 351, FW 466, Z 451, or Z 452)	5
Genetics (Gen 311)	4
Wildlife Biology: Birds (FW 311) or Wildlife Biology: Mammals (FW 310)	5
Electives	12

Senior Year

Fishery Biology (FW 454)	5
Fishery Limnology (FW 456)	3
Fisheries option (FW 455 or 465 or 494 or 495)	3–5
Fisheries Seminar (FW 407—2 terms)	2
Wildlife option (FW 451 or 458 or 481)	4–5
Environmental Engineering Fund (CE 414)	3
Physiology (two from Z 423,431,432,434, 435, BB 350,450, Bi 360, Bot 331; only one BB may be used)	8–10
Electives	16

Wildlife Science Curriculum*

Freshman Year

Orientation to Fisheries and Wildlife (FW 107)	1
Prin of Wildlife Conser (FW 251)	3
English Composition (Wr 121)	3
General Zoology (Z 201,202,203 or 204)	9
General Botany (Bot 201,202)	8
Mathematics (Mth 200 or 163)	4
Communications electives	3
Physical education activity	2
Electives	15

Sophomore Year

Economic Ichthyology (FW 313)	5
General Chemistry (Ch 201,202,203 or 104,105,106)	9–13
Informative Speaking (Sp 112)	3
Technical Report Writing (Wr 327)	3
Principles of Economics (Ec 213)	4
General Physics (Ph 201,202)	8
Physical education activity	1
Electives	15

Junior Year

Statistical Methods (St 451,452)	8
Wildlife Biology: Mammals (FW 310)	5
Wildlife Biology: Birds (FW 311)	5
Intro to Population Dynamics (FW 320 or 431)	4
Organic Chemistry (Ch 331)	3
Systematic Botany (Bot 321)	4
General Ecology (Bi 370) and Ecological Methods (Bi 371)	6
Soils (Sls 210)	5
Electives	8

Senior Year

Wildlife Ecology (FW 481)	5
Wildlife Seminar (FW 407—2 terms)	2
Fisheries option (FW 454 or 456 or 465)	3–5
Physiology (Z 423 or 435 or 431 or Bi 360 or Bot 331 or Z 434)	4–5
Genetics (Gen 311)	4
Plant Ecology (Bot 341)	4
Comparative Vertebrate Anatomy (Z 422)	4
Wildlife option (FW 451 or 458)	4–5
Electives	15

* The number of blanket hours (e.g., 199,401, 405)—with the exception of seminar (e.g., 107, 407)—that may be used to fulfill the 192-hour requirement for graduation is restricted, except by petition.

Lower Division Courses

FW 107
Orientation to Fisheries and Wildlife
1 hour 1 ①
Information relevant to academic pathways and career planning in the fields of fisheries and wildlife. Graded P/N.

FW 161
Wildlife Recreational Techniques
3 hours 3 ① 1 ②
Equipment and techniques used by sportsmen and biologists in harvest, field care, and utilization of the fish and game crops.

FW 199 Special Studies
Terms and hours to be arranged

FW 251
Principles of Wildlife Conservation
3 hours 3 ①
History of conservation and natural resource use; people's relationship to their natural environment; soil, plant, animal relationships; principles and practices of fisheries and wildlife management and the role of research in management of wildlife.

FW 252 Wildlife Resources: Mammals
3 hours 2 ① 1 ③
Identification, life history, and ecology of mammals, with emphasis on adaptations of mammals for life in various environments. Restricted to nonmajors. FW 251 recommended as prerequisite. VERTS.

FW 253 Wildlife Resources: Birds
3 hours 2 ① 1 ②
The biology of birds, with emphasis on ecological adaptations of birds, effects and problems of environmental alterations, and management of game and nongame birds. Identification and natural history of the common birds of Oregon. Restricted to nonmajors. FW 251 recommended as prerequisite. CRAWFORD.

FW 255
Techniques in Wildlife Science
3 hours 2 ① 1 ②
Techniques and equipment used to obtain biological information essential to manage wildlife on a scientific basis. Fundamental procedures of planning and conducting wildlife investigations. For fisheries and wildlife majors only. Students who have successfully completed FW 310,311, and 481 are not eligible for FW 255.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

FW 310 Wildlife Biology: Mammals
5 hours 3 ① 2 ②
Identification, life history, environmental relationships, management principles of mammals, with emphasis on economically important groups. For fisheries and wildlife majors only. Field trip required. Prerequisite: FW 251; Bi 213 or Z 203. VERTS.

FW 311 Wildlife Biology: Birds
5 hours 3 ① 1 ④
Identification, structure, life histories, ecology, management principles and techniques. Upland game birds, waterfowl, marsh birds, raptors, song birds, and pest species. Prerequisite: Bi 213 or Z 203. For fisheries and wildlife majors only. JARVIS.

FW 313 Economic Ichthyology
5 hours 3 ① 2 ②
Identification, anatomy, life history of economically important fishes of Oregon and the Pacific Northwest; the relationship of these fishes to the world fish fauna. Prerequisite: sophomore standing.

FW 314 Economic Ichthyology
4 hours 3 ① 1 ②
Classification, distribution, and uses of orders and families of fishes having economic or other significance. Prerequisite: FW 313.

FW 315 Aquaculture
3 hours 3 ①
Culture of aquatic organisms from a worldwide standpoint. Theories and methods of production of fish and invertebrates. Prerequisite: FW 313. BOND.

FW 320
Introductory Population Dynamics
4 hours 3 ① 1 ②
Principles and concepts of population dynamics related to fish and wildlife populations; methods of estimating abundance and mortality; models for population and yield analysis. Prerequisite: Bi 370.

FW 341 Wildlife Law Enforcement
3 hours 2 ① 1 ②
State and federal fish and game laws and regulations and the scientific methods used to collect, preserve, and present evidence in the enforcement of these laws and regulations. Prerequisite. FW 251 or two years of biology. KUHN.

FW 401 Research

FW 405 Reading and Conference

FW 407 Seminar
Terms and hours to be arranged
Graded P/N.

FW 420 Vertebrate Pest Control (G)
4 hours 3 ① 1 ②
Techniques, methods, and procedures used to control vertebrate pests including fish, fur-bearing animals, birds, and rodents where they become nuisance animals or transmit disease, damage property, or destroy agricultural or forest crops. Prerequisite: senior standing.

FW 431 Dynamics of Marine Biological Resources (G)
4 hours 4 ①
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. Prerequisite: Bi 370 or equivalent. TYLER.

FW 451 Biology of Game Birds (G)
5 hours 3 ① 2 ②
Identification, distribution, life histories, and ecology of game birds. Prerequisite: FW 311.

FW 454 Fishery Biology (G)
5 hours 3 ① 1 ① 1 ②
Principles and methods used in studying the biology of fishes; ecological requirements of freshwater and anadromous fishes; principles and practices in sport fishery management. Prerequisite: FW 313; junior standing. HALL.

FW 455 Fish Culture (G)
3 hours 3 ①
The use of hatcheries and ponds to produce fish for sport and other purposes; environmental and genetic modifications affecting fish production and management. Prerequisite: two years of biology. LANNAN.

FW 456 Fishery Limnology (G)
3 hours 3 ①
Limnological concepts and techniques related to fishery research and management. Prerequisite: senior standing.

FW 457 Fishery Limnology Laboratory (G) 2 hours 1 ① 1 ④
Methods, techniques of limnological investigation. Prerequisite or corequisite: FW 456.

FW 458
Management of Big Game Animals (G)
4 hours 3 ① 1 ③
Practices and procedures including census, food habits, damage controls, limiting factors. Prerequisite: FW 310. COBLENTZ.

FW 459 Wildlife Field Trip (G)
2 hours (6 days during spring break)
Field trip to specific areas of interest with emphasis on big game, upland game, waterfowl, or fisheries. Integration of classroom knowledge with survey of habitats, problems in multiple agency control of public lands, practices of manipulations of habitats, public relations and management of consuming and producing publics, appraisal of management practices of public agencies. Prerequisite: FW 310,311.

FW 465 Commercial Fisheries (G)
5 hours 2 ② 1 ②
Historic and contemporary commercial fisheries, international problems, management concepts, harvesting techniques, consumption and marketing; all-day field trip. Prerequisite: FW 313. HORTON.

FW 466 Invertebrate Fisheries (G)
4 hours 2 ② 2 ②
Economic invertebrates, life histories, harvesting, values, management problems and procedures. Prerequisite: FW 313. HORTON.

FW 470 Water Pollution Biology (G)
3 hours 2 ① 1 ③
Application of biological principles to the solution of water pollution problems. Prerequisite: senior standing.

FW 471 Functional Fishery Biology (G) 4 hours 3 ① 1 ③
Principles of the functional biology of fishes with emphasis on environmental interactions and management implications. Prerequisite: FW 313; one year of general biology. SCHRECK.

FW 481 Wildlife Ecology (g)
5 hours 3 ① 1 ④
Interrelationships of wildlife, environment, and man. Evaluations of properties and habitats of wildlife populations. Prerequisite: Bi 371. JARVIS, CRAWFORD.

Graduate Courses
See also courses marked (g) and (G) above.

FW 501 Research

FW 503 Thesis

FW 505 Reading and Conference

FW 507 Seminar
Terms and hours to be arranged
Graduate Seminar and Selected Topics graded P/N.

FW 555 Fish Genetics
3 hours 3 ①
Examples from population genetics through molecular genetics with emphasis on fish evolution applied to problems of speciation and race formation, hatchery biology, fish taxonomy, and management of natural populations. Prerequisite: Gen 311.

FW 561 Wildlife Population Analysis
4 hours 3 ②
Application of biometrics and mathematics to concepts and problems in wildlife ecology; emphasis on population analysis. Prerequisite: 3 hours of animal ecology; St 451 and 452 or equivalent. Offered alternate years. Not offered 1982-83. ANTHONY.

FW 567,568 Research Perspectives
4 hours each 4 ①
FW 567: Difficulties in ecological thought: physiological and bioenergetic perspectives in ecology. *FW 568:* Behavioral, population, and community perspectives in ecology. Must be taken in order. WARREN.

FW 569 Population Dynamics
4 hours 4 ①
Dynamics and exploitation of fish and wildlife populations; emphasis on computer simulation and population modeling. HALL.

FW 570
Pollution Problems in Fisheries
3 hours 2 ① 1 ②
Polluted waters as they affect fisheries; sources, measures, biological indices, and abatement of water pollution; water requirement and toxicology of fishes and associated aquatic organisms. Prerequisite: FW 470.

FW 571 Functional Ichthyology
4 hours 3 ① 1 ③
Physiological aspects of the biology of fishes; reactions to, and tolerances of, environmental stresses. Prerequisite: two years of upper division fisheries or zoology. WEBER.

FW 572 Systematics of Fishes
3 hours 2 ① 1 ③
Phylogeny and evolution of fishes; systematic arrangement with emphasis on economically important forms. Prerequisite: two years of upper division fisheries or zoology. BOND.

FW 573 Special Topics in Ichthyology
3 hours 2 ① 1 ③
Distribution, ecology, and other current topics. Prerequisite: two years of upper division fisheries or zoology. BOND.

FW 580 Stream Ecology
3 hours 1 ① 1 ②
Structure and function of stream ecosystems, with emphasis on biological processes; physical and chemical relations; watershed influences. CUMMINS.

FW 599
Special Topics in Fisheries and Wildlife
1, 2, or 3 hours 1 ①, 2 ①, or 3 ①
Various topics in fisheries science or wildlife science. Consent of instructor required. May be repeated for a maximum of 9 hours.

Courses from other departments accepted for major credit:

Mb 492 Fish Diseases (G)
3 hours 3 ①

Mb 493 Fish Diseases Lab (G)
2 hours 2 ②
See Microbiology in "College of Science" for descriptions.

FOOD SCIENCE AND TECHNOLOGY

Food science and technology is the application of science and engineering to the production, processing, packaging, storage, distribution, evaluation, and utilization of food.

Processing of the basic raw materials —milk, fruits, vegetables, seafoods, meats, and grains—by canning, freezing, dehydrating, and fermenting, is taught, with emphasis on basic chemical, microbiological, and physical principles rather than on specific procedures. Students completing a major in this department have excellent employment opportunities with the food industry, the largest industry in the world. These opportunities include research and development in industry, government, colleges, and universities; regulation of food quality through government agencies and within companies; and management operation of food processing plants.

The core curriculum includes elective hours which may be used for a minor in business, engineering, nutrition, science, or a related field. Faculty advisers provide guidance in the selection of a minor and offer assistance in career decisions and job placement.

Students may complete the B.S. degree in either four years or in five years with three six-month work experiences. With an adviser's approval, students may earn internship credit for work at approved sites.

Graduate programs leading to the M.S. or Ph.D. degrees in food science permit

intensified study in the subject areas of special interest. Research areas in the department include both basic and applied aspects of the microbiology, enzymology, and toxicology of foods; food lipids, proteins and pigments; flavor chemistry and flavor evaluations; and processing operations involving primarily seafoods, dairy products, fruits, vegetables, and meats.

Departmental facilities include well-equipped laboratories and pilot plants for instruction and research, the Seafoods Laboratory at Astoria, and the Toxicology and Nutrition Laboratory near Corvallis.

Core Curriculum—192 hours

Freshman Year	*Hours*
Food Quality Evaluation (FST 111)	3
Food and Man (FST 112)	3
Food Science Colloquium (FST 113)	1
General Chemistry (Ch 204,205,206)	15
Mathematics (Mth 110, 200)	8
English Composition (Wr 121)	3
Speech (Sp 112)	3
General Biology (GS 103)	4
Physical education	3
FST option, humanities-arts, or social science electives	6
Sophomore Year	
Food Processing (FST 220,222,224)	9
Food Processing Lab (FST 221,223,225)	3
Organic Chemistry (Ch 331,332,333,337)	10
Quantitative Analysis (Ch 234)	4
General Physics (Ph 201,202)	8
Nutrition (FN 225)	4
Technical Report Writing (Wr 327)	3
FST option, humanities-arts, or social science electives	6
Junior Year	
Food Chemistry (FST 411,412,413)	12
Quality Control Systems (FST 424)	3
Sensory Evaluation of Food (FST 320)	2
Food Engineering (AET 441,442)	6
General Biochemistry (BB 350)	4
General Microbiology (Mb 302,303)	5
Statistics (ST 311,312)	6
FST option, humanities-arts, or social science electives	12
Senior Year	
Research (FST 401A)	1
Food Engineering (AET 443)	4
Food Analysis (FST 423)	5
Food Law (FST 421)	3
Seminar (FST 407)	1
Food Microbiology (Mb 440-441)	5
FST option humanities-arts, or social science electives	27

Five-year Curriculum

The five-year curriculum includes three six-month work experiences during summer and fall terms. The freshman and sophomore years are the same as those in the core curriculum.

Junior Year I	
Food Chemistry (FST 411,412)	8
Gen Biochemistry (BB 350)	4
Gen Microbiology (Mb 302,303)	5
Statistics (St 311,312)	6
FST option, humanities-arts, or social science electives	10
Junior Year II	
Food Chemistry (FST 413)	4
Food Analysis (FST 423)	5
Quality Control Systems (FST 424)	3
Food Engineering (AET 441,442)	6
Food Microbiology (Mb 440,441)	5
Internship (FST 410)	(3)
FST option, humanities-arts, or social science electives	9
Senior Year	
Food Law (FST 421)	3
Seminar (FST 407)	1
Internship (FST 410)	(3)
Sensory Eval of Food (FST 320)	2
Food Engineering (AET 443)	4
FST option, humanities-arts, or social science electives	21

Food science and technology majors must earn a C or better in the required 55 hours of food science and technology courses. With adviser approval, students may elect S/U grading in humanities/arts, social science, physical education, and elective courses as provided for in the academic regulations.

The number of math credits required depends on placement. Food science and technology students are required to take math through Mth 200.

Twelve hours of humanities and/or arts and 12 hours of social sciences are a University requirement and are to be selected from courses approved by the College of Liberal Arts. University science and communication requirements are met by the core curriculum.

The University requires 60 upper division hours for graduation.

Minor Program—29 hours

Food Process (FST 220,222,224)	9
Food Process Lab (FST 221,223,225)	3
Food Microbiology (Mb 440)	3
Food Microbiology Lab (Mb 441)	2
Food Chemistry (FST 411,412,413)	12

Lower Division Courses

FST 111 Food Quality Evaluation
3 hours spring 1 ① 2 ③
Standards and quality grading; detection, extraction, and identification of extraneous materials in foods.

FST 112 Food and Man
3 hours fall and winter 3 ①
For majors and nonmajors. An interdisciplinary course relating people's social, economic, and political development to food and the development of food technology. Subject matter from disciplines of food science and technology, nutrition, anthropology, history, political science, economics, and marketing.

FST 113 Food Science Colloquium
1 hour fall 1 ①
For food science majors. Orientation and academic guidance toward career planning in food science and technology. Graded P/N.

FST 199 Special Studies
Terms and hours to be arranged

FST 220,222,224 Food Processing
3 hours fall, winter, spring 3 ①
Methods of processing and preserving products and related unit operations. *FST 220:* Fruit and vegetables. *FST 222:* Beverages, cereal grains, and meats. *FST 224:* Dairy products. Need not be taken in order.

FST 221,223,225
Food Processing Laboratory
1 hour fall, winter, spring 1 ②
Laboratory and field work to accompany FST 220,222,224. Previous or concurrent registration in appropriate lecture course required. Field trip required.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

FST 320 Sensory Evaluation of Food
2 hours fall and winter 1 ① 1 ②
For FST majors and for nonmajors. Procedures and test methods used to evaluate the sensory properties of foods.

FST 401 Research
Graded P/N.

FST 403 Thesis

FST 405 Reading and Conference
Terms and hours to be arranged

FST 407 Seminar
1 hour fall and winter 1 ①

FST 410 Internship
3-6 hours summer, fall
A work-internship to give students practical on-the-job training in the food processing or related industries. Departmental approval, submission of employer and employee evaluation forms, and written reports required. Prerequisite: junior standing.

FST 411,412,413 Food Chemistry (g)
4 hours winter, spring 3 ① 1 ③
Chemistry and biochemistry of foods. *FST 411:* Water, colloids, enzymes, lipids, flavors, and food toxicology. *FST 412:* Carbohydrates, colors and pigments, post-harvest changes in fruits and vegetables. *FST 413:* Proteins, meats, poultry, seafoods, nutritional changes during processing. Prerequisite: FST 221,222,223; Mb 303; BB 350. Need not be taken in order.

FST 421
Food Law (G)
3 hours spring 3 ①
Concepts, statutes, regulations, and agencies controlling the production, processing, and distribution of food. Prerequisite: senior standing.

FST 423 Food Analysis (g)
5 hours winter 3 ① 2 ③
Systematic chemical and physical analysis of foods. Prerequisite: FST 411,412; Ch 234; BB 350.

FST 424 Quality Control Systems (G)
3 hours spring 2 ① 1 ③
Principles of quality control; quality control philosophy and systems and application in the food industry; use and application of statistical techniques in quality control. Prerequisite: FST 221; St 312 or 451.

FST 431 Food Packaging (G)
3 hours winter 2 ① 1 ②
Objectives and requirements of packaging; composition, characteristics, chemical and physical properties, selection and adaptation of packaging materials and packages. Prerequisite: FST 221,223,411; Ch 331. Not offered 1982-83.

FST 451
Current Topics in Food Science (G)
3 hours spring 3 ①
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. Prerequisite: FST 412; Mb 303; BB 350.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

FST 501 Research

FST 503 Thesis

FST 505 Reading and Conference
Terms and hours to be arranged

FST 507 Seminar
1 hour each term 1 ①

FST 531 Carbohydrates in Foods
3 hours fall 2 ① 1 ②
Chemical, physical, and functional properties of carbohydrates and their changes during processing and storage. Prerequisite: Ch 333; BB 451 or 491. Offered alternate years. Not offered 1982-83.

FST 532 Food Flavors and Evaluation
3 hours winter 2 ① 1 ③
Chemical definition; flavor development, preservation, and deterioration; subjective methods for evaluation. Prerequisite: St 312 or 451. Offered alternate years. Not offered 1982-83.

FST 533 Lipids in Foods
3 hours spring 2 ① 1 ③
Function, composition, preservation, deterioration, and analysis. Prerequisite: BB 451 or 491. Offered alternate years. Not offered 1982-83.

FST 551 Food Toxicology
3 hours spring 3 ①
Principles, design, and interpretation of toxicological studies; toxicants found in foods and their toxic effects; evaluation of the safety of food additives. Prerequisite: Ch 336; BB 451 or 491. Offered alternate years. Offered 1982-83.

FST 561
Pigments and Color Evaluation
3 hours fall 2 ① 1 ③
The chemical and physical properties of food pigments and the changes they undergo during processing and storage; color perception and evaluation. Prerequisite: BB 451 or 491. Offered alternate years. Offered 1982-83.

FST 562 Proteins in Food
3 hours winter 2 ① 1 ③
Characterization and biochemical significance of food protein systems; reactions of food proteins with other food components and how these interactions affect the physiochemical and nutritive properties of foods. Prerequisite: BB 451 or 491. Offered alternate years. Offered 1982-83.

FST 563 Enzymes of Foods
3 hours spring 2 ① 1 ③
Effect of processing methods on enzymes of foods; use of enzymes in food processing. Prerequisite: BB 451 or 491. Offered alternate years. Offered 1982-83.

Courses from other departments accepted for major credit:

AET 441,442,443 Food Engineering
3 hours, 3 hours, 4 hours
See Agricultural Engineering Technology for description.

Mb 440 Food Microbiology (G)
3 hours 2 (1½)

Mb 441 Food Microbiology Laboratory
(G) 2 hours 2 (2½)
See Microbiology in "College of Science" for descriptions.

HORTICULTURE

Horticulture involves the production of fruit, nut, vegetable, and ornamental greenhouse and nursery crops; the handling, storage, distribution, and marketing of such crops; and the design, planting, culture, and management of landscapes. It is a science, an art, and a business that is extensive and diversified in Oregon.

The horticulture department offers programs in crop production and in landscape construction and maintenance. The crop production program prepares students for careers dealing directly or indirectly with the production of fruits, vegetables, and ornamental plants. Through the thoughtful selection of elective courses, a student can specialize in the scientific, technological, or business aspects of horticultural crop production. The landscape horticulture program prepares students for careers involving the design, construction, and maintenance of landscapes. The landscape student must elect to specialize in either a turf and landscape management option or a design and construction option after taking a common core of required courses.

There is some flexibility in both programs so they may be tailored to fit student interests. A pest management option is also available to horticulture students (see curricula under Botany or Entomology in "College of Science").

The department also offers M.S. and Ph.D. degrees. At the graduate level, students may pursue studies in the genetics and breeding, physiology and biochemistry, or culture and ecology of horticultural crop production and management.

The two basic curricula below outline the requirements of the University, the School of Agriculture, and the Department of Horticulture in either the crop production or landscape areas. Specialization within these two basic programs is accomplished via the students' and advisers' selection of complementary optional and elective courses. Advisers provide lists of complementary courses which students may consider within each area of specialization.

CROP PRODUCTION CURRICULUM

This option is designed for students wishing to pursue careers in the technology, science, or business of horticultural crop production. Consult adviser about specialization.

Freshman Year	*Hours*
General Chemistry (Ch 104,105,106 or 201,202,213)	9–13
General Botany (Bot 201,202,203)	11
Mathematics (Mth 101)	4
English Composition (Wr 121)	3
Informative Speaking (Sp 112)	3
Physical education (3 activity courses)	3
Social science and arts/humanities electives	see University requirements

Sophomore Year	
Horticulture Principles (Hort 201, 202)	8
Plant Propagation (Hort 311)	4
Soils (Sls 210)	5
Physical sciences (Ch 213, BB 350, and one physical science elective *or* Ph 201, 202,203)	10–12
Approved communications elective	3
Pass comprehensive English examination	0
Economics (Ec 115 or 213)	4
Social science and arts/humanities electives	see University requirements

Junior Year	
Seminar (Hort 407)	1
Horticultural crop production (at least two of the following: Hort 331,341,351,361)	8
Plant materials (at least five hours from Hort 433,355; ALA 326,327,328)	5-6
Business management electives (consult with adviser)	7
Plant Physiology (Bot 331)	5
Plant Pathology (Bot 350)	4
Electives (see University and School of Agriculture degree requirements and consult department adviser)	

Senior Year	
Seminar (Hort 407)	1
Internship (Hort 410)	6
Approved 400-level electives (consult adviser)	7–9
Genetics (Gen 311)	4
Pest management (Ent 311 or CrS 418)	4-5
Electives (see University and School of Agriculture requirements for B.S. degree and consult department adviser)	

LANDSCAPE CONSTRUCTION AND MAINTENANCE CURRICULUM

This curriculum is specifically designed to meet the needs of students interested in the horticultural aspects of landscaping and management of small landscapes. The program relies heavily on course offerings in the Schools and Colleges of Agriculture, Science, Business, and Liberal Arts to provide students with a basis for understanding the arts and sciences of design, construction, and management of functional and appealing landscapes.

Some courses listed under the Department of Architecture and Landscape Architecture, in the College of Liberal Arts, will be transferred to the Department of Horticulture during the 1982-83 academic year. Students should consult the *Schedule of Classes* for specific information on these courses.

Two options are available in the program: the design option and the landscape and turf management option. Students must satisfy the additional requirements of one of these options.

Core Requirements

Freshman Year	*Hours*
General Chemistry (Ch 104,105,106, or 201,202,213)	9–13
General Botany (Bot 201,202,203)	11
Mathematics (through Mth 102)	4
English Composition (Wr 121)	3
Graphics (ALA 111)	3
Physical education (3 activity courses)	3
Communications elective (see University requirements)	
Social science electives (see University requirements)	

Sophomore Year	
Horticulture Principles (Hort 201,202)	8
Plant Propagation (Hort 311)	4
Soils (Sls 210)	5
Plane Surveying (CE 226)	3
Landscape Design Theory (ALA 280)	3
Landscape Design I (ALA 290,291)	6
Plant Materials (three courses from ALA 326,327,328, Hort 355)	9
Communications elective (see University requirements)	
Social science electives (see University requirements)	

Junior Year	
Seminar (Hort 407)	1
Principles of Turfgrass Maintenance (Hort 314)	4
Landscape Maintenance (Hort 315)	4
Sprinkler Irrigation (AET 326A)	3
Plant Ecology (Bot 341)	4
Management Processes (BA 302)	4
Accounting (BA 211,212 or BA 217)	3–8
Landscape Construction (ALA 359)	3

Senior Year	
Seminar (Hort 407)	1
Internship (Hort 410)	6
Business Law (BA 226 or 414)	3–4

LANDSCAPE AND TURF MANAGEMENT OPTION
(additional requirements, taken junior and senior years)

Nursery Management (Hort 361) or Advanced Turf and Landscape Maintenance (Hort 417)	4
Entomology (Ent 311)	4
Plant Pathology (Bot 350)	4
Organic Chemistry (Ch 213 or 331)	3 or 4
Weed Control (CrS 418)	5
One or two physical science electives (consult with adviser)	
Approved electives (consult with adviser)	12

LANDSCAPE DESIGN OPTION
(additional requirements, taken junior or senior years)

Landscape Construction (ALA 360,361)	6
Plant Composition (ALA 426,427,428)	9
Two physical science electives (consult with adviser)	
Approved electives (consult with adviser)	15

Lower Division Courses

Hort 111
Home Gardening and Landscaping
3 hours winter 1 ① 1 ① 1 ②
Horticultural practices as they relate to the production of food and ornamental plants for home utilization and beautification; the art and science of design, construction, and maintenance of home landscapes. A nonprofessional service course for future homeowners. Graded P/N.

Hort 199 Special Studies
Terms and hours to be arranged
Provides independent study opportunity for freshmen and sophomores.

Hort 201,202 Horticulture Principles
4 hours fall and winter 3 ① 1 ①
Physiological, ecological, and genetic principles related to growth and development of horticultural plants; culture and manipulation of these plants for people's needs. Prerequisite: Bot 201,202. Recommended to be taken in order.

Upper Division Courses
Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Hort 311 Plant Propagation
4 hours spring 3 ① 1 ②
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. Prerequisite: Hort 202 or equivalent.

Hort 314
Principles of Turfgrass Maintenance
4 hours fall 3 ① 1 ②
Identification and adaptation of common turfgrasses. Physiology of turfgrass growth and response to cultural and environmental stresses. Physical and chemical properties of soils as related to turf growth. Cultural practices including establishment, general maintenance, and pest control. Prerequisite: Hort 201 *or* CrS 201,202; Sls 210. Field trips required.

Hort 315 Principles and Practices of Landscape Maintenance
4 hours winter 3 ① 1 ②
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. Prerequisite: Hort 201; Sls 210; ALA 326,327,328. Field trips required.

Hort 331 Fruit and Nut Production
4 hours spring 3 ① 1 ②
Geographic distribution of deciduous fruits and nuts; temperature, water, light, and nutritional requirements and limitations; soil management, pollination, thinning, and pruning; growth regulators as related to growth and fruit set; effect of rootstocks on growth, yield, and fruit quality; indices of maturity. Prerequisite: Hort 202 or equivalent.

Hort 341 Vegetable Production
4 hours fall 3 ① 1 ②
Seed, plant production, varieties, irrigation, nutrition, harvesting, and other aspects of major vegetable crop production; environmental effects; problems, economic considerations. Prerequisite: Hort 202 or CrS 201 or equivalent.

Hort 351 Greenhouse and Controlled Environment for Crop Production
4 hours spring 3 ① 1 ②
Management of environmental factors and applied resources in integrated systems for economic crop production in greenhouse and controlled environments. Prerequisite: Hort 201, 202; Sls 210. Bot 331 recommended.

Hort 355
Herbaceous Ornamental Plant Materials
3 hours spring 2 ① 1 ②
Identification, use, and culture of herbaceous flowering and foliage plants used in the home and landscape. Prerequisite: Bot 203.

Hort 361 Nursery Production
4 hours winter 3 ① 1 ②
Nursery and ornamental crop production management; nature of the industry; 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. One 4-hour and one 1-day field trip required. Prerequisite: Hort 311; Sls 210; ALA 326,327.

Hort 401 Research

Hort 403 Thesis

Hort 405 Reading and Conference

Hort 407 Seminar
Terms and hours to be arranged
One-hour seminar graded P/N.

Hort 410 Internship Project
6 hours
Work-internship (10 weeks) 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. Prerequisite: junior standing.

Hort 416 Plant Nutrition (G)
4 hours winter
Factors influencing nutrient absorption and composition; criteria of essentiality and roles of elements; nutritional status and nutrient balance; techniques for determining nutritional status and effects of fertility programs. One 4-hour and one 8-hour field trip required. Prerequisite: Hort 202; Bot 331. Statistics recommended.

Hort 417 Advanced Turf and Landscape Maintenance
4 hours spring 3 ① 1 ②
Conversion of basic principles into specific guidelines and specifications for landscape work. Budgeting, bid preparation, and maintenance specifications covered in detail. Examination of unique technological areas of landscape production, including sod production, athletic fields, and chemical landscape problems. Prerequisite: Hort 314,315. Field trips required.

Hort 431 Post-Harvest Physiology (G)
4 hours winter 3 ① 1 ②
Storage physiology of fruits, vegetables, and ornamental crops. Influence of pre-harvest conditions on post-harvest behavior, maturation, and physiological disorders. Factors influencing quality during harvest, grading, storage, packaging, transportation, and marketing. Effects of storage temperature, CO_2, O_2, and ethylene on ripening, respiration and senescence, and intermediary metabolism. Labs involve recitation, demonstration, and field trip activities. Prerequisite: Hort 202; Bot 331; and *one* of the following: Hort 331, 341, 351, or 361.

Hort 433
Systematics of Fruits and Vegetables
(G) 5 hours fall 3 ① 2 ②
Nomenclature, classification, nature, and importance of horticultural characteristics; varietal identification, origin, and uses.

Graduate Courses
See also courses marked (*g*) and (*G*) above.

Hort 501 Research

Hort 503 Thesis

Hort 505 Reading and Conference

Hort 507 Seminar
Terms and hours to be arranged

Hort 511 Plant Genetics
4 hours spring 4 ①
Specific topics in genetics of higher plants. Prerequisite: Bi 341; CrS 415. Offered alternate years. Offered 1982-83.

Hort 520 Topics in Plant Growth and Development
1-3 hours to be arranged
Analysis of scientific literature on topics of plant growth and development. Topics include dormancy and cold hardiness, crop productivity and photosynthesis, flowering and fruit set, rooting and rootstock physiology, application of growth regulators to horticultural crops. Additional topics added later. Prerequisite: minimum of 20 hours of plant science courses, including Bot 331 or equivalent. Offered alternate years.

MICROBIOLOGY

Microbiology deals with the forms and activities of bacteria yeasts, molds, and viruses. Undergraduate students may elect a major in this field, either for a liberal arts degree or as preparation for professional service in microbiology and allied fields. The first two years of the microbiology curriculum provide a thorough background in chemistry, biology, and liberal arts. During the third and fourth years students may specialize in some area of microbiology.

Many specialized fields of microbiology are available to the student and research worker. These include fundamental aspects such as the physiology, systematics, structure, or genetics of microorganisms; the applications of microbiology concerned with soil fertility, marine environments, food and dairy production and processing, industrial fermentation and biotransformation processes, sanitation, immunology, and human, animal, and plant diseases. Undergraduate studies in these areas will prepare students for admission to graduate programs in microbiology and for positions as health officers, sanitarians, and biotechnicians for private industry and government.

The Department of Microbiology also 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 microbial physiology and genetics; industrial, food dairy, soil, freshwater, and marine microbiology; immunology; and pathogenic microbiology, including bacteria and viruses.

Degrees in microbiology are granted through the College of Science; see "College of Science" for curricula and course descriptions.

POULTRY SCIENCE

Poultry science involves the study of all phases of reproduction, growth, and environmental needs of chickens and turkeys and the economic aspects of poultry production. The department offers undergraduate programs leading to the B.S. or B.Agr. degree.

With the rapid development of the poultry industry, a demand exists for men and women trained in poultry science. A well-trained staff and adequate physical facilities enable the department to offer excellent educational opportunities to both undergraduate and graduate students.

The department has three research plants —two for chickens and one for turkeys— flocks of popular breeds of chickens and turkeys, and various types of buildings and equipment, including modern incubators, batteries, and feed mixers, as well as laboratory facilities for instruction and research.

In addition to School of Agriculture and University requirements for the B.S. degree, poultry science majors are required to complete a minimum of 20 hours in poultry science. Through the careful use of electives and in consultation with their advisers, students may plan their programs to emphasize technology, science, or business to meet their individual needs and abilities. Students interested in a career in veterinary medicine can earn a bachelor's degree in poultry science while completing a preveterinary medicine program.

Graduate study may lead to the M.Agr., M.S., or Ph.D. degree in management, nutrition, or physiology.

Scholarships are available for both undergraduate and graduate students. Additional information may be obtained from the department.

The curriculum below satisfies all the B.S. degree requirements of the School of Agriculture and the University as well as those of the Department of Poultry Science.

Freshman Year	Hours
[5] Poultry Science (P 121)	3
Mathematics (depending on placement or aptitude test score)	12
Biological science, one year	12
English Composition (Wr 121)	3
Speech (Sp 112)	3
Journalism (J 111)	3
Physical education (PEA 101-199)	3
[1] General electives	9
Sophomore Year	
Techniques and Practices (P 312)	2
[2] Avian Embryo (P 321) or Anatomy and Physiology of the Fowl (VM/P 311)	3
[2] General chemistry (one year)	9–13
[2] Principles of Economics (Ec 213,214)	8
Basic Acctng and Fin Analysis (BA 217)	3
[3] Special Studies (P 199)	3
[1] General electives	16–20
Junior Year	
[3] Organic chemistry	3
[2] Anatomy and Phys of the Fowl (VM/P 311)[4] or Avian Embryo (P 321)	3
[2] Poultry Meat Prod (P 421) or Egg Prod (P 422)	4
[2] Poultry Breeding (P 441) or Avian Diseases (VM 451)[4]	3
[2] Feeds and Feeding (P 411)	0–3
[3] Genetics (Gen 311) or Principles of Animal Breeding (AnS 378)	4
[1] General electives	28-31
Senior Year	
[2] Egg Prod (P 422) or Poultry Meat Prod (P 421)	4
[2] Avian Diseases (VM 451)[4] or Poultry Breeding (P 441)	3
[5] Seminar (P 407)	1
[2] Feeds and Feeding (P 411)	0-3
[3] Projects (P 406)	3
[1] General electives	33-36

[1] Electives are under advisement of departmental adviser except 9 elective hours in junior and 9 in senior years.

[2] Offered alternate years. If not offered currently, course should be scheduled during subsequent year.

[3] Highly recommended.

[4] May be substituted for School of Agriculture U.D. requirement.

[5] Department requirement.

Lower Division Courses

P 121 Poultry Science
3 hours fall, winter 3 ①
Various phases of poultry industry; physiology, reproduction, feeding, housing, brooding, and management practices.

P 199 Special Studies
Terms and hours to be arranged

Upper Division Courses
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

P 311
Anatomy and Physiology of the Fowl
3 hours spring 3 ①
Structure and function of fowl. Offered alternately under VM or P prefixes during even-numbered years.

P 312 Techniques and Practices
2 hours spring 1 ① 1 ②
Selection for egg production, meat production. Standard of Perfection. Reasons for, principles behind, and techniques of beak trimming, specking, vaccinating, blood testing, and artificial insemination. Offered odd-numbered years.

P 321 Avian Embryo
3 hours winter 3 ①
Development and environmental requirements of embryos of the domestic fowl. Prerequisite: P 121 or Z 201 or GS 101. Offered odd-numbered years.

P 401 Research

P 405 Reading and Conference

P 406 Projects
Terms and hours to be arranged

P 407 Seminar
1 hour winter, spring 1 ①

P 411 Feeds and Feeding (g)
3 hours fall 3 ①
Nutritional requirements: ration formulation; common nutritional deficiencies; feeding practices. Prerequisite: P 121 or GS 101 or Z 201 or Ch 226. Offered odd-numbered years.

P 421 Poultry Meat Production (g)
4 hours fall 4 ①
Marketing and demand for poultry meat; brooding, rearing, management, economics, housing, equipment of meat and breeder turkeys and of chicken broilers; processing, grading, packing poultry meat. Prerequisite: P 121 or equivalent. Offered odd-numbered years.

P 422 Egg Production (g)
4 hours fall 4 ①
Brooding, rearing, management, feeding of replacement pullets and egg-production stock. Producing, grading, packing, and selling quality eggs and egg products. Prerequisite: P 121 or equivalent. Offered even-numbered years.

P 441 Poultry Breeding (g)
3 hours winter 3 ①
Inheritance of egg and meat production in domestic fowl. Prerequisite: P 121 or GS 101 or Z 201. Offered even-numbered years.

P 451 Avian Environmental Physiology and Reproduction (G)
4 hours winter 3 ① 1 ②
Reproductive systems in male and female fowl, reproductive efficiency, factors affecting reproduction. Effects of external environmental factors on the physiology and performance of the fowl, interrelationships of the fowl with the environment, adapting the environment to the fowl. Prerequisite: Bi 213 or VM 311 or equivalent. Offered odd-numbered years.

Graduate Courses
See also courses marked (g) and (G) above.

P 501 Research

P 503 Thesis

P 505 Reading and Conference
Terms and hours to be arranged

P 507 Seminar
1 hour each term 1 ①

P 513 Monogastric Animal and Poultry Nutrition
5 hours spring 2 ② 1 ①
Nutrient requirements of domestic animals and poultry. Emphasis on digestion, metabolism, and function of nutrients. Prerequisite: graduate standing. Offered even-numbered years. Also offered as AnS 513 in odd-numbered years.

P 550
Selected Topics in Poultry Science
3 hours winter 3 ①
Recent advances in various disciplines pertinent to poultry science. Topics and instructor will vary from year to year. May be taken for a maximum of 6 hours.

RANGELAND RESOURCES

Rangeland resource management is one of the family of natural resources professions important to the social, economic, and political development of Oregon and the nation. It is concerned with the improvement, conservation, ecology, 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 program of training. A good balance among crop, soil, domestic animal, wildlife, and other biological sciences is realized.

The recommended curricula below include University and departmental requirements for the B.S. degree and provide for emphasis either in the science or business aspects of rangeland resources. Facilities available for study and research include greenhouse, field plot, pasture, range, and animal facilities both on campus and at two experiment stations in eastern Oregon. Field trips are taken in conjunction with specific courses.

Graduate work leading to M.Agr., M.S., or Ph.D. degrees may involve domestic or wild animals, range nutrition, range ecology, physiology of range plants, range improvement, range watershed management, range utilization and management, and range resource analysis and monitoring through remote sensing.

Summer employment with private industry, federal and state agencies, and on range research projects makes possible earning while learning. 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.

Curriculum—192 hours

	Science Option (*Hours*)	Business Option (*Hours*)
Freshman Year		
Agriculture	3	
Business		8
English composition	3	3
Botany	8	8
Chemistry	9	9
Mathematics	12	12
Zoology		6
Physical education	3	3
Sophomore Year		
Rangeland resources	3	3
Animal science	3	3
Soils	5	5
Resource electives	6	6
Business		8
Oral communications	3	3
Botany	4	4
Zoology	6	
Chemistry, organic	3	3
Geology	3	
Social science	8	8
Junior Year		
Rangeland resources	9	9
Animal science	3	7
Agriculture resource economics		8
Resource electives	3	3
Writing	3	3
Communications elective		3
Botany	13	9
Physical science	6	
Statistics	6	
Humanities and arts	6	
Senior Year		
Rangeland resources	15	15
Animal science	4	
Agriculture resource economics	3	3
Soils	4	4
Business		7
Communications elective	3	
Botany		4
Genetics	3	3
Humanities and arts	6	12
Social science	4	4
Unrestricted electives	17	4
TOTALS		
Agriculture	63	68
Business		23
Communications	12	12
Biology and physical science	70	58
Physical education	3	3
Social science	12	12
Humanities and arts	12	12
Unrestricted electives	20	4
	192	192

Upper Division Courses

Courses numbered (g) and (G) may be taken for graduate credit.

Rng 341 Rangeland Resources
3 hours 3 ①
Nature and management of rangelands. Integrated land use with emphasis on plant-animal-soil interactions. Prerequisite: sophomore standing.

Rng 343 Range Plant Communities
4 hours winter 3 ① 2 (1½)
Physical, climatic, vegetational, and ecological characteristics of the Great Plains, desert grasslands, southern desert shrub, and woodland-chapparral regions. Prerequisite: Rng 341; Bot 321.

Rng 344 Range Plant Communities
4 hours spring 3 ① 2 (1½)
Physical, climatic, vegetational, and ecological characteristics of the coniferous forest, bunchgrass, northern desert shrub, and juniper regions. Prerequisite: Rng 341; Bot 321.

Rng 405 Reading and Conference

Rng 406 Projects

Rng 407 Seminar

Rng 408 Workshop
Terms and hours to be arranged
Ecological principles and /or management practices as they relate to selected topics in range and related resource management.

Rng 421 Rangeland Improvement and Grazing Management (G)
4 hours fall 4 ①
Discussion and evaluation of different methods and philosophies of managing and improving rangelands. Field trip required. Prerequisite: Rng 341,344, or 343.

Rng 441 Rangeland Analysis (g)
4 hours fall 3 ① 1 ③
Evaluating rangelands; inventory, forage utilization, range condition, and trend; field problems; use of aerial photographs and sampling theory. Field trip required. Prerequisite: Rng 341.

Rng 442 Rangeland-Animal Relations
(G) 4 hours winter 4 ①
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. Prerequisite: Rng 341; AnS 311; ecology.

Rng 443
Range Management Planning (G)
4 hours spring 3 ① 1 (2½)
Administration and management of rangelands: planning processes involving goal setting, inventories, personnel management, environment, and other constraints necessary for decision making. Use of data collected from field problems to support the execution of class plans. Field trip required. Prerequisites: senior standing in a natural resource field.

Rng 450
Range Watershed Management (G)
3 hours winter 2 ① 1 ②
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 a land use, manipulative tool. Concepts of arid land hydrology, with emphasis on the resultant effects on runoff quantity and quality. Prerequisite: Rng 341, 421.

Graduate Courses

See also courses marked (g) and (G) above.

Rng 501 Research

Rng 503 Thesis

Rng 505 Reading and Conference
Terms and hours to be arranged

Rng 505A Reading and Conference: Rangeland Watershed Methods and Analysis
2 hours fall 2 ①
Principles, methods, and uses of arid land hydrology and range management problems investigated through readings, lectures, and problem sets. Optional field trip. Consent of instructor required. Offered alternate years. Offered 1982-83.

Rng 507 Seminar
2 hours winter

Rng 541
Perspectives in Range Research
3 hours winter 3 ①
Problem analysis approach; integration of plant and animal research. Consent of instructor required. Offered alternate years. Not offered 1982-83.

Rng 542 Rangeland Ecology
4 hours spring 2 ① 2 ②
Application of ecology in rangeland and related resource management; field trip. Prerequisite: systematic botany. Bot 441,442. Offered alternate years. Not offered 1982-83.

Rng 543 Rangeland Management
3 hours winter 1 ① 2 ②
Basic physiological characteristics and growth strategies of plants. Importance of these characteristics and strategies in management of rangeland communities. Offered alternate years. Offered 1982-83.

SOIL SCIENCE

Food and fiber production and the quality of the environment concern the soil scientist. Essential to soil science is knowledge in chemistry, physics, biology, and the earth sciences. Soil science is a synthesis of the physical and biological sciences directed towards the study of the nature and properties of soil and its use and conservation in food and fiber production as well as in land use planning.

Majors in soil science may choose from four curricula. Those planning graduate studies leading to research or college teaching, or those intending to work in soil mapping should elect the science option. Those preparing for work in chemical industries, other commercial organizations, and farming may elect the business option. The technology option leads to careers in soil conservation planning, Extension, land appraisal, field work for industrial and commercial organizations, and farming. The land use option provides students with a knowledge of soil survey and land use interpretation and prepares them for employment opportunities with consulting firms, private industry, and with city, county, state, and federal governments.

The department offers graduate work leading to the Master of Science and Doctor of Philosophy degrees. Graduate programs may include research and study in soil fertility and plant nutrition, soil physics, forest and range soils, soil chemistry, clay mineralogy, soil microbiology, soil classification, genesis and morphology of soils, or land use. Many different soils and soil problems are available for study.

Curriculum

Minimum requirements for the B.S. degree (192 hours). Specific elective suggestions for the four undergraduate options are available from department adviser.

Freshman Year	*Hours*
Crop Science (CS 201)	3
Math (through Mth 163 or 201)	8–12
Chemistry (Ch 104,105,106, or 201,202, 203)	9–13
English Composition (Wr 121)	3
Physical education (3 activity courses)	3
Communications elective	
Social science and humanities/arts electives	to total 12 hours each

Sophomore Year	
Soils (Sls 210,324)	5
Botany (Bot 201,202,331)	13
Chemistry (Ch 226,234)	7
Social science and humanities/arts electives	to total 12 hours each

Junior Year

Geology (G 211,212,213) 12
Physics (Ph 201,202) 8
Soils (Sls 412,413,321,324,454) .. at least 10
Electives (see University and School of Agriculture requirements and consult department adviser)

Senior Year

Soils (Sls 311,314,407,421,422,432) at least 12
Microbiology (Mb 302,303) 5
Electives (see University and School of Agriculture requirements and consult department adviser)

Lower Division Courses

Sls 100 Soils and Man
3 hours 3 ①
For nonmajors. 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. KLING.

Sls 199 Special Studies
Terms and hours to be arranged

Sls 210 Soils
5 hours 3 ① 1 ① 1 ③
Origin, formation, classification; physical, chemical, and biological characteristics; effects of soil management on agricultural and forest crop production. Field trip. Prerequisite: Ch 203; Mth 101 or equivalent. BAHAM, CHRISTENSEN.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Sls 311 Soil Water and Plant Growth
3 hours fall 3 ①
Water in soils and plants; measurements of crop water requirements; water movement in soil/plant/atmosphere; soil-water aspects of drainage and irrigation; water in dryland crop production. Prerequisite: Sls 210. WARKENTIN.

Sls 314 Soil Management and Conservation
4 hours 3 ① 1 ③
Identifying, analyzing, and solving problems in soil management; agricultural production systems in different climatic areas of Oregon and on different soils; soil management and quality of the environment. Field trips, discussions, and lectures. Designed for students with a strong background in soils. Saturday and weekend field trips required. Prerequisite: Sls 210; consent of instructor. STAFF.

Sls 321 Soils and Land Use
4 hours 3 ① 1 ③
Soil resource characteristics and distribution as basic considerations in land use; soil maps and interpretations for land use planning; specific environmental problems and solutions in relation to soils. Class discussion; case studies; field trips. Prerequisite: Sls 100 or Sls 210. STAFF.

Sls 324 Soil Fertility
3 hours 3 ①
Relationships between soil properties and plant nutrient availability; characteristics and use of fertilizers, soil amendments and manure; evaluation of fertility status of soils. Prerequisite: Sls 210. GARDNER.

Sls 401 Research

Sls 405 Reading and Conference
Terms and hours to be arranged
Section A: Practice in Teaching.

Sls 407 Seminar
1 hour each term 1 ①

Sls 408 Workshop (g)
Terms and hours to be arranged
Soils information designated either for specific locality in Oregon or to cover selected topics in soils, such as soil management, soil survey, soil fertility, soil physics, irrigation.

Sls 412 Soil Chemistry (G)
3 hours 3 ①
Important chemical phenomena in soils; basic structures and properties of clays; exchange reactions; chemical phenomena of individual elements in soils. Prerequisite: Sls 210; Ch 234 or equivalent. VOLK.

Sls 413 Soil Chemical Analysis (G)
2 hours 2 ③
Application of analytical chemistry and instrumentation: ion extraction and fixation, exchange capacity, free sesquioxides, organic matter, exchange acidity, lime requirement, mineral identification, conductivity. Taken concurrently with Sls 412. Prerequisite: Sls 210; Ch 234 or equivalent. VOLK.

Sls 421 Soil Physics (G)
3 hours 3 ①
Physical properties of soil including structure, moisture, temperature, and aeration, and their measurement. Prerequisite: Sls 210. BOERSMA.

Sls 422 Soil Physics Laboratory (G)
2 hours 2 ③
Techniques for examining or evaluating various physical properties of soil. Prerequisite: Sls 421. STAFF.

Sls 432 Soil Morphology and Survey
(g) 4 hours 3 ① 1 ③
Soils in place; distribution patterns; morphology of major groups; soil survey techniques. Saturday field trips required. Prerequisite: Sls 210 and course in geology. SIMONSON.

Sls 454 Forest Soils (G)
3 hours 3 ①
Physical, chemical, and biological properties of undisturbed soils. Principles of soil science applied to management of forest land. Soils in forest ecosystems. Field trips required. Prerequisite: Sls 210. STAFF.

Graduate Courses

See also courses marked (g) and (G) above.

Sls 501 Research

Sls 503 Thesis

Sls 505 Reading and Conference

Sls 507 Seminar
Terms and hours to be arranged

Sls 511 Soil Genesis and Classification
3 hours 3 ①
Soil development; soil-forming factors and processes as related to soil landscape formation and soil classification. Prerequisite: Sls 432. Offered alternate years. Offered 1982-83. SIMONSON.

Sls 512 Chemical Processes in Soil Systems
3 hours 3 ①
Physical and collodial chemistry of soils; solid-solution, oxidation-reducation, complex, and cation exchange equilibria, modeling. Offered alternate years. Offered 1982-83. BAHAM.

Sls 513 Soil Fertility
3 hours 3 ①
Chemical and physical processes affecting plant response to nutritionally important elements, current literature and approaches to soil fertility and plant nutrition research, predicting response from nutrients, effects of fertilizers on nutrient content of plants. Prerequisite: Sls 324; 2 years of chemistry. Courses in plant physiology and soil chemistry recommended. CHRISTENSEN.

Sls 515 Practicum in Teaching
3 hours 3 ①
Developing skills and competence in teaching soil science under staff supervision; organization and presentation of instructional material by assisting in laboratory, recitation, and lectures.

Sls 522 Plant-Water Relations
3 hours 3 ①
Quantitative aspects of the distribution, movement, and function of water in the soil/plant/atmosphere continuum. Prerequisite: Sls 421 or Ch 442 or permission of instructor. Offered alternate years. Offered 1982-83. BOERSMA.

Sls 523 Clay Mineralogy
3 hours 2 ① 1 ③
Principles of structure; structure of phyllosilicates; theory and practice of identification by X-ray diffraction, differential thermal analyses, chemical and physical properties; formation, alteration, and occurrence of clays. Chemistry, physics, and mineralogy courses recommended. Offered alternate years. Not offered 1982-83. STAFF.

Sls 524 Soil Organic Matter
3 hours 2 ① 1 ③
Soil organic materials, their composition, properties, structure, function; relationships to microorganisms, plant roots /rhizosphere, soil physical and chemical properties; associations with metals, crystalline and amorphous clay-size materials/complexes. Offered alternate years. Not offered 1982-83. STAFF.

Courses from other departments accepted for major credit:

Mb 448 Microbial Ecology (G)
3 hours spring 3 ①

Mb 449 Microbial Ecology Laboratory
(G) 2 hours spring 2 ③

Mb 564 Selected Topics in Soil Microbiology
3 hours winter
See Microbiology in "College of Science" for description.

STATISTICS

The Department of Statistics offers undergraduate service courses, as well as graduate courses and programs leading to the M.A., M.S., and Ph.D. degrees in statistics and operations research or to a minor for an advanced degree in other fields. Specialization is available in theory of statistics, operations research, biometry, or applied statistics. Students planning to major in statistics at the graduate level should have a minimum of mathematics through calculus and upper division work in statistics.

Degrees in statistics are granted through the College of Science; see "College of Science" for curricula and course descriptions.

BUSINESS

FACULTY

As of January 1982

Earl Goddard, *Dean*

Jane Siebler, *Assistant Dean and Head Adviser*

Clifford Dalton, *Assistant Dean*

Professors Emeritus Campbell, Larse, LeMaster, McCain, Newton, Pfanner, Winger, Yerian

Departments in Business Administration

Accounting *Professor* Kemp (department head)
Associate Professors Bailes, Frishkoff, Martin, Neyhart, Shirley, Weiler
Assistant Professors Phillips, Senatra, Shelton
Instructors Dunsdon, Farley, Streit

Management *Professors* Amano, Easton (department head), Goddard, Rettig
Associate Professors Gudger, Motamedi, Shane
Assistant Professors Beran, Bigelow, Buffa, Dalton, King, Larson, Mukatis, Park
Instructors Buck, Lawton, Mackey, Selsky, Siebler, Swanson, Wilmot

Management Science *Professor* McFarlane
Associate Professors Abrassart (department head), Bloomfield, Harrison, Paschke, Woodworth
Assistant Professor Sullivan
Instructors Berggren, Cohen, Coul, Navin, Peters, Thomas

Marketing, Finance, and Production *Professors* Becker, Browne (department head), Dane, Gray, Stonehill, Strickler, Widicus
Associate Professors Brown, Collins, Nielsen, Schary
Instructors Clark, Dickerson, Sisson, Sweeney, Tompkins

Business Programs

Administrative Management *Professor* Wells (program director)
Associate Professor Jones

Health Care Administration *Professor* Ellis (program director)

Hotel and Restaurant Management *Professor* Behrendt
Associate Professor Soule (program director)
Instructor Kluge

The School of Business provides students with the professional preparation necessary for successful careers in modern business and management. Emphasis is placed not only upon the concepts and analytical techniques of business decision making, but also upon the obligations and opportunities of business people for effective service to society.

The school is accredited by the American Assembly of Collegiate Schools of Business.

Degree Programs

The school offers three undergraduate and two graduate degree programs. Undergraduate degree programs:

Business administration, with areas of concentration in accounting, financial management, management, management science, marketing management, personnel administration and industrial relations, international business, agricultural business management, and general business. A minor in a nonbusiness area is required of all students completing an area of concentration in business administration.

Health care administration, a joint program with the School of Home Economics and the School of Health and Physical Education, offering professional training in the management of long-term care facilities, private health care organizations, and public health care organizations. See page 226 for a description of this program.

Hotel and restaurant management, a joint program with the School of Home Economics. See page 227 for a description of this program.

Curricula lead to the degree of Bachelor of Arts (B.A.) or Bachelor of Science (B.S.), Master of Business Administration (M.B.A.), and Master of Science in management science (M.S.). For advanced degrees see "Graduate School."

High School Preparation

The following high school courses are recommended for students planning to enroll in the School of Business: English, four years; mathematics, four years; history and social studies, three years; typing, one year; natural science, two years.

University Honors Program

The Honors Program in this school is coordinated with the programs in other schools and administered by the director of the University Honors Program (see page 37). Information concerning eligibility and application forms may be obtained from the director.

Transfer Students

Students planning to transfer into the School of Business should do so as early as possible. Those planning to transfer from a community college should consult the *Community College Transfer Programs Booklet,* or the business adviser at the community college, to determine the most appropriate courses to complete prior to transfer. The head adviser of the School of Business may also be contacted for advice.

Counseling and Placement

The School of Business has experienced counselors available to advise students in all academic matters as well as the areas of career choice and job placement. Faculty members assist students in any way they can.

The services of the Career Planning and Placement Center are available to all students seeking information concerning placement opportunities, interviews with visiting firms, and general information concerning career objectives.

Academic Requirements

The standards set forth below apply to all students who entered the School of Business at or after the beginning of the fall term, 1980, and are in addition to those standards applicable to all students in the University.

Graduation requirements for students in the School of Business include (a) a minimum 2.00 overall grade-point average for all course work taken in the school, and (b) a minimum 2.00 overall grade-point average for all 400-level course work taken in the school.

In addition, students are expected to make satisfactory progress toward a degree. Satisfactory progress includes, but is not necessarily limited to, the completion of all review group courses listed below by the time the designated number of credits has been completed. The record of every student in the school will be reviewed at minimum at the completion of 45 credits, 90 credits, and 135 credits. Students at or beyond any of these stages of progress will be suspended from the school, if either (a) a minimum 2.00 GPA is not achieved in review group course work, or (b) two or more review group courses have not been completed. (Exception: transfer students who are following a schedule approved for them by the head adviser of the school which provides for the completion of review group courses after the time of review.)

Review group courses consist of the following (or their equivalent taken at other institutions):* (a) at the end of the freshman year (45 credits): BA 131, Wr 121, Mth 101, and Mth 162; (b) at the end of the sophomore year (90 credits): all freshman year review group courses plus BA 211, BA 212, BA 226, BA 235, Mth 163, Ec 213, Ec 214; (c) at the end of the junior year (135 credits): all freshman and sophomore review group courses plus BA 302, BA 311, BA 312, BA 313, BA 338, BA 361, Wr 327, and the English Diagnostic Test must have been taken. Review group courses for which grades of D, F, or W are received may be repeated *once*. Review group courses in which grades of B or C are received may not be repeated.

All students graduating in the spring of 1983 or later must earn a passing score on the English Diagnostic Test prior to graduation or complete an approved alternate. The test must first be taken no later than the junior year.

Concurrent Degrees

Students who wish to earn an undergraduate degree in business administration combined with a degree in other areas in which degrees are offered at OSU can enroll in the concurrent degree program. The requirements to qualify for two degrees are listed under "Requirements for Baccalaureate Degrees" on page 13. Students who intend to obtain one of their degrees in business administration should see the head adviser of the School of Business as soon as possible.

* Review group courses apply to business administration. Students majoring in either health care administration or hotel and restaurant management should consult with the appropriate program director for a listing of the courses applicable to that program.

BUSINESS ADMINISTRATION PROGRAMS

Business Administration

The undergraduate curriculum in business administration reflects the increasingly complex economic, social, and technological aspects of modern business decision making. In all course work, emphasis is placed upon the development of effective decision making, including an understanding of personal values and motivation, and an awareness of the interrelationship between business and society. In the junior or senior year, students select an area of concentration which includes specialized course work in their area of major interest (see page 135).

The study of business administration is combined with a minor in a nonbusiness area (see page 135 for listing of approved minors). Minors are designed to augment the education of the business executive by providing tools or understanding related to the increasingly complex demands a business professional must deal with during a business career.

Summary of Program Requirements (192 hours of university-level courses):

Business Administration Core Curriculum (56 term hours)

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 (see courses with *BA* prefix in core curriculum).

Area of Concentration (17-35 term hours)

The area of concentration is designed to allow students to extend their professional preparation beyond the introductory level in one or more areas. All areas of concentration except accounting may be completed within one academic year and are designed for the senior year. Students electing accounting begin their concentration course work in the junior year.

Minor (23-33 term hours)

Each business administration student selects and completes one of several minors available for study. Students typically begin course work for their minor in the sophomore year (see page 135 for listing of approved minors).

Mathematics (12-16 term hours)

The basic mathematics requirement is Intermediate Algebra II (Mth 101) and Mathematics for the Biological, Managerial, and Social Sciences (Mth 162, 163), preceded, for those students needing it, by Intermediate Algebra I (Mth 95). Entering transfer students who have completed a mathematics sequence through one term of calculus may substitute this mathematics background for part or all of the mathematics requirement.

Economics (8 term hours)

Micro- and macro-economics are covered in the two-term sequence Principles of Economics (Ec 213,214). Students transferring from another institution who have completed a year course in principles of economics have completed this requirement.

Technical Report Writing (3 term hours)

Business students take this course in addition to the one term of English composition required by the University. Transfer students who have completed nine term hours of English composition are excused from this requirement.

*Electives (46-66 term hours)**

Through elective courses, students pursue to some extent their interests in other subject areas. Some elective credits must be taken in science/math, humanities/arts, social sciences, and written/oral communication in order to complete the University general education requirements (see page 13 for outline of University general education requirements). Information on the relationship of these requirements to present School of Business requirements is available from the head adviser.

University General Requirements

The University requires one term of English composition (3 term hours) and three terms in physical education activity courses (3 term hours total). In addition, all students must satisfy the other University general requirements for baccalaureate degrees shown on page 13.

* Seventy-five of the 192 term hours required for graduation must be taken in courses other than business administration.

Core Curriculum

Freshman Year—48 hours

Introduction to Business (BA 101)	4
Intro to Bus Data Proc (BA 131)	4
[1]Mathematics (Mth 101,162,163)	12
English Composition (Wr 121)	3
Physical education	3
[2]Electives	22

Sophomore Year—48 hours

Principles of Economics (Ec 213,214)	8
Quantitative Bus Methods (BA 235)	4
Financial Accounting (BA 211)	4
Managerial Accounting (BA 212)	4
Business Law (BA 226)	4
Technical Report Writing (Wr 327)	3
Minor	9
[2]Electives	12

Junior Year—48 hours

Management Processes (BA 302)	4
Operations Management (BA 311)	4
Marketing (BA 312)	4
Finance (BA 313)	4
Intro to Manag Science (BA 338)	4
Organizational Behavior (BA 361)	4
Minor	9
[2]Electives	15

Senior Year—48 hours

Business and Its Environment (BA 495)	4
Business Policy (BA 499)	4
Minor	9
[2]Electives	8–14
[3]Business administration concentration (students majoring in business administration must choose an area of concentration no later than the beginning of their senior year)	17–23

AREAS OF CONCENTRATION

Students in business administration must complete 17-35 term hours of upper division business administration or related courses in one of the areas of concentration listed below.

[4]Accounting

Junior Year	Hours
Intermed Finan Accounting I (BA 317)	4
Intermed Finan Accounting II (BA 318)	4
Intermed Finan Accounting III (BA 319)	4
Cost Accounting I (BA 421)	4
Cost Accounting II (BA 422)	4

Senior Year

Advanced Accounting I (BA 419)	4
Tax Accounting I (BA 425)	4
Auditing I (BA 427)	4
Related course	3

Related courses

Business Law (BA 413), Advanced Accounting II (BA 420), Not-for-Profit Accounting (BA 423), Tax Accounting II (BA 426), Auditing II (BA 428), Advanced Accounting Theory (BA 429)

[1] Students minoring in applied mathematics should take Mth 110,200 instead of Mth 163.

[2] In selecting electives, students should consider three separate sets of requirements: the 60 upper division hour requirement, the institutional requirements in general education, and those for either the Bachelor of Science or Bachelor of Arts.

[3] Students in accounting will begin their 35-hour area of concentration in the junior year, reducing their elective hours as needed.

[4] Achievement of a minimum GPA in 300-level accounting courses is required for admission to senior-level accounting courses. In addition, other performance standards are applicable to the accounting concentration; students should consult departmental office for enrollment requirements.

Financial Management

Senior Year

MANAGEMENT OF FINANCIAL SERVICES OPTION

Financial Management (BA 447)	5
Manag of Finan Instit (BA 448)	5
Choose three of the following:	
Investments (BA 442)	4
Securities Analysis and Portfolio Management (BA 443)	3
Insurance (BA 444)	3
Business Insurance and Risk Management (BA 445)	4
International Financial Management (BA 485)	4

FINANCIAL PLANNING AND CONTROL OPTION

Intermed Finan Accounting I (BA 317)	4
Intermed Finan Accounting II (BA 318)	4
Intermed Finan Accounting III (BA 319)	4
Financial Managemeont (BA 447)	5
Manag of Finan Instit (BA 448)	5
Choose one of the following:	
Business Insurance and Risk Management (BA 445)	4
Internat Finan Manag (BA 485)	4
Tax Accounting (BA 425)	4
Cost Accounting (BA 421)	4

Management

Senior Year

Manag and Organiz Theory (BA 460)	4
Advan Organizational Behavior (BA 461)	4
Any three courses selected from management option below, or all three courses from entrepreneurship option below	12

MANAGEMENT OPTION

Management Decision Making (BA 493)	4
Organizational Dynamics (BA 494)	4
Management and Labor (BA 496)	4
Management Planning (BA 497)	4
Internat Envir and Manag (BA 486)	4

ENTREPRENEURSHIP OPTION

Venture Initiation and Develop (BA 463)	4
Enterprise Manag and Innov (BA 464)	4
Projects (BA 406)	3–4

Management Science

Senior Year

Business Systems (BA 436)	4
Business Systems (BA 437)	4
Management Science (BA 434)	4
Management Science (BA 435)	4
Any related course	3–4

Related courses

Business Data Processing Systems (BA 331), Simulation in Business (BA 433), Management Decision Making (BA 493), Management Planning (BA 497), Introduction to Symbolic Language Programming: FORTRAN (CS 213), Computer Simulation (St 417)

Marketing Management

Senior Year

	Hours
Marketing Management (BA 471)	5
One course from each of the following three sets of courses:	
Manag Market Comm (BA 473)	5
Consumer Behav (BA 476)	5
Distrib Manag (BA 474)	4
Sales Manag (BA 475)	4
Market Policy (BA 472)	4
Market Research (BA 478)	4
Elective	
International Market (BA 484)	4

Personnel Administration and Industrial Relations

Senior Year

Personnel Management (BA 467,468)	6
Case Prob in Personnel Manag (BA 469)	3
Labor Problems (Ec 425)	3
Labor Legislation (Ec 426)	3
Labor Economics (Ec 427)	3

International Business

Senior Year

International Marketing (BA 484)	4
Internat Finan Manag (BA 485)	4
Internat Environ and Manag (BA 486)	4
Related courses	6–8

Related courses

Approved courses in economics, history, political science, and business administration. See head adviser, School of Business, for list of currently approved courses.

Agricultural Business Management

Senior Year

Agricultural Marketing (AREc 311)	5
Public Policy in Agricul (AREc 411)	4
Agricultural Finance (AREc 431)	3
Related courses	6–10

Related courses

Livestock Economics (AREc 440), International Agricultural Development (AREc 462), Monetary and Banking Theory (Ec 411,412), Agricultural Business Management (AREc 211), Property Appraisal (AREc 425), Land and Water Economics (AREc 461), Farm Management (AREc 414)

General Business

The student electing the general business concentration must take 18 hours of upper division business administration or related courses. A maximum of three approved upper division courses in economics may be accepted in lieu of business administration courses.

MINORS

All students majoring in business administration take a minor in a nonbusiness area; established minor programs are listed below. Students interested in an interdisciplinary minor should consult the head adviser.

Science

Only *natural* science courses are acceptable in this minor.

Sophomore Year

Natural science sequence 9–12

Junior Year

Three natural science courses, dependent upon or related to the sophomore year natural science courses *or* natural science sequence in another area 9–12

Senior Year

Natural science courses, related to each other and dependent upon or related to the sophomore year and/or the junior year natural science courses or other courses approved by head adviser, School of Business 9–12

Applied Mathematics

Professor David H. Carlson, adviser

Freshman Year

Calculus (Mth 200,201,202)	12

Sophomore Year

Elementary Linear Algebra (Mth 241)	4

Junior and Senior Years

Courses in mathematics, statistics, or computer science approved by head adviser, School of Business 9–12

Agriculture

Sophomore Year

Science courses related to junior and/or senior year minor courses	9

Junior Year
Related courses 9

Senior Year
Related courses 9

The related courses must be chosen from *one* of the following departments of the School of Agriculture: Animal Science, Crop Science, Fisheries and Wildlife, Horticulture, Poultry Science, Soil Science; or from Agricultural Engineering (School of Engineering).

Behavioral Science

Courses in minor option must be approved by head adviser, School of Business.

GENERAL OPTION

Sophomore Year
General Psychology (Psy 201,202)..... 6
General Sociology (Soc 204,205) 6

Junior Year
General Anthropology, cultural (Anth 106) 5
Behavior Analysis (Psy 221) 3

Senior Year
Experimental Psychology (Psy 321) *or* Methods of Social Research (Soc 328) 4–5

PSYCHOLOGY OPTION

Sophomore Year
General Psychology (Psy 201,202) 6

Junior Year
Experimental Psychology (Psy 321) 4
Courses in minor option 6

Senior Year
Attitude and Opinion Methodology (Psy 442) 3
Courses in minor option 6

SOCIOLOGY OPTION

Sophomore Year
General Sociology (Soc 204,205) 6

Junior Year
Methods of Social Research (Soc 328) 5
Courses in minor option 3

Senior Year
Courses in minor option 9

Clothing, Textiles, and Related Arts

Professor Ruth Gates, adviser

Sophomore Year
Clothing and Man (CT 211) 3
Construction Lab (CT 225) 1
Analysis of Apparel Construct (CT 226) 3
Textiles (CT 250) 3

Junior Year
Fundamentals of Fashion (CT 270) 3
Fashion Market Analysis (CT 370) 3

Senior Year
Fashion Merchandising (CT 371) 3
Approved courses in minor (see head adviser, School of Business) 5–7

Computer Science

Professor Curtis Cook, adviser

Sophomore Year
Intro to Computer Science (CS 211) 4
Tech of Comp Progr (CS 212) 4
Intro to COBOL Programming (CS 217) 4

Junior Year
Approved courses in computer science or statistics 8

Senior Year
Approved courses in computer science or statistics 7

These junior and senior year courses must be approved by head adviser, School of Business.

Forestry

Professor W. P. Wheeler, adviser

Business administration students minoring in forestry must complete 16-18 hours of required courses in one of the following minor options: forest management; natural resource conservation; forest engineering; wood industry management; wood industry: pulp and paper; or resource recreation management. Consult head adviser, School of Business, for specific requirements in each option.

Sophomore Year
Introduction to Forestry (F 111) 4
Wood Tech and Utiliz (FP 210) 4
Courses in minor option 3

Junior Year
Courses in minor option 8–9

Senior Year
Courses in minor option 8–9

Industrial Engineering

Professor Edward D. McDowell, adviser

Sophomore, Junior, and Senior Years
Work Measurement and Design (IE 361) 4
Materials Handling and Facility Layout (IE 365) 3
Human Factors in Engineering (IE 441) 4
Design Graphics (GE 315) 3
Quality and Reliability Control (IE 491) 3
Related courses (see head adviser, School of Business) 10

Institution Management

Professor Ann Messersmith, adviser

Sophomore Year
Chemistry (Ch 104,105,106 *or* 201,202, 203) 9–13

Junior Year
Human Nutrition (FN 225) 4
Foods (FN 215) 5
Quantity Food Prod (IM 311) 4

Senior Year
Equip Plan Facility Design (IM 441) 3
Foodserv Procur Invent Sys (IM 442) 3
Organ and Manag of Foodserv (IM 445) .. 5

Related courses
Meal Management (FN 313), Microbiology (Mb 130)

Interdisciplinary Minor

Students may design a minor program by combining courses from any of the areas in which minors are offered to business administration majors. Such minors must consist of at least 27 credits. Students choosing an interdisciplinary minor are expected to demonstrate how the courses selected will support their career goals.

The head adviser of the School of Business will help students to select courses for an interdisciplinary minor; such minors must be approved by the head adviser no later than the beginning of the senior year.

Graduate Programs

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 (although business graduates are also accepted). The program stresses breadth of knowledge in all areas of business and administration and is intended to produce a working knowledge of those skills necessary for the graduate to develop into a competent and responsible executive in both private and public organizations. The M.B.A. program consists of 45 credits of graduate courses, plus approximately 45 credits of required prerequisite courses.

Master of Science in Management Science. The M.S. in management science is designed to prepare graduates for staff and executive positions requiring a combination of managerial skills and the application of systems analysis and modern quantitative decision-making techniques. The program requires 45 credits.

BUSINESS ADMINISTRATION COURSES

Lower Division Courses

BA 101 Introduction to Business
4 hours 4 ①
Business organization, operation, and management intended to orient the student in the field of business and to help the student determine a field of major concentration.

BA 131 Introduction to Business Data Processing 4 hours 3 ① 1 ①
Concepts, elements, and structure of business data processing systems; classifying, calculating, and reporting functions; programming, computer fundamentals. Prerequisite: Mth 95.

BA 199 Special Studies
Terms and hours to be arranged

BA 211 Financial Accounting
4 hours 4 ①
Financial reporting to outsiders. The accounting cycle: income determination/asset valuation. Financial statement preparation and analysis.

BA 212 Managerial Accounting
4 hours 4 ①
Providing information for management decisions. Data accumulation for product costing, for performance evaluation and control, and for planning. Prerequisite: BA 211.

BA 217 Basic Accounting and Financial Analysis 3 hours 3 ①
For students who take only one term of accounting. Methods of recording, summarizing, and presenting accounting data. Emphasis on basic principles and terminology; significance, analysis, and interpretation of accounting data; accounting as tool of management. Not open to business students.

BA 226 Business Law
4 hours 4 ①
Nature and function of the law in our business society; obligations arising out of tort; formation, performance, and discharge of contracts.

BA 231 Business Data Processing
4 hours 4 ①
Application of computers to business data processing using COBOL. The development of a common business-oriented computer language and its use in modern business organizations. Comparison of COBOL with other automatic programming languages. Prerequisite: BA 131.

BA 235 Quantitative Business Methods
4 hours 4 ①
Management decision processes utilizing statistical methods; use and application of probability concepts, sampling procedures, parameter estimation, and regression analysis to the analysis and solution of such business problems as income and cost estimation, sales forecasting, performance evaluation, inventory analysis, and quality control. Prerequisite: Mth 162.

Upper Division Courses
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

BA 302 Management Processes
4 hours 3 (1½)
Systematic examination of basic management processes within an enterprise. Planning: development of objectives and plans. Organizing: structuring work relationships. Leading: actuating coordinated effort. Controlling: measuring progress and taking corrective action. Emphasizes an overall framework for effective integration of the distinct processes. Prerequisite: junior standing.

BA 311 Operations Management
4 hours 4 ①
Decision-making methods in the management of production of goods and services. Equipment justification, system analysis, inventory management, simulation, quality control, work methods, facilities selection. Prerequisite: BA 235; junior standing.

BA 312 Marketing
4 hours 4 ①
Industrial and consumer markets; activities and enterprises involved in distributing goods to those markets. Objective is to develop understanding of distribution processes, marketing problems and principles. Prerequisite: Ec 213; junior standing.

BA 313 Finance
4 hours 4 ①
Role and functions of financial manager in modern business firm; environment in which manager operates; formulation of financial objectives and policies; financial analysis, forecasting, planning, and control; cash, credit, and asset management; acquisition of funds through short- and long-term borrowing, leasing, stock issue, and by internal means; dividend policy and other aspects of dealing with business owners. Prerequisite: BA 212; junior standing.

BA 317,318,319
Intermediate Accounting
4 hours 3 (1½)
BA 317: Basic accounting theory and practice, financial statements, revenue recognition, concepts of valuation of current assets. Prerequisite: BA 212. *BA 318:* Concepts of valuation of liabilities, income taxes, pension plans, leases. Prerequisite: BA 317. *BA 319:* Concepts of valuation of owners' equity, earnings per share, changes in financial position, disclosure requirements, alternatives to conventional financial reporting, analysis of financial statements. Prerequisite: BA 318.

BA 321
Management Communication
3 hours 3 ①
Theory of management communication. Preparation and defense of written business proposals and reports. Preparation of internal and external written management communications. Preparation and use of audio-visual aids for management communication. Preparation of formal management meeting documents. Prerequisite: Wr 121, 327, or consent of instructor.

BA 322 Projects in Management Communication
3 hours 3 ①
Formulation of an in-depth application of aspects of management communication. Actual projects drawn from business and industry. Prerequisite: AM 321.

BA 331
Business Data Processing Systems
4 hours 3 (1½)
Use and application of computers to process business data. Use of a high level file-processing language, such as COBOL, and its applicability in modern business organizations. Business data systems, file design and manipulation, feasibility studies, and management problems in accounting and control processes. Prerequisite: BA 131, 212.

BA 338
Introduction to Management Science
4 hours 4 ①
Management decision processes utilizing mathematical models; use and application of modeling techniques, mathematical programming, decision theory, and simulation to the analysis and solution of such business problems as inventory control, capital budgeting, consumer behavior, and resource allocation. Prerequisite: BA 235; Mth 163; junior standing.

BA 361 Organizational Behavior
4 hours 3 (1½)
Introductory concepts in behavior in organizations; interpersonal group and inter-group relationships. Students participate in group projects designed to encourage application of behavioral principles. Prerequisite: junior standing.

BA 405 Reading and Conference (g)
Terms and hours to be arranged
Supervised individual work in some field of special application and interest. Subjects chosen must be approved by professor in charge. Consent of instructor required. Prerequisite: senior or graduate standing.

BA 406 Projects

BA 407 Seminar
Terms and hours to be arranged

BA 410 Business Internship
1 to 6 hours
Planned and supervised work experience at selected cooperating business firms. Supplementary training conference, reports, and appraisals. Prerequisite: upper division standing. Sections A and B graded P/N. Consent of instructor required.

BA 413 Business Law
3 hours 3 ①
Legal aspects of property rights, commercial transactions, and forms of business organizations. Prerequisite: BA 226.

BA 414 Real Estate Law
3 hours 3 ①
Creation and rights of ownership under various estates, title protection, deeds, wills, and inheritance; property transactions related thereto, including contracts, mortgages, leases, and brokerage.

BA 415 Environmental Law: Water and Air (g) 3 hours 3 ①
Legal relationships arising out of rights to natural resources; rights to air, water, and navigable streams; control of pollution and the impact of federal and state legislation. Prerequisite: junior standing.

BA 419 Advanced Accounting I (G)
4 hours 3 (1½)
Advanced financial accounting techniques and reporting procedures regarding corporate acquisitions, mergers, and pooling of interest. Prerequisite: BA 319.

BA 420 Advanced Accounting II (G)
3 hours 3 ①
Advanced accounting techniques and procedures for partnerships, segment reporting, interim reporting, multinational companies, SEC reporting, and selected additional topics. Prerequisite: BA 319.

BA 421 Cost Accounting I (G)
4 hours 3 (1½)
Cost behavior, profit planning and budgeting, motivation and control, cost accounting systems, standard costing. Prerequisite: BA 212.

BA 422 Cost Accounting II (G)
4 hours 3 (1½)
Cost accumulation and allocation for specific decisions, segment performance measurement and control, quantitative techniques in cost and managerial accounting. Prerequisite: BA 421.

BA 423 Accounting for Not-For-Profit Organizations (G) 3 hours 3 ①
Planning, budgeting, and controlling the operations of government and not-for-profit entities; review of fund accounting. Prerequisite: BA 319.

BA 425 Tax Accounting I (G)
4 hours 3 (1½)
Taxation principles and philosophy of the federal tax system; accounting and reporting under the federal tax law, with emphasis on the individual taxpayer. Prerequisite: BA 319.

BA 426 Tax Accounting II (G)
3 hours 3 ①
Accounting and reporting under the federal tax law, with emphasis on the corporate taxpayer; estate and gift taxes; tax planning. Prerequisite: BA 425.

BA 427 Auditing I (G)
4 hours 3 (1½)
Environment and professional nature of auditing; concepts of testing, evidence, internal control; analysis of client accounting systems. Prerequisite: BA 319.

BA 428 Auditing II (G)
3 hours 3 ①
Use of statistical sampling in auditing; auditing EDP systems; auditors' legal liability; current development in audit practice and the accounting profession. Prerequisite: BA 427.

BA 429 Advanced Accounting Theory
(G) 3 hours 3 ①
Basis for accounting theory; accounting principles as guides to income determination and asset valuation. Prerequisite: BA 319.

BA 433 Simulation in Business (G)
4 hours 3 (1½)
Application of simulation techniques to the solution of business problems. Concepts and technical aspects of design, construction, operation, and analysis of business simulation models. Student projects to analyze a business situation using simulation concepts and models. Prerequisite: BA 131,338.

BA 434,435 Management Science (G)
4 hours each 4 ①
BA 434: Application of the philosophy and methods of management science to deterministic business problems. *BA 435:* Application to nondeterministic business problems. Prerequisite: BA 338. Must be taken in order.

BA 436,437 Business Systems
4 hours each 4 ①
BA 436: General systems theory. The elements, relationships, and procedures comprising goal-directed systems. Techniques for system definition, analysis, and control. Modeling concepts and the feedback system. Prerequisite: BA 338. *BA 437:* The business organization as an integrated information system. Identification, evaluation, and modification of information sources and needs as required for effective managerial decision making. Information theory and case study. Prerequisite: BA 212. Need not be taken in order.

BA 442 Investments (G)
4 hours 3 (1½)
Risk and reward characteristics of investments; sources of investment information; investment characteristics of common stocks, preferred stocks, debt securities, convertible securities, option contracts, investment companies; real property investment; economic market analysis; technical market analysis; tax aspects of investments. Prerequisite: BA 313.

BA 443 Security Analysis and Portfolio Management (G)
3 hours 2 (1½)
Analysis of financial statements; analysis of debt securities, common stocks, preferred stocks, convertible securities; industry analysis; measurement of investment risks; random walk theory; capital asset pricing theory; the efficient market hypothesis; portfolio management; measuring portfolio performance; management of institutional portfolios. Prerequisite: BA 442.

BA 444 Insurance (G)
3 hours 3 ①
Understanding the insurance industry by examining insurance applications to risks of individuals: risk nature; general insurance principles; life, auto, fire, liability, homeowner, and health insurance; insurance companies and agents; regulation. Prerequisite: BA 313.

BA 445 Business Insurance and Risk Management (G)
4 hours 3 (1⅓)
Insurance applications to business risks and business treatment of insurable risks: risk management function; risk nature; risk analysis; risk control; non-insurance financing; general insurance principles; liability, fire, crime, multi-line, and other property insurance; employee life, health, and retirement insurance; Social Security; insurance companies and agents. Prerequisite: BA 313.

BA 447 Financial Management (G)
5 hours 3 (1⅔)
Financial planning, forecasting and control techniques, capital budgeting, working capital management, financial structure, cost of capital, the dividend decision, acquisition of funds, mergers, and new enterprise financing. Prerequisite: BA 313.

BA 448 Management of Financial Institutions (G) 5 hours 3 (1⅔)
Operation of commercial banks and other kinds of financial institutions; management of financial services; analysis of loan and investment policies; operating policies; branch management; current developments in financial services. Prerequisite: BA 313.

BA 450 Mathematics for Business Analysis
4 hours 3 (1⅓)
Mathematical methods, including differential and integral calculus, used in the analysis of business problems. Prerequisite: graduate standing or approval of director of graduate business programs.

BA 451 Applied Business Statistics
4 hours 3 (1⅓)
Business information, business data, statistical inference, and hypothesis testing applied to business problems, index numbers, time series analysis, and business forecasting. Prerequisite: graduate standing or approval of director of graduate business programs.

BA 452 Fundamentals of Accounting (g)
4 hours 3 (1⅓)
Basic postulates of accounting: theory and system for classification of economic activities of the firm. Form, content, and meaning of various financial statements and reports, including analytical ratios, trends, and interpretation. Cash flow, systems, cost accounting, and managerial uses of accounting data. Prerequisite: graduate standing or approval of director of graduate business programs.

BA 453 Management and Organizational Behavior (g)
4 hours 3 (1⅓)
Intensive study of organizational development and change issues and of management theory, functions and processes, including organization structure and the design of organizational behavior and processes (leadership, job design, and individual, interpersonal, and group topics in the work setting). Prerequisite: graduate standing, or approval of director of graduate business programs.

BA 454 Fundamentals of Marketing
(g) 3 hours 2 (1½)
Intensive analysis of consumer and industrial markets, institutions involved in marketing and distributing products, and major managerial decisions. Emphasis on identifying structure of decisions, understanding consumer behavior, and application of marketing. Prerequisite: a course in microeconomics and graduate standing or approval of director of graduate business programs.

BA 455 Fundamentals of Finance (g)
3 hours 2 (1½)
Financial management of business firms. Topics include financial planning and control, financial analysis, capital budgeting, cost of capital, financial structure, sources of funds and financial instruments, working capital management, and capital markets. Prerequisite: one year of accounting and graduate standing or approval of director of graduate business programs.

BA 456 Fundamentals of Operations Management (g)
3 hours 2 (1½)
Analysis of the managerial decisions which all managers of production make, including process planning, job design, plant location and layout, production planning and control, quality control, and cost control, in product and service organizations. Emphasis on implications of these managerial decisions on the organization. Prerequisite: a course in statistics and graduate standing, or approval of director of graduate business programs.

BA 457 Advanced Operations Management (G)
3 hours 3 ①
Overview of system theory, application of system theory to production systems, detailed development of the production system (in-depth study of material covered in BA 311). Decision models used in the management of production of goods and services. Prerequisite: BA 311,338.

BA 460 Management and Organization Theory
(g) 4 hours 3 (1⅓)
Organization theory, including organizational objectives and goals, social interaction within the organization, and environmental forces as they bear on the management process. Examination and discussion of such issues as socialization, conflict, technology, and future trends. Prerequisite: BA 302.

BA 461 Advanced Organizational Behavior (g) 4 hours 3 (1⅓)
Study of organizational behavior at an advanced level; includes influence processes, attitude change, role theory, value conflict, motivation, perception, and communication processes. Prerequisite: BA 302,361.

BA 463 Venture Initiation and Development
(G) 4 hours 3 (1⅓)
Entrepreneurial roles, risks, and characteristics. Evaluation of business opportunities and potential acquisitions. Start-up problems, tax aspects, legal forms, forecasts, feasibility studies, venture financing and promotion. Marketing studies, business development plans, and bases for growth and expansion. Prerequisite: BA 302, 312,313.

BA 464 Enterprise Management and Innovation
(G) 4 hours 3 (1⅓)
Small business problems and applications emphasizing innovation, management, planning, budgeting, financing, controlling, marketing, taxes, and government regulations. Developing, evaluating, and funding opportunities for innovation, growth, and expansion. Prerequisite: BA 302,312,313,361.

BA 467,468 Personnel Management
(g) 3 hours each 3 ①
BA 467: Survey of the field, including analysis of personnel objectives, functions, and practices as they relate to overall objectives of an organization. Prerequisite: BA 302.
BA 468: Deeper study of key areas covered in BA 467, with emphasis on the professional periodical literature in the field. Prerequisite: BA 467.

BA 469 Case Problems in Personnel Management (g) 3 hours 3 ①
Cases involving personnel problems and policy, drawn from real situations in business and industry. The student is given an opportunity to apply material learned in BA 467 and BA 468. Prerequisite: BA 467,468.

BA 471 Marketing Management (g)
5 hours 5 ①
Study of marketing management decision making, including use of model concepts and techniques. Emphasis upon the development and implementation of marketing strategies and programs. Prerequisite: BA 312.

BA 472 Marketing Policy (G)
4 hours 2 ②
Formulation of overall strategic marketing policies and tactical plans directed toward the achievement of the objectives of the business enterprise. Prerequisite: BA 471.

BA 473 Management of Marketing Communications (G) 5 hours 5 ①
Marketing communication systems and their effect on consumer choice and product differentiation from point of view of the marketing manager. Prerequisite: BA 312.

BA 474 Distribution Management (G)
4 hours 2 ②
Physical distribution system for movement of products to market and the development of service as a determinant of logistics system strategy. Includes channel structure and logistics strategy, the geography of distribution, transportation, and other elements in the distribution system; management of logistics as a system. Prerequisite: BA 312.

BA 475 Sales Management (G)
4 hours 3 (1⅓)
The role and functions of a field sales-force manager. Includes planning and allocating sales-force effort; sales-force organization; recruiting, selection, training, motivation, and evaluation of sales-force personnel; specialized control and evaluation procedures. Prerequisite: BA 312.

BA 476 Consumer Behavior (G)
5 hours 5 ①
Behavioral science concepts applied to consumer decisions and consumption patterns. Motives, perception, learning theory, and attitudes as influences on individual choice and brand loyalty. The use of social class and reference group theory in identifying and measuring target markets, fashion, and acceptance of innovation. Prerequisite: BA 312.

BA 478 Marketing Research (G)
4 hours 4 ①
Problem identification, problem definition, alternative identification; research design, methodology, questionnaire design; data collection and analysis related to marketing research process. Prerequisite: BA 312.

BA 484 International Marketing (G)
4 hours 4 ①
Influence of foreign environments on choice of the marketing mix: product policy, pricing, channels of distribution, delivery, servicing, promotion, advertising, credit, and insurance; export and overseas marketing. Prerequisite: BA 312.

BA 485 International Financial Management (G) 4 hours 3 (1⅓)
International monetary environment; source and availability of funds to finance trade and multinational operations; taxation; planning, control, and reporting; capital budgeting; risk; evaluation of performance. Prerequisite: BA 313.

BA 486 International Environment and Management (G) 4 hours 4 ①
Political, economic, cultural, and legal constraints on the management of multinational corporations; the colonial legacy; political and economic integration; economic planning; commercial policies; personnel and community relations; legal systems, arbitration and antitrust; organization structure. Prerequisite: senior standing.

BA 493 Management Decision Making (G) 4 hours 3 (1⅓)
Processes, techniques, and interactive effects of administrative decision making in complex organizations. Prerequisite: BA 238,460, and 461 or BA 435,302, and 361.

BA 494 Organizational Dynamics (G) 4 hours 3 (1⅓)
Historical techniques for introduction of change in organizations, current models for organizational change, process and content of organizational changes, organizational change in the future. Prerequisite: BA 460,461.

BA 495 Business and Its Environment 4 hours 4 ①
Social, political, economic, legal, ethical, and other environmental considerations relevant to the management of a business enterprise. Interaction between the societal environment and the business enterprise, including the social considerations in, and consequences of, managerial decisions. Prerequisite: senior standing.

BA 496 Management and Labor (G) 4 hours 3 (1⅓)
Development and management of human resources; collective bargaining from the management point of view. Prerequisite: BA 302,361.

BA 497 Management Planning (G) 4 hours 3 (1⅓)
Analysis of goal development and organizational means for achieving goals within an enterprise; concepts and methods for formulation of management strategies, policies, and procedures; applied planning techniques and methods. Prerequisite: BA 212,302.

BA 498 Government Relations in Business (G) 3 hours 3 ①
Statutory, administrative, and common law controls affecting modern business and their influence on budgetary considerations, business structure, and administrative policies; importance of constructive attitude and recognition of government aids and services to business community. Prerequisite: senior standing.

BA 499 Business Policy 4 hours 2 ②
Advanced integrative course in analysis of top-management decisions, executive responsibilities, and company objectives. Policy making is studied through business cases. Prerequisite: senior standing; BA 302,311,312,313,361.

Graduate Courses
See also courses marked (g) and (G) above.

BA 501 Research

BA 505 Reading and Conference

BA 506 Projects

BA 507 Seminar
Terms and hours to be arranged

BA 510 Business Internship 1 to 6 hours
Planned and supervised work experience at selected cooperating business firms. Supplementary training conferences, reports, and appraisals. Prerequisite: graduate standing. Consent of instructor required.

BA 511 Analytical Techniques in Business Decision Making 3 hours 3 ①
Techniques for making decisions concerning marketing, costs, profits, pricing, competition, production, and capital management. Forecasting techniques as related to decision making under primarily uncertain conditions. Prerequisite: BA 532; graduate standing.

BA 512 Management and Organization Theories 3 hours 3 ①
Study of organization theories and concepts with the purpose of developing an integrated philosophy of management. Emphasis upon current research and concepts. Prerequisite: BA 453 or 302; graduate standing.

BA 513 Behavior in Business Organizations 3 hours 1 ③
Various aspects of formal and informal organizations, communications, motivation, leadership, individual and group behavior, and the administrator's role in interpersonal relationships as they influence and are influenced by business organizations. Prerequisite: BA 453 or 361; graduate standing.

BA 514 Marketing Management 3 hours 3 ①
Product development, marketing planning, selection of distribution channels, communication and demand stimulation, pricing, and marketing program evaluation. Prerequisite: BA 454 or 312; graduate standing.

BA 515 Financial Management 3 hours 3 ①
Financial planning, investment decisions, financial structure, cost of capital, acquisition of funds, and valuation. Prerequisite: BA 455 or 313; graduate standing.

BA 516 Operations Management 3 hours 3 ①
Research and development, plant and process planning, equipment acquisition and replacement, production planning and control, quality control, and production systems. Prerequisite: BA 456 or 311; graduate standing.

BA 517 Business in Its Environment 3 hours 3 ①
Interrelationship between business and society; problems, opportunities, and responsibilities faced by business executives in contemporary society. Prerequisite: graduate standing.

BA 519 Topics in Management Science 3 hours 3 ①
Management science techniques applied to managerial problems. Emphasis upon decision making in the major business functional areas of marketing, finance, production, and personnel, with special emphasis on role of management scientist in the decision-making process. Prerequisite: BA 435; graduate standing.

BA 520 Administrative Accounting 3 hours 3 ①
The adaptation of accounting to managerial operational planning, decision making, and control. Concepts of cost, profits, value, control, planning, decision making, uncertainty are interrelated. Prerequisite: BA 452 or 212; graduate standing.

BA 528 Business Conditions Analysis 3 hours 2 (1½)
Methods of economics and mathematics applied to analysis and forecasting of general business conditions; models in aggregate income analysis, business fluctuations and growth, and such forecasting techniques as input-output analysis, the "indicators" approach, statistical and econometric methods. Prerequisite: Ec 213,214 or Ec 499; graduate standing.

BA 531 Computer-Assisted Management 3 hours 2 (1½)
Electronic processing of business information; unified business data processing systems, computer concepts, systems analysis and design; management considerations involving the use of computers. Prerequisite: knowledge of FORTRAN language; graduate standing.

BA 532 Deterministic Models for Business Analysis 3 hours 2 (1½)
Quantitative analysis of business decision making: mathematical model building, deterministic models, optimization techniques and their interpretation. Prerequisite: BA 450 or one term of calculus; graduate standing.

BA 533 Decision Analysis 3 hours 2 (1½)
Systematic analysis of complex business decisions under conditions of uncertainty; the structure of decisions, prescriptive theories of choice, working with multiple objectives, preference and probability assessment, the use and value of information. Prerequisite: BA 451 or 235; graduate standing.

BA 541 Management Systems 3 hours 1 ③
Philosophy of systems; system and problem-solving methodology; theory of information feedback system; analysis of total business system by interactions between flows and levels of information, money, personnel, capital equipment; development of experimental models to study system behavior and principles. Prerequisite: graduate standing.

BA 542 Information Systems 3 hours 1 ③
Concept of total information system; relationships between informational needs and the organization's structure, objectives, decision centers, information retrieval requirements; information needs to service management planning, execution and control; informational systems integrating various viewpoints. Prerequisite: BA 452 or 212; graduate standing.

BA 543 Topics in Finance 3 hours 2 (1½)
Recent advances in selected finance fields. Prerequisite: BA 455 or 313; graduate standing.

BA 544 Investments 3 hours 2 (1½)
Economic, technical, and tax aspects of alternative financial investments including real property, investment companies, options, interest rate futures; special emphasis on common stock and debt securities. Prerequisite: BA 455 or 313; graduate standing.

BA 545,546 Management Problem Solving 3 hours each 1 ③
Supervised research; analysis of a major problem area confronting a cooperating business firm; comprehensive written report on research undertaken and proposed solution. Prerequisite: graduate standing. Must be taken in order.

BA 562 Organizational Change and Development 3 hours 2 (1½)
Theory, research, and practice of planned organizational change and development. Course topics include change targets, entry processes, organizational diagnosis, intervention approaches, assessment of change, and follow-up. Special attention to change issues and practical skills. Prerequisite: BA 453 or 302,361; graduate standing.

BA 565 Selected Topics in Management and Organization
3 hours 2 (1½)
Recent advances in organizational analysis and their application to the management of formal organizations. Topics covered vary from year to year and may include: (a) motivation theory, (b) organizational communication, (c) radical critiques of management, (d) inter-organizational relationships. Prerequisites: BA 453 or 302,361; graduate standing.

BA 569
Entrepreneurship and Innovation
3 hours 2 (1½)
Examination of creativity, innovation, research and development, technology transfer, and the initiation of new ventures. Development of feasibility studies and business plans for new products and new ventures. Prerequisite: BA 453 or 302; BA 361, 455 or 313; graduate standing.

BA 577
Management Processes in Marketing
3 hours 2 (1½)
Concepts and methodologies in advanced marketing management practice. Latest theoretical developments and quantitative methods in marketing, with particular relevance to managerial applications. Prerequisite: BA 454 or 312; graduate standing.

BA 595 Personnel Administration and Industrial Relations
3 hours 2 (1½)
Examination of major personnel subjects, including procurement, development, compensation, and maintenance of human resources; labor legislation; union-management relations. Prerequisite: BA 453 or 302,361; graduate standing.

BA 599 Business Policy Formulation
3 hours 1 ③
Setting of organizational goals and formulation, evaluation, and implementation of alternative strategies to realize goals; case studies of companies in different industries of differing size and current condition to provide basis for basic organizational policies; opportunity to deal simultaneously with many interrelated aspects of company operation. Prerequisite: BA 512, 513,514,515,516,520; graduate standing and approval of director of graduate business programs.

HEALTH CARE ADMINISTRATION
See "Interdisciplinary Degree Programs."

HOTEL AND RESTAURANT MANAGEMENT
See "Interdisciplinary Degree Programs."

EDUCATION

FACULTY

As of January 1982

Robert D. Barr, *Dean*

Charles A. Stamps, *Associate Dean for Student Services and External Affairs, Head Adviser*

Betty Griffin, *Director of Field Programs*

Professors Emeritus Atteberry, Baron, Beals, Christensen, Hall, Hoeye, A. Leeland, L. Leeland, Lemon, McQuesten, Meeks, Munford, Reichert, K. Smith, TenPas, White, Williamson, R. Wilson, Winger, Workinger, Yerian

Professors G. Anderson, Andrews, Barr, Carpenter, Chick, Clark, Courtney, Cross, T. Evans, Fielder, Fox, Horton, Kenneke, Klein, Lee, LeMay, Lumpkin, Pahre, Severeide, Smith, Stevens, Trow, Tucker, Warnath, H. Wilson, Wood

Associate Professors Ahrendt, E. Anderson, W. Andersen, Becker, Beringson, Britton, Bryan, Craven, Daugherty, Firth, Gathercoal, Grieve, Grigsby, Harp, Haun, Heath, Hlebichuk, Houston, McBride, Milliken, Penn, Poling, Sanderson, C. Stamps, Stiehl, Strowbridge, Suzuki, Wall, Wallace

Assistant Professors Brewer, Cole, D. Evans, Giblin, Griffin, Hall, Haselton, Haverson, Holsberry, Hunsaker, Illinik, Ingram, Jenkins, Malatesha, Martinez, Moore, Nice, Oades, M. Stamps, Steinback, Stern, Streit

Senior Instructor Palmer

Instructors Davis, Dolan, Eichler, Kale, Lorence, Mellen, Schlegel, M. Smith, Yoshimura

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The School of Education at Oregon State University is accredited by the National Council for Accreditation of Teacher Education and the Teacher Standards and Practices Commission for the preparation of elementary and secondary teachers and guidance counselors, with the doctorate the highest degree approved. The school offers both undergraduate and graduate work in elementary and secondary education and provides instruction—principally at the graduate level—in counseling and guidance, college student services administration, reading, adult and community college education, vocational and technical education, and college and university teaching.

The School of Education is organized around seven departments: communication education; counseling and guidance; educational foundations; elementary education; postsecondary education; science, social science, and mathematics education; and vocational and technical education.

The Bachelor of Arts (B.A.) and Bachelor of Science (B.S.) degrees are offered in elementary education and in secondary education in the basic teaching certificate programs. Graduate degrees offered include the Master of Arts (M.A.), Master of Science (M.S.), Master of Education (Ed.M.), Doctor of Education (Ed.D.), and Doctor of Philosophy (Ph.D.).

Specific program areas within each of the seven departments, and corresponding degrees offered, are outlined below:

Communication Education

Basic Skills
Instructional Media (M.A.I.S.)
Language Arts Education (B.A., B.S., graduate minor)
Reading (Ed.M.)

Counseling and Guidance

M.S., Ed.M., Ed.D., Ph.D.

Educational Foundations

Elementary Education

Early Childhood Education (joint program with School of Home Economics)
Elementary Education (B.A., B.S., Ed.M.)

Postsecondary Education

Adult Education (M.A., M.S., Ed.M.)
College Student Services Administration (M.S., Ed.M., Ed.D., Ph.D.)
College and University Teaching (graduate minor)
Community College Education (graduate minor)
Community Education (graduate minor)
Extension Education (graduate minor)

Science, Social Science, and Mathematics Education

Social Science Education (B.A., B.S., M.S., Ed.M.)
Biology (B.A., B.S., M.S., Ed.M., Ed.D., Ph.D.)
Integrated Science (B.A., B.S., M.S., Ed.M.. Ed.D., Ph.D.)
Mathematics, Combined (B.A., B.S., M.S., Ed.M., Ed.D., Ph.D.)
Advanced Mathematics (B.A., B.S., M.S., Ed.M., Ed.D., Ph.D.)
Integrated Science, Combined (B.A., B.S., M.S., Ed.M., Ed.D., Ph.D.)
Physical Science—Chemistry (B.A., B.S., M.S., Ed.M., Ed.D., Ph.D.)
Physical Science—Physics (B.A., B.S., M.S., Ed.M., Ed.D., Ph.D.)

Vocational and Technical Education

Agricultural Education (B.S., M.S., Ed.M.)
Business Education (B.A., B.S., M.S., Ed.M.)
Distributive Education (B.A., B.S.)
Home Economics Education (B.A., B.S.. M.S., Ed.M.)
Industrial Arts (B.A., B.S., M.S., Ed.M.)
Trade and Industrial Education (B.A., B.S., M.S., Ed.M.)
Vocational Education (M.A., M.S., Ed.M., Ed.D., Ph.D.)

Additional Programs

Programs in health education, physical education, music education, and speech impaired are administered through the school's central office.

Certificate Programs

Integrated Science, Combined
Agricultural Education
Business Education
Distributive Education
Home Economics Education
Industrial Arts
Driver Education
Counseling
Trade and Industrial Education
Language Arts
Speech Impaired

Basic Math, Combined
Advanced Mathematics
Biology
Integrated Science
Physical Science—Chemistry
Physical Science—Physics
Health Education
Music Education
Physical Education
Reading
Social Studies Education

General Education Program

Candidates for the Ed.D. or Ph.D. in general education individualize their programs according to their training, background, experience, and career goals. To qualify for either of these degrees, a student must complete a graduate major in education and two graduate minors, with one minor in a substantive field outside the School of Education. For the major, emphasis may be placed on elementary or secondary curriculum and instruction, foundations of education, adult education, or the community college.

Admission

Any student who has met the admission requirements of the University may enroll in the School of Education. To transfer into the School of Education from another OSU college or school, the student must have the approval of the director of the appropriate teacher education program and the dean of education.

Admission to Teacher Education Program

In addition to being admitted to the school, the student must be accepted into a program of studies in teacher education. The program leads to a basic endorsement in elementary or secondary education. Applications may be obtained from the program director of the chosen discipline and must be completed prior to admission to the teacher education program.

To be accepted into this program, a student must fulfill these requirements:

- Pass Theory and Practicum II: Field (Ed 309) or equivalent
- Pass Theory and Practicum II: Media (Ed 309L, 309M)
- Pass Theory and Practicum II: Campus (Ed 311)
- Maintain a cumulative GPA of 2.25
- Complete 75 credit hours
- Complete required interview
- Have transfer credits approved

Graduation Requirements

To qualify for a B.A. or B.S. degree, a student must fulfill the University requirements listed on page 13 and complete one of the undergraduate curricular programs.

Changes in graduation requirements may be made by the University at a time that is too late for inclusion in the current catalog. Such revisions are sometimes necessitated by changes in teacher certification requirements, University policy, technology, or available resources. Students should check with advisers for information on current requirements.

Requirements for Basic Teacher Certification

To be eligible for a basic Oregon teaching certificate, a student must (1) hold a baccalaureate degree from an accredited college or university; (2) meet School of Education program requirements; (3) hold a valid first aid card; (4) demonstrate knowledge of the required Title VI and Title IX anti-discrimination law competencies; (5) demonstrate knowledge of the consumer education/economics/personal finance competencies; and (6) apply for certification within 12 months of completion of required preparation (or face reinstatement regulations).

Theory and Practicum Programs

Students who enter the School of Education as freshmen, and some transfer students, will participate in the Theory and Practicum Program. This program is designed to provide education majors (elementary and secondary) with experience to which theory development can be related. Theory and Practicum II is the first experience in the program. Students are placed in the field with public school learners for three hours each day of the term (Ed 309). Students also enroll in the appropriate section of Theory and Practicum II: Media (Ed 309L or 309M) at the same time. This is usually followed by a term of theory development on campus (Ed 311), but Ed 309 and Ed 311 may be taken concurrently.

Secondary education majors register for Ed 313, which is field experience in their subject matter area, and are in a public school setting for a minimum of 10 hours a week for one term. They register for Ed 451 and the appropriate section of Ed 411, either concurrently or in prior or subsequent terms.

Transfer students who do not readily fit into the Theory and Practicum Program may elect to meet requirements by completing appropriate courses and/or by seeking waiver of requirements that may have been met through previous course work and experience. Waiver requests are submitted to the program directors for Theory and Practicum II and III, and to the associate dean.

*Proficiency in Basic Skills**

All new students enrolled in teacher education, as well as currently enrolled students who have not satisfied a basic skills requirement, are subject to the following: In order to be recommended for basic teaching certification, students must demonstrate proficiency in six skill areas (reading, writing, computing, speaking, listening, and reasoning). As a condition of entry to a teacher education program, students must demonstrate their proficiency by examination.

Educational Media Center

The Educational Media Center, on first floor of Education Hall, provides facilities and equipment for students and faculty to produce and preview their own audio and visual materials.

The center offers a wide range of equipment for graphics preparation, color slide photography, overhead transparency development, display design, audio recording, and paper copy duplication. Preview rooms and projection equipment are available for individual and small group viewing of filmstrips, video tapes, motion films, and slide series.

Students taking education courses have free access to all services and facilities; others can make special arrangements through the center.

Program on Gerontology

Administered through the School of Home Economics, the Program on Gerontology involves students and faculty in seven schools and fourteen departments throughout the University, including the School of Education. 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. Undergraduate students may elect an emphasis in gerontology; graduate students an integrated minor. For further information regarding the program contact the director in the Department of Human Development and Family Studies, School of Home Economics.

* This requirement first applied to students entering the School of Education during the 1979-80 academic year.

Education Curricula

COMMUNICATION EDUCATION

Instructional Media

The program in instructional media draws course work from the Departments of Journalism and Speech Communication in the College of Liberal Arts to offer a Master of Arts in Interdisciplinary Studies degree, with an emphasis in communications media.

The program is offered for attainment of broad knowledge and achievement in communications media by integrating work in journalism, broadcasting, and educational media. Candidates may prepare for positions with public and private agencies in management production and other creative capacities.

Language Arts

The program in language arts helps students prepare to teach English in grades 5-12. Students may earn a basic or standard endorsement in language arts,, with course work in literature, writing, and speech communication.

Reading

The reading program prepares teachers and supervisors in the following areas: (1) teaching developmental and corrective reading in content areas in elementary and secondary schools and in community colleges; (2) teaching reading and study skills in two- and four-year colleges; (3) teaching methods of reading in colleges and universities; (4) conducting remedial reading clinics; (5) supervising and administering reading programs and serving as a reading specialist at the elementary, secondary, and community college levels.

For the Ed.M. degree in education with an emphasis on diagnostic, developmental, and remedial reading, supporting course work in areas related to reading and appropriate to career goals is required. It is recommended that the candidate have completed one year of successful teaching experience and a minimum of 51 term hours, 30 of them in residence.

Elementary and secondary teachers are eligible for the basic and standard reading endorsements. For further information students should contact the program director.

If a student does not wish certification, he or she may, with approval of the program director, alter the program to meet his or her specific needs. An alternative program is available for students who wish to prepare themselves as reading teachers at the community college level.

For a doctorate in education with specialization in reading, the candidate must have had two years of paid teaching experience. Two supporting minors, at least one of them outside of the School of Education, are required. Programs are individualized in accordance with the candidate's background and career goals.

COUNSELING AND GUIDANCE

Counseling and guidance master's programs, standard certification training, paraprofessional training, and doctoral programs help prepare counselors and supervisors of counseling services in elementary, secondary, higher education, and agency settings.

The Master of Education degree (Ed.M.) in guidance and counseling and the Master of Science degree (M.S.) in counseling prepare students to provide professional services for clients' social, educational, personal, and career development. The preparation consists of a sequential program integrating academic knowledge and theory with closely supervised counseling practica and field experience. The M.S. degree in counseling is a joint program with OSU and Western Oregon State College.

Graduates of the master's programs may find employment in various local, regional, and national settings, specifically in schools and college counseling, employment and related public help agencies, mental health programs, family and pastoral counseling services, and other institutions and agencies that employ people with practioner competence in counseling.

The programs consist of 57 term hours of course work. The final evaluation includes a comprehensive examination. The thesis is optional, to be determined in each case by the department and the student's major adviser.

Programs in school counseling lead to both basic and standard level personnel service certificates, in compliance with the administrative rules for certification of the Oregon Teacher Standards and Practices Commission. Basic level certificates require 27 term hours of specific courses, and standard certification requires an additional 30 term hours. All school counselors must have two years of successful teaching experience prior to being certified as counselors. Additional information on certification is available from the program director.

For admission, students apply to the program director. Screening includes personal interviews with applicants. Before admission to the program is granted, each candidate is evaluated in terms of academic background, experience, personal and emotional suitability, and educational and professional goals.

The Doctor of Education degree (Ed.D.) is in education with a major in counseling and guidance. The doctoral candidate should have two years of paid counseling experience. Two supporting minors are required, one of which must be outside the School of Education.

The Doctor of Philosophy degree (Ph.D.) in education, with a major in counseling, consists of at least 65 term hours in counseling and closely related work. A concentration of 35 additional term hours of supportive work is also required, as well as 35 term hours of thesis credit and nine term hours in a research area such as a foreign language or statistical analysis.

Generally, doctoral candidates are required to hold a master's degree in counseling or a closely related degree, and two years of paid, post-master's degree counseling experience.

Programs are individualized according to the training, background, experience, and career goals of the candidates.

Because of limited facilities and availability of settings, supervised training is reserved for those accepted into counseling degree programs. Candidates are selected by a screening committee composed of counselor education faculty, students, and representatives from state professional organizations and agencies. During training, students should arrange to review their progress with their advisers, but they are ultimately responsible for seeing that they have met institutional requirements and personal and professional development expectations. A comprehensive examination is required.

EDUCATIONAL FOUNDATIONS

The M.A., M.S., Ed.M., Ed.D., and Ph.D. degrees in education may be pursued with an emphasis in foundational studies. Candidates work with a major adviser to include courses in educational research, educational psychology, curriculum and supervision, social foundations and school administration. Individual courses of study may vary according to the training, background, experience, and career goals of the candidate.

The Ed.D. or Ph.D. in education requires two supporting minors, one of which must be in a substantive field outside of the School of Education.

ELEMENTARY EDUCATION

Basic Teaching Certificate Program

A student preparing to teach in elementary schools must complete the courses listed in the curriculum below and 27 credits in an area of concentration including Interdisciplinary Curriculum Projects/Elementary (Ed 406E).

The areas of concentration are: agriculture; art; biological science; communication media; earth science; English; environmental studies; fine arts; forestry; handicapped learner; health; health physical education, and recreation; humanities; industrial/career education; integrated science; language arts; mathematics; music; Pacific Northwest; physical education; second language; social science; speech; world cultures; and others (approved by faculty).

All students enrolled in the basic certificate program must take a basic skills test, which is administered by the division.

In order to gain experience in actual school situations, students are assigned in public schools for large blocks of time early in their teacher education program.

CURRICULUM

Bachelor of Science degree*

Freshman Year—48 hours

Math for Elem Teach (Mth 191,192; Ed 199M, N)	8
Physical ed activities (PEA 100s)	3
English Composition (Wr 121)	3
Geography (Geog 105 or 106 or 107 or other)	3
Biology (GS 101 and 102,103 or biology or botany or entomology or zoology)	8
Written/oral communication (J 111,212, 223,317; Sp 112,113; Wr 214,222,224 233,234,235,316,323,324,327)	6
Contemp Ed (Ed 111E, required of freshmen)	2
Social science (anthropology, economics, geography, psychology, sociology, or political science)	6
Music (Mus 199 or approved humanities elective)	2
Electives/area of concentration	7

Sophomore Year—49 hours

Language arts (literature, theater, or Mus 107)	3
Reading (3 one-credit courses with Ed prefix)	3
Consumer ed/personal finance (Ed 406K, FRM 250 or 341)	3
Physical sciennce (GS 104 or 105 or 106 or geology, physics, chemistry, atmospheric sciences, astronomy, or oceanography)	7
U.S. History	3–5
Music for Elem Teach (MuE 371)	4
Theory and Prac II: Field (Ed 309)	5
Theory and Prac II: Media (Ed 309M)	2
Theory and Prac II: Campus (Ed 311)	6
Math (Mth 193; Ed 199O)	4
Sociology	3
Psychology	3
Elem School Indus Arts (IEd 311)	3

Junior Year—47 hours

Phys Ed in Elem School (PE 320)	3
Methods of Read (Ed 350)	6
Projects: Presecond Art (Ed 406N)	4
Math (Mth 391 or 121 or SEd 422X or approved course)	3
Theory and Prac: Elem (Ed 367A,B,401F, 406C)	17
Applied science (forestry, agriculture, oceanography)	3
Electives/area of concentration	11–13
Projects: Math (Ed 406H)	3

Senior Year—48 hours

Projects: Class Manag and Disc (Ed 406A)	3
Theory and Prac: Elem Student Teach (Ed 415)	12–15
Seminar: Student Teach (Ed 407Z)	1
School Health Ed (H 369E)	3
Seminar: Civil Rights Laws in Ed (Ed 407A or B or 476)	1–3
First aid certification (H 358 or Red Cross training)	0–3
Projects: Interdis Curriculum (Ed 406E)	3
Instruct Strat/Computer Ed (SEd 421X)	3
Electives/area of concentration	22

* B.A. degree also offered.

Early Childhood, Physical, and Music Education Programs

Cooperative programs are offered by the Department of Elementary Education and the Departments of Family Life, Physical Education, and Music.

The early childhood program leads to certification in elementary education for grades K-9 with special emphasis in early childhood education. The physical education and music programs lead to dual certification: K-9 self-contained classroom and K-8 music or preprimary-12 physical education certification.

Standard Teaching Certificate Program

The standard certificate (fifth-year program in elementary education) at Oregon State University requires a minimum program of 45 hours planned with an adviser in elementary education subsequent to the basic certificate program. All work must be upper division or graduate level. The program does not necessarily coincide with a master's degree program, but if the student meets graduate admission requirements it usually can be made to do so. The program should be prepared early to avoid taking unnecessary courses.

The program must include specific requirements in elementary education and enough hours to meet requirements in the standard certificate subject matter areas.

Graduate Program

Graduate work leading to the Ed.M. degree under Option C, which requires no thesis, is offered in elementary education. The program is planned to meet the requirements for standard certification K-9 as well as for the Ed.M. degree with emphasis in elementary education.

POSTSECONDARY EDUCATION

These programs offer primarily graduate work. Normally, a student entering one of the programs described below holds a baccalaureate degree, which may be in any field. No previous work in education is required.

Adult Education

Preparation for teaching and/or leadership positions in the rapidly growing area of adult education is provided by the Master of Adult Education degree as well as directed field experience. This core of courses may also be used as an area of emphasis for a doctoral program in general education, or as a minor in other doctoral programs.

Course work in adult education is designed for students planning to teach or work with adults in Extension education, parks and recreation, nutrition education, parent education, public and government service, adult counseling, basic adult education, public school, adult education, military service, business and industry, religious adult education, English as a second language, or community college adult education.

Community College Education

Community college staff development programs are designed to prepare teachers, administrators, and other support personnel for employment in two-year colleges. Graduate students in various academic fields, vocational-technical fields, or adult education are encouraged to consider a minor in community college education as part of their master's degree program. Preparation for community college administration is offered through the Ed.M., Ed.D., or Ph.D. degree in general education with a major area of emphasis in community college education.

Community Education

The community education minor prepares students for careers in community-based institutions or organizations, such as community colleges, public and government service, business and industry, Extension education, and continuing education.

An interdisciplinary approach allows students to develop and strengthen the necessary competencies for adult instruction in community education programs.

College and University Teaching

This curriculum allows students in any department of the University to explore college and university teaching as a career and to gain background in the philosophy, functions, and structure of higher education.

Courses may be taken singly or in any sequence. For the basic courses (HiEd 546 or 558,547,548), the only prerequisite is graduate standing.

For a graduate minor in college and university teaching, 15-18 hours are required at the master's level and 21-24 at the doctoral level. Three courses, HiEd

546 or 558,547 and 548, are required. To complete the minor, students may elect other courses in education or in other fields that fit into their graduate program.

College Student Services Administration

The College Student Services Administration (CSSA) program offers preparation in college union, recreational sports, and student activities administration, residence hall programming and administration, financial aid administration, and general student services administration.

The M.S. or Ed.M. degree is offered with a major in CSSA. Two academic years on campus are required toward the completion of the minimum 54 term hours of academic work. One year of full-time work experience is required for admission.

The Ed.D. or Ph.D. in education is offered with a major in CSSA and two supporting minors, one of which must be in a substantive field outside of the School of Education. This program is designed for educators who are preparing for leadership roles as directors or deans of student services administration. The candidate must be mature, must have had two years of full-time work experience in the field at the college level or in a related area after completion of the master's degree, and must have a satisfactory academic background. Programs are individualized according to the training, background, experience, and career goals of the candidate.

Assistantships in student services are generally required for both master's degree and doctoral students. Preference over master's degree candidates is given to promising doctoral candidates.

Extension Education

Courses in Extension education are designed to give the student interested in the Land Grant/Sea Grant university informal educational system known as the Extension Service an opportunity to explore this function of the University and the philosophies and concepts upon which it is based. These courses are applicable to the program for extension of all subject matter disciplines offered by the University to off-campus audiences. Skills and concepts emphasize the process of communication and education in an informal setting with involvement of the clientele in the planning, designing, evaluating, and teaching of the program.

Extension methods is a recognized minor in both the Schools of Agriculture and Home Economics as well as the School of Education at the undergraduate, master's, and doctoral level. It can also be used as one of the components of the Master of Agriculture program. Depending on their needs and interests, students may select courses other than those listed under Extension education to complete a minor.

SCIENCE, SOCIAL SCIENCE, AND MATHEMATICS EDUCATION

Students preparing to teach biology, integrated science, chemistry, physics, general science, earth science, mathematics, or social science in grades 5-12 must complete the basic secondary endorsement, University requirements, and one or more of the teaching endorsements listed.

Students who wish to earn the B.A. or B.S. degree in science or mathematics education may enroll in either the School of Education or the College of Science; the requirements for graduation and certification are the same.

Students may enroll in either the School of Education or the College of Liberal Arts to earn the B.A. or B.S. degree in social science.

Science and Mathematics

Hours

Biology—54-58 hours (valid for teaching biology and general science)
- General Biology or Botany and Zoology: Bi 211,212,213; GS 101,102,103; Bot 201,202,321; Z 201,202,203 15
- Genetics: Gen 311 4
- Evolution: Z 345 or Bot 321 3
- Microbiology: Mb 302,303; Bot 350; Z 461,462 (select) 4–5
- Ecology: Bi 370 or GS 331 or Bot 341 or Z 351 3
- Botany: Bot 321,331,471; Hort 111, 201,202,311 (select) 3–5
- Chemistry: Ch 104,105,106, or 201,202, 203 or 204,205,206 9
- Physics: Ph 111,112 or 201,202 8
- Earth Sciences: G 200,201,202,203; Oc 331; AtS 300; Sls 210 (select) 5–6

Integrated Science—60 hours (valid for teaching integrated, earth, and general science)
- Biology: Bi 211,212,213; GS 101,102, 103; Z 201,202,203; Bot 201,202,203 (select) 12
- Chemistry: Ch 201,202,203,104,105,106, 204,205,206 (select) 9
- Physics: Ph 111,112 or 201,202 8
- Astronomy: Ph 104 4
- Geology: G 201,202,203,204,205,206 12
- Atmospheric Sciences: AtS 300,301 4
- Oceanography: Oc 331 3
- Earth science elective 4
- Upper division biological science elective 4

Combined Integrated Science—50 hours (combined with another basic endorsement: valid for teaching integrated, earth and general science)
- Biological Sciences: Bi 211,212,213; GS 101,102,103; Bot 201,202,203; Z 201, 202,203; Hort 111,201,202,311 (select) 9
- Chemistry-Physics: Ch 104,105,106; 201, 202, 203; 204, 205, 206; Ph 111, 112; 201,202,203; GS 104,105,106 9
- Atmospheric Sciences: AtS 300,301 4
- Geology: G 201,202,203;204,205,206; Sls 210 (select) 9
- Oceanography: Oc 331 3
- Required electives: earth sciences 7
- Teaching Methodology: Ed 411B, G, or L; SEd 411B, G, or L; SEd 491 5

Physical Science—53 hours (valid for teaching chemistry, physics, and general science)

Chemistry Option
- General Chemistry: Ch 104,105,106, 107 or 201,202,203,207 or 204, 205,206 15
- Organic Chemistry: Ch 226,227,228, 229 or 334,335,336 9
- Physical Chemistry: Ch 423,424,425 or 440,441,442 9
- Physics: Ph 201,202,203 or 211,212, 213 12
- Required electives: approved upper division physics 8

Physics Option
- General Physics: Ph 201,202,203,104; or 211,212,213,214 16
- Modern Physics: Ph 323,474,475,476 (select) 4
- Advanced Physics: Ph 313x or 331 or 332 3
- Electronics: Ph 430 3
- Required electives: approved upper division physics 9
- Chemistry: Ch 104,105,106 or 201, 202,203 or 204,205,206 9
- Organic or Physical Chemistry: Ch 226,227,228 or 334,335,336 or 423, 424,425 or 440,441,442 9

Advanced Mathematics—56 hours
- Analysis: Mth 200,201,202,203 12
- Statistics: St 311 or 421 or 451 3
- Geometry: Mth 337 3
- Algebra: Mth 392 or 447 3
- Probability: Mth 361 3
- Linear Algebra: Mth 241 or 341 4–3
- Math for Secondary Teachers: Mth 491, 492,493 9
- Computer Science: CS 211 or 213 4
- Required electives: mathematics, statistics and/or computer science 15–16

Combined Mathematics-Option 1—27 hours (Combined with another basic endorsement: valid for teaching up to and including algebra)
- Analysis: Mth 200 4
- Linear Algebra: Mth 241 4
- Geometry: Mth 337 or 493 3
- Algebra: Mth 391 3
- Statistics: St 311 or 451 3
- Computer Science: CS 211 or 213 4
- Teaching Methodology: Ed 411F and SEd 484 6

Combined Mathematics-Option 2—26 hours (Combined with another basic endorsement: valid for teaching up to and including algebra)
- Mathematics: Mth 110 or 101 or 102 4
- Analysis: Mth 163 or 200 or 201 4
- Mathematics for Elementary Teachers: Mth 191,192,193 9
- Algebra: Mth 391 3
- Teaching Methodology: Ed 411F and SEd 484 6

Social Science

Those wishing a social science credential should consult with the credential adviser and establish a planned program. Course offerings may be selected from American history, world history, anthropology, political science, economics, geography, psychology, sociology, and religious studies. Should the individual wish to concentrate in one area, he or she will be advised to complete the degree requirements for the College of Liberal Arts. For a more generalized and broader program of studies, the student may complete requirements in the School of Education.

Curriculum—65 hours
- 34 hours selected from three of the following: world history, geography, political science, sociology, psychology, anthropology 34
- Economics (Ec 213,215) 7
- U.S. History (Hist 201,202,203, and one upper division course) 12
- State and local govt (PS 103,313,423) 6
- Interdisciplinary studies 6
- Social science electives (upper division) 8–12

VOCATIONAL AND TECHNICAL EDUCATION

Basic Teaching Certificate Programs

Students preparing to teach vocational-technical subjects in grades 5-12 may register either in the School of Education or in the professional school of their subject matter field. The School of Agriculture and the School of Home Economics have departments devoted to teacher training that are shared with the School of Education. Students preparing to teach industrial arts, industrial education, business education, and distributive education in grades 5-12 register in the School of Education.

To qualify for a B.A. or B.S. degree, a student must (1) complete University requirements (see page 13), (2) complete school requirements, and (3) complete one of the curricula listed below to meet certification requirements.

The *basic curriculum* in secondary education for vocational-technical education is the same as for the teaching specialties.

BASIC ENDORSEMENTS

Agricultural Education

Three options are available in the agricultural education basic endorsement program.

GENERAL OPTION—62-65 hours

Agribusiness Management (AREc 211,311)	10
Agricultural Mechanics (IEd 382L or AET 406; AET 221, 312,325)	12–13
Animal Science (AnS 211 or 311; VM 441)	8
Crop Science (CrS 201,202 or 322 or 324 or 414; F 344)	6–8
Horticulture (Hort 111 or 311)	3–4
Soil Science (Sls 210 *or* 100,324)	5–6
Elective technical agriculture course work	13–17
Vocational Student Organization (AEd 407L; AEd 411)	2–5

HORTICULTURE OPTION—62-65 hours

Agribusiness Management (AREc 211)	5
Agricultural Mechanics (IEd 382L or AET 406; AET 221, 312)	9–10
Animal Science (AnS 121,122)	4
Crop Science (CrS 314x or Hort 315)	4
Soil Science (Sls 210 *or* 100,324)	5–6
Horticulture (Hort 201 and/or 202,311; Hort 331 or 341; Hort 351,361)	20
Elective technical agricultural course work	13–14
Vocational Student Organization (AEd 407L,411)	2–5

AGRICULTURAL MECHANICS OPTION—62-65 hours

Agribusiness Management (AREc 211)	5
Agricultural Mechanics (IEd 382L or AET 406; AET 221, 312; AET 319 or AET 321, or AET 326; AET 325,331,361,391)	24–25
Animal Science (AnS 211 or 311)	3
Crop Science (CrS 201 or 322 or 324 or 414)	3–5
Soil Science (Sls 210 *or* 100,324)	5–6
Horticulture (Hort 111 or 311)	3–4
Elective technical agricultural course work	13–17
Vocational Student Organization (AEd 407L; AEd 411)	2–5

Internship

An intern must hold a Bachelor of Science degree in agriculture or be within one term of completing such a degree. The internship consists of a minimum of six months clinical experience in a public high school on at least one-half-time basis (three periods per day). The employment is arranged in a public high school with an individualized program developed in cooperation with the hiring district and Oregon State University.

The normal academic load for an intern is nine hours per term for a total of 27 hours over the academic year.

Business and Distributive Education

Business education and distributive education curricula are designed to meet the needs of prospective teachers in junior high, secondary, and postsecondary levels. The curricula in business education follow two tracks—basic business/accounting, and office occupations. The distributive education/marketing program has a single curriculum.

BUSINESS EDUCATION

BASIC BUSINESS/ACCOUNTING OPTION —58 hours

Intro to Bus Data Proc (BA 131)	4
Accounting (BA 211,212)	8
Quantitative Business Methods (BA 235)	4
Management Processes (BA 302)	4
Business Law (BA 226)	4
Marketing (BA 312)	4
Organizational Behavior (BA 361)	4
Business and Its Environment (BA 495)	4
Organ and Admin of Office and Dist Ed (BEd 450)	3
Finance (BA 313)	4
Coordination Techniques (VEd 483)	3
Typing (BEd 122,123)	6
Sem: Acct for Teach (BEd 407H)	3
Occupational Internship (VEd 410) (optional)	3–15
Sem: Lead Dev in OEA/FBLA (BEd 407E)	3

OFFICE OCCUPATIONS OPTIONS—62 hours

Accounting (BA 211,212)	8
Intro to Bus Data Proc (BA 131)	4
Business Law (BA 226)	4
Marketing (BA 312)	4
Management Processes (BA 302)	4
Organizational Behavior (BA 361)	4
Organ and Admin of Office and Dist Ed (BEd 450)	3
Coordination Techniques (VEd 483)	3
Typing (BEd 122,124)	6
Applied Stenography (BEd 211,212)	8
Office Proced (BEd 311)	4
Adv Office Proced (BEd 312)	4
Sem: Acct for Teach (BEd 407E)	3
Occupational Internship (VED 410) (optional)	3–15
Sem: Lead Dev in OEA/FBLA (BEd 407E)	3

DISTRIBUTIVE EDUCATION/MARKETING —60 hours

Intro to Data Proc (BA 131)	4
Accounting (BA 211,212)	8
Quantitative Business Methods (BA 235)	4
Management (BA 302)	4
Marketing (BA 312)	4
Law (BA 226)	4
Finance (BA 313)	4
Organizational Behavior (BA 361)	4
Marketing Management (BA 471)	5
Sem: Acct for Teach (BEd 407H)	3
Organ and Admin of Office and Dist Ed (BEd 450)	3
Coordination Techniques in Coop (VEd 483)	3
Sem: DECA Supervis (BEd 407D)	3
Sem: DE Curric and Store (BEd 407F)	4
Occupational Internship (VED 410) (optional)	3–15
Sem: Oper and Promot (BEd 407J)	3

Home Economics Education—58-63 hours

Curricula in home economics education are designed to prepare students for teaching in middle, junior, and senior high schools. Two options are offered in the basic endorsement program. The occupational option requires work experience in the area to be taught.

Required for All Options:

Perspectives in Home Ec (HEc 101) *or* Home Ec Prof (HEc 230) for transfers	1
Contemp Issues in Home Ec (HEc 412)	1
Clothing and Man (CT 211)	3
Clothing Construct (CT 225)	1
Textiles (CT 250)	1
Prenatal and Infant Dev (HDFS 225)	3
Devel in Early Child (HDFS 311)	3
Contemporary Amer Families (HDFS 240)	3
Fam Relations (HDFS 322)	3
Fam Housing and Its Environ (FRM 235)	3
Dec Making and Consumer (FRM 250)	3
Pers and Fam Finance (FRM 341)	3
Human Nutrition (FN 225)	4
Foods (FN 215)	5
Meal Management (FN 313)	3

GENERAL HOME ECONOMICS EDUCATION OPTION:

Analysis of Apparel Const (CT 226)	3
Apparel Const (CT 227)	3
Fam Nutrition (FN 325)	3
Dir Exp with Preschool Child (HDFS 326)	2

Select 3-4 hours from each group:

Group I

Fam Mgt Systems (FRM 420)	4
Comm Ser and Welfare Fam (FRM 470)	3

Group II

Home Furn (CT 341)	3
Home Equip (FRM 330)	3
Organiz and Use of House Spc (FRM 335)	3

OCCUPATIONAL OPTION:

Occup Intern (VEd 410)	4
Occup Prep in Home Economics Educ (HEd 427)	3

Foodservice Emphasis

Household Equip (FRM 330) *and* Fam Food Purchasing (FN 411) *or* Purchas for Institu (IM 440)	3–5
Quan Food Produc (IM 311) *or* Food-service Systems (IM 415)	4–3
Institu Exp (IM 450)	4

Child Care Service Emphasis

Dir Exp with Young Child (HDFS 326)	2
Prog in Early Child (HDFS 427)	3
Admin of Hum Serv (HDFS 435)	3

Industrial Education

INDUSTRIAL ARTS EDUCATION

The four-year professional program in industrial arts education, leading to the degree of Bachelor of Science, meets certification requirements of all states except those requiring graduate study as a pre-

requisite to certification, and at the same time provides an excellent foundation for graduate study. Students should confer with the major adviser for counseling on objectives, program planning, and occupational opportunities.

The basic endorsement for a teaching certificate in industrial arts in Oregon requires completion of a major in industrial arts, which must include the following 76 hours:

IEd 241L,251L,261L,281L,282L,371L	18
Graphics (GE 115)	3
Three credit hours from each of the four technologies at the 300 level (each course listed is 3 hours): Mechanical Power (IEd 341L,342L,343L); Graphic Communication (IEd 352L,353L,354L); Electricity-Electronics (IEd 372L); Materials-Processes (IEd 333L,363L,382L, 384L)	12
Safety in Industrial Education (IEd 477)	3
Restricted technical electives (to be selected from courses offered in the 4 technologies listed above)	28
Foundations of Indus Ed (IEd 281)	3
Leader and Mgt in Indus Ed (IEd 383)	3
Organ and Mgt of Ind Ed (IEd 420)	3
Instructional Materials (IEd 482)	3

TRADE AND INDUSTRIAL EDUCATION

BASIC ENDORSEMENT—76 hours

Trade competency examination, plus recommended courses in selected teaching field, based on examination results, and IEd 477, 3 credit hours—64 hours.

Foundations of Indus Ed (IEd 281)	3
Leader and Mgt in Indus Ed (IEd 383)	3
Organ and Mgt of Ind Ed (IEd 420)	3
Instructional Materials (IEd 482)	3

To qualify for the basic endorsement for an Oregon teaching certificate in trade and industrial education, a student must verify at least three years beyond the standard learning period of trade or industrial work experience in the content area he or she will be teaching and must be accepted into the teacher education program. This endorsement requires 64 credit hours of trade and industrial education. A maximum of 48 of these hours may be gained through a required trade competency examination. The remainder of the 64 hours, the number of which is dependent on the examination results, must be satisfied through the course work recommended by the student's evaluation committee, which will advise the student on electives relevant to his or her chosen teaching field.

The competency examination includes the following: (a) a comprehensive written examination, (b) a manipulative performance examination, and (c) an oral examination and evaluation by committee. Information on the scope of the three exams is available from the industrial education program.

COOPERATIVE PROGRAM

Outstanding graduates of two-year technical education curricula may be admitted into an industry-School of Education cooperative program whereby twenty months are spent in industry as part of the teacher education requirements.

The total program requires a minimum of 144 term hours of classwork plus a maximum of 48 hours earned by completing a written and performance examination in the student's subject area. This examination is scored 50% on knowledge of technical content of subject and 50% on performance. A student must complete six terms of industrial experience, be accepted into the program, and have completed 45 term hours of approved lower division academic course work before taking his or her trade examination. However, the credits earned as a result of the examination will be entered in the Registrar's Office as *incompletes* until the student has completed 93 academic term hours, including all lower division courses required in the program. Credits awarded will be applied toward the fulfillment of teaching field electives.

Standard Teaching Certificate Program

Requirements for a standard teaching certificate in vocational-technical education are the same as for a standard teaching certificate in the teaching specialties division.

STANDARD ENDORSEMENTS

Agricultural Education

Completion of the basic endorsement requirements.

Required courses in agricultural education: Rural Survey Methods (AEd 533), Community Programs for Agricultural Education (AEd 541), and Vocational Agriculture Program Management (AEd 516A).

Required courses in technical agriculture: 18 hours in animal science, crop science, agricultural mechanics, soils, or agricultural business management.

Electives in education and agriculture.

Business Education

Completion of basic endorsement.

Measurements in Business Education (BEd 537)	3
Administration and Supervision of Business Education (BEd 540)	3
Problems in Research Techniques in Business Education (BEd 536)	3
Sp Topics: Bus and Distr Ed (BEd 543)	3–9

Elective courses in business administration and education.

Distributive Education

Standard endorsement (distributive education-marketing)

Instructional areas include distributive education, business administration, vocational and career education, and general education. Required courses or the equivalent include: Current Trends in Distributive Education (BEd 543), 6-9 hours; Measurements in Business Education (BEd 537), 3 hours; Administration and Supervision of Business Education (BEd 540), 3 hours; Problems in Research Techniques in Business Education (BEd 536), 3 hours.

Home Economics Education

Completion of basic endorsement.

Select:

12 hours from the following with at least three groups represented:

Group I

Dev in Textiles (CT 450)
Clothing for Special Needs (CT 415)
Costumes and Cultures (CT 463)
Clothing and Human Behavior (CT 585)

Group II

Dev in Mid Childhood and Adolescence (HDFS 413)
Parent Education (HDFS 423)
Dir Exp with Preschool Child (HDFS 425)
Prog in Early Child (HDFS 427)
Curriculum Enrichment for Young Child (HDFS 428)
Understanding Child Behavior (HDFS 430)
Admin of Hum Serv (HDFS 435)
Selected Topics in Fam Relationships (HDFS 481)

Group III

Consumer Economics (FRM 412)
House Plan in Relation to Function (FRM 435)
Home Management Theory (FRM 440)
Economics of Family (FRM 441)
Housing Policy and Prog (FRM 465)
Comm Ser and Welfare Families (FRM 470)
Advanced Per and Fam Finance (FRM 481)

Group IV

Family Food Purchasing (FN 411)
Home Food Preservation (FN 414)
Food Economics (FN 415)
Cultural Aspects of Food (FN 416)
Principles of Foods for Teachers (FN 590T)
Principles of Nutrition for Teachers (FN 591T)

Industrial Arts Education

Completion of basic endorsement.

Org and Mgt of Integ Tech (IEd 573)	3
Design Lab Activ (IEd 475)	3
Industrial ed electives selected from following: Indus Arts for Inter Grades (IEd 474), Safety in Indus Ed (IEd 477), Curric Prac and Trends in Indus Ed (IEd 574), Facil Design for Indus Ed (IEd 511L)	3
Technical electives	15

Trade and Industrial Education

Completion of basic endorsement.

Org and Mgt of Integ Tech (IEd 573)	3
Selec Topics in Indus Ed (IEd 540)	3
Prin of Voc Ed (VEd 542)	3
Industrial ed electives selected from following: Safey in Indus Ed (IEd 477), Instruct Mat (IEd 482), Org and Superv of Voc Ed (VEd 535), Coordin Techn and Coop Work Exp (VEd 483), The Commun College (HiEd 550), Pub Rel for Teach (VEd 487), Design Lab Activ (IEd 487), Facil Design for Indus Ed (IEd 511L)	6
Technical electives	12

Graduate Degrees

M.A., M.S., and Ed.M. degrees are offered in business education, home economics education, and industrial education, and the M.S. and Ed.M. in agricultural education. Both master's and doctorates are available in vocational-technical education.

AGRICULTURAL EDUCATION

Agricultural education, a joint department of the Schools of Agriculture and Education, helps students prepare to become teachers of agriculture and supervisors of agricultural programs in secondary schools.

BUSINESS EDUCATION

Business education provides instruction for the preparation of teachers in three areas: basic business/accounting, office occupations, and distributive education. No thesis is required for the Ed.M. degree (Option C). The thesis is optional in the M.A. and M.S. degree programs.

HOME ECONOMICS EDUCATION

The Department of Home Economics Education, a joint department of the Schools of Education and Home Economics, provides professional preparation for teachers of home economics subjects. Graduate programs are developed to meet individual needs.

INDUSTRIAL EDUCATION

Industrial education provides four programs leading to the master's degree. Two programs offer a major in trade and industrial education and a minor in education or science. The second two programs offer a major in industrial arts and a minor in education or science.

VOCATIONAL AND TECHNICAL EDUCATION

The vocational and technical education program offers the master's and doctoral degrees, with emphasis on leadership development.

The master's degree (M.A., M.S., or Ed.M.) with a major in vocational education requires 45 term hours. The degree emphasizes leadership activities and prepares graduates to enter supervision and coordination positions at local education agency levels.

The doctorate (Ed.D. or Ph.D.) in vocational education prepares leaders and researchers in career and vocational and technical education, specifically as coordinators of career and vocational education, supervisors at the state Department of Education level, deans in community colleges or vocational and technical schools, or in universities as instructors, administrators of career and vocational education; doctorate requires a major and one minor; two minors may be selected. For a Ph.D., 36 hours must be outside the School of Education (24 hours for an Ed.D.). Internships may be planned in cooperation with state and regional agencies for graduate credit applicable toward meeting the degree requirements.

SECONDARY EDUCATION

Basic Teaching Certificate Programs

A student preparing to teach in secondary school must complete the courses listed below and also complete requirements for a basic endorsement in a teaching field. If he or she can supervise at least one student activity, job opportunities upon graduation are improved. Activities which provide excellent training and experience for prospective teachers include intercollegiate and intramural sports, journalism, art, dramatics, debate, oratory, orchestra, band, chorus and other vocal groups, writing and producing radio and television programs, collegiate organizations, and student government. The electives recommended for freshmen and sophomores help broaden the educational experience and preparation, and may be used as a starting point in student activities.

Students preparing to teach grades 5-12 may graduate from the School of Education or the school or college in which they have their major teaching specialty. When graduating from a school or college other than the School of Education, the student must meet the graduation requirements of that school or college as well as requirements for certification. The Department of Science and Mathematics Education in the College of Science shares teacher education programs in science and mathematics education with the School of Education. The College of Liberal Arts shares the teacher education programs in language arts, music, and social studies. Programs in health education and physical education are offered through the School of Health and Physical Education. Programs in agricultural education and home economics education are shared with the School of Agriculture and School of Home Economics.

CURRICULUM

Courses in speech, literature, history, science, and physical education may be taken in either the freshman or sophomore year.

Before students enroll in Student Teaching (Ed 416), they must have had extensive field experience, must have a minimum grade-point average of 2.50 in the major field, 2.25 overall, must not be on probation, and must have passed the basic skills exam.

Freshman Year

	Hours
English Composition (Wr 121)	3
Mathematics or a laboratory science (one year sequence)	9–15
Speech (Sp 112 or 113)	3
Physical education (PEA 100s)	3
History (Hst 101,102,103 or Hst 121,122 or Hst 201,202,203 or Hst 221,222)	9–10
Courses in basic endorsement	9–18
Other electives	9–18

Sophomore Year

Theory and Prac II (Ed 309,309L or M, 311)	13
General Phychology (Psy 201,202)	6
Literature	9
Social science course (anthropology, economics, geography, political science, psychology, sociology) from three or more fields	at least 15
Written/oral communication	3
Electives/basic endorsement	3–12

Junior Year

Theory and Practicum III: Field (Ed 313)	6
Special Secondary Methods (Ed 411)	3
Methods in Reading/Sec (Ed 451)	3
Science or mathematics to bring total to 15	0–6
Courses in basic endorsement	18–24
Other electives	6–12

Senior Year

Sec Student Teaching (Ed 416)	12–15
Seminar: Student Teaching (Ed 407)	3
First Aid card (Red Cross instruction or H 358)	0–3
Sem: Civil Rights Laws (Ed 407A or 476)	1–3
Science or social science as needed to bring total to 45	0–9
Consumer ed/economics/Personal and Fam Finance (FRM 341 or BEd 407P, Q)	3
Courses in basic endorsement	18–24
Other electives	6–12

BASIC ENDORSEMENTS

Driver Education (combined)—12 hours

Certification for driver education must be combined with certification in another endorsement area. Students who desire the basic driver education/combined endorsement must include:

Safety Education (H 380) *or* Safety Program Management (H 483)	3
Driver and Traffic Safety Education (H 480)	3
Programs in Traffic Safety Education (H 481)	3
Problems in Safety (H 482)	3

Health Education

Students who wish to teach health in grades preprimary through 12 complete the basic endorsement which includes the following 43 hours:

Personal Health (H 170)	3
Consumer Health (H 262)	3
Values, Attitudes, and Hlth Behavior (H 263)	3
Communicable and Noncom Diseases (H 320)	3
Community Health (H 321)	3
Man, Health, and Environment (H 344)	3
Contemporary Drug Problems (H 364)	3
School Health Education (H 369)	3
Safety Education (H 380)	3
First Aid and Emergency Care (H 386)	3
Seminar: Instructor Competency in Emerg Care (H 407)	3
Mental Health (H 421)	3
Sex Education (H 461)	3
Human Nutrition (FN 225)	4
Elementary Human Anatomy (PE 321)	3
Twelve hours included in general education:	
Introductory Microbiology (Mb 130)	3
Physiology (Z 331,332,333)	9

When combined with an endorsement in another related subject area such as home economics, physical education, social studies, or biology, the combined endorsement for grades 5-12 may be obtained by completing the following 34 hours:

Personal Health (H 170)	3
Consumer Health (H 262)	3
Communicable and Noncom Diseases (H 320)	3
Man, Health, and Environment (H 344)	3
Contemporary Drug Problems (H 364)	3
School Health Education (H 369)	3
Safety Education (H 380)	3
First Aid and Emergency Care (H 386)	3
Mental Health (H 421)	3
Sex Educatio n(H 461)	3
Human Nutrition (FN 225)	4
Three hours included in general education:	
Introductory Microbiology (Mb 130)	3

Language Arts—63 hours

Literature—42 hours

Two sequences of the following three: Survey of English Literature (Eng 101, 102,103); World Literature (Eng 107, 108,109); Survey of American Literature (Eng 253,254,255)	18
Shakespeare (Eng 201,202, or 203)	3
Upper division courses before 1800 (electives)	9
Upper division courses after 1800 (electives)	6
Literary Criticism (Eng 345)	3
Literature for Teachers (Eng 488)	3

Communication—12 hours

Written expression: English Composition for Teachers (Wr 411)	3
Oral expression (electives in either speech, film, television, or drama)	3
General linguistics (electives in either semantics, communication, or communication theories (Sp 310,370,470,420, or Eng 490: Devel of the English Language)	3
Cultural linguistics: Structure of the English Language (Eng 491)	3
Three electives in written expression, oral expression, general or cultural linguistics (a total of 12 quarter hours must be taken in written expression for certification)	9

Music—63 hours

Music education majors have several areas of emphasis available: public school teaching with state certification in music at the elementary, junior, and senior high school levels (K-12 certificate); state certification in music in combination with preparation for elementary classroom teaching (K-9 certificate); or preparation for independent music teaching. Requirements for music education follow:

Lit and Mat of Music (Mus 121,122,123)	12
Lit and Mat of Music (Mus 221,222,223)	9
Ear Training I (Mus 134,135,136)	3
Ear Training II (Mus 234,235,236)	3
History of Music (Mus 324,325,326)	9
Special Studies: Global Musics (Mus 499)	3
Conducting (Mus 314,316 or 315,318)	4
Mus in the Elem School (MuE 372)	3
Mus in the Jun High School (MuE 373)	3
Choral Meth and Mat for High School (MuE 474) or Instr Meth and Mat for the High School (MuE 475)	3
Studio Instruction (MuP 190-196, 290-296)	8
Perform Group (Mus 140-168)	6
Instrumental Techniques (MuE 376-379)	6
	*72

Piano and vocal proficiency examinations must be passed at the end of the sophomore year.

Physical Education

Students who wish to teach physical education in grades preprimary through 12 complete the basic endorsement in physical education, which includes the following 53 hours:

Professional Activ (PE 194,294,394)	16
Phil Basis of Human Movement (PE 211)	3
Psy Basis of Human Movement (PE 311)	3
Soc Basis of Hum Movement (PE 312)	3
Motor Development (PE 313)	3
Elem School Physical Ed (PE 320)	3
Elementary Human Anatomy (PE 321, 322)	6
Kinesiology (PE 323)	3
Physiological Basis of Human Movement (PE 324)	3
Care and Prev of Ath Injuries (PE 356)	3
Adapted Physical Education (PE 444)	3
School Programs (PE 461)	4

When combined with an endorsement in another subject area, the basic physical education endorsement for grades 5-12 may be obtained by completing the following 48 hours:

Basic Rhythms (PE 194D)	2
Indiv Sports (PE 194E,394E,394F, or 394G)	2
Movement Fundamentals (PE 194C)	2
Gymnastics (PE 294B or 294H)	2
Developmental Activities (PE 394C)	2
Aquatics (PE 394D)	2
Team Sports (PE 294A, 294C or 294G)	2
Philosophical Basis of Human Movement (PE 211)	3
Psy Basis of Human Movement (PE 311)	3
Soc Basis of Human Movement (PE 312)	3
Motor Development (PE 313)	3
Elementary Human Anatomy (PE 321, 322)	6
Kinesiology (PE 323)	3
Physiological Basis of Human Movement (PE 324)	3
Care and Prev of Ath Injuries (PE 356)	3
Adapted Physical Education (PE 444)	3
School Programs (PE 461)	4

Speech Impaired—54-60 hours

Phonetics (SPA 370)	3
Speech Science (SPA 371)	3
Physics of Sound, Hearing, and Music (Ph 331)	3
Seminar: Diagnostic Methods in Speech Pathology and Audiology (SPA 407)	3
Seminar: Beginning and Advanced Sign Language (SPA 407)	6
Speech and Language Development (SPA 470)	3
Speech Pathology (SPA 481,482,483)	9
Clinical Methods in Speech Correction (SPA 484,485,486)	9
Audiology (SPA 487,488,489)	9
Lip Reading (SPA 490)	3
Communication with the Hearing Impaired (SPA 491)	3
Aural Rehabilitation (SPA 492)	3
Practicum: Speech Pathology and Audiology (SPA 494)	1–9

* Twelve music education hours are counted as humanities credit under the University's general education requirements.

Standard Teaching Certificate Programs

A program for a standard certificate in secondary education requires 45 term hours planned with an adviser, subsequent to completion of the basic certificate.

To obtain the standard teaching certificate a student must complete 15 term hours in specified education courses (standard secondary endorsement) and 21 to 30 hours in his or her teaching field (standard subject matter endorsement). An alternative to the standard subject matter endorsement is two basic subject endorsements.

The standard secondary endorsement requires work in the areas of diagnostic, prescriptive, and evaluative techniques; research; education of the exceptional child; counseling and guidance; and reading. Some practicum experience must be included.

STANDARD SUBJECT MATTER ENDORSEMENTS

Language Arts Education

Basic endorsement in English	
Graduate courses to include advanced writing, linguistics, literary criticism, and literature, depending on prior studies	21
Graduate hours in education with the adviser's approval (all graduate courses usually can be applied to the 45-hour planned program for either an M.A. or Ed.M. or standard endorsement)	15
Graduate elective hours, with adviser's approval	9

Health Education—91 hours

Basic endorsement in health ed	46
Health Agen and Prog (H 420) or Comm Health (H 321)	3
Health of the School Aged Child (H 460)	3
Advanced Teaching Strategies (H 462)	3
School Health Administration (H 463)	3
Approved upper division or graduate health courses	6
Education and approved electives	27

Physical Education

Physical Education (preprimary-12)-98 hours

Basic Endorsement in physical education (K-12)	53
Psychomotor Measurement (PE 473)	3
Human Movement, Perception, and Cognition (PE 411)	3
[1]Physiology of Exercise (PE 433)	3
Workshop: Advanced Lab Practicum (PE 408)	6
[2] Upper division or graduate courses in physical education	6
Education and/or approved electives	24

Physical Education (5-12 combined with Health)—93 hours

Basic endorsement in physical education (5-12)	48
[1] Physiology of Exercise (PE 433)	3
Human Movement, Perception, and Cognition (PE 411)	3
Psychomotor Measurement (PE 473)	3
Workshop: Advanced Lab Practicum (PE 408)	6
[2] Upper division or graduate courses in physical education	6
Education and/or approved electives	24

Social Science Education

Basic endorsement in social studies, including 30 upper division hours	65
Required graduate education courses	16–18
Required graduate social studies courses	12
Approved electives	15–17

Science and Mathematics Education

Science

Basic endorsement (all required science and mathematics)	65–72
Approved upper division and graduate science and mathematics courses (12 hours must be graduate)	15
Approved upper division and graduate electives	15
Science education and education	15

Mathematics

Basic endorsement (all required science and mathematics)	63
Mathematics to include analysis, elementary number theory, logic, and set theory	18
Approved upper division and graduate electives	12
Science education and education	15

Graduate Programs in Secondary Education

A master's degree in education (Ed.M.) is offered in the first three fields below, while both master's and doctor's degrees are available in science and mathematics education.

LANGUAGE ARTS EDUCATION

Under Option C, which requires no thesis, students may qualify for the Ed.M. in education with English the principal teaching field. The program includes 21 term hours in English and 24 in education. Normally, all requirements for a standard teaching certificate in English can be met at the same time.

HEALTH AND PHYSICAL EDUCATION

Students may qualify for the M.A., M.S., or Ed.M. degree with a major in health education or with a subject matter specialty in physical education in a program that meets standard teaching certificate requirements as well as those for the degree. Health education, community health, or physical education may be used as minor fields in the Ed.D. and Ph.D. programs in education.

[1] Exercise physiology must be taken if not fulfilled in undergraduate curriculum.

[2] Credit for PE 401,405,406,407, or 408, singly or combined, cannot exceed nine term hours for master's degree programs.

SCIENCE AND MATHEMATICS EDUCATION

The Department of Science, Social Science, and Mathematics Education offers the M.A., M.S., and Ed.M. degrees. The Master of Science in science education degree is designed primarily for middle, junior, and senior high school science and mathematics teachers, but may also serve science and mathematics teaching at the community college level. Students must complete 45 term hours of approved graduate courses; 30 hours must be in the major. Major fields include biological, physical, earth, or general science, mathematics, integrated science, and science and mathematics education. When science or mathematics is the major field, at least nine term hours must be in each of two separate science and/or mathematics departments. Fifteen hours must be in the minor. When the minor field is science and mathematics education, it must include a minimum of nine hours in science and mathematics education. The degree is considered terminal when special courses designed for science and mathematics teachers predominate in the program. The curriculum may be completed during the academic year or during summer sessions.

The doctorate (Ed.D. or Ph.D.) in science education is designed primarily for specialists in science and mathematics education who anticipate work at the elementary or secondary school levels in supervision, in teacher education, or in related pursuits. It may also be designed for science and/or mathematics teaching at the community college level. The degree requires a major and two minors. The major includes a minimum of 24 hours (including seminars) in the Department of Science, Social Science, and Mathematics Education and 21 hours in professional education courses (to include educational psychology, educational sociology, and educational philosophy). Statistics and a dissertation are required. A language is required for the Ph.D. degree.

Education Courses

Education courses with an *Ed* prefix are presented first, followed in alphabetical order by those groups of courses with more specific designators.

Because *Ed* courses are often most relevant to a specific program, the following guide is offered:

General courses—Ed 50, 59, 199, 401, 402, 405, 406, 407, 408, 501, 503, 505, 506, 507, 508, 521

Adult education, community college education, college and university teaching, Extension education (See EM)—HiEd 496, 497, 498, 505, 506, 507, 507A, 507F, 508, 509, 546, 547, 548, 550, 551, 552, 595, 596

Agricultural education courses—all AEd courses

Business and distributive education courses—all BEd courses plus VEd 483

College student services administration courses—HiEd 507O, 507T, 555, 556, 557, 558, 584, 585, 586, 587, 588, 589

Counseling and guidance courses—all Coun courses

Elementary education courses—Ed 111, 367, 414, 415, 450, 553, 567, 568, 569, 570

Extension education courses—all EM courses

Foundations courses—Ed 50, 59, 309, 310, 311, 312, 313, 424, 439, 440, 460, 461, 463, 464, 465, 470, 473, 474, 475, 476, 492, 511, 512, 519, 533, 543, 561, 566, EdAd 574, 575, 576, Ed 597, 598, 599

Home economics education courses—all HEd courses

Industrial education courses—all IEd courses

Media courses—Ed 309L, Ed 309M, 435, 436, 437, 406M

Middle/junior high school—Ed 530, 531, 532

Reading courses—Ed 350, 429, 451, 467, 468, 472, 479, 481, 579, 580, 583, 590, 594

Secondary education courses—Ed 416, 522, 527

Science education courses—all SEd courses

Vocational education courses—all VEd courses

EDUCATION

Lower Division Courses

Ed 50 Reading Improvement
3 hours 3 ①
Reading in different content areas with individual instruction. Emphasis on vocabulary, comprehension, and word recognition skills as well as on oral reading and locating information. Close attention to individual reading problems of each student. Restricted to students in Educational Opportunities Program. Graded P/N.

Ed 59 Methods of Study
3 hours 3 ①
Development of skills and habits essential to effective learning. Specific methods applied to various subject matter fields; taking and using notes; preparation for tests and examination-taking skills, study schedule, use of the library, preparing study sheets, underlining textbooks effectively, using auxiliary materials, fixing study habits. Knowledge and skills applied to the demands of an actual university course. Restricted to students in Educational Opportunities Program.

Ed 111 Contemporary Education
2 hours 2 ①
Exploration of trends and educational practices in today's schools. Graded P/N.

Ed 199 Special Studies
Terms and hours to be arranged
Section A, Tutoring, graded P/N.

Ed 296 Leadership Training
2 hours 2 ①
Study of group process, goal setting, time and group meeting management, personal leadership styles, problem solving, decision making, and conflict resolution; leadership in campus life as laboratory experience. Prerequisite: an actual leadership position and consent of instructor. Section E graded P/N.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Ed 309 Theory and Practicum II: Field
5 hours
A field-based course designed to develop observational skills. Students assigned to a public school on a half-day basis to develop competencies in the social, psychological, and cultural foundations of education. Teaching strategies, including the teaching of reading and operation of media equipment; classroom operation. Prerequisite: Psy 200 or 201,202. Graded P/N.

Ed 309L Theory and Practicum II: Media/Computer
2 hours 2 ①
Learning experiences designed to enable the preprofessional student to use common classroom instructional equipment, including microcomputers, and to produce instructional materials commonly used for learning activities in the classroom. Practical applications provided through laboratory and field-based experiences. Graded P/N. Credit not given for both Ed 309L and 309M.

Ed 309M Theory and Practicum II: Media
1 hour 1 ① 1 ①
Learning experiences designed to enable the preprofessional student to utilize all types of common classroom instructional equipment and to produce some specific materials commonly used for learning activities in the classroom. Graded P/N.

Ed 310 School in American Life
3 hours 3 ①
Elementary and high schools from standpoint of teacher; aims, functions, and characteristics. Prerequisite: Psy 201,202; two weeks of scheduled observation in the public schools in September to be arranged the preceding April; and admission to the teaching credential program.

Ed 311 Theory and Practicum II: Campus
6 hours 5 (1½)
A campus-based course for the in-depth development of concepts in the cognitive and affective development of learners; school as a social system; classroom behavior; cultural diversity; instruction and learning. To be taken during the term immediately followed Ed 309.

Ed 312 Educational Psychology: Learning
3 hours 3 ①
Principles of learning and application to classroom; motivation; transfer of training; memory; forgetting; psychology of school subjects. Prerequisite: Psy 200 or 201,202.

Ed 313 Theory and Practicum: Field
6 hours
A field-based course designed to develop competency in understanding the adolescent; his or her life roles, maturation, characteristics, and factors influencing development; in developing objectives, diagnostic and prescriptive techniques, teaching strategies, and use of educational media. Prerequisite: Ed 309 and 311 or equivalents. Ed 313D must be taken concurrently with Ed 408E; Ed 313Y, Z must be taken concurrently with Ed 408R. Graded P/N.

Ed 350 Methods of Reading: Elementary
6 hours 3 ① 2 (1½)
Prerequisite: Ed 309,311.

Ed 367 Theory and Practicum: Elementary
7-15 hours 1 ⑦ 4 ⑥
Basic instructional strategies: skill development, concept formation, inquiry, simulation, reading, and media. Emphasis on diagnosis, prescription, and evaluation in basic subject areas (language arts, mathematics, science, and social studies), integrating substantive knowledge and classroom application. Continued development of content in Ed 309 and 311. May be repeated for a maximum of 15 hours. Prerequisite: Ed 309, 311,350E. To be graded in blocks: 8 hours of field practicum (P/N grading) and 7 hours of lecture (regular grading).

Ed 401 Research

Ed 402 Independent Study

Ed 405 Reading and Conference
Section K, Music, graded P/N.

Ed 406 Projects
Section B, Tutoring, terms and hours to be arranged; Section I, Student Teaching Internship, 5 hours; Section L, Media/Computer, 1 hour; Section M, Media, 1 hour; each graded P/N.

Ed 406 Projects (G)

Ed 407 Seminar
1, 2, or 3 hours any term 1, 2, or 3 ①
Prerequisite: Ed 309,311,350,408, or consent of instructor; Sections A,B, Civil Rights Laws in Education, 1 hour, and Section Y, Inservice Education, maximum of 9 hours, each graded P/N.

Ed 407 Seminar (G)

Ed 408 Workshop

Ed 408 Workshop (g)

Ed 408 Workshop (G)
Terms and hours to be arranged

Ed 411 Special Secondary Methods
3 hours
Problems and methods in selecting and organizing materials for instruction; comparison and evaluation of methods, laboratory techniques, supplies, equipment; economy of time and materials. Sections include: (a) agriculture, (b) biological science, (c) business, (d) distributive education, (e) industrial education, (f) mathematics, (g) physical science, (h) physical education, (i) health education, (j) language arts, (k) social studies, (l) general science, (m) modern languages, (n) art, (o) music, (p) liberal arts, (r) home economics, (s) speech, (t) language arts/social studies. Prerequisite: Ed 309,311. Prerequisite or corequisite: Ed 451.

Ed 414 Student Teaching: Kindergarten
3 hours
Open only to students in elementary education. Prerequisite: Ed 415 (minimum of 6 hours), 450, and consent of adviser. Arrangements for student teaching must be made during registration for winter term of junior year. Graded P/N.

Ed 415 Theory and Practicum: Elementary Student Teaching
3-15 hours
A full-time experience in an elementary school. Open only to students in elementary education. Prerequisite: senior standing in elementary education and consent of instructor. Student must not be on probation. Corequisite: Ed 407. Graded P/N. Section M, Elementary Student Teaching, 12-15 hours, graded P/N.

Ed 416 Theory and Practicum: Secondary Student Teaching
3-15 hours
A full-time experience in a secondary school in the student's field of preparation and interest: (a) agriculture, (b) biological science, (c) business, (d) home economics, (e) industrial arts, (f) mathematics, (g) physical science, (h) physical education, (i) health education, (j) English, (k) social science, (l) junior high school science, (m) foreign languages and literatures, (n) art, (o) music, (p) journalism, (s) speech communication, (t) trade and industrial education. Prerequisite for section A: Ed 411A; AEd 411. Corequisite for all sections: Ed 407. Graded P/N.

Ed 424 Measurement in Education
(G) 3 hours 3 ①
Standard tests and scales; statistical method. Prerequisite: senior standing.

Ed 429
Diagnosis and Prescription in Reading for the Handicapped Learner (G)
3 hours 3 ①
Provides teachers with diagnostic and prescriptive strategies for the handicapped learner, as defined by PL 94-142. Prerequisite: Ed 350; senior standing.

Ed 435 Instructional Media (G)
3 hours 1 ② 1 ②
Selection, utilization, and evaluation of instructional media including film projection, video production, computerized instruction, communication theory and research relating to effective teaching and media selection.

Ed 436
Instructional Materials Preparation (G)
3 hours 1 ② 1 ②
Diagrams, charts, graphs, transparencies, still photographs, displays, exhibits, and simple audio recordings. A systems approach to the design and production of visual materials for improved instruction and learning emphasized.

Ed 437 Multi-Media Production (G)
3 hours 2 (1½) 1 ②
Design of multi-media and multi-image programs in relation to instructional research and learning theory. Development, production, and evaluation of slide-sound programs to meet specified instructional objectives, including multi-image instructional lessons and audio-tutorial slide-sound lessons. Prerequisite: senior standing.

Ed 439 The Gifted Child (G)
3 hours 3 ①
Psychology, education, and guidance of the mentally superior and the extraordinarily gifted child. Prerequisite: senior standing. Not offered every year.

Ed 440
Developmental Learning Abilities (G)
3 hours 3 ①
Development and introduction to awareness and understanding of the constructs underlying child development and the inhibitions to normal learning—physical, perceptual, growth, and emotional. Prerequisite: Psy 311 and senior standing. Cross-listed as Coun 440.

Ed 450 Kindergarten Education (G)
3 hours 3 ①
Building good attitudes toward school; group adjustment, work habits, readiness for first-grade subjects. Prerequisite: Ed 350; student teaching. Elementary education majors only.

Ed 451 Reading and Composition in the Secondary School
3 hours 3 ①
Prerequisite: Ed 309,311.

Ed 460 Psychology of Childhood
(G) 3 hours 3 ①
Behavior during the prenatal period, infancy, and childhood; muscular activities, perception, emotional adjustment, intelligence, language, and social behavior. Prerequisite: senior standing.

Ed 461 Psychology of Adolescence
(G) 3 hours 3 ①
Behavior changes during preadolescence and adolescence as related to physiological development and social and cultural factors. Prerequisite: senior standing.

Ed 463
The Educationally Different Child (G)
3 hours 3 ①
Curriculum, strategies, and opportunities for assisting the educationally different child. Prerequisite: Ed 367.

Ed 464 The Mentally Retarded Child
(G) 3 hours 3 ①
Psychology, education, and guidance of the mentally retarded child. Prerequisite: senior standing.

Ed 465 Diagnostic and Corrective Techniques in the Basic Skills (G)
3 hours 3 ①
Diagnostic, remedial, and corrective techniques in basic skills exclusive of reading. Prerequisite: senior standing in education.

Ed 467 Reading in the Elementary School: Advanced (G)
3 hours 3 ① 1 ①
Advanced work in reading methods designed to emphasize diagnostic and prescriptive techniques used in the elementary school classroom to meet the needs of all students.

Ed 468 Principles and Practices in Remedial Reading (G)
3 hours 3 ①
Review of research on causal factors in reading disability; procedures and materials for correction of reading problems and development of reading skills; organization and administration of remedial programs. Prerequisite: Ed 350 or 351.

Ed 469
Diagnostic Techniques in Reading (G)
3 hours 1 ② 1 ①
Lecture-discussion and laboratory; use of standardized tests; construction and use of informal measures for estimating reading achievement and specific needs. Instruction differentiated for elementary, secondary, and college teachers. Prerequisite: Ed 350 or 351.

Ed 470
Education of the Exceptional Child (G)
3 hours 3 ①
The emotionally disturbed, the mentally accelerated, the slow learner, and the physically handicapped. Visits are made to state institutions and agencies to acquaint students with service available. Prerequisite: senior standing.

Ed 472 Reading Materials, Media, and Management Systems (G)
3 hours 3 ①
Developing competence in utilizing instructional reading materials, media, and reading management systems in the classroom and public school district resource centers; training and supervising support personnel in the regular classroom or reading resource center. Prerequisite: Ed 350.

Ed 476 The Teacher and the Law (G)
3 hours 2 ①
For teachers and administrators concerned with the law as it relates to problems in education. Prerequisite: junior standing.

Ed 479 Clinical Practicum in Reading
(G) 3 hours 3 ①
Diagnostic tests, remedial techniques in reading, diagnosis, corrective procedures. Prerequisite: Ed 468 and 469. Consent of instructor required.

Graduate Courses
Also see courses marked (g) and (G) above.

Ed 501 Research
In addition to regular courses listed, members of the staff supervise research and investigation by qualified graduate students. Registration by permission of staff members. Prerequisite: graduate standing in education. See also AEd 501, BEd 501, HEd 501, IEd 501, SEd 501.

Ed 503 Thesis

Ed 505 Reading and Conference

Ed 506 Projects

Ed 507 Seminar

Ed 508 Workshop
Terms and hours to be arranged

Ed 511 Recent Educational Trends and Problems
3 hours 3 ①
Trends, problems, and developments in all fields of education. Prerequisite: 24 hours of upper division education including student teaching.

Ed 512
Research Procedures in Education
3 hours 3 ①
Methods, techniques, and tools; scientific method; locating and formulating problems; solving problems; necessary statistical tools; collection and interpretation of data; preparing research proposals.

Ed 515 Quantitative Applications
4 hours 2 ②
Quantitative and deterministic methods for both parametric and nonparametric problems in educational research. Theory, models, and concepts of educational practices studied by application to the solution of field and laboratory investigations. Prerequisite: St 451 or consent of instructor.

Ed 517 Research Design Techniques
2 hours 2 ①
Quantitative methods for the design of problems in social science and education research. Models and concepts of research design studied by application to field and laboratory practices. Prerequisite: St 451 or equivalent; Ed 515 or St 452.

Ed 519 Tests and Measurements
3 hours 3 ①
Selected tests and measurements applicable to a particular subject or department. Prerequisite: Ed 424 and other courses specified by department. Not offered every year.

Ed 521 Selected Topics in Education
1 to 3 hours to be arranged
Current literature and research on particular elements of formal schooling such as policy formulation, the instructional process, and the learner. May be repeated, with different topics, for a maximum of 9 credits.

Ed 522 Secondary School Curriculum
3 hours 3 ①
Study of the basic structure of the secondary school curriculum and the process of reconstruction as related to social and cultural change and need. Consideration also given to the extracurricular program.

Ed 524 Construction and Use of Objective Examinations
3 hours 3 ①
Selection of test items; types of examinations; validity; administering, scoring, grouping results. Not offered every year.

Ed 527 Secondary School Administration and Supervision
3 hours 3 ①
Emphasis on the important principles of secondary school administration and supervision and on involving faculty, students, and parents in the work of the school. Ways of improving the total school program.

Ed 530 Middle School and Junior High School
3 hours 3 ①
Development and needs of preadolescent and adolescent youth; rationale and development of middle schools and junior high schools; current practices in representative middle schools and junior high schools; transitional responsibility in a school system. Prerequisite: Ed 311 or senior standing; Ed 367,408.

Ed 531 Middle School and Junior High School Curriculum
3 hours 3 ①
Aims and objectives; curricular design and development, curricular models; activity programs, alternative programs; staffing, evaluation, strategies; individualization, basic skills, technology; planning and designing learning activities; learning environment, evaluation. Prerequisite: Ed 311 or senior standing.

Ed 532 Middle School and Junior High School Practicum
3 hours 3 ①
Supervised field experience to familiarize the student with the operation of middle and junior high schools: administration and organization, guidance program, activities program, pupil personnel program, and instructional materials center. Required seminar covers some theory in each area. Prerequisite: Ed 530 and/or 531.

Ed 533 Psychological-Sociological Aspects of Vocations
3 hours 3 ①
Choice of occupations; adjusting, or aiding others in adjusting; alteration of occupational conditions and demand to meet needs. Prerequisite: graduate standing in education.

Ed 543 History of American Education
3 hours 3 ①
Intellectual and social history and development of American education. Common school movement; rural/urban education; curriculum reform; efficiency; desegregation; pluralism.

Ed 553 Elementary School Curriculum
4 hours 4 ①
Pupil needs in life situations, objectives, essentials of a goal program, varying curriculum designs, organization of learning experiences, evaluation of learning, appraisal of new curriculum practices. Prerequisite: elementary certification; one year of elementary teaching.

Ed 561 Advanced Educational Psychology
3 hours 3 ①
Advanced consideration of learning theories, developmental theories, classroom psychodynamics; implications for curriculum and instruction. Prerequisite: graduate standing.

Ed 566 Curriculum Construction
3 hours 3 ①
Building elementary and secondary school curricula; theories and policies since 1900; selecting and organizing subject matter; courses of study; curriculum organization; curriculum theory. Prerequisite: graduate standing.

Ed 567 Strategies in Language Arts Instruction in the Elementary School
3 hours 2 ① 1 ②
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. Prerequisite: Ed 367; classroom teaching experience.

Ed 568 Strategies in Mathematics Instruction in the Elementary School
3 hours 2 ① 1 ②
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. Prerequisite: Ed 368; successful elementary teaching experience.

Ed 569 Strategies in Social Science Instruction in the Elementary School
3 hours fall 2 ① 1 ②
Analyzes structure of several social science disciplines; research literature pertaining to social studies instruction. Prerequisite: Ed 367; classroom teaching experience.

Ed 570 Strategies in Science Instruction in Elementary School
3 hours 2 ① 1 ②
Emerging programs in elementary science with emphasis on the interdependence of content and process in scientific inquiry; general, diagnostic, and prescriptive techniques in science instruction.

Ed 579 Clinical Practicum in Reading: Advanced
3-6 hours 1 ① 3 ②
Developing reading supervision skills competencies and applying specialized reading instructional techniques in the field-based public school clinical reading program. Prerequisite: Ed 468,469,479.

Ed 580 The Psychology of Reading Instruction
3 hours 3 ①
Psychological and physiological aspects and their application to classroom procedure. Prerequisite: Ed 460 or 461; Ed 467 or 468.

Ed 583 Development and Supervision of Reading Programs
3 hours 3 ①
Prepares reading specialists to design, implement, and supervise the school-wide developmental reading program. Examination of all components of the reading program in terms of administration and supervision. Prerequisite: Ed 350 or 351; Ed 469.

Ed 590 Reading and Composition in the Secondary School: Advanced
3 hours 3 ①
Reading methods which can be used by teachers to individualize instruction, correct basic reading and writing skills, and promote learning for the advanced student. Practical application and theory. Required for standard secondary certification in Oregon. Prerequisite: Ed 350 or 351.

Ed 594 College and Adult Reading
3 hours 2 ① 1 ①
Prepares students and inservice teachers to teach reading at the community college, college, university, and adult levels. Includes goals and objectives, course organizational procedures, management systems, and physical setting for fully functional skills laboratory and instructional environment. Prerequisite: Ed 350 or 351; Ed 468,583.

Ed 597,598,599 Education and Contemporary Trends in Thought
3 hours each 3 ①
Six major intellectual movements that have formed the ethos for the contemporary period, their impact upon the nature of the educational system of the United States, and their implications for the future. *Ed 597:* Social Darwinism and nineteenth-century scientism; pragmatism, pragmaticism, and instrumentalism. *Ed 598:* Marxism, Freud and psychoanalytic thought. *Ed 599:* science in the twentieth century, existentialism. Courses may be taken independently.

EDUCATION ADMINISTRATION

Oregon State University offers the following courses in education administration, which may be transferred to the administrative certification programs at the University of Oregon or at Portland State University.

EdAd 554 Elementary School Supervision and Administration
3 hours 4 ①
Role, duties, needs, problems; evaluation and improvement of teaching and learning. Prerequisite: elementary certification; one year of elementary teaching experience.

EdAd 574 School Supervision
3 hours 3 ①
Problems, issues, theories, and practices of supervision, especially for teachers and administrators. Supervisory roles, styles, goals, and problems conceptually analyzed relative to changing demands of individuals, schools, and society. Theories of leadership, values, interpersonal relations, innovation, curriculum planning, clinical techniques, group processes, teacher evaluation, and related approaches to the improvement of educational service and programs. Prerequisite: graduate standing or consent of instructor.

EdAd 575 School Finance
3 hours 3 ①
Finance, budgeting, and accounting; sources of revenue; federal, state, and local financing; budgeting and accounting models, capital and general fund financing and accounting; practical experience combined with examination of theory, trends, and issues. Focus on either public school or higher education finance through individual projects. Prerequisite: graduate standing or consent of instructor.

EdAd 576 School Buildings
3 hours 3 ①
Planning, financing, building, equipping, and remodeling public school and higher education facilities; managing and maintaining current facilities; effective use of school facilities; ecological and aesthetic considerations; enrollment projections and needs assessments. Prerequisite: graduate standing or consent of instructors.

The School of Education offers a core of courses which may be transferred to administrative certification programs at the University of Oregon or at Portland State University.

Cooperative program with University of Oregon

University of Oregon requirements: The following courses are directly transferable to the University of Oregon administrative credential program. Other courses in OSU's core curriculum may also be accepted, providing students consult with the U of O program adviser prior to taking the course:

Secondary School Curriculum (Ed 522)	3
Advanced Educational Psychology (Ed 561)	3
School Supervision (Ed Ad 574)	3
School Finance (Ed Ad 575)	3
School Buildings (Ed Ad 576)	3
Seminar: Law and the Schools (Ed 507D)	3
Collective Bargaining in Education (Ed 507E)	3
Research Procedures in Education (Ed 512)	3
Elementary School Curriculum (Ed 553)	4

Cooperative program with Portland State University

Portland State University requirements: Under terms of a reciprocity agreement, students may transfer 6 of the 12 credits required for vice-principal certification (basic), 6 of the 12 credits required for principal certification (basic), and 9 of the 21 credits required for principal certification (standard). PSU prefers Curriculum Construction (Ed 566) to Secondary School Curriculum (Ed 522) because of the K-12 endorsement.

Admission to PSU prior to beginning course work at OSU is not essential. However, the student should seek approval from a PSU adviser and should apply for admission to PSU soon after beginning course work at OSU.

Vice-principal (basic)

School Supervision (Ed Ad 574)	3
Seminar: Law and the Schools (Ed 507D)	3
Public School Organization and Admin (Ed 507)	3

Principal (basic)

School Supervision (Ed Ad 574)	3
School Finance (Ed Ad 575)	3
Public School Org and Admin (Ed Ad 507)	3
Seminar: Law and the Schools (Ed 507D)	3

Principal (standard)

Counseling Procedures (Coun 581)	3
Curriculum Construction (Ed 566)	3
Research Procedures in Education (Ed 512)	3

ADULT EDUCATION, COMMUNITY COLLEGE EDUCATION, COLLEGE AND UNIVERSITY TEACHING

HiEd 405 Reading and Conference (g)

HiEd 406 Projects (g)

HiEd 407 Seminar (g)

HiEd 408 Workshop (g)
Terms and hours to be arranged

HiEd 496 Education for Adults (G)
3 hours 3 ①
Overview of the nature, extent, and significance of adult education; historical development in the U.S. and abroad; the nature of adult groups, institutions, agencies, and programs; the literature of adult education. Prerequisite: senior standing.

HiEd 497 Adult Development (G)
3 hours 3 ①
Social scientific literature contributing to a better understanding of human development during the adult years. Prerequisite: 9 hours of upper division behavioral science.

HiEd 498
Field Experience in Adult Education
(G) 1-4 hours to be arranged
A directed practicum in which student observes, assists, and evaluates adult education activities under the direction of an administrator, teacher, or researcher. Prerequisite or corequisite: HiEd 496 or 497.

HiEd 505 Reading and Conference
Terms and hours to be arranged

HiEd 506
Projects: College Teaching Studies
3 hours any term
Reading, conference, and preparation of written reports related to, but distinct from, a teaching assignment at college level. Open to graduate students who have teaching assignments concurrent with the course. Prerequisite HiEd 546, 547,548.

HiEd 507 Seminar
Terms and hours to be arranged
Section A, College Teaching Procedures, 3 hours; Section F, Contemporary Issues in Community Education; Section T, Current Issues in College Student Services, 1 hour, graded P/N.

HiEd 508 Workshop
Terms and hours to be arranged

HiEd 509 College Curriculum Studies
Terms and hours to be arranged
Structured approach with philosophical base to the creation of curricular offerings in college or university teaching.

HiEd 546 The College Student
3 hours 3 ①
Student as central factor in college and university teaching; hereditary background, physical environment, cultural environment, and group relationships as contributors to his or her maturation.

HiEd 547 College and University Teaching 3 hours 3 ①
Professional awareness of the competence, concerns, methods, and techniques of postsecondary teaching. The college instructor's role in relation to the missions of postsecondary institutions.

HiEd 548 American Higher Education
3 hours 3 ①
Historical study of the college and university; influence of the European university; rise of American university; structure and curriculum; international higher education.

HiEd 550 The Community College
3 hours 3 ①
History and philosophy of the community and junior college; goals, functions, populations served, organizations, and articulation with secondary and higher education.

HiEd 551
Community College Curriculum
3 hours 3 ①
Curriculum development and management; faculty characteristics and evaluation; transfer, occupational, and adult continuing education; needs assessment and accreditation; instructional strategies. Prerequisite: graduate standing; HiEd 550 or community college experience or consent of instructor.

HiEd 552 Administration and Supervision of the Community College
3 hours 3 ①
Management and leadership; financial characteristics; board/community relations; organizations and personnel relations. Prerequisite: HiEd 550 or community college experience or consent of instructor.

HiEd 595 Leadership Development for Adult and Community Education
3 hours 3 ①
Adult education and basic career expectations in community education. Understanding of leadership roles in this area of educational planning. Prerequisite: HiEd 496 or recent experience in some area of adult education.

HiEd 596
Program Design for Adult Education
3 hours 3 ①
Problems, coordination, and implementation of adult education programs; situations, objectives, content and instructional resources, promotion, and evaluation. Prerequisite: HiEd 496,497 or recent experience in adult education.

AGRICULTURAL EDUCATION

Lower Division Course

AEd 199 Special Studies
Terms and hours to be arranged

Upper Division Courses
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

AEd 401 Research

AEd 405 Reading and Conference

AEd 407 Seminar
Section L, Leadership Organization; Section P, Agricultural Skills; Section S, Senior Seminar.

AEd 407 Seminar (G)
Terms and hours to be arranged

AEd 411 Program Report Analysis
2 hours winter 2 ①
Principles of vocational agriculture education; program analysis; vocational student organization (FFA).

AEd 417 The Agricultural Curriculum
(G) 3 hours 3 ①
Course content and types of course organization with reference to objectives to be attained in the field. Prerequisite: Ed 313,416.

Graduate Courses
Also see courses marked (g) and (G) above.

AEd 501 Research

AEd 503 Thesis

AEd 505 Reading and Conference

AEd 507 Seminar
Terms and hours to be arranged

AEd 516
Extension Course in Teacher Education
Hours to be arranged
Enables present and prospective teachers of agriculture to continue professional improvement; conference, followup instruction, supervision, correspondence, reports. Prerequisite: Ed 309, 311.

AEd 533 Rural Survey Methods
3 hours 1 ③
Technique; analyzing, interpreting, and using results in evaluating and formulating programs; field studies. Prerequisite: Ed 309,311; teaching experience.

AEd 541 Community Programs of Agricultural Education
3 hours 3 ①
Developing the natural and human resources of a community through agricultural education. Prerequisite: Ed 411A; teaching experience.

BUSINESS AND DISTRIBUTIVE EDUCATION

Lower Division Courses

BEd 110 Abbreviated Systems
3 hours 3 ①
Speedwriting systems for personal and job use. For business education majors and technical staff.

BEd 111,112 Stenography
4 hours each 4 ① 2 ①
Symbol shorthand; theory of shorthand and skill development. Laboratory assignments. Placement in sequence determined in consultation with department.

BEd 121 Basic Typing
3 hours 4 ① 1 ②
Keyboard introduction. Skill building and basic letters; tabulation problems, manuscript typing.

BEd 122 Intermediate Typing
3 hours 4 ① 1 ②
Skill development. Intermediate problems of typing correspondence, manuscripts, tabulation problems, outlines, and reports. Prerequisite: BEd 121 or equivalent.

BEd 123 Proficiency Typing
3 hours 4 ① 1 ②
Major emphasis on speed and accuracy development. Specialized drill work, proofreading competency, and special keyboard techniques. Prerequisite: BEd 121 or consent of instructor.

BEd 124 Professional Typing
3 hours 4 ① 1 ②
Advanced interrelated office production work; emphasis on statistical typing and advanced application typing. Prerequisite: BEd 122.

BEd 211,212 Applied Stenography
4 hours each 4 ① 2 ①
Advanced dictation and transcription. Laboratory assignments. Prerequisite: BEd 112,122, or equivalent.

Upper Division Courses

Courses designated (*g*) or (*G*) may be taken for graduate credit.

BEd 311
Introduction to Office Procedures
4 hours 3 ① 1 ②
Technical preparation and proficiency development in modern office equipment such as reprographics, calculators, word processors, and dictation/transcription machines. Prerequisite: BEd 121.

BEd 312 Advanced Application of Office Procedures
4 hours 3 ①
Organization and administration of a model office, including forms, machines, word processing, and records control. Prerequisite: BEd 311.

BEd 401 Research

BEd 403 Thesis

BEd 405 Reading and Conference
Section A, Directed Study, 1-5 hours, graded P/N.

BEd 407 Seminar
Section D, DECA Supervisor, 1 hour; Section E, Leadership Development in OEA/FBLA, 1 hour; Section F Distributive Education Curriculum and Store, 4 hours; Section P, Consumer Education for Teachers: Modules 1, 2, 3, 1 hour, graded P/N; Section Q, Consumer Education for Teachers: Modules 4, 5, 6, 1 hour, graded P/N.

BEd 407 Seminar (G)
Terms and hours to be arranged

BEd 450
Organization and Administration of Office and Distributive Education (G)
3 hours 3 ①
Organizing and administering vocational office and distributive education programs: development, legislation, and functions within career and vocational education; advisory committees, community survey, and youth organizations; secondary, postsecondary, and adult levels.

Graduate Courses

Also see courses marked (*g*) or (*G*) above.

BEd 501 Research

BEd 503 Thesis

BEd 505 Reading and Conference

BEd 507 Seminar
Practicum in Business Education: planning and development of practical and creative projects, group or individual, in business education. Students are urged to use actual school situations as nucleus for the term's work and to arrive at the best possible solutions.

BEd 508 Workshop
Terms and hours to be arranged

BEd 536 Problems in Research Techniques in Business Education
3 hours 3 ①
Philosophy, trends, and problems in business education; research models and techniques for conducting action research in the classroom. Prerequisite: Ed 408 or teaching experience in business subjects.

BEd 537
Measurements in Business Education
3 hours 3 ①
Objectives and principles; testing in specific areas; construction of sample tests; available testing materials; use of tests in diagnostic and remedial teaching. Prerequisite: Ed 408 or teaching experience in business subjects; BEd 536.

BEd 538
Current Trends in Office Procedure
3 hours 3 ①
Clerical and secretarial procedure programs used in secondary and collegiate schools; course content, teaching methods and materials; organization of laboratories; objectives, standards, instruction sheets, courses of study, and miscellaneous teaching aids. Prerequisite: Ed 408; BEd 536.

BEd 539
Current Trends in Basic Business Subjects
3 hours 3 ①
Analysis and application. Material covered will be useful in teaching related courses at the high school or postsecondary level.

BEd 540 Administration and Supervision of Business Education
3 hours 3 ①
Problems of curriculum, new teachers and orientation, public relations, professional growth and certification, and the use of community resources in administering a business education program.

BEd 541
Current Practices in Typewriting
3 hours fall 3 ①
Principles underlying development of typing skills; motivation, supplementary materials, and special devices. Prerequisite: Ed 408 or teaching experience in typing.

BEd 542
Current Practices in Shorthand
3 hours winter 3 ①
Teaching strategies in shorthand, including skill building, dictation, grading and standards, motivation, and transcription techniques. Prerequisite: Ed 408 or teaching experience in stenography.

BEd 543 Selected Topics in Business and Distributive Education
1-3 hours to be arranged
Current competencies, strategies, diagnostic and evaluative techniques, and a practicum in a specified teaching area. May be repeated with different topics for a maximum of nine credits. Prerequisite: Ed 408 or consent of instructor.

COLLEGE STUDENT SERVICES ADMINISTRATION

HiEd 507 Seminar
Terms and hours to be arranged
Section M, Issues in Financial Aid Administration, 3 hours; Section T, Current Issues in College Student Services, 1 hour, graded P/N.

HiEd 555,556 Student Services in Universities and Community Colleges
3 hours each 2 (1½)
HiEd 555: historical, philosophical, and organizational foundations of student personnel services in higher education; student development theory and practice. *HiEd 556:* student services functions and applications in colleges, universities, and community colleges. Prerequisite: HiEd 555.

HiEd 557 Organization and Administration of Student Services
3 hours 2 (1½)
Governance models, management principles, legal foundations, organizational goals and structures, administrative leadership, personnel management, financial management, and program evaluation. Prerequisite: HiEd 555.

HiEd 558
The Student and the University
3 hours 2 (1½)
The student in the campus community. Topics include student development; student/faculty relations; needs of special student groups, such as women, ethnics, married, older and returning, or handicapped students. Opportunity for discussion with students from these special groups and personnel from the offices serving these special students at OSU.

HiEd 584
College Union Administration
3 hours 2 (1½)
Historical and philosophical study of the college union around the world with special emphasis upon current principles and practices in college union administration in the United States. Prerequisite: HiEd 555. Enrollment in CSSA or consent of instructor required. Offered alternate years.

HiEd 585
Student Activities Administration
3 hours 2 (1½)
Historical and philosophical study of student activities with particular emphasis upon current principles and practices in student activities administration and advising. Prerequisite: HiEd 555. Enrollment in CSSA or consent of instructor required. Offered alternate years.

HiEd 586
Student Financial Aid Administration
3 hours 2 (1½)
History, philosophy, development, and growth; types of programs; needs analysis, packaging, and general administration of financial aid. Offered alternate years.

HiEd 587
Practicum in College Student Services
3 hours each term, three terms 3 (1½)
Supervised practical experience in student services areas: general administration, counseling center, financial aids, residence hall programs, student housing, student activities, college union, placement center, international education, community and four-year colleges, and educational opportunities. Limited to students in the College Student Services Administration program.

HiEd 588 Student Housing Programs and Administration
3 hours 2 (1½)
Relevant aspects of providing a choice of living environments for students; organizational style, fiscal realities, philosophical differences, observation of daily housing operations. Prerequisite: HiEd 555. Offered alternate years.

HiEd 589
Legal Issues in Higher Education
3 hours 1 ③
A comprehensive discussion of the law governing community colleges, colleges, and universities.

COUNSELING AND GUIDANCE

Upper Division Course

Courses designated (*g*) or (*G*) may be taken for graduate credit.

Coun 440
Developmental Learning Abilities (G)
3 hours 3 ①
Development of and introduction to awareness and understanding of the constructs underlying child development and the inhibitions to normal learning—physical, perceptual, growth, and emotional. Prerequisite: Psy 311 and senior standing. Cross listed as Ed 440.

Graduate Courses

Coun 501 Research

Coun 503 Thesis

Coun 505 Reading and Conference

Coun 506 Projects

Coun 507 Seminar

Coun 508 Workshop
Terms and hours to be arranged

Coun 509A Practicum in Counseling
Terms and hours to be arranged
Counseling experience in an appropriate professional counseling setting. Links the theoretical and practical aspects of counseling. Prerequisite or corequisite: Coun 587 and consent of instructor. Maximum of nine hours.

Coun 509B
Advanced Practicum in Counseling
Terms and hours to be arranged
Specialized counseling experiences in counseling laboratory and professional counseling setting or settings including schools, agencies, industrial, business, and social milieu. Maximum of 12 hours. Prerequisite: Coun 509A.

Coun 510 Counseling Internship
9 hours maximum
Planned and supervised work experience in a school or social service agency. On-site supervision by appropriately trained and certified professionals. Supplementary conferences, reports, and appraisals. Interns will spend 100 clock hours on-site for each 3 hours of academic credit earned. Prerequisite: Coun 509A.

Coun 526 Counseling Theories
3 hours 3 ①
Psychodynamic, behavioral, and humanistic theories of counseling, with emphasis on developing alternative counselor strategies for working with a wide range of clients. Prerequisite: Coun 587 or Psy 485.

Coun 532 Appraisal of the Individual
3 hours 3 ①
Development of framework for understanding the individual; methods for data gathering and interpretation; individual and group testing; case study approaches; observational, sociometric, and environmental procedures; study of individual differences. Ethnic, cultural, and sex factors. Prerequisite: Ed 424 or Psy 421.

Coun 533
Appraisal of Individual Laboratory
1 hour 1 ③
Optional laboratory to accompany Coun 532.

Coun 576 Counseling the Older Adult
3 hours 1 ③
Theoretical and applied educational experiences to enhance effectiveness in working with the older adult. Preretirement and retirement counseling; problems unique to minorities; special social and health policies affecting older people. Prerequisite: FL 445 or 446 or Soc 480 or HiEd 497.

Coun 577 Group Procedures
3 hours 3 ①
Principles underlying behavior and methods for modifying individuals' attitudes and actions by group procedures; group dynamics, leader's role in group; attitudinal change and its results; group and play therapy, individual and group counseling methods. Prerequisite: Coun 585, 587.

Coun 581 Counseling Procedures
3 hours 3 ①
Philosophic bases of helping relationships; counseling theory; supervised practice and application; emphasis on development of counselor and client/consultee self-awareness and self-understanding. Theory lectures and discussions accompanied by laboratory activities. Role-playing, making/viewing/listening to audio/videotape recordings; organizing and using personnel records; visits to social service programs; interviews with practitioners; case studies; career information materials. Prerequisite or corequisite: Coun 585.

Coun 585 Principles and Practices of Counseling and Guidance
3 hours 3 ① or 1 ③
Overview of counseling and guidance in school and agency settings. Introduction to counseling skills, research on counselor effectiveness, legal and ethical standards, program coordination, consultation strategies.

Coun 586
Life Style and Career Development
3 hours 3 ① or 1 ③
Vocational choice theory, relationship between career choice and life style; sources of occupational and educational information; approaches to career decision-making processes; career exploration techniques.

Coun 587 Counseling Techniques
3 hours 3 ① 1 ③
Development of philosophical concepts, psychological constructs, goals, and methodology basic to counseling theory and practice. Prerequisite: Coun 585.

Coun 589 Organization and Administration of Human Services
3 hours 3 ① or 1 ③
Criteria for evaluating current human services programs in school or agency settings; utilizing advisory committees; selection of personnel; responsibilities and duties of staff, development of program services, and inservice training. Prerequisite: Coun 585,587.

Coun 595 Issues in Counseling
3 hours 3 ①
Investigation of issues facing the professional counselor, e.g., licensure, confidentiality, legality, accountability. Prerequisite: Coun 509A.

Coun 596 Counselor Education
3 hours 1 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, theoretical considerations, planning strategies, and programming and evaluation of effectiveness. Prerequisite: documented background in counselor training (or related profession), including equivalent of 45 quarter hours (30 semester) and two years of counseling (or helping profession) experience.

Coun 597 Counselor Supervision
3 hours 1 ③
Practical experience for counseling professions who have responsibility for directing personal and professional development of counselors, promoting counselor competency, and developing and implementing counseling services and programs. Prerequisite or corequisite: Coun 596 and consent of instructor; documented background in counselor training (or related profession), including equivalent of 45 quarter hours (or 30 semester) and two years of counseling experience.

EXTENSION EDUCATION

Upper Division Courses

Courses designated (*g*) or (*G*) may be taken for graduate credit.

EM 405 Reading and Conference
Terms and hours to be arranged

EM 411 Extension Methods (G)
3 hours winter or spring 3 ①
Organization, scope, and responsibilities of the Extension Service; adult learning; diffusion and communication processes; the social action process; overview of teaching methods, leadership skills, and program planning.

EM 412 Extension Methods (G)
3 hours winter or spring 3 ①
A learning laboratory with student presentations involving the use of videotape to develop skills in selecting and using teaching methods applicable in Extension and other informal educational programs.

EM 453 Field Work in Extension
(*g*) Terms and hours to be arranged
Field practice in Extension Service work under the supervision of an Extension agent or specialist and the professor of Extension methods. Prerequisite: EM 411 or consent of instructor.

Graduate Courses

Also see courses marked (*g*) or (*G*) above.

EM 505 Reading and Conference
Terms and hours to be arranged
KLEIN.

EM 508 Workshop
Terms and hours to be arranged
To provide special job-related training for Extension workers and others with comparable background. Individual offerings depend largely on interests and needs of Extension staff, e.g., program planning, resource development, educational methods in Extension, rural social problems. Taught by resident and Extension staff.

EM 513
Program Planning in Extension
3 hours spring 2 (1½)
Trends in Extension program planning since 1914. Involving clientele and volunteers in planning methods of planning programs in Oregon and selected states. Educational results of differing planning methods. Staff skills for conducting program planning in agriculture, family living, 4-H and youth, forestry, marine advisory, energy, and community development. Selected sociological factors influencing planning for change. Evaluating and reporting educational results. Prerequisite: EM 411. Offered alternate years.

EM 514 Marine Extension Methods
3 hours winter 2 (1½)
Traditional Extension work plus marine resources; identification of marine users; establishment of priorities; marine program planning and execution. Emphasis on methods and special techniques of marine Extension work. Prerequisite: EM 411. Offered alternate years.

EM 515
International Extension Methods
3 hours winter 2 (1½)
Adapting Extension concepts to domestic and foreign cultures, with emphasis on developing countries and differing ethnic groups. Comparative study of nonformal educational systems and information delivery methods used to diffuse research results to food and fiber producers and their families worldwide. Importance of Extension education to farmers, herdsmen, fishermen, and others in the rural social system, including women and youth, in divergent educational, cultural, economical, and political systems. Prerequisite: EM 411.

HOME ECONOMICS EDUCATION

Upper Division Courses
Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

HEd 321
Strategies for Nutrition Education
3 hours 3 ①
Principles of learning in education applied to nutrition. Opportunity for off-campus presentation of a nutrition education program. For students in foods and nutrition, in institution management, and others interested in nutrition education. Majors may not enroll. Prerequisite: Psy 201,202; FN 225.

HEd 401 Research

HEd 403 Thesis

HEd 405 Reading and Conference

HEd 406 Projects

HEd 407 Seminar

HEd 407 Seminar (G)
Terms and hours to be arranged

HEd 422 Organization and Administration of Homemaking Education
3 hours 3 ①
Organization of homemaking departments with special emphasis on the unique aspects of secondary homemaking. Prerequisite: Ed 411.

HEd 427 Occupational Preparation in Home Economics Education (g)
3 hours 1 ① 1 ②
To prepare individuals to teach home economics-related occupation programs in the public schools. Prerequisite: HEd 422.

HEd 440 Homemaking Education in the Community High School (G)
Hours to be arranged
Programs of home and family living for extending secondary homemaking departments into school and community. Development of home and family life education at all levels of day-school and adult-education programs under vocational education. Prerequisite: Ed 411.

Graduate Courses
Also see courses marked (*g*) and (*G*) above.

HEd 501 Research

HEd 503 Thesis

HEd 505 Reading and Conference

HEd 507 Seminar
Terms and hours to be arranged

HEd 511 Current Methods in Teaching Homemaking
3 hours 3 ①
Current trends in education applied to homemaking education. Prerequisite: Ed 411.

HEd 512 Supervision of Home Economics Education
3 hours 3 ①
Inservice and preservice home economics supervision. Prerequisite: Ed 411 and teaching experience.

HEd 513 Special Student Groups
3 hours 3 ①
Curriculum programs and teaching methods for the gifted, disadvantaged, handicapped, or mentally retarded child. Prerequisite: Ed 411.

HEd 514 Curriculum Designs in Home Economics Education
3 hours 3 ①
Curriculum programming emphasizing both useful and gainful aspects of homemaking education; current trends such as flexible scheduling and team teaching, curriculum designs for boys, and coeducational classes in homemaking. Prerequisite: Ed 411.

HEd 530 Strategies of Instruction in Home Economics
3 hours 3 ①
Applying findings of current research in learning/teaching theory to selected subject areas in home economics. May be taken three times if subject studied is not repeated. Prerequisite: Ed 411.

HEd 540 Selected Topics in Home Economics Education
1 to 3 hours
Current literature and research on a specific topic of concern to home economics education. May be taken a maximum of three times for credit if specific topic is not repeated. Prerequisite: Ed 411.

INDUSTRIAL EDUCATION

INDUSTRIAL EDUCATION COURSES

Lower Division Course

IEd 281
Foundations of Industrial Education
3 hours 3 ①
Historical perspective, state and federal guidelines, goals and objectives, and contemporary programs in industrial education.

Upper Division Courses
Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

IEd 311,312
Elementary School Industrial Arts
3 hours each 3 ①
Objectives, methods, techniques of *expressional* industrial arts in elementary schools. *IEd 311:* objectives and techniques, group projects in home room, creative expression. *IEd 312:* individual projects for special displays, tools and material for special-subjects room. Prerequisite: Ed 310 or junior standing. Must be taken in order.

IEd 321 Laboratory Technical Aide
3 hours 3 ②
Special techniques and procedures for implementing effective laboratory instruction; participating in planning, supervising, demonstrating, evaluating, maintaining equipment, supply ordering, and other elements of laboratory instruction. Consent of instructor required. Graded P/N.

IEd 383 Leadership and Management in Industrial Education
3 hours 3 ①
Theory and techniques to improve student leadership, safety, and achievement; laboratory budgeting and management principles. Prerequisite: IEd 281.

IEd 401 Research

IEd 403 Thesis

IEd 405 Reading and Conference

IEd 407 Seminar
One-hour section graded P/N.

IEd 407 Seminar (G)
Terms and hours to be arranged

IEd 420 Industrial Education Organization and Management (g)
3 hours 3 ①
Goals and objectives, course organizational procedures, management strategies, and physical setting for the fully functioning laboratory and instructional environment. Prerequisite: Ed 411E; senior standing.

IEd 423 Industrial Education Competency Evaluation
3 hours 2 ① 1 ②
Unique applications of performance testing, manipulative product evaluation, competency testing, basic measurement, and evaluation applications. Prerequisite: Ed 411E.

IEd 474 Industrial Arts for the Intermediate Grades (G)
3 hours 3 ①
Scope and sequence of industrial arts curricula. Organization, content, methods, applied learning experiences, materials, and physical setting. Prerequisite: senior standing; teaching experience in industrial arts.

IEd 475
Designing Laboratory Activities (G)
3 hours 3 ①
Designing-applied activities for use in teaching industrial education based on objectives, processes, functions, and methodology. Prerequisite: IEd 420; teaching experience.

IEd 477
Safety in Industrial Education (G)
3 hours 3 ①
Application of industrial safety procedures in developing safety programs for industrial education laboratory activities. Prerequisite: Ed 411E.

IEd 482 Instructional Materials (g)
3 hours 3 ①
Planning, development, organization, and utilization of instructional materials for industrial education.

IEd 490 Industrial Education Laboratory Design and Utilization (g)
3 hours 3 ①
Laboratory design for industrial education technical laboratories. Equipment, budget, and laboratory layout for effective teaching and facility utilization. Development of instructional program-facility relationship. Prerequisite: Ed 411E.

Graduate Courses
Also see courses marked (g) and (G) above.

IEd 501 Research

IEd 503 Thesis

IEd 505 Reading and Conference

IEd 507 Seminar
Terms and hours to be arranged

IEd 520 Field Research and Seminar in Industrial Education
3 hours 3 ①
Selection and development of a field research problem. Use of a faculty/peer seminar setting to test, apply, and report field research. May be taken for a maximum of 9 hours.

IEd 540 Selected Topics in Industrial Education
3 hours 3 ①
Current competencies, strategies, literature, and research applied to specific teaching and/or program needs in selected areas of industrial education. May be repeated with different topics a maximum of three times. Prerequisite: Ed 411E and teaching experience.

IEd 570 Historical Perspective of Industrial Education
3 hours 3 ①
The evolving concepts, issues, problems, and forces related to the development of education for work. Study of institutions, legislation, and society and their influence on industrial education. Prerequisite: graduate standing.

IEd 573 Course Organization and Management of Integrated Technologies
3 hours 3 ①
The teacher as a classroom-laboratory manager. Responsibilities and problems of planning, organizing, coordinating, directing, and controlling activities in an integrated technology laboratory. Prerequisite: Ed 411E; teaching experience.

IEd 574 Curriculum Practices and Trends in Industrial Education
3 hours 3 ①
Principles underlying curriculum research and development, coordination of industrial education programs, trends in state and national programs, long-range planning and improvement. Prerequisite: graduate standing and teaching experience in industrial education.

IEd 576 Management of Industrial Education
3 hours 3 ①
Functions, techniques of management, supervision principles from teacher's viewpoint; teacher-supervisor relationships. Prerequisite: graduate standing; teaching experience.

INDUSTRIAL EDUCATION LABORATORY COURSES

Lower Division Courses

IEd 241L Mechanical Power: Internal Combustion Engines
3 hours 3 ②
Theory and operation of Otto, diesel, and Brayton cycle engines and auxilary systems; measurement of power output and efficiency; diagnosis of performance problems. Teaching techniques and laboratory procedures for small engines, service, and overhaul.

IEd 251L Graphic Communication Processes
3 hours 3 ②
Survey of graphic communication industries: basic theory, processes, applications, and career information. Includes design, copy preparation, offset lithography, and graphic arts processes.

IEd 261L Materials-Processes: Nonmetallic Materials
3 hours 3 ②
Orientation to processes in wood and plastics.

IEd 281L Materials-Processes: Metal Fabrication
3 hours 3 ②
Theory and practice of sheet and structural metal fabrication.

IEd 282L Materials-Processes: Casting and Machining
3 hours 3 ②
Theory and application of processes used to produce cast-machined products.

Upper Division Courses
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

IEd 317L Technical Design
3 hours 3 ②
Technical and industrial teacher applications of the design process. Statement of an industrial design need and application of design process to the solution; design applications to problems representative of the four major technologies.

IEd 333L Materials-Processes: Industrial Coatings
3 hours 3 ②
Theory and application of protective and decorative industrial coatings.

IEd 341L Mechanical Power: Alternative Energy and Appropriate Technology
3 hours 3 ②
Investigation of alternative forms of energy conversion. Construction and/or operation of working models to demonstrate theory; emphasis on small scale energy utilization. Identification of world, national, and regional energy base. Prerequisite: IEd 241L.

IEd 342L Mechanical Power: Mechanics of Energy Control
3 hours 3 ②
Concepts in energy and power; emphasis on physical and chemical transformations. Theory and construction of working models which include concepts in rocketry, direct convertors, external combustion systems. Prerequisite: IEd 241L; Ph 115; Mth 95.

IEd 343L Mechanical Power: Thermal Technology
3 hours 3 ②
Applied thermodynamic systems; experiments in utilization of heat flow. Refrigeration/air conditioning; heating plants, including solar technology; heat pumps; turbosupercharging. Industrial service techniques. Prerequisite: IEd 342L or equivalent experience.

IEd 352L Graphic Communication: Preparation of Graphic Materials
3 hours 3 ②
Fundamentals, principles, techniques for preparing graphic communication materials. Experiences with drafting, graphic design, layout, composition, makeup, copy setting, and product evaluation. Prerequisite: IEd 251L; prerequisite or corequisite: GE 115.

IEd 353L Graphic Communication: Photographic Processes
3 hours 3 ②
Applications of continuous tone and reproduction photography to solutions of visual or graphic problems; emphasis upon industrial uses. Includes photographic theory and practice, screen, line, and graphic reproduction processes. Prerequisite: IEd 251L or equivalent experiences.

IEd 354L Graphic Communication: Offset Lithography
3 hours 3 ②
Integrated applications of offset lithographic processes, using concepts of design, graphics, process photography, stripping, platemaking, and press operation. Prerequisite: IEd 251L or equivalent experience; GE 115.

IEd 363L Materials-Processes: Cabinet Making and Furniture Construction
3 hours 3 ②
Selection and application of material. Joinery, adhesives, finishing techniques. Prerequisite: IA 281L.

IEd 366L Materials-Processes: Building Construction
3 hours 3 ②
Application of materials and techniques used in small building construction. Prerequisite: IEd 281L.

IEd 371L Electricity-Electronics: Electricity
3 hours 3 ②
Basic electrical concepts. Electrical safety procedures and the use of test equipment; DC circuits; the time constant; basic AC concepts and residential power distribution; electrical appliance design and construction techniques. Prerequisite: Mth 95; Ph 115 or equivalent.

IEd 372L Electricity-Electronics: Electronics
3 hours 3 ②
Basic solid state electronics concepts. AC circuits; junction and field-effect transistor amplifier configurations; audio systems; electronic design and construction techniques. Prerequisite: IEd 371L or equivalent.

IEd 373L Electricity-Electronics: Electrical Power Distribution Systems
3 hours 3 ②
Residential electrical distribution systems; industrial and residential construction wiring according to the National Electrical Code; cost estimation; electrical home economics and energy conservation. Prerequisite: IEd 371L or equivalent.

IEd 374L Electricity-Electronics: Energy Conversion
3 hours 3 ②
Generation of electrical power. Sources of energy; solar power: alternatives. Characteristics of electrical motors; power tools and appliances; maintenance and repair techniques; automotive electricity and test equipment. Prerequisite: IEd 371L or equivalent.

IEd 382L Materials-Processes: Metal Welding and Fabrication
3 hours 3 ②
Application of electrical arc, MIG, TIG, and oxyacetylene welding; flame cutting; brazing processes to metal fabrication. Prerequisite: IEd 281L.

IEd 384L Materials-Processes: Machine Tool Practice
3 hours 3 ②
Selection and application of machine tool processes. Prerequisite: IEd 281L.

IEd 406L Projects

IEd 406L Projects (G)

IEd 408L Workshop

IEd 408L Workshop (G)
Terms and hours to be arranged

IEd 437L Materials-Processes: Mass Production Techniques
3 hours 3 ②
Organizing, planning, and implementing production techniques for the classroom. Prerequisite: IEd 281L.

IEd 441L Mechanical Power: Engine and Vehicular Measurements
3 hours 3 ②
Advanced diagnostic procedures related to motor vehicle performance. Dynamic test procedures; utilizing dynamometers, micrometers and electronic test equipment. Maintenance management principles. Prerequisite: Ed 241L or equivalent; community college vehicle laboratory competencies.

IEd 442L Mechanical Power: Power Transmission and Control Systems
3 hours 3 ②
Fluid power, hydraulics, and pneumatics. Design and experimental problems using simulators and flow bench. Service procedures related to high school teaching requirements. Mechanical power transmission systems and maintenance procedures; industrial mechanics. Principles of logical electrical and fluidic control systems. Prerequisite: IEd 241L, 372L.

IEd 452L Graphic Communication: Graphic and Lithographic Processes
3 hours 3 ②
Applications of drafting, design, and offset lithographic processes to advanced problems; emphasis on specialized uses of theory, processes, and materials. Prerequisite: IEd 354L or equivalent experiences.

IEd 454L Graphic Communication: Specialized Photographic Applications
3 hours 3 ②
Industrial photographic uses. Experiences with halftones, duotones, color reproduction, copy correction techniques, screen processes, reprographics, advanced continuous tone techniques, and offset lithographic applications. Prerequisite: IEd 353L or equivalent.

IEd 457L Graphic Communication: Management, Production, and Materials
3 hours 3 ②
Laboratory experiences that present the economic, management, and production aspects of graphic communication programs; applications to student-selected printing, photographic, or graphic production problems. Prerequisite: IEd 352L, 354L.

IEd 463L Materials-Processes: Industrial Plastics and Ceramics
3 hours 3 ②
Application of processing techniques used in plastics and ceramics industries. Prerequisite: IEd 281L.

IEd 473L Electricity-Electronics: Audio Systems
3 hours 3 ②
Characteristics of bipolar and field-effect transistors. Transistor amplifiers; operational amplifiers. Audio music systems; pickups; microphones; loudspeakers, and loudspeaker systems; tape and disc recording and reproduction. Audio system specifications and design. Prerequisite: IEd 372L or equivalent.

IEd 474L Electricity-Electronics: Digital Electronic Systems
3 hours 3 ②
Solid-state switching devices and applications. Transistor switching circuits; digital integrated circuits; logic circuits, digital systems, and the microcomputer. Prerequisite: IEd 372L or equivalent.

IEd 475L Electricity-Electronics: Electronic Communication Systems
3 hours 3 ②
Electromagnetic radiation; antennas, AM, FM, FM multiplex, monochrome and color television systems; two-way communications; diagnosis and repair of electronics equipment. Prerequisite: IEd 372L or equivalent.

IEd 491L,492L,493L Advanced Problems in Technology
3 hours each 3 ②
Advanced theory and application of the four technology areas of materials-processes, graphic communications, mechanical power, and electricity-electronics. Individual and/or group applications. Prerequisite: all lower courses within a field of the selected technology.

Graduate Courses
Also see courses marked (g) or (G) above.

IEd 506L Projects

IEd 508L Workshop
Terms and hours to be arranged

IEd 511L
Facilities Design for Industrial Education
3 hours 3 ①
Principles of school laboratory planning for effective instruction in industrial education programs. Design and organization of physical plant for different types of programs and schools. Prerequisite: graduate standing; teaching experience.

IEd 521L Selected Technological Units
3 hours
Course areas of emphasis may be chosen from: electronics, graphic communications, materials-processes, or mechanical power. Development of technical instructional units through laboratory experiences. May be repeated for a maximum of 12 hours with a maximum of 18 hours total in IA 521,522,523. Prerequisite: graduate standing and prior experience in the technology.

IEd 522L
Integration of Technological Units
3 hours
Course area of emphasis may be chosen from: electronics, graphic communication, materials-processes, or mechanical power. Laboratory experiences in organizing and integrating units; techniques of program development. May be repeated for a maximum of 12 hours with a maximum of 18 hours total in IA 521,522,523. Prerequisite: graduate standing and prior experience in the technology.

IEd 523L
Experimental Laboratory Problems
3 hours
Course area of emphasis may be chosen from: electronics, graphic communication, materials-processes, or mechanical power. Content identification, organization, and development of technological experiences. May be repeated for a maximum of 6 hours with a maximum of 18 hours total in IA 521,522,523. Prerequisite: prior experience in the technology.

SCIENCE AND MATHEMATICS EDUCATION

Lower Division Courses

SEd 199 Special Studies
Terms and hours to be arranged

SEd 266 Environmental Education
3 hours 3 ①
Acquaintance with the basic concepts with special attention to the meaning, scope, value, and philosophical foundations. Field trips required.

Upper Division Courses
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

SEd 365 Environmental Education Practicum
3 hours 3 ①
Planning, conducting, and evaluating field experiences. Prerequisite: SEd 266.

SEd 401 Research

SEd 403 Thesis

SEd 405 Reading and Conference

SEd 406 Projects

SEd 407 Seminar
Terms and hours to be arranged

SEd 411 Methods Practicum
2 hours 1 ③
Viewing model teaching; planning, presenting, and critique of short lessons designed to develop technical skills of teaching. Feedback via videotape, peers supervisor. Prerequisite: Ed 411 in science/mathematics.

SEd 465 Administration of Environmental Education (g)
3 hours 3 ①
Planning, supervision, administration, personnel, financing, and evaluation of programs. Prerequisite: SEd 365.

SEd 484 The Mathematics Laboratory (g) 3 hours 3 ①
Theory and practice of the laboratory approach to teaching mathematics. Analysis of laboratory components into conceptual, motivational, and recreational aspects. Practical experience in using some current laboratory material. Prerequisite: Ed 416.

SEd 491 Practicum in Science I (G)
3 hours 2 ① 1 ②
Laboratory, field work, projects, and demonstration skills; science program planning; maintaining and developing laboratory materials and equipment. Rationale for laboratory, field work, and projects. Prerequisite: Ed 411 in science, Ed 416, or classroom teaching experience.

Graduate Courses
Also see courses marked (g) and (G) above.

SEd 501 Research

SEd 503 Thesis

SEd 505 Reading and Conference

SEd 506 Projects

SEd 507 Seminar

SEd 508 Workshop
Terms and hours to be arranged

SEd 572 Historical and Psychological Basis for Elementary School Science
3 hours 3 ①
History and nature of elementary school science, with emphasis on modern trends. Prerequisite: Ed 367, equivalent, or consent of instructor; major concentration in science. Alternate summers only.

SEd 581 Practicum in Mathematics
3 hours 3 ①
Advanced methods of teaching mathematics. Emphasis on laboratory and heuristic approaches. Prerequisite: Ed 416; teaching norm in mathematics. Offered alternate summers and alternate years.

SEd 588 Mathematics Curriculum in Secondary Schools
3 hours 3 ①
Current trends. History of these trends and the rationale for the "modern" revolution. Prerequisite: Ed 416; teaching norm in mathematics. Offered alternate summers and alternate years.

SEd 589 Advanced Topics in Mathematics Education
3 hours 3 ①
Current issues in mathematics education. Extensive use of bibliographies. Prerequisite: math teaching endorsement.

SEd 591
Practicum in Science II
3 hours 3 ①
Laboratory and demonstrative skills, program planning, maintaining and designing laboratory materials. Prerequisite: Ed 411B,416, and teaching major in biological science.

SEd 595 Evaluation Techniques
3 hours 3 ①
Trends, practices, and techniques with emphasis on construction of tests, rating scales, check lists, and development of criteria for analysis of student work product. Prerequisite: 411B, G, or F, Ed 416, and teaching experience.

SEd 597 Administration and Supervision of Programs
3 hours 3 ①
Purposes, problems, and procedures for science education programs; individual problems studied. Prerequisite: Ed 408B, G, or F, Ed 416, and teaching experience.

SEd 598 Science Curriculum in Secondary Schools
3 hours 3 ①
Trends, problems, and procedures in junior high and secondary school curricula. Prerequisite: 24 hours of upper division education including Ed 416.

VOCATIONAL EDUCATION

Upper Division Courses
Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

VEd 405 Reading and Conference

VEd 405 Reading and Conference (g)

VEd 406 Projects

VEd 406 Projects (g)

VEd 407 Seminar

VEd 407 Seminar (g)

VEd 408 Workshop

VEd 408 Workshop (g)
Times and hours to be arranged

VEd 410 Occupational Internship (g)
3-12 hours
Cooperative business/industry work experience planned and supervised to develop students' technical and cooperative-work-experience competencies and assist in meeting vocational teacher certification. Work experience related to the student's particular specialty area. Related seminar required. Consent of instructor required. May be repeated for maximum of 15 hours; maximum of 9 hours for graduate programs.

VEd 483 Coordination Techniques in Cooperative Work Experience (g)
3 hours 3 ①
Strategies and techniques used in coordinating the classroom phase of cooperative vocational education with the on-the-job work experiences. Cooperative work experience, training stations, employment regulation, training plans, public relations, and evaluation.

VEd 487 Public Relations for Teachers (G)
3 hours 3 ①
Industrial, civic, and labor organizations; techniques to promote wholesome relationships with community and outside groups. Prerequisite: Ed 408 or teaching experience.

Graduate Courses
Also see courses marked (*g*) and (*G*) above.

VEd 501 Research

VEd 503 Thesis

VEd 505 Reading and Conference

VEd 506 Projects

VEd 507 Seminar
Section Z, Doctoral Seminar in Vocational Education, 1 hour, graded P/N.

VEd 508 Workshop
Terms and hours to be arranged

VEd 510 Vocational Education Internship
3-12 hours
Supervised experience in leadership roles in vocational education to develop competencies for assuming leadership positions in vocational education. Prerequisite: VEd 535; VEd 534 or 536. May be repeated for a maximum of 15 hours.

VEd 530 Contemporary Issues and Trends in Vocational Education
1 to 3 hours
Current issues and trends in specific topics of concern to vocational education. Consent of instructor required. Maximum of six hours for master's degree and nine hours for doctoral degree programs.

VEd 534 Program Planning in Vocational Education
3 hours 1 ③
Systematic approach to developing occupational and practical arts programs, focusing on techniques for task analysis, priority setting, specifying instructional objectives, structuring and scheduling learning activities, and curriculum evaluation. Change process strategies; alternative theories of curriculum development. Prerequisite: HEd 514; IEd 420; BEd 450 or AEd 417.

VEd 535 Organization and Supervision of Vocational Education
3 hours 1 ③
Organization of occupational and practical arts programs at all levels of educational governance; staffing and supervising programs. Prerequisite: at least one year's experience in occupational or practical arts teaching or work/experience coordination.

VEd 536 Evaluation of Vocational Education Programs
3 hours 1 ③
Theories of evaluation; methodologies for evaluating courses and programs in vocational education. Prerequisite: Ed 512; VEd 534.

VEd 537 Managing Work Experience
3 hours 3 ①
Principles involved in the organization and administration of work experience including exploratory, general, and cooperative, with emphasis on cooperative education. Areas include planning, development, and implementing work experience at the secondary and postsecondary levels.

VEd 541 Service Areas in Vocational Education
2 hours 1 ②
Overview of the component service areas in occupational and practical arts education. Sections include: (A) agriculture, (B) business, (D) distributive, (HO) health occupations, (H) home economics, and (T) industrial education. Provides background in scope and sequence, promising practices, curriculum materials, teacher training and certification, and program design and organization. Maximum of 10 hours credit.

VEd 542 Principles of Vocational Education
3 hours 3 ①
Basic principles of vocational education. Philosophic, psychological, sociological, and economical bases of vocational education; review of historical and legislative trends in vocational education. Prerequisite: VEd 541.

VEd 544 Trends in Occupational Choice
3 hours 1 ③
Alternative theories of occupational choice; contemporary research on career development; current practices in occupational exploration; strategies for vocational adjustment. Prerequisite: Ed 416.

ENGINEERING

FACULTY

As of January 1982

Fredrick Joseph Burgess*, *Dean; Director, Engineering Experiment Station*

Warren Lee Schroeder*, *Assistant Dean; In Charge of Engineering Experiment Station*

Solon Allen Stone*, *Assistant Dean; Head Adviser*

W. H. Buckley, *Assistant to Dean (Business Affairs)*

Professors Emeritus Albert*, Croff, Cropsey*, Engesser*, Garrard, Gleeson*, Gray, Haith, Harmond, Holcomb*, Huber, Hughes*, McClellan*, Michael*, Oorthuys, Paasche, Paul*, Rodgers*, Sheely, Sinnard, Slegel*, Smith*, Walton*, Willrich*, Wolfe*

Agricultural Engineering, Agricultural Engineering Technology *Professors* Miner* (department head), Booster, Brooks*, H. J. Hansen, Kirk*, Long, Matson, Shearer
Associate Professors H. E. Hansen, Hellickson*, Kolbe*, Moore*
Assistant Professors Cuenca*, English

Chemical Engineering *Professors* Wicks (department head), Knudsen*, Levenspiel*, Mrazek*
Associate Professor Meredith*
Assistant Professor Konuk

Civil Engineering, Construction Engineering Management *Professors* Schaumburg* (department head), Bell*, Bella*, Burgess*, Hicks*, Klingeman*, Laursen*, Leonard, Nath*, Pritchett*, Schroeder*, Schultz*, Slotta*
Associate Professors Hudspeth*, LaBaun, Layton, Nelson, Northcraft*, J. Peterson*, Phelps*, Sollitt*, Staton*, Vinson*, Williamson*
Assistant Professor Rogge
Instructors Kruchoski, Marker*

Electrical and Computer Engineering *Professors* Owen (department head), Engle*, Magnusson*, Mohler, Short, S. A. Stone*, Weber
Associate Professors Alexander*, Amort*, Engelbrecht, Herzog, Jensen*, Looney*, Osborne, Powers, Saugen*, Tripathi
Assistant Professors Adams, Bhattacharya, Bucolo, Kolodziej, Lauw, Plant, Rathja

Engineering Physics *Professor* Boedtker (in charge)

Industrial and General Engineering *Professors* Riggs* (department head), Inoue*
Associate Professors Campbell*, Frazier, McDowell, West*
Assistant Professors Fichter*, Funk
Instructors Airth, Nichols
Research Associate Felix

Mechanical Engineering *Professors* Welty* (department head), Boubel*, Davis*, Larson*, Mingle*, Reistad*, Smith, Thornburgh*, Thresher*, Wilson*, Zaworski*
Associate Professors Bucy*, Burke, Bushnell*, Calder*, Holley, Junge*, Kennedy*, Shively*
Assistant Professors Adams, Saletore, Wheeler, Williams

Nuclear Engineering *Professors* Wang (department head), Johnson, Robinson*, Spinrad, Woods
Associate Professors Binney*, Hornyik*, Peddicord, Ringle*
Assistant Professor Dodd

* Licensed professional engineers

The School of Engineering at Oregon State University grew out of a department established in 1889. Its purpose is to provide a quality education for students who are entering the engineering profession. It has awarded more than 15,000 degrees, and the reputation that its graduates have established in industry, business, and government through their imaginative work and leadership attests to the accomplishments of the school in providing a sound education.

Students choose their majors from among the engineering curricula of the Departments of Agricultural, Chemical, Civil, Electrical and Computer, Industrial, Mechanical, and Nuclear Engineering. Educational preparation for land surveying, a licensed profession in all states, is offered through civil engineering. In addition to the various engineering curricula, the school also offers a program of study in construction engineering management.

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 utilize economically the materials and forces of nature for the benefit of mankind. It is a licensed profession in all of the states, 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.

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 or a Bachelor of Arts degree in an established engineering field. Each engineering curricula requires 204 term hours and includes a balance of courses in mathematics, science, liberal arts, engineering science, and engineering design.

Initial studies at the freshman and sophomore levels are in the pre-engineering program and are followed by studies in the professional program at the junior and senior levels. Upon graduation, students are eligible to take the Engineering in Training Examination (EIT) of the State Board of Engineering Examiners in any state. After passing the EIT examination and completing four years of progressively responsible engineering work under supervision, 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 governmental 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.

Pre-Engineering Program

Courses included in the freshman and sophomore years comprise a program of pre-engineering study that produces a solid foundation for professional program studies at the junior, senior, and advanced degree levels. (See the pre-engineering curricula which follow.) The pre-engineering program may be taken at Oregon State University or at any accredited college or university that offers equivalent courses transferable to OSU. Because of variations among institutions, students should refer to the *Advising Guide* to plan their pre-engineering studies. The manual is available free of charge through the School of Engineering.

The pre-engineering courses requiring completion in order for a student to be eligible to apply for admission to the professional engineering programs are indicated by the symbol † in the pre-engineering program listing. The other courses listed, while very important, may be taken during the junior and senior years.

Professional Engineering Program

The professional engineering program consists of various curricula offered at the junior and senior levels which are designed to prepare students for a professional career in one of the recognized fields of engineering. Each program consists of 102 term hours of study including general University requirements, mathematics, science, engineering sciences, and engineering design.

Each curriculum also provides an opportunity for specialization through judicious selection of elective courses. However, to become fully versed in an engineering specialty requires additional study at the graduate level.

Admission Requirements

Pre-Engineering Program

Admission to the pre-engineering program at Oregon State University requires that students meet general University admission requirements, as published in the OSU *General Catalog*. Students admitted to the pre-engineering program are assigned to the department of their choice for the purposes of advising and program planning. Pre-engineering students are eligible to apply for admission to the professional engineering program upon completion of the requirements of the pre-engineering curriculum. (See the *Advising Guide*.)

Sophomore Standing in Engineering

"Sophomore standing in engineering" refers to a student registered in an accepted program who has completed 45 credit hours, including Mth 200,201, plus three additional science or mathematics courses listed in an engineering curriculum. In addition, grades of A, B, or C must have been earned in the engineering, mathematics, and science courses required for the pre-engineering program, including those courses mentioned above. Many engineering courses required sophomore standing in engineering as a prerequiste.

Professional Engineering Program

Enrollment in the professional engineering program is restricted to those students who have clearly demonstrated an ability to achieve the high standards required for professional engineering studies, and is limited by the number of students who can be served by the faculty and the facilities of the school.

Students must apply to the School of Engineering for admission to the professional engineering program. To be eligible to apply, students must have completed 90 credit hours, including completion of the required courses in the pre-engineering program, with grades of C or better. These consist of courses in mathematics, science, engineering science, and certain basic requirements. Required courses are indicated with a † in the pre-engineering curriculum listing. Courses not indicated by a † may be taken during the junior and senior years of the professional engineering program.

Applicants for admission are evaluated by the school and are ranked according to demonstrated academic ability in pre-engineering studies. The school reserves the right to require a comprehensive admissions examination for validation of course work (a) taken at out-of-state institutions or (b) taken at in-state institutions not accredited by the Accreditation Board for Engineering and Technology.

Students who have completed their pre-engineering 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 School of Engineering for admission to the professional engineering program. Application forms and information on policies and programs are available from the dean's office, School of Engineering.

Construction Program

Admission to the junior year of the construction engineering management program is subject to the same procedures and general requirements as admission to the professional engineering program. Students must first complete the pre-construction engineering management curriculum listed on page 164 of this catalog. Application for admission to the junior year of the program may be made by those who have completed the pre-construction engineering management curriculum. Applicants are judged by the school's admissions committee. Application forms and information on policies of the program can be obtained from the dean's office, School of Engineering.

Students in the construction engineering management (CEM) program must comply with the academic requirements of the School of Engineering as stated below with the following exception: References to grade requirements include the courses in science, mathematics, business, engineering, and construction management that are required in the CEM curriculum.

Academic Requirements

Because of the technical and professional nature of all of the school's curricula, the school reserves the right of final determination in matters of admission, retention, reinstatement, placement, and transfer of students. All University students must satisfy the institutional standards and requirements. School standards and requirements are set forth by the school and its departments in addition to those of the University. The rules and policies which implement all standards and requirements are available in the offices involved and are published in appropriate documents.

All rules and policies of the school and departments are subject to modifications for individual cases upon appeal by petition to the school or department.

Rules and Policies: Pre-Engineering Program

In addition to the admission requirements for the professional program, the school and departments have rules and policies which relate to grades and ethical conduct. Each student will receive a copy of these at the time of matriculation.

Rules and Policies: Professional Program

To assure that all School of Engineering graduates have the strongest possible educational preparation for a professional

career in engineering with no deficiencies in any required area of study, the School of Engineering has adopted rules which include the following (see the school's policy statement for complete listing):

1. Grades
   a. Students must maintain a grade-point average in their professional program courses that is consistent with their prior academic performance, as demonstrated by their GPA in required pre-engineering courses at the time of admission to the professional program. A drop in GPA of more than .80 or a drop to below an accumulative GPA of 2.25 in professional program courses will be grounds for suspension.
   b. The GPA in *each* of the following areas must be 2.00 or higher at the end of each year (summer term may be used to end the year instead of spring term):
      - Engineering science courses with an *Engr* prefix
      - All other engineering courses
      - Required science and mathematic courses.
   c. Engineering courses for which grades D, F, or W were received may be repeated *once* unless otherwise stipulated by the student's major department.
   d. Engineering courses for which grades of B or C were received may *not* be repeated.
2. Probation: Students are placed on probation by the school when their overall University GPA is below 2.00, if their progress toward a degree is less than 36 credit hours per year for full-time students, or if their grades in engineering, as described above in item 1, are not satisfactory.
3. Suspension: A student will be suspended from the professional engineering program and reclassified in pre-engineering or will be suspended from the School of Engineering for:
   a. being placed on probation for two consecutive terms.
   b. being placed on probation for a third time during any period of the professional engineering program.
   c. failure to maintain academic progress in accordance with item 1a.
   d. any academic dishonesty or other act which violates ethical conduct standards.
4. Reinstatement: A student suspended from the University, from the School of Engineering, or from the professional engineering program of the school may apply in writing for readmission to the pre-engineering or to the professional engineering program at the regular time for all entrance applications.
5. Enrollment in any upper division engineering course in a curriculum of the professional engineering program requires that:
   a. Students have been admitted to the professional engineering program of the School of Engineering and that the course is required in their program of study.
   b. Students are enrolled in any major program at OSU whose curriculum, as printed in the OSU *General Catalog*, stipulates the course by name and number.
   c. Students who do not qualify for enrollment under item 5a or 5b may be admitted to such courses only with the approval of the school and the department offering the course.

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-engineering 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. Students who are unsure as to whether to major in engineering or in construction engineering management are advised to register in pre-general engineering for the first two terms while they are making 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 school by off-campus teams operating under the Accreditation Board for Engineering and Technology, Inc. (A.B.E.T.), formerly the Engineer's Council for Professional Development (E.C.P.D.). The major curricula at Oregon State University are accredited by A.B.E.T., with civil, electrical, and mechanical engineering first being accredited in 1937; chemical engineering in 1942; agricultural engineering in 1949; industrial engineering in 1950; and nuclear engineering in 1973. The construction engineering management program was accredited in 1980 by the American Council for Construction Education (A.C.C.E.).

Honors Program

Engineering students of superior scholastic ability may elect to participate in the University Honors Program. All of the facilities of the University are available to provide a wide variety of intellectual experiences. See "University Honors Program" on page 37 in this catalog.

Graduate Study

Because of the growing complexity of modern engineering practice, graduate study beyond the baccalaureate degree is becoming increasingly 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 at the graduate level. Study for the Master of Arts (M.A.) or the Master of Science (M.S.) degree normally requires one year beyond the baccalaureate degree. The Doctor of Philosophy (Ph.D.) degree requires three to four additional years.

Degrees Offered

Bachelor of Science, B.S.
Bachelor of Arts, B.A.
Agricultural Engineer, A.E.
Chemical Engineer, Ch.E.
Civil Engineer, C.E.
Electrical Engineer, E.E.
Industrial Engineer, I.E.
Mechanical Engineer, M.E.
Metallurgical Engineer, Met.E.
Mining Engineer, Min.E.
Nuclear Engineer, N.E.
Master of Arts, M.A.
Master of Science, M.S.
Master of Engineering, M.Engr.
Master of Materials Science, M.Mat.S.
Master of Ocean Engineering, M.Oc.E.
Doctor of Philosophy, Ph.D.

Engineering Curricula

Registration in any of the following curricula at the junior or senior level requires formal admission to the professional engineering program of the School of Engineering, in accordance with the procedures described under "Admission Requirements."

Agricultural Engineering

A.B.E.T. Accredited

Pre-Agricultural Engineering

Freshman Year

	Hours
Agricultural Eng Orien (AE 101,102)†	4
Special Studies (AE 199)	1
Calculus (Mth 200,201,202)†	12
General Chemistry (Ch 201,202,203)†	9
General Biology (GS 101,102)	8
General Physics (Ph 211)†	4
English Composition (Wr 121)†	4
Speech (Sp 112)	3
Physical education (3 terms)	3
Humanities or social science elective	3

Sophomore Year

Special Studies (AE 199)	2
Computer Applications (AE 356)†	3
Calculus (Mth 203)†	4
Applied Differential Equations (Mth 321)†	4
Principles of Statistics (St 314)	3
General Physics (Ph 212)†	4
General Physics (Ph 213)	4
Introductory Microbiology (Mb 130)	3
Mechanics of Solids (Engr 211,212,213)†	9
Engineering Graphics (GE 115)†	3
Crop Production (CrS 201,202)†	4
Humanities or social science electives	9
	102

Professional Agricultural Engineering

Junior Year

Power Farming Machinery (AE 391)	3
Agricultural Machine Design (AE 492)	3
Electrical Fundamentals (Engr 221)	4
Thermodynamics (Engr 311,312)	6
Momentum, Mass, and Energy Transfer (Engr 331,332)	8
Soils (Sls 210)	5
Technical Report Writing (Wr 327)	3
Humanities or social science electives	9
Engineering science, synthesis, or design electives	6
Unrestricted electives	4

Senior Year

Soil and Water Conservation (AE 471)	3
Drainage Engineering (AE 472)	3
Irrigation Systems Design (AE 473)	3
Rural Electrification (AE 431)	3
Farm Structures (AE 461)	3
Engineering Economy (Engr 390)	3
Senior Project (AE 406)	3
Seminar (AE 407)	2
Humanities or social science elective	3
Engineering science, synthesis, or design electives	11
Unrestricted electives	14
	102

Chemical Engineering

A.B.E.T. Accredited

Pre-Chemical Engineering

Freshman Year

	Hours
Chemical Eng Orien (ChE 101,102†)	6
General Chemistry (Ch 204,205,206)†	15
Calculus (Mth 200,201,202)†	12
English Composition (Wr 121)†	3
General Physics (Ph 211)†	4
Humanities, social science, or communications electives	8
Physical education (3 terms)	3

† Required courses.

Sophomore Year

Engineering Stoichiometry (ChE 211,22)†	4
Computer-Aided Stoichiometry (ChE 213)†	2
Organic Chemistry (Ch 334,335,336)†	9
Calculus (Mth 203)†	4
Differential Equations (Mth 321)†	4
Mathematics or statistics elective	4
Mechanics of Solids (Engr 211†, Engr 212†, Engr 213)	9
General Physics (Ph 212)†	4
Humanities, social science, or communications electives	11
	102

Professional Chemical Engineering

Junior Year

Chem Engineering Problems (ChE 323)	3
Measurements and Instrument (ChE 313)	2
Thermodynamics (Engr 311,312,313)	9
Momentum, Energy, Mass Transfer (Engr 331,332,333)	11
Electrical Fundamentals (Engr 221,222)	8
Physical Chemistry (Ch 425,440,441)	9
Communications to be selected from speech communication, Technical Report Writing (Wr 327), English composition	3
Humanities and social science	6

Senior Year

Unit Operations (ChE 411,412)	6
Chemical Engineering Lab (ChE 414,415)	6
Chemical Reaction Engineering (ChE 443)	3
Chemical Plant Design (ChE 431,432)	6
Process Dynamics and Control (ChE 461)	3
Design elective (completed with advisement of departmental faculty)	3
Analytical Chemistry (Ch 421)	4
Humanities and social science	4
Science elective	3
Unrestricted electives	13
Field trip	0

Civil Engineering

A.B.E.T. Accredited

Pre-Civil Engineering

Freshman Year

	Hours
Intro to Civil Eng (CE 101)†	1
Civil Eng Computations (CE 102,103)†	4
Graphics (GE 115)†	3
General Chemistry (Ch 201,202)†	6
Calculus (Mth 200,201,202)†	12
General Physics (Ph 211)†	4
Writing (Wr 121)†	3
Speech (Sp 112 or 113)	3
Humanities electives	12
Physical education (3 terms)	3

Sophomore Year

Calculus (Mth 203)†	4
Differential Equations (Mth 321)†	4
General Physics (Ph 212,213)†	8
Mechanics of Solids (Engr 211,212)†	6
Strength of Materials (Engr 213)†	3
Science electives	6
Electrical Fundamentals (Engr 221)	4
Technical Report Writing (Wr 327)	3
Mathematics elective (200-level or above)	4
Social science electives	9
	102

Professional Civil Engineering

Junior Year

Structural Theory (CE 381,382)	6
Steel Design (CE 484)	3
Fluid Mechanics (Engr 301,302)	6
Hydraulics (CE 312)	3
Soil Mechanics (CE 371,372)	6
Environmental Engineering (CE 351)	3
Surveying Theory (CE 361)	3
Transportation Engineering (CE 321,322)	6
Engineering Economy (Engr 390)	3
Comp Applic in Civil Eng (CE 310)	3
Field Experience (CE 499)	1
Thermodynamics (Engr 311)	3
Engineering science electives	6

Senior Year

Reinforced Concrete (CE 481)	3
Sanitary Engineering (CE 452)	3
Approved technical electives	27
Engineering science electives	8
Social science elective	3
Unrestricted electives	6
	102

Civil Engineering-Forest Engineering

A five-year dual-degree program in civil engineering and forest engineering is offered jointly by the Departments of Civil Engineering (in the School of Engineering) and Forest Engineering (in the School of Forestry). Advising is done through either department. See program details on page 185 of this catalog.

Construction Engineering Management

A.C.C.E. Accredited

The construction engineering management curriculum is a four-year program which leads to the bachelor's degree. For approved electives consult the Department of Civil Engineering.

Pre-Construction Engineering Management

Freshman Year

	Hours
Technical Problems (CEM 111,112,113)†	6
Graphics (GE 115)†	3
General Physics (Ph 201,202,203)†	12
English Composition (Wr 121)†	3
Speech communication (Sp 112 or 113)	3
Calculus Preparation (Mth 110)†	4
Calculus (Mth 200,201)†	8
Electives in humanities	9
Physical education (3 terms)	3

Sophomore Year

Plane Surveying (CE 226)†	3
Highway Location and Design (CE 365)†	3
Mechanics: statics, dynamics, strength of materials (CEM 252,253,254)†	9
Civil Engineering Drawing (CEM 232)†	3
General Chemistry (Ch 201)†	3
Financial, Managerial Account (BA 211, 212)†	8
Business Law (BA 226)	4
Quantitative Business Meth (BA 235)†	4
Principles of Economics (Ec 213,214)	8
Technical Report Writing (Wr 327)	3
Humanities elective	3
	102

Professional Construction Engineering Management

Junior Year

Hydraulics (CEM 321,322)	6
Construction Materials Lab (CEM 341, 342,343)	9
Fund of Estimating (CEM 361)	3
Estimating and Cost Control (CEM 362)	3
Electrical Facilities (CEM 371)	4
Mechanical Facilities (CEM 372)	3
Project Scheduling (CEM 381)	3
Intro to Business Meth (BA 338)	4
Operation Management (BA 311)	4
Marketing and Finance (BA 312,313)	8
Engineering Economy (Engr 390)	3
Social science elective	1

Senior Year

Structural Problems (CEM 451,452)	8
Estimating and Contracts (CE 492)	3
Const Meth and Cont (CEM 441,442,443)	9
Labor Problems (Ec 425)	3
Human Relations in Business (BA 361)	4
Cost Accounting (BA 421)	3
Approved electives	12
Seminar (CEM 407) and field trip	3
Free electives	6
	102

Electrical and Computer Engineering

A.B.E.T. Accredited

Pre-Electrical and Computer Engineering

Freshman Year

	Hours
Engineering Orien (EE 101,102,103)†	7
Calculus (Mth 200,201,202)†	12
Introduction to Symbolic Language (CS 213)†	4
General Chemistry (Ch 201,202)†	6
English Composition (Wr 121)†	3
General Physics (Ph 211,213)†	8
Physical Education	3
Humanities, social science electives	6
Electives	2

Sophomore Year

Elec and control fund (Engr 221,222)†	8
Mechanics of solids (Engr 211,213)†	6
Calculus (Mth 203)†	4
Calculus of Several Variables (Mth 304)†	3
Applied Differ Equations (Mth 321)†	4
Physical Prop of Materials (Engr 323)†	4
Electric and Magnetic Fields (EE 312)†	4
General Physics (Ph 214)†	4
Approved mathematics course	3
Science elective	3
Humanities, social science electives	4
Electives	4
	102

Professional Electrical and Computer Engineering

Junior Year

Electromagnetic Fields and Transmission Lines (EE 314)	4
Electronic Circuits (EE 322)	4
Digital Electronics (EE 323)	4
Electromechanical Energy Conversion (EE 331)	4
Network Analysis (EE 351,352)	6
Fundamentals of Digital Logic Design (EE 371)	4
Basic Computer Structures and Operations (EE 373)	4
Engineering science electives (excluding Engr 321, 322)	8
Approved mathematics	4
Humanities, social science electives	6
Communication elective	3

Senior Year

Senior departmental electives	24
Restricted electives (chosen from appropriate linear and discrete mathematics, statistics, engineering courses, or 4 hours of business course work with advisement)	13
Humanities, social science electives	8
Communications elective	3
Electives	3
	102

Engineering (Computer Science)

Offered through the Department of Electrical and Computer Engineering

Pre-Engineering (Computer Science)

Freshman Year

	Hours
Engineering Orientation (EE 102,103)†	4
Calculus (Mth 200,201,202)†	12
Intro to Computer Science (CS 211)†	4
Techniques for Computer (CS 212)†	4
Intro to Symbolic Language Prog (CS 213)†	4
General Chemistry (Ch 201,202)†	6
English Composition (Wr 121)†	3
Physical education	3
Humanities, social science electives	11

Sophomore Year

Elec and control fund (Engr 221,222)†	8
Statics (Engr 211)†	3
Dynamics (Engr 212)†	3
Calculus (Mth 203)†	4
Linear Equations and Matrices (Mth 241)†	4
Applied Differ Equations (Mth 321)†	4
General Physics (Ph 211,212,213)†	12
Humanities, social science electives	4
Communications electives	6
Science elective	3
	102

Professional Engineering (Computer Science)

Junior Year

Electric and Magnetic Fields (EE 312)	4
Network Analysis (EE 351)	3
Electronic Circuits (EE 322)	4
Digital Electronics (EE 323)	4
Fundamentals of Digital Logic Design (EE 371)	4
Basic Computer Structures and Operations (EE 373)	4
Physical Properties of Materials (Engr 323)	4
Thermodynamics (Engr 311)	3
Engineering science elective (excluding Engr 321,322)	3
Humanities or social science electives	9
Computer Organization (CS 215)	4
Data Structures (CS 317)	4

Senior Year

Electrical engineering electives (must include 12 hours of computer oriented courses (EE 47X) plus 8 hours of 400-level courses)	24
Computer science elective	6
Restricted electives (chosen from appropriate linear and discrete mathematics, statistics, science, or engineering with advisement)	13
Electives	9
	102

Engineering Physics

Students electing the curriculum in engineering physics register under the School of Engineering in the Department of Physics by cooperative arrangement.

Pre-Engineering Physics

Freshman Year

	Hours
Calculus (Mth 200,201,202)†	12
General Chemistry (Ch 204,205,206)†	15
English Composition (Wr 121)†	3
Physics with Calculus (Ph 211)†	4
Intro to Computer Science (CS 211)†	4
Physical education (3 terms)	3
Required courses and/or electives	11

Sophomore Year

Calculus of Several Variables I (Mth 203)†	4
Calculus of Several Variables II (Mth 304)†	3
Applied Differential Equations (Mth 321)†	4
Physics with Calculus (Ph 212,213,214)†	12
Statics (Engr 211)†	3
Strength of Materials (Engr 213)†	3
Electrical Fundamentals (Engr 221)†	4
Intro to Symbolic Language FORTRAN (CS 213)†	4
Required courses and/or electives	14
	106

Professional Engineering Physics

Junior and Senior Years

Math Methods for Engrs and Phys (Mth 481,482)	6
Mechanics (Ph 424,425,426)	9
Electromagnetism (Ph 431,432)	6
Selected Topics in Modern Physics (Ph 474,475)	6
Upper division physics elective	3
Thermodynamics (Engr 311)	3
Momentum, Energy, and Mass Transfer (Engr 331,332)	8
Materials Science (Engr 321)	4
Approved engineering analysis and/or design courses	24
Required courses and/or electives	33

The 58 hours of required courses and/or electives consist of:

- 6 hours of approved communication courses
- 12 hours of approved social science courses
- 12 hours of approved humanities and/or arts courses
- 28 hours of free electives

Forest Engineering

See School of Forestry. *Also see* School of Forestry *for information on the civil engineering-forest engineering program.*

General Engineering

The pre-general engineering curriculum below will prepare students to enter many of the engineering degree 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)

	Hours
Engineering Orientation (GE 101,102, 103)†	6
Calculus (Mth 200,201,202)†	12
General Chemistry (Ch 201,202,203)†	9
General Physics (Ph 211)†	4
English Composition (Wr 121)†	3
Informative Speaking (Sp 112)	3
Physical education (3 terms)	3
Humanities and social science electives	11
	51

Geological Engineering

A cooperative program with the University of Idaho. See head adviser, School of Engineering, for information.

Industrial Engineering

A.B.E.T. Accredited

Pre-Industrial Engineering

Freshman Year

	Hours
Eng Orien (GE 101,102,103)†	6
Calculus (Mth 200,201,202)†	12
General Physics (Ph 211)†	4
General Chemistry (Ch 201,202)†	6
English Composition (Wr 121)†	3
Physical education (3 terms)	3
Humanities and social science electives°	17

Sophomore Year

Calculus (Mth 203)†	4
Linear Equations (Mth 241)†	4
Applied Differ Equations (Mth 321)†	4
General Physics (Ph 212)†	4
Science electives	7
Statics (Engr 211)†	3
Dynamics (Engr 212)†	3
Strength of Materials (Engr 213)†	3
Electrical Fundamentals (Engr 221)†	4
Math Models (IE 271,272†,273†)	9
Basic Account and Fin Anal (BA 217)	3
Manufacturing Processes (ME 262)	3
	102

Professional Industrial Engineering

Junior Year

	Hours
Work Meas and Design (IE 361)	4
Production Plan and Control (IE 362)	3
Material Handl and Facil Layout (IE 365)	3
Engineering Economy (Engr 390)	3
Management Models I, II (IE 381,382)	8
Design Graphics (GE 315)	3
Engineering science electives	7
Materials Science (Engr 321)	4
Social science electives	4
Restricted electives	9
Communications elective	3

Senior Year

Elec Data Proc Systems I, II (IE 411,412)	6
Ind Engl Anal and Design (IE 497,498)	6
Quality and Reliability Control (IE 491)	3
Human Factors in Engr (IE 441)	4
Ind Supervis Principles (IE 451)	3
Technical Report Writing (Wr 327)	3
Engineering science electives	8
Restricted electives	6
Humanities electives	6
Free electives	6
	102

Manufacturing Engineering Option in Industrial Engineering

A.B.E.T. Accredited

Pre-Manufacturing Engineering

Freshman Year

	Hours
Engineering Orientation (GE 101,102,103)†	6
Calculus (Mth 200,201,202)†	12
English Composition (Wr 121)†	3
General Chemistry (Ch 201,202)†	6
General Physics (Ph 211)†	4
Speech (Sp 112)	3
Physical education (3 terms)	3
Principles of Economics (Ec 214,213)	8
Humanities and social science electives	5

Sophomore Year

Calculus (Mth 203)†	4
Linear Eqns and Matrices (Mth 241)†	4
Mat and Mech of Manufacturing (IE 231)†	3
General Physics (Ph 212)†	4
Science electives	7
Statistics (Engr 211)†	3
Dynamics (Engr 212)†	3
Strength of Materials (Engr 213)†	3
Electrical Fundamentals (Engr 221)†	4
Math Models (IE 271,272†,273†)	9
Financial Accounting (BA 211)	4
Managerial Accounting (BA 212)	4
	102

° Ec 312,214 recommended.

Professional Manufacturing Engineering

Junior Year

Mat and Mech of Manufacturing (IE 331, 332)	6
Work Measurement and Design (IE 361)	4
Production Plan and Control (IE 362)	3
Math Models I (IE 381)	4
Design Graphics (GE 315)	3
Eng Economy (Engr 390)	3
Thermodynamics (Engr 311)	3
Industrial Eng Seminar (IE 407A)	1
Free elective	2
Humanities and social science electives	2
Six-month internship	0

First Senior Year

Industrial Eng Seminar (IE 497B,417C)	2
Quality and Reliability Control (IE 491)	4
Human Factors in Engineering (IE 441)	4
Manufacturing Eng Design (IE 431)	3
Materials Science (Engr 321)	4
Technical Report Writing (Wr 327)	3
Restricted elective	4
Free elective	3
Humanities and social science electives	3
Six-month internship	0

Second Senior Year

Seminar (IE 407D,407E)	2
Elec Data Proc Systems I, II (IE 411,412)	6
Material Handling and Facil Layout (IE 365)	3
Momentum, Energy, and Mass Transfer (Engr 331)	4
Humanities and social science electives	6
Restricited electives	16
Free elective	4
	102

Mechanical Engineering

A.B.E.T. Accredited

Pre-Mechanical Engineering

Freshman Year

	Hours
Mechanical Eng Orien (ME 101,102)†	6
Graphics (GE 115)†	3
Calculus (Mth 200,201,202)†	12
General Chemistry (Ch 201,202,203)†	9
Physics (Ph 211)†	4
English Composition (Wr 121)†	3
Principles of Economics (Ec 213,214)	8
Informative Speaking (Sp 112)	3
Physical education (3 terms)	3

Sophomore Year

Calculus of Several Variables (Mth 203)†	4
Applied Differ Equations (Mth 321)†	4
Applied Statistics (St 314)	3
General Physics (Ph 212,213)†	8
Statics, Dynamics, Strength of Materials (Engr 211,212,213)†	9
Electrical fundamentals (Engr 221†, 222 or 223)	8
Manufacturing Processes (ME 262)	3
Instrument Laboratory (ME 251)	1
Science elective	4
Communication elective	3
Electives	4
	102

Professional Mechanical Engineering

Junior Year

Engineering Mechanics (ME 311,312)	6
Mechanical Laboratory (ME 351)	3
Introduction to Design (ME 382)	3
Thermodynamics (Engr 311,312,313) (A Grade of C or better is required in each course of an Engr sequence listed before proceeding to the subsequent course in the sequence)	9
Materials Science (Engr 321)	4
Mechanical Properties of Materials (Engr 322)	4
Momentum, Energy, and Mass Transfer (Engr 331,332)	8
Humanities or social science electives	9
Electives	5

Senior Year

Mechanical Analysis and Design (ME 411, 412)	6
Mechanical Laboratory (ME 438,439)	3
Seminar (ME 407P)	1
Engineering Economy (Engr 390)	3
Design electives (No fewer than 9 term hours to be selected from an approved departmental listing)	9
Restricted electives (Senior Mechanical Engineering courses to be selected upon advisement with departmental faculty)	9
Humanities or social science electives	9
Electives	11
	102

Metallurgical Engineering

A cooperative program with the University of Idaho. See head adviser, School of Engineering, for information.

Mining Engineering

A cooperative program with the University of Idaho. See head adviser, School of Engineering, for information.

Nuclear Engineering

A.B.E.T. Accredited

Pre-Nuclear Engineering

Freshman Year

	Hours
Nuclear Eng Orien (NE 101,102)†	4
Intro Nuclear Eng (NE 103)	3
Calculus (Mth 200,201,202)†	12
General Chemistry (Ch 201,202,203)†	9
General Physics I (Ph 211)†	4
English Composition (Wr 121)†	3
Humanities or social science electives	15

Sophomore Year

Calculus of Several Variables (Mth 203)†	4
Applied Differ Equations (Mth 321†,481)	8
General Physics I (Ph 212†,213†,214)	12
Statics; Strength of Materials, Dynamics (Engr 211,212,213)†	9
Elec Circuit Fundamentals (Engr 221)	4
Nuclear Energy Fundamentals (NE 201)†	3
Nuclear Radiation and Matter (NE 202)†	3
Nuclear Radiation Detection and Measurement (NE 203)	3
Electives	6
	102

Professional Nuclear Engineering

Junior Year

Thermodynamics (Engr 311,312)	6
Momentum, Energy, and Mass Transfer (Engr 331,332)	8
Intro to Nuc Reac Engr (NE 411,412, 413)	12
Nuclear Chemistry (Ch 316)	4
Nuclear Fuel Cycle (NE 430)	3
Nuclear Materials (NE 435)	2
Intro to Material Science (Engr 321)	4
Electives	12

Senior Year

Nucl React Anal and Comp (NE 421,422, 423)	9
Reactor Thermal Hydraulics (NE 431)	3
Nuclear Reactor Design (NE 432,433)	5
Nuclear Engr Expts (NE 441)	3
Radiation Prot Engr (NE 461)	3
Nuclear Rules and Regs (NE 465)	3
Seminar (NE 407)	1
Electives	24

The 54 hours of electives are composed of:
- 12 hours of humanities
- 12 hours of free electives
- 8 hours of free electives
- 13 hours of restricted electives
- 3 hours of engineering science electives
- 6 hours of communication electives.

Engineering Courses

Prerequisites and enrollment restrictions are defined on pages 162,163.

ENGINEERING SCIENCE

Each engineering curriculum includes a number of courses that are appropriate for all engineering students. Because of their commonality, these are called common core courses. Approximately 32 hours of such courses in each engineering curriculum are devoted to engineering science instruction.

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 method to practical engineering situations and lead to solution of problems that are fundamental in analysis, design, and synthesis. The courses are managed through the Office of the Dean, School of Engineering, and are indicated by the prefix *Engr* in the curriculum of the school's programs.

Common Engineering Courses

Upper Division Courses‡

Engr 390 Engineering Economy
3 hours 3 ①
Time value of money; economic study techniques, depreciation, taxes, retirement, and replacement of engineering facilities.

Engr 490 Engineering Economic Analysis (G)
3 hours 3 ①
Advanced techniques in engineering economy featuring capital budgeting, cost estimating, tax considerations, evaluation of public activities, cost effectiveness, risk and uncertainty models, and project comparison methods. Prerequisite: Engr 390.

Engineering Science Courses

Lower Division Courses

Engr 211 Statics
3 hours any term 2 ① 1 ②
Analysis of forces induced in structures and machines by various types of loading. Prerequisite: sophomore standing in engineering. Corequisite: Mth 201.

Engr 212 Dynamics
3 hours any term 2 ① 1 ②
Kinematics, Newton's laws of motion, and work-energy and impulse-momentum relationships applied to engineering systems. Prerequisite: Engr 211; Mth 201; Ph 211; sophomore standing in engineering.

Engr 213 Strength of Materials
3 hours any term 2 ① 1 ②
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. Prerequisite: Engr 211; Mth 201; sophomore standing in engineering.

‡ Restricted enrollment; see page 163, item 5.

Engr 221
Electrical Circuit Fundamentals
4 hours any term 3 ① 1 ②
Electrical circuit theory. Steady state circuits and systems. Prerequisite: Mth 201; sophomore standing in engineering.

Engr 222
Electrical Control Fundamentals
4 hours any term 3 ① 1 ②
Transformers, electronic amplifiers, and linear control systems. Transient and steady state analysis of circuits and systems. Prerequisite: Engr 221; sophomore standing in engineering.

Engr 223 Electrical Energy Conversion Fundamentals
4 hours 3 ① 1 ②
Electronic amplifiers, transformers, and energy conversion devices. Prerequisite: Engr 221; sophomore standing in engineering.

Upper Division Courses‡

Engr 301,302 Mechanics of Fluids
3 hours each 2 ① 1 ②
Incompressible and compressible fluids; effects of fluid properties upon pressure distribution and flow patterns; similitude relationships. Prerequisite: Mth 321; Engr 212. Must be taken in order.

Engr 311,312,313 Thermodynamics
3 hours each 2 ① 1 ②
Laws of thermodynamics, closed and open (control volume) systems; thermodynamics properties; thermodynamic cycles, phase and chemical equilibria, and gas dynamics. Prerequisite: Mth 203; Ch 203 for Engr 313. Must be taken in order.

Engr 321 Materials Science
4 hours 3 ① 1 ②
Structure and properties of metals, ceramics, and organic materials; control of structure during processing and structural modification by service environment. Prerequisite: Mth 201; Ch 203.

Engr 322
Mechanical Properties of Materials
4 hours 3 ① 1 ③
Mechanical behavior of materials, relating laboratory test results to material structure, and elements of mechanical analysis. Prerequisite: Engr 213, 321.

Engr 323
Physical Properties of Materials
4 hours 4 ①
Properties determined by free electron behavior: electrical, thermal, dielectric, optical, and magnetic properties. Prerequisite: Engr 221.

Engr 331,332,333
Momentum, Energy, and Mass Transfer
4, 4, 3 hours 3 ① 1 ②, 3 ① 1 ②, 2 ① 1 ②
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. Prerequisite: Mth 321; Engr 212. Corequisite: Engr 311. Must be taken in order.

AGRICULTURAL ENGINEERING

Agricultural engineering is the application of engineering principles and problem-solving techniques to the production, processing, and handling of people's food supply and the management of their natural resources. Its goal is to improve the standard of living and quality of life through the development of agriculture.

The curriculum is flexible and diversified and helps students prepare for employment in positions of responsibility in agriculture, agriculture-related industries, and in government. In addition to providing a strong foundation in the physical and engineering sciences, it allows students to expand their interests into the liberal arts, biological sciences, and basic agriculture. The major areas of emphasis are in power and machinery, soil and water conservation, electric power and processing, structures and environment, and food engineering.

Lower Division Courses
AE 101,102
Agricultural Engineering Orientation
2 hours each 1 ① 1 ②
Lectures and elementary problems.

AE 199 Special Studies
Terms and hours to be arranged

Upper Division Courses‡
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

AE 356 Computer Applications
3 hours 3 ①
Application of digital computers to practical problems.

AE 405 Reading and Conference

AE 406 Projects

AE 407 Seminar
Terms and hours to be arranged
One-hour seminar graded P/N.

***AE 431 Rural Electrification (g)**
3 hours winter 3 ①
Electrical codes, electric motors, and motor controls. Application of electricity to agricultural loads. Prerequisite: Engr 221 or equivalent.

***AE 456 Computer Modeling of Agricultural Systems (G)**
3 hours winter 3 ①
Integration of engineering and biological principles with efficient modeling techniques to solve complex agricultural and biological operational problems. Prerequisite: AE 356; St 314; senior standing.

***AE 459**
Agricultural Systems Optimization (G)
3 hours fall 3 ①
Integration of engineering and biological principles in agriculture to optimize complete operational systems. Application of relevant theory to present and future systems. Prerequisite: AE 356; St 314; senior standing.

***AE 461 Farm Structures (g)**
3 hours spring 1 ① 2 ③
Materials and types of construction; services, uses, and economics of farm structures; structural, environmental, and system designing. Prerequisite: Engr 213,312.

***AE 471 Soil and Water Conservation**
(g) 3 hours fall 3 ①
Mechanics of erosion. Design of erosion control structures. Estimation of water supplies and crop water requirements. Prerequisite: Engr 331.

***AE 472 Drainage Engineering (g)**
3 hours winter 3 ①
Benefits of drainage, hydraulics of soil profiles, drainage investigations, design of agricultural drainage systems, interceptor drains, construction practices, drainage enterprises. Prerequisite: Engr 331.

***AE 473 Irrigation System Design (g)**
3 hours spring 2 ① 1 ③
Sprinkler and gravity irrigation methods, design of farm irrigation systems, land leveling, performance characteristics of pumps and sprinkler irrigation equipment. Prerequisite: Engr 331.

***AE 481**
Agricultural Pollution Control (g)
3 hours 3 ①
Pollutants of agricultural origin and their effects upon environmental quality; problems caused by animals, crop production, and products processing; control methods. Prerequisite: senior standing.

***AE 491 Power Farming Machinery**
(g) 3 hours fall 2 ① 1 ③
Power farming machinery; operation, calibration, selection, and systems of use. Prerequisite: Engr 213.

***AE 492,493**
Agricultural Machine Design (g)
3 hours winter and spring 1 ① 2 ②
Mechanics, mechanisms, and strength of materials applied to the design of agricultural machines with consideration given to motion, size, material, strength, durability, and manufacturing processes. Prerequisite: AE 491. Must be taken in order.

Graduate Courses
See also courses marked (g) and (G) above

AE 501 Research

AE 503 Thesis

AE 505 Reading and Conference

AE 506 Projects

AE 507 Seminar
Terms and hours to be arranged

AE 511 Irrigation Science
3 hours spring 3 ①
Hydraulics of surface irrigation, irrigation structures, estimation of evapotranspiration, and new developments in irrigation science and technology. Not offered every year.

***AE 520**
Animal Waste Management
3 hours 2 ① 1 ③
Planning and design of animal waste management systems. Prerequisite: Ch 203 and Mb 130 or equivalent.

AE 530 Agricultural Instrumentation and Application
3 hours spring 2 ① 1 ③
Pyrometry, air measurements, psychrometry, soil and field-crop moisture determinations, and water measurements. Not offered every year.

AE 540
Mechanics of Fluids in Porous Media
3 hours fall 3 ①
Fundamentals of the mechanics of two immiscible fluids in porous media and their application to drainage, irrigation, engineering, and other soil-water problems. Soil physics and fluid mechanics background desirable. Offered alternate years. Not offered 1982-83.

‡ Restricted enrollment; see page 163, item 5.

* Field trips may be required.

AGRICULTURAL ENGINEERING TECHNOLOGY

See "School of Agriculture."

CHEMICAL ENGINEERING

Chemical engineers design and develop processes and plants for converting basic raw materials to products that are useful to people.

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 become college or university teachers should continue with graduate work toward the M.S. or Ph.D. degree.

Lower Division Courses

ChE 101,102
Chemical Engineering Orientation
3 hours fall and winter 1 ① 2 ②
Department engineering orientation. Need not be taken in order.

ChE 211,212
Engineering Stoichiometry
2 hours fall and winter 1 ① 1 ②
Heat and material balances. Basic thermodynamic relationships; energy balances, and thermo-physical calculations. Prerequisite: general chemistry; sophomore standing in engineering. Corequisite: Mth 202. Must be taken in order.

ChE 213
Computer-Aided Stoichiometry
2 hours spring 1 ① 1 ②
Elementary computer-aided design. Application of digital computers in complex material and energy balances. Prerequisite: ChE 102,212; sophomore standing in engineering.

Upper Division Courses‡
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

ChE 313
Measurements and Instrumentation
2 hours spring 1 ① 1 ②
Principles of industrial measurement and control. Application of analog computer in industrial control. Prerequisite: Engr 221,222,331.

ChE 323
Chemical Engineering Problems
3 hours spring 2 ① 1 ②
Application of momentum and energy transfer phenomena for designing industrial equipment. Prerequisite: Engr 332; ChE 212.

ChE 401 Research
Terms and project to be arranged

ChE 405 Reading and Conference
Terms, hours, and subject to be arranged

ChE 406 Projects

ChE 411,412 Unit Operations (g)
3 hours fall and winter 1 ① 2 ②
Mass, momentum, and heat transfer operations; basic transport equations. Prerequisite: ChE 212; Engr 313,333; Ch 425. Must be taken in order.

ChE 414,415
Chemical Engineering Laboratory (g)
3 hours winter and spring 1 ① 1 ④
Unit operations and transfer processes; preparation of technical reports. Prerequisite: ChE 411, 443. Must be taken in order.

ChE 425,426,427
Chemical Engineering Calculations (G)
3 hours each 3 ①
Mathematical analysis; setting up differential equations; special methods of solving problems. Prerequisite: ChE 213,323. Corequisite: ChE 411. ChE 425 is prerequisite to either ChE 426 or 427.

ChE 431,432 Chemical Plant Design
(g) 3 hours winter and spring
1 ① 2 ②; 2 ① 1 ②
Design of plants and chemical engineering equipment. Reports required. ChE 431 prerequisite to ChE 432. Prerequisite for ChE 431: ChE 213,411,443. Corequisite: ChE 412.

ChE 443
Chemical Reaction Engineering (G)
3 hours fall 2 ① 1 ②
The design of chemical reactors, comparison of performance and economic evaluation of reactor types. Emphasis on single phase reacting systems. Prerequisite: Mth 321; Ch 441 or 424; Engr 313,333; ChE 212.

ChE 461
Process Dynamics and Control (G)
3 hours fall 2 ① 1 ②
Fundamental principles of process dynamics and instrumentation used in control of process variables such as pressure, temperature, and flow rate. Prerequisite: Mth 321; ChE 313.

Graduate Courses
See also courses marked (g) and (G) above

ChE 501 Research

ChE 503 Thesis

ChE 505 Reading and Conference

ChE 506 Projects

ChE 507 Seminar
Terms and hours to be arranged
One-hour seminar graded P/N.

ChE 514 Fluid Flow
3 hours 2 ① 1 ②
Momentum transfer and related theory; special attention to recent literature. Prerequisite or corequisite: ChE 425. Not offered every year.

ChE 520,521 Diffusional Operations
3 hours winter and spring 2 ① 1 ②
Diffusion in gases, liquids, and solids; interphase mass transfer; macroscopic mass balance. Prerequisite: ChE 425. Must be taken in order.

ChE 522 Heat Transmission
3 hours 2 ① 1 ②
Mechanisms of transfer of heat energy; transport theory. Prerequisite: ChE 425.

ChE 531,532
Electrochemical Engineering
3 hours each 2 ① 1 ②
Fuel cells, electro-organic reactions, electrodialysis and electro-winning, mass transfer and polarization, fused salt electrolysis, cell analogies, theory of electrolytic conduction, electrochemistry in nonaqueous solvents, current distribution. Must be taken in order. Not offered every year.

ChE 535
Corrosion and Corrosion Control
3 hours 3 ①
Corrosion as an electrochemical reaction, metal activity, passivity, stress corrosion cracking, corrosion inhibitors, cathodic protection, corrosion control.

ChE 537,538
Chemical Engineering Thermodynamics
3 hours each 2 ① 1 ②
Theory and laws governing energy transformations, phase equilibria, nonideal systems, and activities of electrolytes. Must be taken in order.

ChE 540 Chemical Reactor Theory
3 hours 2 ① 1 ②
Performance of chemical reactors with emphasis on multiphase reacting systems and on nonideal flow.

ChE 550 Process Systems Analysis
3 hours 2 ① 1 ②
Mathematical modeling of physical and chemical processes. Analysis and control of systems using matrix methods in continuous and discrete time. Identification of flow and reaction systems with and without noise. Prerequisite: ChE 425,427.

ChE 551
Process Systems Optimization
3 hours 2 ① 1 ②
Optimization theory. Application to computer simulated mathematical models of chemical process systems. Prerequisite: ChE 427 or equivalent. Offered alternate years.

ChE 552 Process Systems Simulation
3 hours 2 ① 1 ②
Computer modeling and simulation of physical and chemical processes by digital and hybrid computer techniques. Recent advances in computer-aided process design. Real time computer control. Offered alternate years.

ChE 561 Selected Topics
3 hours 2 ① 1 ②
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.

CIVIL ENGINEERING

The curriculum in civil engineering is designed to prepare students for a professional career in responsible engineering positions with business, industry, private consultants, or government. The curriculum includes basic science, social science, humanities, communication skills, and engineering sciences in addition to engineering courses. Civil engineering is a diverse discipline which includes the fields of structural engineering, transportation systems engineering, engineering land surveying, hydraulics and water resources engineering, soil mechanics and foundation engineering, water supply, wastewater treatment and water pollution control, municipal engineering, ocean engineering, and engineering planning and economy. All students receive basic instruction in these fields and may specialize by choosing electives to satisfy major requirements in structural engineering, transportation engineering, water resources engineering, or surveying.

The growing complexity of modern engineering practices makes graduate study increasingly necessary for civil engineers who wish to specialize to a

‡ Restricted enrollment; see page 163, item 5.

greater degree than is possible in baccalaureate degree programs. To provide greater specialization, a Master of Ocean Engineering degree program is offered, as are Master of Science degree programs in environmental engineering, transportation engineering, structural engineering, surveying, water resources engineering, geotechnical engineering, ocean engineering, and construction engineering management. In addition, Ph.D. degree programs are offered in environmental engineering, transportation engineering, structural engineering, and geotechnical engineering.

Lower Division Courses

CE 101
Introduction to Civil Engineering
1 hour 1 ①
Description of engineering as a profession. Self-evaluation of mathematical and study skills and motivations for choosing engineering as a profession. Graded P/N.

CE 102,103
Civil Engineering Computations
2 hours 1 ① 1 ②
Introduction to communication and problem-solving techniques and strategies with engineering applications. Programming of hand-held calculators. Prerequisite: *for CE 103,* CE 102.

CE 226 Plane Surveying
3 hours 2 ① 2 ②
Use of engineer's transit, tape, and level; surveying methods applied to problems in construction and area survey. For non-civil engineering students. Prerequisite: Mth 102.

Upper Division Courses‡
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

CE 310 Computer Applications in Civil Engineering
3 hours 2 ① 1 ②
Development of individual computer programs for civil engineering problems. Use of library programs. Prerequisite: junior standing in civil engineering; Engr 302 or 331; CE 371,382.

CE 312 Hydraulics
3 hours 3 ①
Reservoirs, dams, spillways and outlet works, open channels, water hammer, pipe networks, hydraulic machinery. Prerequisite: Engr 302.

CE 321 Introduction to Transportation Engineering
3 hours 2 ① 1 ②
Transportation systems development and planning; characteristics of transportation modes; facility operation and control. Prerequisite: Mth 202.

CE 322 Highway Engineering
3 hours 2 ① 1 ②
Vehicle and driver characteristics; highway capacity, highway location and design; pavement design, highway construction and maintenance. Prerequisite: CE 321, 361, 371. Corequisite: CE 312.

CE 351 Environmental Engineering
3 hours 2 ① 1 ②
Treatment of liquid, solid, and gaseous wastes; application of engineering principles to the protection of the environment from pollutants. Prerequisite: junior standing; Ch 202; Engr 302.

‡ Restricted enrollment; see page 163, item 5.

CE 361 Surveying Theory
3 hours 2 ① 2 ②
Use of surveying equipment, Gaussian error theory applied to measurements, calculations of position on spherical and plane surfaces, mapping techniques. Prerequisite: Mth 203.

CE 362 Photogrammetry
3 hours 2 ① 1 ③
Geometry of terrestrial and vertical photographs, radial line plotting, ground control, stereoscopy and parallax, stereoscopic plotting instruments, orientations, and aerial cameras. Prerequisite: CE 361.

CE 363 Property Surveys
3 hours 2 ① 1 ③
Private and federal land boundary location and relocation, maps and plats, property descriptions, the U.S. Public Land Survey, field astronomy, subdivision design. Prerequisite: CE 361.

CE 365 Highway Location and Design
3 hours 2 ① 1 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. Prerequisite: CE 226 or 361.

CE 371 Soils in Engineering
3 hours 2 ① 1 ②
Uses of soils in engineering. Identification and classification. Permeability and consolidation, and applications in settlement analysis. Prerequisite: Engr 213. Corequisite: Engr 301.

CE 372 Applied Soil Mechanics
3 hours 3 ①
Soil strength and soil mechanics theories applied to problems of slope stability, retaining structures, and foundations. Prerequisite: CE 371.

CE 381,382,383 Structural Theory
3 hours each 2 ① 1 ②
CE 381, 382: beam deflection, redundant structures, combined stress, columns, structural members and frames. Prerequisite: Mth 203; Engr 213. *CE 383:* analysis of statically indeterminate structures by moment distribution, slope deflection, strain-energy, elastic methods. Must be taken in order.

CE 401 Research

CE 405 Reading and Conference

CE 406 Projects
Terms and hours to be arranged

CE 407 Seminar
1 hour 1 ①
Graded P/N.

CE 411 Hydrology (g)
3 hours 2 ① 1 ②
Fundamentals of hydrology; the several phases of the hydrologic cycle; special emphasis on precipitation, streamflow, hydrograph analyses, and hydrologic measurements. Prerequisite: junior standing; CE 312.

CE 412 Hydraulic Engineering (G)
3 hours 1 ① 2 ②
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. Prerequisite: CE 312.

CE 413 Water Resources Design (G)
3 hours 1 ① 2 ②
Application of hydrologic and hydraulic engineering principles, together with economic planning and analysis, to the planning and design of water resources projects. Consideration of comprehensive basin development as well as development of small projects. Prerequisite: CE 312.

CE 414,415 Environmental Engineering Fundamentals (g)
3 hours each 2 ① 1 ②; 1 ① 2 ②
Water quality analysis, water quantity measurements, hydraulic considerations, water supply and treatment, water pollution control, treatment of domestic and industrial wastes. For non-engineering students. Prerequisite: Ch 105 or equivalent. Must be taken in order. CE 415 not offered every year.

CE 424 Transportation Materials (G)
3 hours 2 ① 1 ③
Characteristics and behavior of transportation materials, pavement mixtures, and control. Prerequisite: senior standing: CE 322,371.

CE 425 Pavement Structures (G)
3 hours 2 ① 1 ②
Design for streets, highways, and airports. Prerequisite: CE 372, 424.

CE 441 Ocean Engineering (g)
3 hours 3 ①
Introduction and overview: sea power, physical and hydrodynamic factors, wave phenomena; wave forces and structures; dredging; vessels and floating platforms; diving; environmental considerations of undersea work systems; instrumentation and materials. Prerequisite: CE 312.

CE 450
Municipal Planning and Engineering
(G) 3 hours 3 ①
Urban structure; urban goals and objectives; concepts of planning; analysis and demand estimation for planning and implementing civil services; regulation and control of land use and development; financing and funding municipal engineering projects; administration and management of municipal engineering. Prerequisite: senior standing.

CE 452,453 Sanitary Engineering
(g) 3 hours each 2 ① 1 ②
CE 452: domestic water supply and wastewater collection and treatment. Prerequisite: CE 312, 351. *CE 453:* theory and design of wastewater treatment units with emphasis on physical and biological unit operations, solids handling, and disposal. Prerequisite: CE 452.

CE 461 Oregon Land Survey Law
(G) 3 hours 3 ①
U.S. Public Land Survey System; history, development, Congressional legislation, restoration of corners, and rules of evidence; Oregon Supreme Court decisions; adverse possession, eminent domain and riparian rights, guarantees of title, descriptions, and plats. Prerequisite: senior standing.

CE 462 Photo Interpretation (G)
3 hours 2 ① 1 ③
Air photo interpretation and application to engineering problems; factors responsible for the formation and development of artificial features and geological landforms. Prerequisite: senior standing.

CE 463 Control Surveying (G)
4 hours 2 ① 2 ③
Theory, equipment, and data reduction of electro-optical and microwave electronic distance measurements; control specifications, methods, and problems in obtaining large area angular measurements; precise leveling; triangulation and trilateration figure adjustments with introduction of least square techniques. Prerequisite: CE 361.

CE 465 Cadastral Surveying
3 hours 3 ①
Cadastral surveying and U.S. public land survey, cadastral arrangements and the property institution general cadastral theory land registration system, information systems.

CE 471 Soil Testing for Engineers (G)
4 hours 2 ① 2 ③
Soil sampling; organization of soils laboratory; identification; permeability, consolidation and strength tests. Prerequisite: CE 372.

CE 472 Foundations for Structures (g)
3 hours 2 ① 1 ②
Criteria, theory, and practice of design and construction for shallow and deep foundations for structures. Prerequisite: CE 372.

CE 473 Earth Structures (g)
3 hours 3 ①
Analysis of seepage and stability for earth dams; design and construction considerations for embankments; earth dams and their foundations. Prerequisite: CE 372 or equivalent.

CE 480 Structural Design
3 hours 2 ① 1 ②
Basic design and proportioning of reinforced concrete and structural steel member. Application of appropriate code requirements. Prerequisite: CE 383.

CE 481 Reinforced Concrete (g)
3 hours 2 ① 1 ②
Theory and design of reinforced concrete structural members, strength properties and control of structural concrete, design limitations and building codes. Prerequisite: CE 383.

CE 482,483 Structural Engineering (g)
3 hours each 2 ① 1 ②
Structural design in timber, reinforced and prestressed concrete, ultimate strength and limit design. Design criteria, limitations, and detail problems. Prerequisite: CE 383,481,484. Must be taken in order.

CE 484 Design of Steel Structures
(g) 3 hours 2 ① 1 ②
Elastic and plastic methods of structural steel analysis, design of steel structures. Prerequisite: CE 383.

CE 485 Indeterminate Structures (g)
3 hours 2 ① 1 ②
Elastic deflections and stress analysis. Prerequisite: CE 383.

CE 489 Building Design (g)
3 hours 2 ① 1 ③
Building elements constructed of steel, reinforced concrete, timber, and miscellaneous building materials; fabrication and construction. Prerequisite: CE 472,481,484.

CE 491 Engineering Planning (G)
3 hours 3 ①
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. Prerequisite: senior standing in engineering.

CE 492 Estimating and Contracts (g)
3 hours 2 ① 1 ②
Quantity surveying; unit prices, subcontracts, overhead costs, profits; principles and laws of contracts applied to engineering. Prerequisite: senior standing.

CE 494 Modern Construction Methods
3 hours 2 ① 1 ③
Equipment and performance factors, plant selection, productivity, and costs.

CE 499 Field Experience
1 hour
Senior field trip to visit industry and engineering projects. Graded P/N.

Graduate Courses

See also courses marked (g) and (G) above
Courses marked with an asterisk (°) are offered alternate years or as demand requires.

CE 501 Research

CE 503 Thesis

CE 505 Reading and Conference

CE 506 Projects

CE 507 Seminar
Terms and hours to be arranged
Section E, Ocean Engineering, and section M, Research Methods, are 1 hour and graded P/N.

CE 511 Engineering Properties of Soils
4 hours 4 ①
Geochemistry of soil formation, clay mineralogy, physical chemistry of clay water systems, permeability, consolidation, shear strength, and soil stabilization. Prerequisite: CE 371.

CE 512 Earth Retention and Support
4 hours 4 ①
Earth pressure theories. Earth supporting structures including walls, bulkheads, culverts, and shafts. Prerequisite: CE 371.

CE 513 Foundation Engineering
4 hours 4 ①
Advanced topics in analysis, design, and construction of foundations for structures, including preparation of reports. Prerequisite: CE 472,511.

°CE 515 Advanced Soil Testing
3 hours 1 ① 2 ③
The direct shear test, the vacuum triaxial test, and triaxial testing of cohesive soils. Prerequisite: CE 511.

CE 516 Soil Improvement
3 hours 2 ① 1 ③
Techniques to improve the performance of soils in engineering applications: compacted, blending, admixture, grouting, electro-osmosis, thermal treatment, vibroflotation, dynamic consolidation, compaction piles, dewatering, fabrics, and reinforced earth. Prerequisite: CE 372,424.

CE 518 Soil Dynamics
3 hours 3 ①
Characteristics of ground motions during earthquakes; dynamic soil properties. Liquefaction and settlement under transient and repeated loadings; foundation design for vibratory loads, wave propagation in soil media. Prerequisite: CE 372.

CE 519 Applied Soil Mechanics
3 hours spring 3 ①
Actual problems presented as realistically as possible. Individual reports prepared. Student reports critically reviewed by other students and the instructor. Prerequisite: CE 471,473,512, 513.

°CE 521 Hydraulic Systems
4 hours 4 ①
Problems of fluid flow in closed conduits and complex piping systems. Application of numerical methods to problems in water hammer, surge tank design, and pressures in pump discharge lines. Prerequisite: Engr 302.

°CE 522 Fluid Mechanics
3 hours 3 ①
Dimensional analysis; principles of energy, continuity, and momentum; boundary layer theory; unsteady flow in pipes. Prerequisite: CE 312.

CE 524 Sediment Transport
3 hours 3 ①
Principles of transport in rivers and coastal waters; sediment problems associated with reservoirs. Prerequisite: CE 526.

°CE 525 River Control and Utilization
4 hours 4 ①
Multi-purpose river basin development; reservoir regulation; behavior of alluvial channels; dams, channel control structures, channel improvements and stabilization; fish passage and spawning facilities; hydraulic models. Prerequisite: CE 526.

CE 526 Hydraulics of Open Channels
3 hours 3 ①
Steady, uniform, and nonuniform flow including transitions, delivery curves, side channel spillways, cavitation, and open channel surges. Prerequisite: CE 312.

°CE 527 Applied Hydrology
4 hours 4 ①
Advanced treatment of hydrology covering major components of hydrologic cycle. Hydrologic analysis and design of water resource systems, flood prediction and control, simulation of surface water systems. Prerequisite: CE 411.

°CE 529 Ground Water Hydraulics
3 hours 3 ①
Steady and unsteady flow in confined and unconfined aquifiers, seepage through embankments, river depletion due to well pumping, bank storage, flow toward drains, method of images, and use of electrical and other analogs. Prerequisite: CE 312.

°CE 530 Structural Model Analysis
3 hours 1 ① 2 ③
Theory, design, and construction of models for solution of stresses in continuous frames.

CE 531
Analysis of Engineering Structures
3 hours 3 ①
Stress analysis of statically indeterminate structures, energy and geometric methods.

CE 532 Finite Element Analysis
3 hours 3 ①
Applications of the finite element method to fluid flow, heat conduction and elasticity problems. Use of large finite element computer programs. Prerequisite: B.S. in engineering or consent of instructor.

CE 533 Structural Stability
3 hours 3 ①
Mathematical models of elastic and inelastic stability in structural frames, numerical methods of solution.

CE 534 Mechanics of Materials
3 hours 3 ①
Structural materials; theories of failure, multiaxial stress conditions, torsion, shear distortions, impact and vibrations, energy methods of analysis, stresses in plates and shells.

CE 535 Structural Dynamics
3 hours 3 ①
Numerical and closed-form solutions for single and multi-degree of freedom vibrating systems. Behavior of structures under dynamic forces and support motions.

CE 536
Plastic Methods of Structural Analysis
3 hours 3 ①
Formation of yield hinges, upper and lower bound theorems, equilibrium and mechanism techniques applied to redundant frames.

CE 537,538 Reinforced Concrete
3 hours each 3 ①
Winter: prestressed concrete analysis and design; systems of prestressing; materials; economics. *Spring:* special structures in concrete; analysis and design. Liquid holding tanks, underground and marine structures, walls, slabs, hydroelectric plant structures. WSD and USD methods. Must be taken in order. CE 538 not offered every year.

CE 539 Plate and Shell Structures
3 hours 3 ①
Development of basic plate equations; classical and numerical solutions; shell structures.

CE 540 Fundamentals of Biological Treatment Processes
3 hours 2 ① 1 ③
Bacterial metabolism and growth processes important to water and wastewater treatment and polluted environments. Introduction to stoichiometry and kinetics of bacterial growth.

CE 541 Biological Kinetics and Treatment Processes
4 hours 3 ① 1 ③
Stoichiometry and kinetics of bacterial and algal growth in sanitary engineering processes and polluted natural environment. Prerequisite: CE 540.

CE 542 Fundamentals of Unit Processes
3 hours 3 ①
Mass, momentum, and heat transfer as applied to water and wastewater treatment processes.

***CE 543 Water Quality Studies**
3 hours 1 ① 2 ③
Study of non-point source pollution of lakes, streams, rivers, and estuaries.

CE 544
Environmental Engineering Chemistry
4 hours 3 ① 1 ③
Fundamentals of chemistry for environmental engineers and others with an interest in environmental processes; concepts in ionic equilibria, physical, organic, biochemical, and analytical methods.

CE 545 Water Chemistry
3 hours 3 ①
Chemistry of natural waters, emphasizing equilibrium concepts in acid-base precipitation-dissolution, complex formation, and oxidation-reduction reactions. Prerequisite: CE 544.

***CE 547 Industrial Wastes**
3 hours 2 ① 1 ③
Industrial processes; strength, quality, and character of industrial wastes; methods of prevention, treatment, and disposal.

CE 548 Water Quality Dynamics
3 hours 3 ①
Mass balance, convection, and diffusion in streams, lakes, and estuaries; thermal pollution, heat balance, oxygen balance, and eutrophication. Prerequisite: CE 544.

CE 549 Sanitary Engineering Design
3 hours 2 ① 1 ③
Design of water and waste water collection and treatment facilities. Prerequisite: CE 541,542.

CE 551 Transportation Systems Analysis and Planning
4 hours 3 ① 1 ②
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. Prerequisite: CE 321.

CE 552 Traffic Operations and Traffic Engineering
4 hours 3 ① 1 ③
Traffic operations and engineering; human and vehicular factors; traffic flow theory and stream characteristics; highway and street capacity analysis; regulation; accidents, safety traffic control and operation. Prerequisite: CE 321.

CE 553 Transportation Facility Design
4 hours 3 ① 1 ③
Location and design of highways, airports, and other surface transportation terminals; design for safety, energy efficiency, and environmental quality. Prerequisite: CE 321,322.

CE 554 Airport Planning and Design
3 hours 3 ①
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.

CE 556 Urban Transportation Planning
3 hours 2 ① 1 ③
Techniques of transportation planning applied in an urban area; calibration, testing, and application of traffic estimation models; evaluation of alternate plans. Prerequisite: CE 551.

***CE 561 Photogrammetry**
3 hours 2 ① 1 ③
Geometry of aerial and terrestrial photographs; design of cameras; rectification; design, construction, operation, and error theory of photogrammetric plotting instruments; analytical aerotriangulation. Prerequisite: Mth 202.

***CE 562 Geodesy**
3 hours 3 ①
History and properties of the spheroid; calculation of geodetic position; figure of the earth and isostasy; gravity measurement; geodetic astronomy. Prerequisite: Mth 203.

***CE 563 Space Surveying**
3 hours 3 ①
Field astronomy; celestrial mechanics; dynamic and geometrical scientific observation and reduction of artificial satellite data; cis-lunar and lunar positions. Prerequisite: Mth 203.

***CE 564 Surveying Adjustments**
3 hours 3 ①
Need for adjustments; normal distribution of random errors and the least squares principle; observation and condition equations; formation of normal equations, error propagation; covariance matrix; adjustment of level nets, triangulation, traverses, and other applications. Prerequisite: Mth 203.

***CE 565 Analytical Photogrammetry**
3 hours 3 ①
Photogrammetric coordinate systems, photograph orientation in space, condition equations, linearization of the condition equations, data analysis and normalizing of observation equations, analytical aerial triangulation, adjustment of strips and blocks. Prerequisite: Mth 203; CE 561.

***CE 566 Ocean Position Surveying**
3 hours 3 ①
Systems, uses, measurements, and accuracies of navigation and positioning methods; optical- and radio-celestial methods; circular, hyperbolic, elliptical, and azimuthal electronic methods; artificial satellite measurements; inertial and acoustic methods for surface and subsurface positioning. Prerequisite: Mth 203.

CE 570 Coastal Hydraulics
4 hours 4 ①
Deep and shallow water waves; shoaling effects; tidal dynamics in bays, estuaries, and harbor entrances; wave and current forces; mixing processes; engineering considerations. Prerequisite: Engr 302. Consent of instructor required.

CE 571 Forces on Marine Structures
3 hours 3 ①
Havelock's wavemaker theory in two and three dimensions. Radiation and scattering forces computed by Ursell's source method, Fredholm's integral method, and variational method. Green's function and Haskind's theorem. Fourier transform methods and spectral response functions. Prerequisite: CE 570. Consent of instructor required.

CE 572
Marine Water Quality Dynamics
3 hours 3 ①
Water quality control and waste disposal in esturaries and nearshore areas; principles of diffusion and dispersion of dissolved and particulate matters in marine waters; fate of pollutants; interrelationships of physical, hydraulic, chemical, and biological factors. Prerequisite: CE 570. Consent of instructor required.

***CE 573 Ocean Engineering Design**
3 hours 2 ① 1 ②
Conceptual analysis, design, and planning of ocean systems. Team project work is stressed on functional design of nearshore and offshore facilities. Prerequisite: CE 570.

CE 574
Ocean Engineering Facilities Planning
3 hours 3 ①
Functional planning and design criteria of nearshore and harbor facilities including piers, platforms, jetties, sea walls, groins, moorings, docks, submerged pipelines, harbor design, and use of hydraulic models. Prerequisite: CE 312.

CE 578 Marine Geotechnique
3 hours 3 ①
Marine sediment processes, beach dunes, marine soil properties, sampling and testing; seismic surveys; foundations and anchorages; marine location surveys. Consent of instructor required.

***CE 579**
Selected Topics in Ocean Engineering
1, 2, or 3 hours 1 ①, 2 ①, or 3 ①
Special topics on various problems of concern in ocean engineering. Subject matter based on student interest and instructor availability. May be repeated for a maximum of 9 hours on different topics.

***CE 580 Contemporary Technology**
3 hours 3 ①
Philosophy of contemporary technology; technological methods and their limitations; criticisms and conflicts concerning contemporary technology.

CE 588
Physical-Chemical Treatment Processes
4 hours 3 ① 1 ③
Fundamental phenomena and design concepts of physical and chemical unit processes, including sedimentation, coagulation, filtration, gas transfer, carbon adsorption, demineralization, and membrane processes. Prerequisite: CE 542.

CE 590
Engineering Economic Planning
3 hours 3 ①
Planning of engineering facilities, economic analysis, selection of alternatives, benefit-cost analysis, rate structures, retirement, replacement, pricing decisions, capital budgeting for engineering objective. Prerequisite: Engr 490.

CE 593,594
Construction Engineering Management
3 hours each 3 ①
Construction management and planning, project mobilization, contract documents, contracting procedures, legal considerations, insurance and safety requirements, project control and scheduling, selection of materials and methods, and project administration. Must be taken in order.

CE 599
Selected Topics in Civil Engineering
1, 2, 3, or 4 hours
1 ①, 2 ①, 3 ①, or 4 ①
Selected topics dealing with special problems and concerns in civil engineering. Subject matter selected on the basis of student and faculty interest and current emphasis within the profession. Consent of instructor required.

CIVIL ENGINEERING—FOREST ENGINEERING

See "School of Forestry."

CONSTRUCTION ENGINEERING MANAGEMENT

This curriculum offered in the Department of Civil Engineering is based on mathematics and the physical sciences. Course work is also drawn from the liberal arts and business administration because construction engineering managers work closely with people and business ventures. Courses in this curriculum emphasize engineering mechanics, engineering materials, surveying, construction methods and management, engineering economy, estimating, and cost control.

The construction engineering management program gives students an opportunity to gain practical field experience through a required, one-week senior field trip and through cooperation with the Associated General Contractors during the summer.

Lower Division Courses

CEM 111,112,113 Technical Problems
2 hours each 1 ① 1 ②
Elementary technical problems related to civil engineering field, methods of work, use of slide rule, graphical representation. Prerequisite: Mth 102. Must be taken in order.

CEM 121
Drawing and Descriptive Geometry
3 hours 1 ① 2 ②
Fundamentals of engineering drawing, orthographic projection, study of lines, planes, and solids. Not offered each year.

CEM 221,222,223 Plane Surveying
3 hours each 2 ① 2 ②; 2 ① 1 ③; 2 ① 1 ③
CEM 221: care and use of theodolite, transit, level, electronic distance measuring equipment and tapes; effect of errors of observations; traverse and area surveys; machine computations. *CEM 222:* geometry of highway location; circular, compound, vertical, and spiral curves. *CEM 223:* theory and practice of construction surveys applied to highways, buildings, tunnels, and special situations. Adjustment of instruments and error analysis of surveying layouts and measurement problems. Must be taken in order. CEM 221 and 223 not offered every year.

CEM 232 Civil Engineering Drawing
3 hours 1 ① 2 ③
Drawing techniques applied to civil engineering projects. Prerequisite: GE 115.

CEM 252,253,254 Mechanics: Statics, Dynamics, Strength of Materials
3 hours each 2 ① 1 ②
Fundamental concepts of mechanics applied to elementary civil engineering problems. Prerequisite: Mth 201 previously or concurrently with CEM 252; sophomore standing in construction engineering management or engineering. Courses to be taken in sequence.

Upper Division Courses‡

CEM 321,322 Hydraulics
3 hours 2 ① 2 ②
CEM 321: pressure and energy concepts of fluids, fluid measurements, flow in pipes and open channels. Prerequisite: CEM 253; Mth 201. *CEM 322:* pump characteristics and selection, elements of hydrology, storm runoff, drainage, culvert selection. Prerequisite: CEM 321.

CEM 341,342,343
Construction Materials Laboratory
3 hours each 2 ① 1 ③
CEM 341: origin of soils, standard soil tests for engineering projects. *CEM 342:* standard tests for structural elements, timber, steel, concrete. *CEM 343:* highway materials standard tests, asphalt, concrete, base and subbase materials. Prerequisite: CEM 254. Must be taken in order.

CEM 361 Fundamentals of Estimating
3 hours 2 ① 1 ②
Principles of estimating, classification of work, types of estimates, quantity take-off techniques. Prerequisite: CEM 112; admission to the professional program in construction engineering management.

CEM 362 Estimating and Cost Control
3 hours 2 ① 1 ③
Quantity surveying, establishment of unit prices, overhead, profits; concrete, steel, and timber. Prerequisite: CEM 361.

CEM 371 Electrical Facilities
4 hours 3 ① 1 ③
Basic electrical circuit theory, power, motors, costs; use of test equipment, electrical controls, drawings, codes, and building distribution systems. Prerequisite: Ph 203.

CEM 372 Mechanical Facilities
3 hours 2 ① 1 ③
Principles and applications of mechanical facilities such as heating, air conditioning, drainage, fire protection, and vertical transportation within buildings. Prerequisite: Ph 203.

CEM 381 Project Scheduling
3 hours 2 ① 1 ③
Computer coding and computer applications to project scheduling and critical path methods. Prerequisite: CEM 362.

CEM 405 Reading and Conference

CEM 406 Projects

CEM 407 Seminar
Terms and hours to be arranged

CEM 441,442,443 Construction Methods and Control (g)
3 hours each 2 ① 1 ③
CEM 441: earthmoving, grading, materials classification methods, and equipment utilization. *CEM 442:* construction of concrete, steel, timber structures, and form design. *CEM 443:* study of construction projects and their improvement through the implementation of management techniques and operational procedures. Prerequisite: senior standing in CEM; Engr 390; CEM 381. Must be taken in order.

CEM 451,452 Structural Problems
4 hours 2 ① 2 ③
Study and design of building elements of concrete, steel, and timber; detailing and fabrication. Prerequisite: CEM 254. Must be taken in order.

CEM 461 Contracts and Specifications
3 hours 2 ① 1 ③
Laws of contracts as applied to engineering work; correlation of blueprints and specifications. Not offered every year.

ELECTRICAL AND COMPUTER ENGINEERING

The curriculum in electrical and computer engineering provides a wide range of opportunities in undergraduate and graduate study in the areas of biomedical engineering, communications, computers, control and systems science, electric power generation and transmission systems, electronics, and electrophysics.

Two baccalaureate degree programs are offered:

The curriculum for *electrical and computer engineering* meets requirements for the professional engineering degree and is accredited by A.B.E.T. Students choosing this curriculum may elect courses in computer engineering as well as in the electrical and electronics areas. Students completing course work in this curriculum are awarded the B.A. or B.S. degree in electrical and computer engineering.

The *computer science* curriculum requires most of the lower division courses and some of the upper division courses required in electrical engineering, but provides additional opportunities for computer-science related course work during the junior and senior years. The undergraduate program in computer science emphasizes the design of computers or information systems and the use of computers in design, system analysis, and simulation. Students completing course work in this curriculum are awarded the B.A. or B.S. degree in engineering (computer science).

Both curricula allow students to take course work in the sciences and the liberal arts. Undergraduates may elect courses in science or engineering during the sophomore, junior, and senior years to prepare for graduate work or to form a broad undergraduate program. Many courses allow students to work in the department's well-equipped laboratories, providing direct experience with analog, digital, and hybrid computers, design and manufacture of integrated circuits, and a variety of electronic and electrical engineering equipment.

Lower Division Courses

EE 101
Electrical Engineering Orientation
3 hours 3 ①
Orientation to the field of electrical and computer engineering and to departmental curricula.

EE 102,103 Concepts and Computations in Electrical Engineering
2 hours each 2 ①
EE 102: techniques and methods used in defining, solving, and documenting engineering projects or problems. Computational methods in engineering. *EE 103:* formulation approaches, and solutions for engineering problems introduced by the project method. Prerequisite: EE 101; Mth 200.

EE 199 Special Studies
Terms and hours to be arranged
One-hour section graded P/N.

Upper Division Courses‡
Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

EE 312 Electric and Magnetic Fields
4 hours 4 ①
Static and quasi-static electric and magnetic fields. Prerequisite: Mth 304; Engr 222.

EE 314 Electromagnetic Fields and Transmission Lines
4 hours 3 ① 1 ②
Time varying fields with application to engineering problems and transmission lines theory. Prerequisite: EE 312; Mth 321.

EE 322 Electronic Circuits
4 hours 3 ① 1 ③
Transient and steady state behavior of linear electronic circuits. Prerequisite: Engr 222,323.

EE 323 Digital Electronics
4 hours 3 ① 1 ③
Switching in electronic devices and circuits. Design and analysis of circuits in digital systems. Interconnection and noise problems. Prerequisite: EE 314,322.

EE 331 Electromechanical Energy Conversion
4 hours 3 ① 1 ③
Application and analysis of non-linear stationary magnetic devices. Large- and small-signal characteristics of transformers. Motion-to-voltage converters. Electromechanical energy conversion principles. Principles of electromechanical machines. Prerequisite: EE 314,351.

‡ Restricted enrollment; see page 163, item 5.

EE 351,352 Network Analysis
3 hours each 3 ①
Analytical techniques for circuit and system analysis. Prerequisite: Engr 222; Mth 321.

EE 371 Fundamentals of Digital Logic Design 4 hours 3 ① 1 ②
Digital codes, fundamentals of combinational and sequential machine design, applications.

EE 373 Basic Computer Structures and Operations 4 hours 3 ① 1 ②
Introduction to computer structures and operations. Principles and implementation of central processor operations and memory interactions. Interrupt and direct memory access principles, interfacing, and operations. Design for application to simple real-time control problems. Prerequisite: EE 371.

EE 401 Research

EE 403 Thesis
3 hours any term

EE 405 Reading and Conference

EE 406 Projects

EE 407 Seminar
Terms and hours to be arranged
Section J, Junior Seminar, is 1 hour and graded P/N.

EE 415 Probabilistic Methods in Electrical Engineering (G)
3 hours 3 ①
Design of circuits and systems with random internal or external parameters. Introduction to random processes and spectral analysis. Prerequisite: Mth 361; St 314 or 421.

EE 418 System Simulation (G)
4 hours 3 ① 1 ②
Analog and hybrid computer simulation methods: principles and applications. Prerequisite: EE 352.

EE 421,422 Instrumentation (G)
4 hours each 3 ① 1 ③
EE 421: fundamentals; interface with physical systems. Prereqquisite: EE 322,352, *EE 422:* analog and digital data acquisition systems. Prerequisite: EE 323,373.

EE 424
Computer-Aided Circuit Design (G)
4 hours 4 ①
Use of CAD programs in design and analysis of integrated circuits. Prerequisite: senior standing in electrical and computer engineering; EE 323,352,373.

EE 425,426
Biomedical Instrumentation I, II (G)
4 hours each 3 ① 1 ③
Design concepts in medical instrumentation with pathophysiologic correlates. Prerequisite: *for EE 425,* EE 322; *for EE 426,* EE 425.

EE 431
Electromechanical Energy Conversion II
(G) 4 hours 3 ① 1 ③
Generalized machine theory. Steady state and dynamic characteristics and analysis of electromechanical machines: direct current, synchronous, and induction machines. Prerequisite: EE 331. Offered alternate years. Offered 1982-83.

EE 432 Power Systems I (G)
4 hours 3 ① 1 ②
Energy flow systems, parameters, characteristics and control under steady state conditions. Prerequisite: EE 314,352.

EE 433 Power Systems II (G)
4 hours 3 ① 1 ②
Energy flow systems, characteristics and modeling under transient flow conditions. Prerequisite: EE 432.

EE 434 Power Electronics (G)
4 hours 3 ① 1 ③
Fundamentals and applications of electronic circuits and devices used in energy-related systems. Prerequisite: EE 322,352.

EE 441 Solid State Design (G)
4 hours 3 ① 1 ③
Theory, design, and construction of semiconductor devices. Prerequisite: EE 322.

EE 442 Integrated Circuit Design (G)
4 hours 3 ① 1 ③
Theory, design, and construction of integrated circuits. Prerequisite: EE 441.

EE 451 Control Engineering (G)
4 hours 4 ①
Classical analysis of linear, continuous control systems; stability, design, compensation, and other topics. Prerequisite: EE 352.

EE 452,453 Systems (G)
4 hours each 4 ①
EE 452: the systems engineering approach to analysis of large scale linear, continuous systems using state variable methods. Prerequisite: EE 352. *EE 453:* state-space analysis of linear discrete systems. System optimization and analysis of nonlinear systems. Prerequisite: EE 418,452.

EE 461 Communication Engineering I (G) 4 hours 4 ①
Modulation and demodulation of information signals; properties of noise and its effect in communication systems. Analog and digital systems. Prereqquisite: EE 352 and one of the following: Mth 361; St 314 or 421.

EE 462 Communication Engineering II (G) 4 hours 4 ①
Digital data communication systems, introductory information theory and coding. Prerequisite: EE 415,461.

EE 463 Digital Signal Processing (G)
4 hours 4 ①
Discrete-time signals; the discrete Fourier transform; design and implementation of digital filters. Prerequisite: EE 352.

EE 475 Computer Engineering: Microcomputers (G)
4 hours 3 ① 1 ②
Introduction to the internal organization and application of microprocessors and microcomputers. Design process for microprocessor systems. Prerequisite: EE 371; EE 373 or CS 215.

EE 476
Computer Engineering: Applications
(G) 4 hours 3 ① 1 ②
Design of microprocessor-based systems. Use of design tools including development systems and logic analyzers. Design specification and documentation. Prerequisite: EE 475.

EE 478 Computer Architecture I (G)
4 hours 4 ①
Introduction to design techniques for the synthesis of digital computers. Prerequisite: EE 371,373.

EE 479 Computer Architecture II (G)
4 hours 4 ①
Principles of computer structure and design as applied to major computer functions. Prerequisite: EE 478.

EE 481 Antennas and Propagation (G)
4 hours 4 ①
Electromagnetic wave propagation and radiation. Prerequisite: EE 314,352.

EE 482 Optical Electronic Systems
(G) 4 hours 3 ① 1 ②
Basic principles. Prerequisite: EE 314; Engr 323; Ph 214.

Graduate Courses
See also courses marked (*g*) and (*G*) above. Courses at the graduate level are given when warranted by demand.

EE 501 Research

EE 503 Thesis

EE 505 Reading and Conference

EE 506 Projects

EE 507 Seminar
Terms and hours to be arranged
Section A, Graduate Seminar, graded P/N.

EE 511,512,513 Solid State Devices
3 hours each 2 ① 1 ③
EE 511: semiconductor device design. *EE 512:* integrated circuit design. *EE 513:* thin-film devices and circuits. Must be taken in order. Offered alternate years or on demand.

EE 514,515,516
Advanced Solid State Electronics
3 hours each 3 ①
Properties of elemental and compound semiconductors; analytical techniques for understanding solid state materials and devices. Prerequisite: EE 441,442. Must be taken in order. Offered alternate years or on demand.

EE 519 Selected Topics in Solid State
3 or 4 hours 3 ① or 4 ①
Current topics in solid state electronics; new development and progress in optical and quantum devices, solid state devices, integrated optical systems, and amorphous materials. Prerequisite: graduate standing in EE.

EE 520 Advanced System Simulation
4 hours 4 ①
Modern system simulation principles and techniques. Special purpose simulation languages used to solve a range of practical system simulation problems. Prerequisite: graduate standing in EE.

EE 530
Analytic Techniques in Fields & Waves I
4 hours 4 ①
Basic analytical techniques required to solve meaningful field problems in engineering. Prerequisite: graduate standing in EE.

EE 531
Analytic Techniques in Fields & Waves II
3 hours 3 ①
Advanced analytical techniques required for solving field problems. Techniques applied to study a wide range of systems including guided waves and interaction of materials and charges with electromagnetic fields. Prerequisite: EE 530.

EE 533 Optical Electronics
3 hours 3 ①
Principles underlying the operation of quantum exchange devices, field-material interaction and theory, and applications of optical circuits and devices. Prerequisite: EE 482,530. Not offered every year.

EE 535
Microwave Circuits and Measurements
4 hours 3 ① 1 ②
Application of wave theory to distributed circuits. Precision measurement techniques. Basic circuit elements and modeling techniques. Prerequisite: EE 530. Not offered every year.

EE 536 Microwave Devices
3 hours 2 ① 1 ②
Operating characteristics, limitations, and related theory of circuit elements used above 1 GHz. Prerequisite: EE 530,535. Not offered every year.

EE 539
Selected Topics in Fields and Waves
3 or 4 hours 3 ① or 4 ①
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. Prerequisite: graduate standing in EE.

EE 541 High Voltage
4 hours fall 3 ① 1 ③
Complex combination of dielectrics in insulation systems, including properties and mechanisms of failure of dielectrics. Prerequisite: graduate standing in EE.

EE 542 Power Systems I
4 hours 4 ①
Calculation algorithms and procedures used for large power systems networks in the determination of fault currents and voltages. Prerequisite: EE 431, 432.

EE 543 Power Systems II
4 hours 4 ①
Determination and analysis of complex power flow in power system networks and machines during conditions of steady state and transient operation. Prerequisite: EE 542.

EE 545 Electrical Energy Devices I
4 hours 4 ①
Development of dynamic models for synchronous machines suitable for power system transient studies. Classical techniques for describing the machines by analytical and empirical means reviewed; modern analysis methods introduced. Prerequisite: EE 331.

EE 546
Generator Excitation and Control
4 hours 4 ①
Dynamic models of synchronous excitation systems for selection of the most appropriate forms for use in power system transient stability analysis. All forms of continuously acting excitation systems investigated, with emphasis on rotating exciters. Prerequisite: EE 451, 545.

EE 547 Electrical Energy Devices II
4 hours 4 ①
Induction machine models with non-sinusoidal and unbalanced windings with a view toward numerical simulation of the dynamic behavior of induction machines. Prerequisite: EE 580.

EE 549
Selected Topics in Electrosystems
3 or 4 hours 3 ① or 4 ①
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. Prerequisite: graduate standing in EE.

EE 550 Introduction to Systems Theory
4 hours 4 ①
Linear systems theory, system identification and optimization. Prerequisite: EE 452.

EE 551 Nonlinear System Theory
4 hours 4 ①
Nonlinear systems, both classical and modern solution methods, with emphasis on stability theory. Prerequisite: EE 550.

EE 554 Control Systems—Stochastic
4 hours 4 ①
Discrete and continuous Kalman-Bucy filters developed for state estimation and prediction; practical applications of a separation principle. Prerequisite: EE 550, 560.

EE 555 Control Systems—Optimal
4 hours 4 ①
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. Prerequisite: EE 550.

EE 557 System Identification
4 hours 4 ①
Statistical and deterministic methods for system identification for both parametric and nonparametric problems; solution methods derived as algorithms for computational use; practical applications. Prerequisite: EE 550, 560.

EE 559
Selected Topics in Systems and Control
3 or 4 hours 3 ① or 4 ①
Topic examples: economic system theory, transportation systems, energy systems, advanced topics in systems stability and optimal control. Prerequisite: graduate standing in EE.

EE 560 Signals and Noise
4 hours 3 ① 1 ②
Stochastic processes, correlation functions, spectral analysis applicable to communication and control systems. Prerequisite: EE 415.

EE 561 Communication Systems—Wave Form Communications
4 hours 4 ①
Modern "Shannon" communication theory. Basic receiver and transmitter models for discrete and continuous information; some implementations. Prerequisite: EE 560.

EE 562 Communication Systems—Coding and Information Theory
4 hours 4 ①
Various aspects of information theory, with particular emphasis on the coding process; data compression problems and the development of rate distortion theory. Prerequisite: EE 462, 560.

EE 569
Selected Topics in Communications
3 or 4 hours 3 ① or 4 ①
Topics include modulation theory, coding and information theory, rate distortion and practical implementation aspects such as phase lock loops, information measures for computers. Prerequisite: graduate standing in EE.

EE 570
Switching Systems and Automata I
4 hours 4 ①
Analytic techniques applicable to the design and analysis of computer systems. Prerequisite: graduate standing in EE.

EE 571 Switching and Automata II
3 hours 3 ①
Switching networks and sequential machines. Prerequisite: EE 570.

EE 572 Switching and Automata III
3 hours 3 ①
Coding theory and automata. Prerequisite: EE 571.

EE 575 Computer Systems I
3 hours 3 ①
Advanced computer architecture. Design and analysis at the processor-memory-switch level; hardware/software/firmware interaction in a modern total computer system. Prerequisite: EE 474 and/or basic knowledge of computer architecture.

EE 576 Computer Systems II
3 hours 3 ①
Theoretical and practical models on limits to performance, effectiveness, and computability; complexity of algorithms and performance evaluation of computer systems. Prerequisite: EE 570, 575.

EE 578 Digital Signal Processing
4 hours 4 ①
Elements from sampling and filter theory used in the handling of digital signals. A class of digital filters discussed with applications to pattern recognition problems. Prerequisite: EE 560.

EE 579
Selected Topics in Computer Systems
3 or 4 hours 3 ① or 4 ①
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. Prerequisite: graduate standing in EE.

EE 580 Network Theory
4 hours 4 ①
Linear graphs, multi-port networks and other topics in advanced network theory. Prerequisite: graduate standing in EE.

EE 581 Network Synthesis
4 hours 4 ①
Synthesis of specified driving point and transfer functions by using both passive and active networks. Prerequisite: EE 580.

EE 599 Selected Topics in Biomedical Engineering
3 or 4 hours 3 ① or 4 ①
Advanced clinical diagnostic tools such as acoustic imaging, pattern recognition of X-rays; biological system modeling, simulation, and parameter identification; hospital care delivery systems; physiological systems. Prerequisite: graduate standing in EE.

ENGINEERING PHYSICS

The curriculum in engineering physics provides basic and advanced knowledge in physics and applied mathematics and the techniques for applying this knowledge to engineering problems. It seeks to prepare students for engineering opportunities that have roots in fundamental knowledge produced by physical research.

Students are encouraged to develop insight into the application of concepts by taking a selected core of engineering science sequences. By selecting engineering electives in analysis, synthesis, and design, they open for themselves the way to several technological areas, such as recent advances in gas- and aerodynamics, magneto hydrodynamics and plasmas, masers and lasers, radar and radioastronomy, earth and space sciences, nuclear science and engineering, material science and engineering, and in solid state physics systems development.

The program provides a foundation for graduate study in all areas of physical and engineering research based on physics and applied mathematics. Students who complete the curriculum with a B average or better should encounter no difficulties in pursuing graduate work toward an advanced degree in their field of interest in any of the major universities of this country. The program has also proved to be an excellent foundation for employment in the newer technological industries that transcend the boundaries of the established engineering profession.

FOREST ENGINEERING

See "School of Forestry." Also see "School 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. Students who have not decided upon a major are encouraged to register in general engineering during their pre-engineering studies.

Lower Division Courses

GE 101,102,103
Engineering Orientation
2 hours each 1 ① 1 ②
Departmental engineering orientation. Must be taken in order.

GE 115,116,117 Graphics
3 hours each 3 ②
Graphic communication, multiview and pictorial representation, conceptual design; spatial analysis, engineering applications; graphical analysis and solutions, industrial procedures. Must be taken in order.

Upper Division Course‡

GE 315 Design Graphics
3 hours spring 2 ②
Use of latest methods, media, and materials in the solution of engineering and industrial design problems. Practical applications. Primarily for juniors and seniors.

INDUSTRIAL ENGINEERING

The industrial engineering curriculum 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 professional engineering program in industrial engineering has two options. The four-year, standard program provides courses in all of the traditional areas of industrial engineering: operations research, information systems, work design, human engineering, systems analysis, quality control, facilities planning, production control, and industrial management. In addition, students may utilize restricted electives to gain added expertise in special areas such as statistics, economics, or business.

The five-year option, the manufacturing engineering co-op program (MECOP), is directed toward careers in manufacturing. It includes two six-month internships with cooperating industries in the Northwest and allows students to gain practical experience. The internships are coordinated with University classes. MECOP is similar to the standard industrial engineering curriculum, but includes several manufacturing-oriented courses.

Lower Division Courses

IE 231,331,332 Materials and Mechanics of Manufacturing
3 hours each 1 ① 2 ②
Material properties as applied to manufacturing, metal casting, welding, forming, machine tool processes, and tool design for mass production. Prerequisite: IE 231,331 for IE 332.

‡ Restricted enrollment; see page 163, item 5.

IE 271
Introduction to Operations Analysis
3 hours 3 ①
Introduction to the basic philosophy of engineering management and operations analysis; survey of selected engineering management and analysis techniques such as production planning techniques, forecasting, resource allocation, project management, human engineering, and techniques of inventory management. Prerequisite: Mth 201.

IE 272 Mathematical Models I
3 hours 3 ①
Basic probability and statistical models for engineering, with application to quality control, reliability, project management, inventory control, random processes, and model development. Prerequisite: Mth 201.

IE 273 Mathematical Models II
3 hours 3 ①
Introduction to the design of industrial experiments, with application to work measurements, quality and reliability assurance, human engineering, and product design and development. Prerequisite: IE 272; Mth 201.

Upper Division Courses‡
Courses numbered 400-499 and designated (*g*) or (G) may be taken for graduate credit.

IE 361
Work Measurement and Design
4 hours 3 ① 1 ②
Theory and application, work design and measurement, value-increase planning approaches, principles of motion practice, micro-motion studies, standardization and process charts, standard data and time standards. Prerequisite: IE 272.

IE 362
Production Planning and Control
3 hours 3 ①
Forecasting techniques; network and other scheduling methods; routing, dispatching, and inspecting; machine assignment and maintenance; material and process control. Prerequisite: IE 271,272.

IE 365
Material Handling and Facility Layout
3 hours 3 ①
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. Prerequisite: IE 361,362,381; Engr 390.

IE 371 Systems Analysis I
5 hours 2 ① 2 ②
Appraisal and improvement of work systems for existing, modified, and newly designed operations; motion-economy principles, work count, cost analysis, paper work controls.

IE 372 Systems Analysis II
4 hours 3 ① 1 ②
Production planning, analysis, and control. Scheduling methods, materials control, project management forecasting and plant design. Prerequisite: IE 272. Corequisite: IE 273.

IE 381 Management Models I
4 hours 4 ①
Techniques for analysis and solution of problems in industrial and management systems. Emphasis on application of linear and integer programming and extensions. Prerequisite: Mth 203, 241.

IE 382 Management Models II
4 hours 4 ①
Techniques for analysis and solution of problems in industrial and management systems. Emphasis on application of dynamic programming, Markovian processes, queueing, and general nonlinear optimization as applied to industrial problems. Prerequisite: IE 272,381.

IE 405 Reading and Conference

IE 406 Projects

IE 407 Seminar
Terms and hours to be arranged
One-hour sections, graded P/N.

IE 411 Electronic Data Processing Systems I (G)
3 hours 3 ①
Data processing equipment and programming systems. Programming and operation of electronic calculators and computers for engineering and management application. Prerequisite: GE 102 or computer experience; IE 271 or equivalent.

IE 412 Electronic Data Processing Systems II (G)
3 hours 3 ①
Data processing software and management systems. Computer-aided modeling, optimization, and simulation techniques. Prerequisite: IE 411.

IE 431
Manufacturing Engineering Design
3 hours 3 ①
Automation, production systems, and computer-aided manufacturing.

IE 441 Human Factors in Engineering
(G) 4 hours 3 ① 1 ②
Knowledge about human sensory, perceptual, mental, psychomotor, and other characteristics applied to the design of man-machine systems; techniques of measuring conditions affecting human behavior in operational settings; human factors in environmental design. Prerequisite: IE 272.

IE 451 Industrial Supervision Principles
(G) 3 hours 3 ①
Company, supervisor, and operator objectives and responsibilities, and their relationship to one another; solutions of case problems compared with fundamentals established by industrial leaders.

IE 455 Critical Path and Related Scheduling Methods
2 hours 1 ②
Construction of arrow networks and time charts; time/cost tradeoffs; resource leveling; line-of-balance technique; customized application to project planning and control.

IE 465 Occupational Safety (G)
4 hours 2 ②
History, legislation, and organization of safety management; accident costs, causes, and prevention; role of environmental and drug hazard in industrial safety. Four-hour program leads to National Safety Certificate.

IE 491 Quality and Reliability Control
(G) 3 hours 3 ①
Control of quality through the use of statistical analysis; typical control techniques and underlying theory. Development of reliability models and procedures for product assurance. Prerequisite: IE 272.

IE 492
Materials Handling and Plant Layout
(G) 3 hours 2 ②
Selection of materials handling equipment; location and arrangement of facilities; economic analysis of equipment and layout alternatives; design of warehouse systems.

IE 497,498 Industrial Engineering Analysis and Design
3 hours each 3 ①
Selection, replacement, and training of people; product design; selection and replacement of major tools, processes, and equipment; paperwork controls; subsystem revision; system or plant revision; long-run policies and strategy. Prerequisite: senior standing. Must be taken in order.

Graduate Courses
See also courses marked (*g*) and (*G*) above

IE 503 Thesis

IE 505 Reading and Conference

IE 506 Projects

IE 507 Seminar

IE 508 Workshop
Terms and hours to be arranged

IE 521,522,523
Selected Topics in System Studies
3 hours each 3 ①
Recent advances in industrial engineering pertaining to the theory and application of system studies. Analysis and design of ocean resources; 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 information theory to operations research and management science. Non-sequence course. Not all topics offered each year.

IE 561 Operations Analysis
3 hours 3 ①
Appraisal and improvement of existing and proposed operational systems; work analysis and design, production planning and scheduling, forecasting and materials control. Not open to students with strong industrial engineering background.

IE 571,572,573
Systems Theory and Cybernetics
3 hours each 3 ①
Systems theory and cybernetics as foundation engineering analysis and design of complex systems; resource planning and management; linear and non-linear optimization; single and multiple objectives, model building for systems analysis, conversion of descriptive models into normative models, model simulation and optimization, and implementation and control of designed systems. Must be taken in order.

MECHANICAL ENGINEERING

Mechanical engineering is concerned with the generation, conversion, and optimum utilization of energy. Mechanical engineers are involved with all aspects of design, operation, and testing of machines and processes which utilize energy to accomplish tasks that are useful to society. The mechanical engineering 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. These areas include automotive engineering; air pollution control; applied stress analysis; design and analysis; dynamics of physical systems; fuels and lubricants; heating, ventilating, and air conditioning; heat transfer; fluid dynamics; metallurgy and materials; and power plant design.

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.

Lower Division Courses

ME 101,102,103
Mechanical Engineering Orientation
3 hours each 2 ① 1 ②
Orientation to mechanical engineering: methods used in solving engineering problems; computer programming; experience with typical mechanical engineering projects and problems. Must be taken in order.

ME 206 Projects (Sophomore)
Terms and hours to be arranged

ME 251 Instrument Laboratory
1 hour 1 ②
Function, operation, and application of common mechanical engineering instruments; measurement principles. Prerequisite: Engr 211 or Ph 211; sophomore standing in engineering. Graded P/N.

ME 262 Manufacturing Processes
3 hours 3 ①
Metal casting, welding and brazing, machining, and plastic flow of metals and nonmetals; quality control, production economy. Prerequisite: sophomore standing in engineering.

ME 291
Introduction to Aerospace Engineering
3 hours 3 ①
Principles of aerodynamics, performance, control, propulsion, and design. Prerequisite: sophomore standing in engineering. Not offered every year.

Upper Division Courses‡
Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

ME 306 Projects (Junior)
Terms and hours to be arranged

ME 311,312 Engineering Mechanics
3 hours each 2 ① 1 ②
ME 311: Particle dynamics, vibration of single degree of freedom systems, dynamics of rigid bodies. Prerequisite: Engr 212. *ME 312:* Determination of stresses, deflections, and stability of deformable bodies. Prerequisite: Engr 213. Need not be taken in order.

ME 351 Mechanical Laboratory
3 hours 1 ① 2 ②
Selection, calibration, and application of instruments for testing machines and processes. Analysis of test results and preparation of engineering reports. Prerequisite: Engr 312,332; Wr 121.

ME 382 Introduction to Design
3 hours 2 ① 1 ②
Lectures on and direct involvement in mechanical design with emphasis on the importance of physical science fundamentals, flexibility of approach, and economic feasibility. Prerequisite: Mth 202; ME 262. Corequisite: Engr 212,213.

ME 401 Research

ME 405 Reading and Conference

ME 406 Projects

ME 407 Seminar
Terms and hours to be arranged
Section P, Senior Seminar: Mechanical Engineering, is 1 hour and graded P/N.

ME 411,412,413
Mechanical Analysis and Design (g)
3 hours each 2 ① 1 ②
Systems involving mechanical, thermal, hydraulic, and electrical principles. Prerequisite: ME 382; Engr 322. Must be taken in order.

‡ Restricted enrollment; see page 163, item 5.

ME 414
Mechanical Engineering Applications
3 hours 2 ① 1 ②
Use of previous course work in making judicious analyses leading to synthesis and design. Prerequisite: ME 311,312.

ME 416,417,418
Applied Stress Analysis (G)
3 hours each 3 ①; 3 ①; 2 ① 1 ③
Elementary stress analysis, failure theories, combined stresses, fatigue stresses; load-deformation relationships, energy theorems, finite-element-stress analysis; experimental stress analysis techniques-strain gages, photoelasticity, brittle lacquers, optical interference methods; applications. Prerequisite: ME 312. Must be taken in order.

ME 419,420 Vibrations (g)
3 hours each 2 ① 1 ②; 2 ① 1 ③
Dynamics applied to vibrating systems; mechanical systems with one and several degrees of freedom; continuous systems; shaft "whirl," vibration isolation, and absorption; machine balancing. Prerequisite: ME 311. Must be taken in order. Not offered every year.

ME 421,422
Heating and Air Conditioning (g)
3 hours each 2 ① 1 ②
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; testing of air conditioning equipment and controls. Prerequisite: Engr 313. Must be taken in order.

ME 423 Refrigeration (g)
3 hours 2 ① 1 ②
Thermodynamics; systems in use and principal characteristics of each, fundamentals of design, principal applications. Prerequisite: Engr 313.

ME 424
Solar Energy Thermal Processes (g)
3 hours 3 ①
Design of solar thermal systems for heating of buildings emphasizing the f-chart design approach. Prerequisite: ME 421; Engr 332.

ME 425 Fuels and Lubricants (g)
3 hours 2 ① 1 ③
Combustion theory, physical and chemical properties of solid, liquid, and gaseous fuels; application of lubricants; laboratory tests and specifications. Prerequisite: Ch 203; Ph 213.

ME 429 Transport Processes (G)
3 hours 3 ①
Momentum, energy, and mass transfer in continua. Prerequisite: Engr 332. Offered alternate years.

ME 430 Thermodynamics of Optimum Energy Use (G)
3 hours fall 3 ①
Energy use: possibilities and performance. Second law concepts and criteria as used in the analysis of energy systems. Entrophy, exergy, and anergy as tools for evaluating the effectiveness of energy use. Applications to power generation and storage systems, refrigeration and cryogenic systems. Prerequisite: Ph 212; Engr 313.

ME 431,432 Power Plant Engineering
(g) 3 hours each 2 ① 1 ②
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. Prerequisite: Engr 313. Must be taken in order.

ME 434,435
Gas Turbines and Jet Engines (g)
3 hours each 2 ① 1 ③
Power generation, process industries, and aircraft; various cycles and component equipment including compressors, combustion chambers, gas turbines, heat exchangers; jets and ducts; gases, fuels, and high-temperature materials. Prerequisite: Engr 313. Must be taken in order.

ME 438,439
Mechanical Engineering Laboratory (g)
1 hour fall, 2 hours winter
1 ③; 1 ① 1 ③
Experimental evaluation of machines and processes by performance test and project assignments. Prerequisite: Engr 313; ME 351. Must be taken in order.

ME 441 Rocket and Space Propulsion
3 hours 2 ① 1 ②
Analysis of chemical, nuclear, plasma, and ion propulsion systems and components. Prerequisite: Engr 313. Not offered every year.

ME 444,445,446 Fluid Dynamics (G)
3 hours each 3 ①
Continuity, momentum, and energy relations applied to perfect, viscous, and compressible fluid models. Applications to turbomachinery. Prerequisite: Engr 331.

ME 450
Fundamentals of Compressible Flow (g)
3 hours 2 ① 1 ②
Fluid properties, treatment of one-dimensional steady and unsteady flows, shock waves and shock structure. Prerequisite: Engr 312,331. Not offered every year.

ME 454,455,456 Aerodynamics (g)
3 hours each 2 ① 1 ②
Theories of flow of perfect, compressible, and viscous fluids; application of these theories to aerodynamic design. Prerequisite: Engr 331. Must be taken in order.

ME 457 Aircraft Performance (g)
3 hours 2 ① 1 ②
Performance and flight environment of aircraft and space vehicles. Prerequisite: Engr 311; ME 311. Not offered every year.

ME 458
Aircraft Stability and Control (g)
3 hours 2 ① 1 ②
Development of the theory of static aircraft stability and control and an introduction to dynamic stability and response to controls. Prerequisite: ME 457. Not offered every year.

ME 460,461,462
Dynamics of Physical Systems (G)
3 hours each 2 ① 1 ③
Analysis and synthesis of dynamic systems containing mechanical, electrical, thermal components. Modeling, mathematical analysis, and computer and laboratory simulation. Prerequisite: Engr 221,312,332; ME 311. Must be taken in order.

ME 470,471,472
Mechanical Engineering Analysis (G)
3 hours each 3 ①
Problems solved by use of advanced mathematical methods. Prerequisite: Mth 321. Must be taken in order.

ME 477
Measurement and Control of Sound (g)
3 hours 2 ① 1 ②
Sound generation and propagation; measurements and analysis; acoustical characteristics of materials and configurations; design to reduce noise levels. Laboratory use of sound and vibration measuring equipment to obtain information for analysis of problem situations. Prerequisite: ME 351.

ME 481,482,483
Engineering Materials (G)
3 hours each 3 ①
Recent developments and applications in engineering materials; materials solution, specifications, and design implications. *Fall:* ferrous and nonferrous metallic materials. *Winter:* polymeric materials. *Spring:* ceramic materials. Prerequisite: Engr 321. Must be taken in order.

ME 484,485,486
Physical Metallurgy and Metallography
(G) 3 hours each 2 ① 1 ③
Internal structure, constitution, heat treatment, physical and mechanical properties of ferrous and nonferrous metals and alloys; metallographic laboratory practice, photomicrography. Prerequisite: Engr 321. Must be taken in order.

ME 490 Air Sanitation (g)
3 hours fall 2 ① 1 ②
Definition and study of air pollution and the factors affecting it. Engineering, chemical, meteorological, social, and economic aspects of atmospheric pollution and its control. Prerequisite: senior or graduate standing.

ME 491,492,493
Automotive Engineering (g)
3 hours each 2 ① 1 ③
ME 491: Design and analysis of piston-type, internal combustion engines. Thermodynamic analysis of fuel-air cycle; piston engine mechanics; design and stress analysis of piston, connecting rod, and shank shaft; piston engine balance and flywheel; flow loss in manifolds and valve openings; heat energy distribution and dissipation; mechanics of combustion; diesel injection and combustion chambers. Prerequisite: Engr 313,332; ME 212. *ME 492:* Design and analysis of automotive chassis components: moment of momentum analysis through torque converter elements; ration changing, torque reaction and transmission for gearing, clutching, and banding of planetary transmissions; hydraulic control of ration changing; mechanics of braking systems; suspension and steering; mathematics of understeer for handling by computer analysis. Prerequisite: ME 311, 382; Engr 311. *ME 493:* vehicle performance testing and analysis; tractive effort and tractive resistance forces; fuel consumption and exhaust emissions. Analysis of vapor cycle and electric-powered vehicles. Prerequisite: ME 251. Need not be taken in order.

Graduate Courses
See also courses marked (g) and (G) above

ME 501 Research

ME 503 Thesis

ME 505 Reading and Conference

ME 506 Projects

ME 507 Seminar
Terms and hours to be arranged

ME 514,515 Selected Topics in Design
3 hours each 3 ①
Systematic approach, from first suggestion of the need through preliminary steps leading to initial design; the design itself; cursory treatment of the development, redesign, testing, manufacturing, and servicing aspects. Must be taken in order. Prerequisite: ME 412 or equivalent.

ME 516,517 Systems Engineering
3 hours each 1 ① 2 ②
The preliminary design of a complex system by student teams starting with the statement of the problem to be solved, extending through feasibility studies to the identification of subsystems and their various interactions. Design topics change each year. Must be taken in order.

ME 524,525 Thermodynamics
3 hours each 3 ①
Concepts and postulates of thermodynamics and their consequences as applied to a wide variety of situations. Thermodynamic modeling of real situations. Must be taken in order. Prerequisite: Engr 313.

ME 526
Selected Topics in Thermodynamics
3 hours 3 ①
Topics in thermodynamics selected from the following or related material: application of thermodynamic concepts and postulates, thermodynamics of irreversible processes, coupling of thermodynamics with statistical mechanical property calculation methods, phenomenological statistical thermodynamics. Prerequisite: ME 524,525.

ME 527 Conduction Heat Transfer
3 hours 3 ①
Analytical, numerical, and analog solutions to steady state and transient conduction problems.

ME 528 Radiation Heat Transfer
3 hours 3 ①
Analytical and numerical methods of solution of thermal radiation problems.

ME 529 Convection Heat Transfer
3 hours 3 ①
Analytical, numerical, and analog solutions to convection problems together with a discussion of pertinent literature of experimental work.

ME 530
Selected Topics in Heat Transfer
3 hours 3 ①
Topics in heat transfer including advanced problems in conduction, convection, and radiation. Additional examination of heat transfer in multi-phase systems, equipment design, solution techniques, and other current interest topics considered. Current technical literature included. Not all topics covered each year. Prerequisite: ME 527. Not offered every year.

ME 546
Selected Topics in Gas Dynamics
3 hours 3 ①
Dynamics and thermodynamics of gaseous flow fields including steady and unsteady, reacting and non-reacting, one- and two-dimensional flow; applications to current problems in subsonic to hypersonic flight. May be taken for a maximum of 9 hours. Prerequisite: Engr 313; ME 450.

ME 550 Continuum Mechanics
3 hours 3 ①
Kinematics and governing field laws for continua. Applications to fluid dynamics, elastic and inelastic solids, and electromagnetic continua.

ME 551,552 Elasticity
3 hours each 3 ①
Basic equations of linear elasticity with emphasis on physical interpretation; exact and approximate solutions with applications to engineering problems. Prerequisite: ME 550; concurrent registration in Mth 416 recommended. Must be taken in order.

ME 554
Selected Topics in Solid Mechanics
3 hours 3 ①
Advanced topics in solid mechanics emphasizing research applications and current literature. May be taken for a maximum of 9 hours. Prerequisite: ME 550. Not offered every year.

ME 557
Incompressible Fluid Mechanics
3 hours 3 ①
Generalized fluid mechanics; principal methods of fluid dynamics; hydrostatics, kinematics of liquids and gases; methods of description, geometry of the vector field, acceleration of a fluid particle, continuity equation; dynamics of non-viscous fluids; Eulerian reference, potential motion, two-dimensional potential motion, vortex motion, energy and momentum theorems. Prerequisite: ME 550.

ME 559
Selected Topics in Fluid Mechanics
3 hours 3 ①
Boundary layer stability, transition prediction methods, computational methods in fluid mechanics, recent developments. Not all topics covered each year. Prerequisite: ME 557. May be repeated for credit.

ME 560 Experimental Mechanics
3 hours 2 ① 1 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.

ME 561,562 Optical Stress Analysis
3 hours each 2 ① 1 ③
Photoelasticity; photoelastic coating techniques, photoplasticity, three-dimensional photoelasticity, interferometric methods, Moiré techniques, grid methods. Must be taken in order.

ME 566,567,568 Advanced Dynamics
3 hours each 3 ①
Fall: variational mechanics; virtual work, generalized coordinates, Hamilton's principle, and Lagrange's equations; applications to systems of current interest. *Winter:* analysis of linear dynamic systems, including model analysis of structural vibrations. *Spring:* response and stability of dynamic systems with nonlinear characteristics. Must be taken in order.

ME 573 Numerical Methods for Engineering Analysis
3 hours 3 ①
Numerical solutions of linear equations, difference equations, interpolation, numerical integration, roots of equations, and ordinary differential equations. Emphasis on methods suitable for digital computers.

ME 581
Selected Topics in Materials Science
3 hours 3 ①
Theory of alloy phases, solid state reactions, liquid metals and solidification, strengthening mechanisms in solids, mechanisms of flow and fracture in metals, point and line defects, physical properties of metals. Not all topics covered each year. Consent of instructor required.

ME 584 Crystal Imperfections
3 hours 3 ①
A detailed study of crystal defects and the influence of such defects on the mechanical and physical properties of engineering materials. Point, line, and surface defects and their interactions. Prerequisite: ME 486.

ME 585 Mechanical Metallurgy
3 hours 3 ①
Response of metals to applied forces; elements of elasticity, plasticity, advanced strength of materials, crystal deformation and dislocations; applications to testing and plastic working of metals. Prerequisite: Engr 322.

ME 586 X-ray Metallography
3 hours 2 ① 1 ③
The space lattice; diffraction of X-rays by crystals; experimental techniques in X-ray diffraction; effects of plastic deformation on diffraction patterns; radiographic inspection of metal castings and welds. Prerequisite: Engr 321.

ME 591,592 Measurement and Control of Air Pollutants
3 hours each 2 ① 1 ③
Atmospheric chemistry; pollutants and control measures; winds, thermal effects, and atmospheric cleaning. Must be taken in order.

ME 593
Selected Topics in Air Sanitation
3 hours any term 3 ①
Aerosol technology, electrostatic cleaning processes, air quality studies, statistical analysis of atmospheric data. Not all topics covered each term.

ME 595 Industrial Hygiene
3 hours winter 2 ① 1 ③
People and their health as a function of their work environment; evaluation and control of environmental hazards.

NUCLEAR ENGINEERING

The nuclear engineering curriculum is designed to provide personnel for nuclear power plant operation, design of nuclear facilities, and research and development programs dealing with nuclear energy. 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.

Excellent facilities are available for the instructional program at the Radiation Center, including a TRIGA III reactor. Instruction is integrated with an extensive research program, with opportunities to participate at both the undergraduate and graduate levels.

Lower Division Courses

NE 101,102
Nuclear Engineering Orientation
2 hours each 1 ① 1 ②
Concepts and problems in nuclear engineering, including unit systems; radioactivity; nuclear reactions; basic nuclear and fusion theory; reactor types, economics, fuel cycle, waste management; safety and environmental factors.

NE 103 Introductory Nuclear Engineering and Computations
3 hours 2 ① 1 ②
Broad look at nuclear industry including principles of reactors, uses of nuclear energy, isotopes and radiation, radiation effects, and environmental considerations in nuclear engineering and technology; FORTRAN programming. Prerequisite: NE 102 or equivalent.

NE 201 Nuclear Energy Fundamentals
3 hours fall 3 ①
Structure of the atom; mass-energy equivalence and nuclear binding energy; radioactivity; radioactive decay modes; nuclear reaction and transmutation energetics; nuclear forces; fission; fusion; nuclear energy units. Corequisite FORTRAN programming.

NE 202 Nuclear Radiation and Matter
3 hours winter 3 ①
Interaction of ionizing radiation and matter; neutron interactions, nuclear reaction rates; ionizing radiation, effects of radiation on solids; biological effects; radiation dose units; radiation protection; shielding principles; sources of natural background radiation; statistical nature of decay. Prerequisite: NE 201.

NE 203 Nuclear Radiation Detection and Measurement
3 hours spring 1 ① 1 ④
Principles and mechanisms underlying nuclear radiation detection and measurement; operation of nuclear electronic instrumentation application of gas-filled, scintillation, and semiconductor detectors to measuring alpha, beta, gamma, and neutron radiation; experimental investigation of interactions of radiation with matter. Prerequisite: NE 202.

Upper Division Courses‡
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

NE 401 Research

NE 403 Thesis
3 hours any term

NE 405 Reading and Conference

NE 406 Projects

NE 407 Seminar
Terms and hours to be arranged
Untitled one-hour sections, graded P/N.

NE 411,412,413 Introduction to Nuclear Reactor Engineering (g)
4 hours each 4 ①
Basic principles of nuclear reactors covering the fundamentals of steady state and transient operation. Description, operating characteristics, and power generation in nuclear reactors and fusion devices. Introduction to heat transfer and fluid flow in nuclear reactors. Basic principles of health physics, reactor safety, and environmental effects. Provides background for engineers not majoring in nuclear engineering. Prerequisite: Mth 321.

NE 421,422,423 Nuclear Reactor Analysis and Computation
(G) 3 hours each 3 ①
Mathematical analysis of the behavior of nuclear reactors based upon physical models; steady state homogeneous and heterogeneous reactors, transient behavior. Computational analysis using digital computers to solve nuclear reactor engineering problems. Prerequisite: FORTRAN; NE 411.

NE 430 Nuclear Fuel Cycle (g)
3 hours 3 ①
Processes within nuclear industry which deal with exploration, mining, and purification of uranium and thorium; conversion to special compounds; enrichment; fuel fabrication; reactor fuel storage, shipment, reprocessing, and waste management. Prerequisite: Ch 203 or 206.

NE 431 Reactor Thermal Hydraulics
(G) 3 hours 3 ①
Heat transfer and fluid flow analysis of reactors, core heat removal; temperature distributions in fuel subchannels. Heat transfer rates, critical heat fluxes, channel hot spot factors, single and two-phase coolant systems. Prerequisite: Engr 332.

NE 432,433 Reactor Design (g)
2 hours, 3 hours 2 ① 2 ②
Numerical and analytical calculations and design of components and systems within a nuclear power plant. Prerequisite: NE 422.

NE 435 Nuclear Materials (g)
2 hours 2 ①
Materials problems as applied to reactor technology; radiation effects on metallic and ceramic materials; response of materials in a power reactor environment; metallurgy of uranium, thorium, and plutonium; properties of oxides and carbides; creep, swelling, densification, stress corrosion cracking. Prerequisite: Engr 321.

NE 441,442
Nuclear Reactor Experiments (g)
3 hours each 1 ① 1 ④
Experiments using the TRIGA reactor to measure reactor properties and verify theoretical reactor physics; steady state and transient behavior of reactors including reactivity effects of control rods and fuel approach to criticality; measurement of neutron flux distributions; nuclear physics experiments. Prerequisite: NE 421.

‡ Restricted enrollment; see page 163, item 5.

NE 451
Nuclear Power Plant Technology
3 hours 3 ①
Study of the technological aspects of nuclear power plants with emphasis on current reactor types. Nuclear, thermo-mechanical, and electrical plant systems are discussed as well as plant operations. Dynamic plant response with and without control system interaction is studied by way of a reactor simulator. Prerequisite: NE 413.

NE 453 Nuclear Quality Assurance
2 hours 2 ①
Introduction to quality assurance pertaining to nuclear plant safety. Familiarization with QA documents. Study of applications of QA requirements and classifications to nuclear power plants. Review of QA methods: preop and start-up testing, in-service inspection, destructive and nondestructive testing techniques. Prerequisite: NE 413.

NE 461
Radiation Protection Engineering (g)
3 hours 3 ①
Basic principles with particular emphasis on radiation protection instrumentation use and calibration, radiation dosimetry, shielding for radiation protection, design of radiation monitoring programs, radiation protection equipment and techniques, radioactive waste management, biological effects of radiation, transportation of radioactive materials. Prerequisite: NE 203 and NE 413; or GS 460.

NE 465 Nuclear Rules and Regulations
(g) 3 hours 1 ② 1 ②
The regulatory phase of the nuclear field, including history of the key nuclear regulatory programs, organization and responsibilities of nuclear regulatory agencies, early and current radiation protection standards and organizations responsible for their formulation, major nuclear legislation, and pertinent nuclear rules and regulations and their applications. Prerequisite: NE 471 or GS 460 or equivalent.

NE 481,482,483
Selected Topics on Nuclear Engineering
1-3 hours each 1-3 ①
Fast reactor systems, breeder reactors, thorium fuel cycles, fusion systems, reactor thermalhydraulics, in-core nuclear fuel management, fuel cycle economics, nuclear materials safeguards, isotope separation, methods, nuclear waste management. Topics may vary from year to year. Course may be repeated for credit. Prerequisite: consent of instructor.

Graduate Courses
See also courses marked (*g*) and (*G*) above

NE 501 Research
Untitled sections, graded P/N.

NE 503 Thesis

NE 505 Reading and Conference

NE 506 Projects
Untitled sections, graded P/N.

NE 507 Seminar
Terms and hours to be arranged
Untitled one-hour sections, graded P/N.

NE 511, 512 Neutron Transport Theory
2 hours each 2 ①
Properties of and methods for solution of the linear Boltzmann equation for nuclear reactors; spherical and double-spherical harmonics, integral equation methods, SN: multi-group and time-dependent problems. Must be taken in order. Offered alternate years.

NE 513
Nuclear Reactor Variational Theory
2 hours 2 ①
Multigroup reactor perturbation; general reactor perturbation theory; reactor variational functional, spectral, and spatial synthesis methods. Prerequisite: NE 423. Offered alternate years.

NE 514 Nuclear Reactions in Nuclear Engineering
2 hours 2 ①
Origin of fission spectra, (n, xn) and inelastic reactions, nuclear potentials and giant resonances, nuclear level densities and resonances, quantum mechanical treatment of scattering and coppler effect. Offered alternate years. Not offered 1982-83.

NE 521
Reactor Environmental Problems
3 hours winter 3 ①
Federal and state regulations concerning environmental effects of nuclear power plants; development of the analytical techniques for calculating effects of release of gaseous and liquid radioactive effluents, effects of thermal discharges, atmospheric dilution and dispersion, and cost-benefit studies.

NE 522 Reactor Safety Problems
3 hours winter 3 ①
Investigation of outstanding reactor safety problems such as those addressed in safety analysis reports: nuclear and thermal transients associated with reactor excursions, fuel failure, release of radioactivity to the environment, effectiveness of emergency systems. Formulation of analytic models, critical review of assumptions and conditions, discussion of methods of solution and results. Prerequisite: NE 421,431.

NE 523 Advanced Reactor Design
2 hours 2 ①
Advanced analysis and design of nuclear power systems. Prerequisite: NE 423.

NE 524 Advanced Reactor Design
3 hours 1 ① 2 ②
Advanced analysis and design of nuclear power systems. Prerequisite: NE 423.

NE 531 Nuclear Reactor Kinetics
3 hours 3 ①
Time behavior of nuclear reactors; development of kinetics equations, reactor core control theory, reactivity feedbacks. Prerequisite: NE 423 or equivalent.

NE 532 Reactor Economics
2 hours 2 ①
Engineering economic analysis of power reactors and nuclear fuel cycles: capital cost ranges, indirect costs, present worth of future improvements in systems; technological learning curves and economies of scale in the nuclear industry; fuel cycle unit costs and cost trends; financing practices.

NE 534 Power Reactor Dynamics
3 hours 3 ①
Stability and control of power reactor systems; thermohydraulic and power-demand feedbacks, stability of different reactor types, nuclear system control practices and their analysis. Prerequisite: NE 531.

NE 541 Advanced Nuclear Fuel Cycle
3 hours 3 ①
Projections of fuel cycle requirements for breeders, burners, and advanced converters; advanced topics in isotope enrichment, problems and prospects of nuclear fuel reprocessing; high-level nuclear waste management techniques and critiques. Prerequisite: NE 430.

NE 542,543
Advanced Thermal Hydraulics
2 hours each 2 ①
Advanced topics on reactor heat transfer and fluid flow, effects of two-phase flow, system hydrodynamics, fuel element heat removal analysis, boiling heat transfer, subchannel analysis, mechanical behavior of fuel pins, and current topics in reactor safety heat transfer. Prerequisites: NE 431,435. Must be taken in order. Offered alternate years.

NE 552,553 Computational Methods for Nuclear Reactors
3 hours each 3 ①
The application of digital computers to problems in nuclear engineering. Numerical solution of nuclear reactor equations. Topics include multi-group diffusion theory, kinetic equations, Monte Carlo methods, S_n, P_1 methods; criteria for selecting methods, and computer programming. Prerequisite: ME 573. Must be taken in order.

NE 581
Selected Topics in Reactor Theory
1-3 hours 1 ① to 3 ①
Fast reactor physics, advanced reactor thermohydraulics, advanced numerical techniques in nuclear reactor applications, advanced reactor kinetics and dynamics. Topics may vary from year to year. Course may be repeated for credit.

NE 582 Selected Topics in Advanced Nuclear Systems
1-3 hours 1 ① to 3 ①
Fusion systems, including magnetic confinement, laser fusion, materials, and engineering problems in fusion. Breeder reactors, thorium cycle, other advanced systems. Topics may vary from year to year. Course may be repeated for credit.

NE 583
Selected Topics in Nuclear Energy
1-3 hours 1 ① to 3 ①
Nuclear materials safeguards, isotope separation methods, advanced nuclear waste management, comparative risks and benefits in nuclear energy. Topics may vary from year to year. Course may be repeated for credit.

NUCLEAR ENGINEERING TECHNOLOGY

The program in nuclear engineering technology has been temporarily suspended. Contact the head of the Department of Nuclear Engineering for more information.

FORESTRY

FACULTY

As of January 1982

Carl Henry Stoltenberg, *Dean*

George W. Bengtson, *Associate Dean*

Perry J. Brown, *Assistant Dean*

John Herman Beuter, *Director of School Forests*

James Theodore Krygier, *Coordinator, Forestry Extension*

Ralph E. McNees, *Director, Forestry Publications*

Edward Charles Jensen, *Coordinator, Forestry Instructional Services*

Professors Emeritus Berg, Bever, Davies, Dunn, Ferrell, Hopkins, Jemison, Kallander, Kangur, McLaren, Reichart, Robinson, Slezak, Wheeler, R. Wilson, Yoder

Forest Engineering *Professors* G. Brown (department head), Froehlich, O'Leary*

Associate Professors Beschta, Olsen*

Assistant Professors P. Adams, Pyles*

Instructors Garland*, Kellogg, LeDoux, McNabb, Rowley*, Tuor

Forest Management *Professors* Boyle (department head), Bell, Beuter, Hermann

Associate Professors D. Adams, Brodie, Paine, Sutherland, Tappeiner, Tedder

Assistant Professor Hann

Instructors Elwood, Jensen

Forest Products *Professors* Resch (department head), Atherton, Bublitz, Graham, Krahmer, McKimmy, Van Vliet

Associate Professors T. Brown, Currier, J. Johnson, Kozlik, Laver, McMahon, Polensek, J. Wilson

Assistant Professors Funck, Miller

Research Associate Scheffer

Forest Science *Professors* Gordon (department head), Ching, Lavender, Newton, Tarrant, Waring, Zaerr

Associate Professors Cleary, Pitman, Walstad

Assistant Professors T. Adams, Cromack, DeYoe, Duryea, Emmingham, Hobbs, Perry, Stafford, Tesch

Research Associates Alaback, Conard, Rose, Sollins, Spycher, Witmer

Instructor McKee

Resource Recreation Management *Professors* P. Brown (department head)

Associate Professors Gibbs, Jackson, Milliken, Starkey

Assistant Professors Freed, Manfredo, Mitchell, Shelby

* Licensed professional engineers

The general aim of the School of Forestry is to provide opportunity for a quality liberal and professional education. A specific aim is the development of students as individuals, citizens, and professional men and women to enable them to serve society effectively.

Forests constitute Oregon's most valuable natural resource. The forest industry is the backbone of the state's economy. Oregon's forest environment is world renowned for scenic beauty and recreational attractions.

OSU's forestry graduates are well equipped to participate in developing and managing the forest-based water, wood, wildlife, recreation, and forage resources of the state and nation. They are employed throughout the world in harvesting forest crops; in developing, processing, and marketing wood products; in managing forests and related resources; in teaching; in Extension; and in research.

Forestry is a demanding and highly satisfying profession with a wide range of opportunities for qualified men and women, including those from minority groups. The school, which is accredited by the Society of American Foresters, helps its students locate seasonal as well as permanent employment.

Departments and Degrees

Through four of its departments the school offers the Bachelor of Science (B.S.) degree in forest engineering, forest management, and forest products, and the B.S. or Bachelor of Arts (B.A.) degree in resource recreation management. The Department of Forest Science offers graduate programs only. Graduate programs in the other four departments are indicated in their departmental statements.

It is possible to complete requirements for more than one option within a department or to earn degrees in two departments if programs are carefully planned.

High School Preparation

Students planning to major in the School of Forestry should include the following subjects in their high school program: English, four years; mathematics, four years including trigonometry and advanced algebra; chemistry, one year; physics, one year; graphics or mechanical drawing, one year.

Entrance

All new students must satisfy Oregon State University and School of Forestry requirements for entrance.

Transfer students who do not have academic credit for college-level mathematics will also take the appropriate placement test if mathematics is required in the departmental major. Deficiencies shown by this test should be removed before enrolling in the prescribed courses in mathematics. Transfer students should realize that problems of scheduling sequence and prerequisite courses may require them to spend additional time to complete their programs.

Appropriate courses from accredited schools are accepted without examination to fulfill the school's curricular requirements. Courses in forestry subjects from institutions with nonac-

credited forestry programs may be accepted only after the student demonstrates an adequate grasp of the subject matter concerned by examination or other adequate evidence. Transfer credits in general education courses accepted by the University may be used to satisfy the school's general education requirements. The school does not grant credit for work done in vocational or technical training programs.

Graduation

Academic Requirements

204 hours of university-level courses including:

- Written communication ..... 9 hours
- Oral communication ..... 6 hours
- Arts and humanities ..... 12 hours
- Social science ..... 12 hours
- Physical and biological sciences ..... 24 hours
- Completion of an approved departmental curriculum
- Satisfactory completion of a comprehensive English examination
- Three credit hours of speech (required for forest engineering students)

At registration each new student will designate the department in which he or she wishes to major. To transfer to another department later, a student should consult his or her faculty adviser. A change in major may involve additional time to complete curricular requirements.

Professional and Personal Requirements

The School of Forestry is recognized nationally for its strong educational program, for its personal interest in students and their development, and for graduates who perform effectively and responsibly as professionals.

The school's personnel program provides assistance and incentive, but success is dependent on the individual. Students are personally responsible for fulfilling all curricular requirements in proper sequence. Work performance and personal conduct are thoroughly appraised by the school. Since forestry is highly regarded for its ethical and its academic standards, students are responsible for observing the honor code of the school in its entirety. Departure from these ethical requirements may be reason for terminating a student.

No summer camp is required. Those majoring in forest management, forest engineering, or forest products must complete six months of satisfactory employment in the area related to their major.

Educational Facilities

Corvallis is one of the largest forestry research centers in America. Peavy Hall, the new OSU forestry building, contains 84,000 square feet of floor space for modern classroom, laboratory, and study facilities. An aggressive research program is conducted by the school 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.

The school 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. Classes use the nearby school forests for daily field instruction. In addition to these 11,000 acres in the McDonald and Dunn Forests, the school manages other forests in Benton and Columbia counties for education and research.

University Honors Program

Students with exceptional scholastic abilities will be interested in the honors seminars of the School of Forestry. Information concerning the program may be obtained from faculty advisers. See also "University Honors Program" in this catalog.

WICHE Program

Oregon State University's School of Forestry receives students supported through the WICHE Professional Student Exchange Program. This interstate program allows students from 13 cooperating western states to obtain professional training not available in their home states.

For further information regarding the WICHE Program, write to the state certifying officer, or to the WICHE Professional Student Exchange Program, P.O. Drawer P, Boulder, Colorado 80302.

Forestry Curricula

Forest Engineering

Accredited by Society of American Foresters

Electives listed below should include 12 hours of arts and humanities, 12 hours of social science, and 9 hours of communications.

Freshman Year—52 hours

General Botany (Bot 202)	4
Mathematics (Mth 200,201,202)	12
Chemistry (Ch 201)	3
English Composition (Wr 121)	3
Introduction to Forestry (F 111)	4
Dendrology (F 254)	4
Forest Engineering (FE 222)	5
Accounting (BA 211)	4
Physical education	3
Electives	10

Sophomore Year—51 hours

Statics, Dynamics, Strength of Materials (Engr 211,212,213)	9
General Physics (Ph 211,212)	8
Accounting (BA 212)	4
Principles of Economics (Ec 213,214)	8
Basic Geology (G 221)	3
Photointerpretation (F 320)	4
Wood Technology and Utilization (FP 210)	4
Mensuration (F 321)	5
Applied Statistics (St 314)	3
Electives	3

Junior Year—52 hours

Forest Management Operations (F 432,433)	9
Forest Ecology (F 341)	5
Forest Road Design (FE 320)	3
Forest Engineering (FE 323)	4
Northwest Logging (FE 360)	4
Logging Roads (FE 361)	3
Logging Operations Analysis (FE 480)	4
Production Planning and Control in Logging (FE 481)	4
App Forest Soils Engin (FE 359)	4
Electives	12

Senior Year—49 hours

Forest Economics and Regulation (F 434, 435)	8
Logging Plans (FE 461)	4
Logging Transportation (FE 462)	4
Logging Costs (FE 463)	5
Watershed Management (FE 424)	3
Seminar (FE 407)	1
Cost Accounting (BA 421)	3
Personnel management (BA 361 or BA 467) (not required of students completing 18 term hours of upper division military courses)	3
Agricultural Machine Design (AE 492)	3
Electives	15

CIVIL ENGINEERING*-FOREST ENGINEERING† OPTION

Dual Degree Program

**A.B.E.T. Accredited*

†Society of American Foresters Accredited

Students may enroll and be advised in either the Department of Civil Engineering (School of Engineering) or the Department of Forest Engineering. A student who completes the program is awarded a bachelor's degree in both civil and forest engineering.

FIVE-YEAR CURRICULUM

Freshman Year—54 hours

Mathematics (Mth 200,201,202)‡	12
Chemistry (Ch 201,202)‡	6
General Physics (Ph 211)‡	4
Principles of Economics (Ec 213,214)	8
General Botany (Bot 202)	4
Civil Engineering Computations (CE 101, 102)‡	4
Graphics (GE 115)‡	3
English Composition (Wr 121)‡	3
Humanities and social science electives	7
Physical education (3 terms)‡	3

‡ Required courses for professional engineering program.

Sophomore Year—48 hours

Calculus (Mth 203)‡	4
Applied Differential Equations (Mth 321)‡	4
Applied Statistics (St 314)	3
Basic Geology (G 221)	3
Informative Speaking (Sp 112)	3
Statics, Dynamics, Strength of Materials (Engr 211,212,213)‡	9
Electrical Circuit Fundamentals (Engr 221)	4
General Physics (Ph 212,213)‡	8
Forest Ecology (F 341)	5
Forest Engineering (FE 222)	5

Junior Year—47 hours

Structural Theory (CE 381,382)	6
Steel Design (CE 484)	3
Mechanics of Fluids (Engr 301,302)	6
Hydraulics (CE 312)	3
Environmental Engineering (CE 351)	3
Photointerpretation (F 320)	4
Mensuration (F 321)	5
Forest Engineering (FE 323)	4
Northwest Logging (FE 360)	4
Applied Computers (CE 310)	3
Engineering science electives	6

Senior Year—51 hours

Reinforced Concrete (CE 481)	3
Soils in Engineering (CE 371)	3
Applied Soil Mechanics (CE 372)	3
Sanitary Engineering (CE 452)	3
Civil engineering electives	3
Engineering science electives	4
Forest Management Operations (F 432,433)	9
Forest Road Design (FE 320)	3
Logging Roads (FE 361)	3
Watershed Management (FE 424)	3
Logging Operations Analysis (FE 480)	4
Production Planning and Control in Logging (FE 481)	4
Transportation Engineering (CE 321,322)	6

Fifth Year—53 hours

Logging Plans (FE 461)	4
Logging Transportation (FE 462)	4
Logging Costs (FE 463)	5
Forest Economics and Regulation (F 434,435)	8
Agricultural Machine Design (AE 492)	3
Accounting (BA 211,212)	8
Cost Accounting (BA 421)	3
Humanities and social science electives	9
Civil engineering electives	9

Forest Management

Accredited by Society of American Foresters

Freshman Year—51 hours

General Botany (Bot 201,202) (Bot 201 not required of students with one year of college biology or students with one year of high school biology who pass the CLEP exam)	8
Mathematics (Mth 110,200,201 *or* 210) (Students who wish to minor in statistics must take Mth 201 rather than Mth 210.)	12
Chemistry (Ch 201,202,213) (Other acceptable sequences: Ch 104, 105,106,213; Ch 104,202,213. Students who wish to minor in forest biology must take Ch 203 rather than Ch 213.)	10
English Composition (Wr 121)	3
Introduction to Forestry (F 111)	4
Dendrology (F 254)	4
Physical education	2
Electives	8

Sophomore Year—52 hours

General Physics (Ph 201) (not required of students with one year of high school physics)	4
Principles of Economics (Ec 213,214)	8
Plant Physiology (Bot 330)	4
FORTRAN Programming (CS 190)	3
Soils (Sls 210)	5
Photointerpretation (F 320)	4
Forest Engineering (FE 222)	5
Wood Technology and Util (FP 210)	4
Applied Statistics (St 314)	3
Physical education	1
Electives	7-11

Junior Year—51 hours

Forest Pathology (Bot 415)	3
Forest Entomology (Ent 423)	3
Forest Ecology (F 341)	5
Mensuration (F 321)	5
Forest Models (F 322)	3
Logging Methods (FE 392)	3
Forest Fire Management (F 345)	3
Range Resources (Rng 341)	3
Group Dynamics (Psy 361)	3
Gov Instit and Resource Policy (PS 301)	4
Business elec (BA 211,217,226, or 415)	3-4
Forest Economics and Reg I (F 434)	4
Electives	9-10

Senior Year—50 hours

Watershed Management (FE 424)	3
Silviculture: Reforestation (F 432)	5
Silvicultural Practices (F 433)	4
Forest Economics and Regul II (F 435)	4
Tech for Forest Resource Anal (F 437)	4
Multiple-Use Decisions (F 439)	3
Seminar (F 407)	1
Organization and Human Relations (Psy 446 or PS 413)	3
Electives	23

Minors

Minors in the Department of Forest Management are optional. Students who do not select a minor may use electives in any way they choose so long as other departmental, school, and University requirements are met. Students who choose a minor must take two of the following three courses: Ent 423, Bot 415, and F 345. Students who do not select a minor must take all three courses.

Courses listed under a minor are in addition to those specified in the core curriculum except where otherwise noted.

BUSINESS

[1]Financial Accounting (BA 211)	4
Managerial Accounting (BA 212)	4
Business Law (BA 226)	4
Operations Management (BA 311)	4
Marketing (BA 312)	4
Finance (BA 313)	4
Business Policy (BA 499)	4
	28

FOREST BIOLOGY

[2]Organic Chemistry (Chem 331,332)	6
Systematic Botany (Bot 321)	4
Genetics (Gen 311)	4
Forest Soils (Sls 454)	3
Approved science electives (see below)	9-11
	26-28

Science Electives for Forest Biology Minor

(Students may take all courses in one of the specialties or take at least nine hours of courses in two or more specialties to meet the elective requirements.)

Biometry

Statistical Methods (St 452)	4
Statistical Methods (St 453)	4
Sampling Methods (St 441)	3
	11

Botany

Morphology of Vascular Plants (Bot 413)	4
Hormonal Regulation of Plant Growth (Bot 433)	3
Plant Anatomy (Bot 471)	4
	11

[1] BA 211 may be used to meet one of the business requirements of the core curriculum.

[2] This minor requires Ch 203 instead of Ch 213 in the core curriculum.

Chemistry

Physical Chemistry (Ch 423)	3
Physical Chemistry (Ch 424)	3
Physical Chemistry (Ch 425)	3
	9

Entomology

Insect Biology (Ent 314)	4
Forest Insect Dynamics (Ent 425)	3
Insect Pest Management I (Ent 442) *or*	4
Biological Control (Ent 486)	3
	10–11

General Biology

Statistical Methods (St 452)	4
Elementary Biochemistry (BB 350)	4
Cell Physiology (Bi 360)	3
	11

Soils

Soil Fertility (Sls 324)	3
Soil Physics (Sls 421)	3
Soil Morphology and Survey (Sls 432)	4
	10

[3]FOREST HARVESTING

Statics (Engr 211)	3
Forest Road Design (FE 320)	3
Forest Engineering (FE 323)	4
Northwest Logging (FE 360)	4
Logging Operations Analysis (FE 480)	4
Production Planning and Control in Logging (FE 481)	4
	22

FOREST PRODUCTS

Version I: Wood Products

Wood Anatomy (FP 311)	4
Physical Properties of Wood (FP 314)	4
Mechanical Properties of Wood (FP 321)	4
Mechanical Conversion I (FP 441)	4
Mechanical Conversion II (FP 442)	4
Forest Products Merchandising (FP 453)	4
	24

Version II: Pulp and Paper Technology

Wood Anatomy (FP 311)	4
Physical Properties of Wood (FP 314)	4
Introduction to Wood Chemistry (FP 360)	4
Mechanical Conversion II (FP 442)	4
Pulp and Paper Processes (FP 443)	4
Advanced Pulp and Paper (FP 460)	4
	24

FOREST SOILS

Soils (Sls 210)	5
Soil Morphology and Survey (Sls 432)	4
Forest Soils (Sls 454)	3
Principles of Geology (G 211,212)	8
At least nine hours from among the following: Soil Water and Plant Growth, Sls 311; Soils and Land Use, Sls 321; Soil Fertility, Sls 314; Soil Chemistry, Sls 412; Soil Physics, Sls 421; Microbial Ecology, Mb 448	9
	29

PUBLIC ADMINISTRATION

American National Government (PS 211)	3
Choice Theory (PS 407E)	4
Public Administration (PS 411,412)	8
Politics of Environmental Policy (PS 489)	4
Public Expenditure (Ec 429)	4
Public Finance (Ec 430)	4
	27

RANGE MANAGEMENT

Systematic Botany (Bot 321)	4
Range Plant Communities (Rng 344)	3
Rangeland Improvement (Rng 421)	3
Rangeland Analysis (Rng 441)	4
Animal Science (AnS 121)	3
Sheep Production (AnS 422)	4
Beef Production (AnS 424)	4
Principles of Wildlife Conservation (FW 251)	3
	28

[3] Students in this minor are not required to take FE 392.

RESOURCE RECREATION MANAGEMENT

Park and Recreation Area Analysis (RR 281)	5
Social Behavior and Resource Management (RR 321)	4
Issues in Rec Plan (RR 475)	3
Cultural Resources Planning and Management (RR 440)	4
Economics of Outdoor Recreation (RR 462)	4
Park and Recreation Administration (RR 485)	4
Environmental Interpretation (RR 493)	3
Landscape Design Theory (ALA 280)	3
	30

STATISTICS

Calculus (Mth 202)	4
Introduction to Mathematical Statistics (St 421,422,423)	9
Sampling Methods (St 441)	3
Regression Methods (St 452)	4
Operations Research Methods (St 471)	3
Project in Quantitative Methods Application in Forestry (F 406)	3
	26

WILDLIFE

General Zoology (Z 201,202)	6
Principles of Wildlife Conservation (FW 251)	3
Wildlife Resources: Mammals (FW 252)	3
Wildlife Resources: Birds (FW 253)	3
Introductory Population Dynamics (FW 320)	4
Management of Big Game Animals (FW 458)	3
Wildlife Ecology (FW 481)	5
Systematic Botany (Bot 321)	4
	31

Forest Products

WOOD INDUSTRY MANAGEMENT OPTION

Approximately 27 elective credits are required in areas related to forest products, such as business, economics, production management, and biological, physical, chemical, and engineering fields. Additional electives are to include sufficient courses in arts and humanities, social sciences, and communication to meet University general education requirements.

Freshman Year—51 hours

General Botany (Bot 202)	4
Mathematics (Mth 110,200,201)	12
Chemistry (Ch 201,202,213)	10
English Composition (Wr 121)	3
Introduction to Forestry (F 111)	4
Dendrology (F 254)	4
Physical education	3
Approved electives	11

Sophomore Year—51 hours

Introduction to Data Processing (CS 190 *or* BA 131)	3
General Physics (Ph 201,202)	8
Principles of Economics (Ec 213,214)	8
Accounting (BA 211,212)	8
Wood Technology and Utilization (FP 210)	4
Intro to Forest Measure (F 311x)	3
Technical Report Writing (Wr 327)	3
Approved electives	14

Junior Year—51 hours

Quantitative Methods (BA 235)	4
Introduction to Management Science (BA 338)	4
Wood Anatomy (FP 311)	4
Introduction to Wood Chemistry (FP 370)	4
Physical Properties of Wood (FP 314)	4
Mechanical Properties I (FP 321)	4
Logging Methods (FE 392)	4
Mechanical Conversion I (FP 441)	4
Approved electives	19

Senior Year—51 hours

Mechanical Properties II (FP 422)	4
Mechanical Conversion II (FP 442)	4
Pulp and Paper Processes (FP 443)	4
Wood Industry Problems (FP 452)	3
Forest Products Merchandising (FP 453)	4
Forest Economics and Regulation (F 434, 435)	8
Seminar (FP 407)	1
Approved electives	23

WOOD SCIENCE OPTION

The wood science option differs from the wood industry management option in that the following courses are not required: BA 211, 212, 235, 338; Ch 213; F 311x, 434, 435; FE 392; FP 452, 453. Additional courses required in the wood science option are: Ch 203; Mth 202, 203; Ph 203; St 451,452,453; and one year of organic chemistry.

PULP AND PAPER TECHNOLOGY OPTION

This option takes a multidisciplinary approach but emphasizes forest products as well as chemical and general engineering.

Freshman Year—51 hours

Chem Engr Orientation (ChE 102)	3
General Botany (Bot 202)	4
Mathematics (Mth 110,200,201)	12
General Chemistry (Ch 204,205,206)	15
English Composition (Wr 121)	3
Physical education	3
Wood Technology (FP 210)	4
Electives	7

Sophomore Year—51 hours

General Physics (Ph 211,212)	8
Organic Chemistry (Ch 334,335,336)	9
Calculus and Differential Equations (Mth 202,203,321)	12
Stoichiometry (ChE 203,212)	4
Mechanical Properties I (FP 321)	4
Dynamics (Engr 212)	3
Electives	11

Junior Year—51 hours

Wood Anatomy (FP 311)	4
Physical Prop of Wood (FP 314)	4
Physical Chemistry (Ch 423,424,425)	9
Wood Chemistry (FP 370)	4
Thermodynamics (Engr 311,312,313)	9
Momentum, Energy, and Mass Transport (Engr 331,332,333)	11
Electives	10

Senior Year—51 hours

Principles of Economics (Ec 213,214)	8
Unit Operations (ChE 411,412)	6
Statistics (St 451,452)	8
Pulp and Paper (FP 443)	4
Advanced Pulp and Paper (FP 460)	4
Mechanical Conversion I and II (FP 441,442)	8
Seminar (FP 407)	1
Electives	12

Resource Recreation Management

Freshman Year—51 hours

Intermediate Algebra (Mth 101)	4
Math for the Bio, Mngt, and Soc Sci (Mth 163)	4
Soils and Man (Sls 100)	3
Intro to Forestry (F 111)	4
Graphics (ALA 111) or approved graphics course	3
Informative Speaking (Sp 112)	3
Basic Logic (Phl 101)	4
English Composition (Wr 121)	3
Physical education	3
Gen Botany (Bot 201,202,203)	11
Gen Sociology (Soc 204,205)	6
Electives	3

Sophomore Year—51 hours

Geog Photointerpretation (Ggs 413)	3
Recreation Resource Management (RR 251)	4
Principles of Economics (Ec 213,214)	8
Oral communication	3
Written communication	3
Intro to Business Data Process (BA 131)	4
Intro to Physical Geography (Ggs 227)	5
Intro to Statistics (St 311)	3
Park and Recreation Area Analysis (RR 281)	4
Electives/minor	14

Junior Year—51 hours

Social Behavior and Resource Mgt (RR 321)	4
Intro to Forest Biology (F 340)	4
Methods of Social Research (Soc 328)	5
Recreation Resource Planning (RR 381)	3
Natural Resource Interpretation (RR 391)	4
Technical Report Writing (Wr 327)	3
Government Instit and Res Policy (PS 301)	4
Pre-Internship Seminar (RR 407B)	1
Electives/minor	23

Senior Year—51 hours

History of Outdoor Recreation (RR 471)	4
Economics of Outdoor Recreation (RR 462)	4
Cultural Resources Plan and Mgt (RR 440)	4
Outdoor Recreation Policy (RR 473)	4
Issues in Recreation Plan and Mgt (RR 475)	3
Resource Recreation Internship (RR 410)	12
Electives/minor	20

Minors

Students majoring in resource recreation management select a minor from among the programs listed below; an individualized minor must be approved by the department.

BUSINESS ADMINISTRATION

Financial Accounting (BA 211)	4
Managerial Accounting (BA 212)	4
Business Law (BA 226)	4
Quantitative Business Methods (BA 235)	4
Marketing (BA 312)	4
Finance (BA 313)	4
Plus two of the following:	
Management Processes (BA 302)	4
Operations Management (BA 311)	4
Organizational Behavior (BA 361)	4
	32

[4]CULTURAL RESOURCE MANAGEMENT

Photojournalism (J 334)	3
Cultural Resources Plan and Mgt (RR 440)	4
History of the Pacific Northwest (Hst 469)	3
Selected Topics in Anthro: Cultures of the Northwest (Anth 470)	3
Plus a minimum of 9 hours from each group of courses:	
History and Environmental Interpretation	
History of the Amer Indian (Hst 367, 368)	6
Historiography (Hst 420)	4
The American Frontier (Hst 427,468)	8
Environmental Interpretation (RR 493)	3
Interpret Methods and Site Develop (RR 496)	5
Anthropology and Archeology	
Anthropology of North America (Anth 412)	3
Archeology (Anth 430,432)	6
Archeology of the Northwest (Anth 433)	3
Archeology Field School (Anth 436)	1–3
	29–42

[4]ENVIRONMENTAL RESOURCE INTERPRETATION

Multi-Media Production (Ed 437)	3
Environmental Education (SEd 266)	3
Public Information Methods (J 318)	3
Photojournalism (J 334)	3
Independent Study: Photojournalism Lab (J 402A)	1
Environmental Interpretation (RR 493)	3
Interpret Methods and Site Develop (RR 496)	5
Plus a minimum of 6 hours from each group of courses:	
Natural History	
Contemporary Geology (G 200)	3
Geology of Oregon (G 352)	3
General Botany (Bot 203)	3
Wildlife Resources: Birds (FW 253)	3
Intro to the Atmosphere (AtS 300)	3
Insect Biology (Ent 314)	4
Vertebrate Biology (Z 371)	5
Herpetology (Z 473)	4
Cultural Resources	
History of the Amer Indian (Hst 367, 368)	6
The American Frontier (Hst 467,468)	8
History of the Pacific Northwest (Hst 469)	3
Archeology (Anth 430)	3
Archeology of the Northwest (Anth 433)	3
Selected Topics in Anthro: Cultures of the Northwest (Anth 470)	3
Cultural Resources Plan and Mgt (RR 440)	4
	33

[5]FOREST RESOURCES

Wood Technology and Utilization (FP 210)	4
Forest Engineering (FE 222)	5
Intro to Forest Measure (F 311)	3
Forest Fire Management (F 345)	3
Forest Econ and Reg I (F 434)	4
Forest Econ and Reg II (F 435)	4
Plus a minimum of 6 hours from the following:	
Principles of Wildlife Conserv (FW 251)	3
Rangeland Resources (Rng 341)	3
Forest Ecology (F 341)	5
Industrial Forestry (F 427)	3
Forest Pathology (Bot 415)	3
Forest Entomology (Ent 423)	3
Watershed Management (FE 424)	3
	29

LAW ENFORCEMENT

Ethics (Phl 205)	4
American Constitutional Law (PS 319)	5
Deviant Behav and Social Control (Soc 211)	3
Juvenile Delinquency (Soc 411)	3
Criminology and Penology (Soc 412)	3
Social Psychology (Soc 473)	3
Plus a minimum of 6 hours from the following:	
Wildlife Law Enforcement (FW 341)	3
Sociology of Small Groups (Soc 430)	3
Collective Behavior (Soc 436)	3
Selected Topics: Law Enforce (RR 430)	3
	27

RESOURCE PLANNING

Map and Map Interpretation (Ggs 261)	3
Geography of Land Use (Ggs 426)	3
Automated Geog Data Handling (Ggs 464)	3
Landscape Design Theory (ALA 280)	3
Landscape Design I (ALA 290)	3
Environmental Economics (Ec 335)	3
Regional Economics (EC 414)	4
Environ Law: Water and Air (BA 415)	3
Plus a minimum of 6 hours from the following:	
Principles of Wildlife Conserv (FW 251)	3
Rangeland Resources (Rng 341)	3
Range Watershed Management (Rng 450)	3
Wilderness Management (RR 342)	3
Watershed Management (FE 424)	3
Geography of Resource Use (Ggs 420)	3
	31

PUBLIC ADMINISTRATION

American National Gov and Politics (PS 101,102)	6
Intro to Political Anal (PS 311)	5
Public Administration (PS 411,412)	8
Prob and Issues in Pub Admin (PS 413)	3
The Policy Process (PS 487)	5
Public Finance (Ec 430)	4
Park and Recreation Admin (RR 485)	4
	35

JOURNALISM

Survey of American Journalism (J 110)	3
Newswriting (J 111)	3
Newswriting and Reporting (J 212)	4
Copyediting (J 214)	3
Special Feature Articles (J 317)	3
Public Information Methods (J 318)	3
Photojournalism (J 334)	3
Indepen Study: Photojournalism (J 402A)	1
Indepen Study: Computer Editing (J 402B)	1
Plus a minimum of 9 hours from the following:	
Broadcast Newswriting I (J 311x)	3
Broadcast Newswriting II (J 312x)	3
Mechanics of Publishing (J 335)	3
Industrial Advertising (J 350)	3
Technical Photojournalism I (J 434)	3
Technical Photojournalism II (J 435)	3
The Media and Society (J 450)	3
Law and Reg in Mass Media (J 465)	3
Environmental/Wildlife Photog (J 485)	4
	33

RANGE RESOURCES

Principles of Wildlife Conserv (FW 251)	3
Systematic Botany (Bot 321)	4
Rangeland Resources (Rng 341)	3
Range Plant Communities (Rng 344)	4
Range Improve and Grazing Mgt (Rng 421)	4
Rangeland Analysis (Rng 441)	4
Range Watershed Management (Rng 450)	3
Plus a minimum of 6 hours from the following:	
Animal Science (AnS 121)	3
Range Plant Communities (Rng 343)	4
Rangeland-Animal Relations (Rng 442)	4
Range Management Planning (Rng 443)	4
	31

RESOURCE ECONOMICS

Intro to Management Science (BA 338)	4
Intro to Economic Research (Ec 315)	3
Environmental Economics (Ec 335)	3
Microeconomic Theory (Ed 357)	4
Regional Economics (Ec 414)	4
Public Expenditures (Ec 429)	4
Economics of Marine Firms (AREc 413)	3
Land and Water Economics (AREc 461)	3
Natural Resources Policy (AREc 481)	3
	31

WILDLIFE RESOURCES

General Zoology (Z 201,202)	6
Vertebrate Biology (Z 371)	5
Principles of Wildlife Conserv (FW 251)	3
Wildlife Resources: Mammals (FW 252)	3
Wildlife Resources: Birds (FW 253)	3
Intro Population Dynamics (FW 320)	4
General Ecology (Bi 370)	3
Ecological Methods (Bi 371)	3
Plus one of the following:	
Wildlife Law Enforcement (FW 341)	3
Biology of Game Birds (FW 451)	5
Mgt of Big Game Animals (FW 458)	4
	33–35

MINOR IN RESOURCE RECREATION MANAGEMENT

Core Courses

Recreation Resource Mgt (RR 251)	4
Social Behav and Resource Mgt (RR 321)	4
Recreation Resource Plan (RR 381)	3
Natural Resource Interpret (RR 391)	4
Economics of Outdoor Rec (RR 462)	4
Outdoor Recreation Policy (RR 473)	4
Plus two of the following:	
Wilderness Management (RR 342)	3
Recreation Planning Techniques (RR 382)	4
Cultural Resources Plan and Mgt (RR 440)	4
History of Outdoor Recreation (RR 471)	4
Issues In Recreation Plan and Mgt (RR 475)	3
Recreation Area Management (RR 483)	3
Environmental Interpret (RR 493)	3
Interpretive Methods and Site Development (RR 496)	5
	29–31

[4]This minor requires Anth 105 and 106 instead of Soc 204 and 205 (see freshman year).

[5]This minor requires Mth 102.

Forestry Courses

FOREST ENGINEERING

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 which will help 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, business, 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 School of Engineering's professional engineering program in order to be eligible for the dual degree. See page 162. Students from both curricula are eligible to take the Land-Surveyor-In-Training and Engineer-In-Training examinations.

Forest engineering graduates are employed by private forestry firms and public forestry agencies. Some establish their own consulting business after a few years of field experience.

Through the Graduate School, the department offers the Master of Science (M.S.) and the Master of Forestry (M.F.) degrees with areas of emphasis in logging engineering and forest hydrology, and the Doctor of Philosophy (Ph.D.) degree with a specialization in forest hydrology.

Lower Division Course

FE 222 Forest Engineering
5 hours any term 3 ① 1 ⑥
Measurement of distance, direction, and elevation; topographic surveying; stadia; computation and plotting of field data. Prerequisite: trigonometry and engineering drawing. Field trips required.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

FE 320 Forest Road Design
3 hours fall 3 ①
Logging road reconnaissance; circular and vertical curves; end areas; volumes; mass diagrams; prismoidal correction; location and construction surveying methods. Prerequisite: FE 222. O'LEARY.

FE 323 Forest Engineering
4 hours spring 3 ① 1 ④
Public land survey; polar and solar observation; triangulation; electronic surveying equipment; trilateration; Lambert grid system; theodolites. Field trips required. Prerequisite: FE 222. TUOR.

FE 359
Applied Forest Soils Engineering
4 hours winter 3 ① 1 ③
Forest soil classification and soil strengths, compaction and permeability theory, mass volume relationships, and capillary settlement. Fluid flow in forest soils, slope stability, lateral earth pressures, and bearing capacity of foundations as related to forest structures. Prerequisite: Engr 213. PYLES.

FE 360 Northwest Logging
4 hours fall 3 ① 1 ④
A basic course in logging methods and equipment with particular application to the Pacific Northwest. Field trips required. Prerequisite: Engr 211; F 224; FE 222. KELLOGG.

FE 361 Logging Roads
3 hours spring 2 ① 1 ③
Design of logging roads. Field trips required. Prerequisite: F 220; G 221; CE 372. PYLES.

FE 392 Logging Methods
4 hours any term 3 ① 1 ③
Relation between logging and forest production; felling and bucking; skidding, loading, hauling; relative merits of various methods. Field trips required. Prerequisite: FE 222; F 220,224. KELLOGG.

FE 401 Research

FE 403 Thesis

FE 405 Reading and Conference

FE 406 Projects

FE 407 Seminar
Terms and hours to be arranged

FE 424 Watershed Management (g)
3 hours fall or spring 2 ① 1 ②
Understanding the impact of logging, road building, and other forest uses on water quality and quantity in forest streams as a basis for land use decisions. Field trips required. Prerequisite: senior standing. BESCHTA.

FE 461,462,463
Logging Engineering (g)
4,4,5 hours
2 ① 1 ⑥; 2 ① 1 ⑥; 2 ① 1 ③ 1 ⑥
Development of logging plans, including transportation network design, logging system selection and layout, bridge design, and logging cost analysis. Field trips required. Prerequisite for FE 461: FE 320,323,360,361; for FE 462: FE 461; for 463: FE 462; Engr 213. O'LEARY.

FE 480 Logging Operations Analysis (g) 4 hours winter 2 ① 1 ⑥
Identification and measurement of components and interactions in harvesting operations. Logging system analysis; logging time study techniques and field measurements. Development of models; computer programming and simulation. Field trips required. Prerequisite: St 314; FE 360. OLSEN.

FE 481 Production Planning and Control in Logging (G)
4 hours spring 3 ① 1 ③
Collecting and analyzing field data. Mathematical models of cost and performance of principal phases of logging. Work scheduling procedures; inventory control; mechanics of yarding; new and experimental logging equipment; simulation; linear programming. Field trips required. Prerequisite: FE 360 or 392; FE 480. OLSEN.

Graduate Courses

See also courses marked (g) or (G) above.

FE 501 Research

FE 503 Thesis

FE 505 Reading and Conference

FE 506 Projects

FE 507 Seminar
Terms and hours to be arranged
Subject matter as required by graduate programs.

FE 534 Forest Hydrology
3 hours winter 2 ① 1 ③
Interception, transpiration, evaporation, and sedimentation with emphasis on aspects dealing with forest practice as related to stream flow. Field trips required. Prerequisite: FE 424. FROEHLICH.

FE 535
Water Quality and Forest Land Use
3 hours fall 3 ①
Water quality parameters; analytical methods; land use effects; municipal watershed management. Prerequisite: FE 424. BESCHTA.

FE 536
Environmental Measurement Techniques
3 hours spring 2 ① 1 ③
Principles of design, evaluation, and operation of sensor-recorder systems suitable for measuring environmental quantities, including temperature, humidity, wind, and thermal radiation, with particular reference to the forest environment. Projects and field trips required.

FE 559 Timber Harvesting Mechanics: Ground Vehicles
2 hours 2 ①
Analysis of harvesting vehicles, influence of design on yarding performance, and interaction between vehicle and soil. Wheeled and tracked vehicles compared. Prerequisite: Engr 211,212.

FE 560 Logging System Mechanics
4 hours 3 ① 1 ③
Engineering of catenaries, interlocks, tensions, intermediate supports for skyline systems. Field trips required. Prerequisite: Engr 211.

FE 561
Forest Transportation Systems
4 hours fall 3 ① 1 ③
Design of yarding systems, logging road networks, residue transportation systems. Field trips required. Prerequisite: FE 463. O'LEARY.

FE 562
Forest Road Drainage Structures
4 hours spring 3 ① 1 ③
Subsurface drainage; culverts; bridges. Field trips required. Prerequisite: CE 372; FE 463, 534. PYLES.

FE 563
Advanced Forest Engineering Analysis
4 hours fall 3 ① 1 ③
Harvest unit optimization; optimization of equipment replacement, scheduling, and selection. Field trips required. Prerequisite: Mth 201; FE 481. OLSEN.

FOREST MANAGEMENT

The successful forest manager is more than a tree specialist. He or she must understand the biological and physical processes of the forest and the social and economic forces that influence policies and actions affecting forests. Accordingly, 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. Additional strength in a related field can be obtained by selecting a minor in one of the following: business, forest biology, forest harvesting, forest products, forest soils, public administration, range management, resource recreation management, statistics, and wildlife.[1] Each minor is designed to fit within the four-year curriculum with the use of elective hours included. Students not wishing to pursue one of the specified minors may use elective hours as they wish, provided all University and School of Forestry requirements for graduation are completed.

Graduates in forest management are employed by the forest industry, U.S. Forest Service, Bureau of Land Management, and state, county, and municipal forestry agencies. Some are self-employed as forestry consultants. Although the curriculum is designed to produce forest managers, many graduates find their skills useful in employment outside of forestry.

The Master of Forestry (M.F.), Master of Science (M.S.), and Doctor of Philosophy (Ph.D.) degrees are available in the department through the Graduate School.

Lower Division Courses

F 111 Introduction to Forestry
4 hours fall or winter 3 ① 1 ③
Forest resource use alternatives; public interests and inputs; management alternatives; problems and policies of forest industries and agencies; foresters' roles in increasing wood, water, wildlife, recreation, and forage values; site visits to acquire skills and observe problems and operations. Field trips required. BEUTER.

F 153 Tree Identification
3 hours fall and spring 1 ① 2 ②
Principal Northwest trees and shrubs; range, silvicultural characteristics, and wildlife uses. Field trips required. Not open to forestry majors. Self-paced course. JENSEN.

F 199 Special Studies
Terms and hours to be arranged

F 254 Dendrology
4 hours fall and spring 1 ① 3 ②
Principal Northwest trees and shrubs; identification and taxonomic classification, silvicultural characteristics, major U.S. forest regions. Field trip required. Self-paced course. Not open to first- or second-term freshmen. Prerequisite: Bot 202. JENSEN.

F 260
Conservation of Natural Resources
3 hours winter 3 ①
Global nature, extent, and importance of natural resources and operation of various agencies in developing and conserving them. Energy, forest, forage, recreation, wildlife, soil, minerals, food, water, and atmospheric aspects. Not open to forest management majors. Not offered every year. HERMANN.

[1] Additions or deletions in the number and variety of minors may occur, depending on student interest, professional need, and the availability of resources.

Upper Division Courses
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

F 320
Forest Sampling and Photointerpretation
4 hours 3 ① 1 ④
Basic sampling, aerial photo and measurement techniques required to plan efficient inventory designs for supplying data required in decision making. Prerequisite or corequisite: St 314. PAINE.

F 321 Applied Forest Mensuration
5 hours 3 ① 1 ⑥
Application of basic sampling, aerial photo, and measurement techniques from F 320 to specific management questions associated with each phase of stand development. Prerequisite: F 320. BELL.

F 322 Forest Mensuration
3 hours 2 ① 1 ③
Introduction of static and dynamic forest models: defining what they are, how they might be used, and, in general terms, how they are developed. Prerequisite: F 321. BELL, PAINE.

F 340 Forest Biology
4 hours 1 ① 1 ② 1 ④
Forest plants and animals, communities, and ecosystems, their functioning and their relationship to resource management. Field trips required. Prerequisite: Bot 201, 202 *or* Bi 211, 212,213; F 153 or equivalent.

F 341 Forest Ecology
5 hours fall or spring 4 ① 1 ③
Influence of environmental factors on the development, distribution, and succession of forest vegetation. Field trips required. For forestry students only. Prerequisite: Sls 210; F 254; Bot 330. STAFF.

F 344 Woodland Operations
3 hours spring 2 ① 1 ③
Forest resources as related to farm and suburban environments. Operation techniques on small-size farm forests and suburban woodlands. Field trips required. Designed for vocational agriculture education and agriculture majors. Prerequisite: junior standing. Not offered every year. STAFF.

F 345 Forest Fire Management
3 hours 2 ① 1 ③
Influence of fuels, weather, and topography on fire behavior; fire prevention and control techniques, planning, and financing; legal and environmental aspects of prescribed fire. Field trips required. Prerequisite: junior standing. STAFF.

F 364
Forest Recreation Decision Making
3 hours fall or spring 2 ①½
Resource decision making; multiple-use management; benefit-cost analysis of nonmarket uses; conflicts among competing forest uses; land use planning concepts and analyses. Field trips required. Prerequisite: Mth 200; Ec 213. GIBBS.

F 401 Research

F 403 Thesis

F 405 Reading and Conference

F 406 Projects

F 407 Seminar
Terms and hours to be arranged
Section W graded P/N.

F 427 Industrial Forestry (g)
3 hours spring 2 ① 1 ③
Topics in industrial forest management in the Pacific Northwest, including property and income taxation, labor problems, and timber sales and contracts. Prerequisite: senior standing. SUTHERLAND.

F 432 Silviculture: Reforestation (g)
5 hours fall or winter 4 ① 1 ③
Seed, seedlings, and cuttings; nursery operation; vegetation management in forests; herbivores in young forests; the use of fire in reforestation. Field trips required. Prerequisite: F 327, F 341, or Bot 341. LAVENDER.

F 433 Silvicultural Practices (g)
4 hours winter or spring 3 ① 1 ③
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. Field trips required. Prerequisite: F 432. HERMANN.

F 434
Forest Economics and Regulation I (g)
4 hours spring or fall 3 ① 1 ③
Valuation of forest resources, even and uneven-aged harvest optimization, elementary harvest scheduling and forest regulation, economics of conservation, protection, and multiple use. Prerequisite: Mth 200; Ec 214. BRODIE, SUTHERLAND, TEDDER.

F 435
Forest Economics and Regulation II (g)
4 hours fall or winter 3 ① 1 ③
Property, income, and estate tax impacts on forest management; spatial and locational impacts on forest production and manufacturing; zoning. Supply and demand of forest products; impact of forest management and policy decisions on public welfare. Prerequisite: F 434. SUTHERLAND, BRODIE, TEDDER.

F 437
Techniques for Forest Resource Analysis
(g) 4 hours winter or spring 3 ① 1 ③
Use of linear programming, nonlinear programming, dynamic programming, and simulation to solve complex forest management problems, with emphasis on harvest scheduling. Forestry transportation problems, multiple-use allocation, and investment analysis. Field trips required. Prerequisite: F 435. TEDDER.

F 439 Forest Resource Problem Solving and Decisions (G)
3 hours fall or spring 2 ① 1 ④
Integration of biological, economic, mathematical, and amenity characteristics of the forest system in making resource management decisions. Field trips required. For forestry students only. Prerequisite: Rng 341; F 364,424, 433,435. ADAMS, BRODIE.

F 446
Fire Ecology and Environment (G)
3 hours spring 3 ①
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. Prerequisite: F 433 or equivalent. STAFF.

F 460 Conflicts in Forest Conservation
(g) 3 hours spring 2 ① 1 ③
Current problems and issues in wildland management with specific reference to land use and management alternatives, environmental quality, recreation, multiple use, people pressures, political aspects, and urban sprawl. Designed for nonforestry majors. Prerequisite: senior standing. Not offered every year. STAFF.

F 464 Forest Recreation Management
(g) 3 hours fall 3 ①
Management of public and private outdoor recreation areas. Integration of recreation with other land management objectives. Prerequisite: F 364. STAFF.

Graduate Courses

See also courses marked (*g*) or (*G*) above.

F 501 Research

F 503 Thesis

F 505 Reading and Conference

F 506 Projects

F 507 Seminar
Terms and hours to be arranged

F 511 Economics of Private Forestry
3 hours spring 3 ①
Economic and social characteristics of owners of small woodlands. Study of credit, incentives, leasing, and other measures to increase production on small woodlands. Prerequisite: F 434. Offered alternate years. Offered 1982-83. SUTHERLAND.

F 512
Economics of the Forest Resource
3 hours fall 3 ①
Economic aspects of forest production, regulation, and silvicultural applications. Micro-economic interactions of forest production and regulation and environmental constraints. Prerequisite: F 434,435 or equivalent. BRODIE.

F 515 Forest Policy Analysis
3 hours winter 3 ①
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 analysis and economics of forest policy. Prerequisite: F 512. ADAMS.

F 520 Aerial Photo Mensuration
3 hours spring 1 ① 2 ③
Use of aerial photographs in forest inventory; photo mensurational techniques in preparation of stand and tree volume tables; planning large-scale photo mensurational projects. Field trips required. Prerequisite: F 220; St 452 or equivalent. Offered alternate years. Not offered 1982-83. PAINE.

F 524 Forest Mensuration
3 hours winter 2 ① 1 ③
Growth determination; mensurational aspects of level of growing stock; variable plot sampling; current forest inventories. Field trips required. Prerequisite: F 327; St 451. BELL.

F 525 Principles of Forest Modeling
3 hours spring 3 ①
Evaluation of regression techniques and assumptions; examination of general model forms; techniques for modeling growth, mortality, recruitment, volume, residues, and stand structure. Prerequisite: St 452; F 524. HANN.

F 526 Projects in Forest Modeling
2 hours spring 2 ②
Application of modeling techniques learned in F 525 to real data sets. Prerequisite: CS 213; F 525 (may be taken concurrently). HANN.

F 532 Problem Solving and Decision Making in Silviculture Planning
4 hours to be arranged
Methods of economic analysis, computer programming and interpretation, problems analysis, and decision making presented in the context of silviculture planning. Emphasis on building a framework for analysis sensitive to the objective and constraints of the situation, compatible with evaluation criteria selected by the decision maker, and useful in tracing effects of silvicultural decisions on future forest conditions and harvest. Prerequisite: B.S. in forestry or related field and two years experience as a practicing silviculturist *or* B.S. in a nonrelated field and five years experience as a practicing silviculturist.

F 555
Market Structure and Prices in Forestry
3 hours winter 3 ①
Structure, conduct, and performance of the forest products industry; demand factors and pricing strategies unique to the industry; lumber and plywood futures; and review of industry trends. Prerequisite: F 435 or equivalent. TEDDER.

F 557 Harvest Scheduling Development and Analysis
3 hours winter 2 ①½
Harvest scheduling theory, techniques, and development. Harvest schedule synthesis and analysis. Prerequisite: F 512. TEDDER.

FOREST PRODUCTS

The Department of Forest Products stresses the efficient utilization of materials derived from forest trees. The course of study combines a background in science and general education, including communications, social sciences, and humanities, with knowledge of technologies and business practices. Three options are offered to prepare individuals for diversified careers in the forest products and allied industries and in public agencies. They permit students to select areas of study according to their particular interests and abilities.

The option in wood industry management emphasizes production, sales, and technical services. The option in wood science emphasizes science and technology in wood and bark utilization and provides a base for advanced degree work for students interested in research, product development, and academic careers. The option in pulp and paper technology emphasizes wood technology as well as chemical and general engineering to prepare students for employment requirements in the pulp and paper industry.

A number of students have earned concurrent bachelor's degrees in science or in business by taking additional time to complete requirements.

The department offers advanced studies through the Graduate School leading to the Master of Science, Master of Forestry, and Doctor of Philosophy degrees with majors in wood science for the doctorate and in wood science and technology at the master's level.

Lower Division Course

FP 210
Wood Technology and Utilization
4 hours any term 3 ① 1 ③
Characteristics of wood related to growth, manufacturing, treatment, grading, and use of products. VAN VLIET, KRAHMER, FUNCK.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

FP 311 Wood Anatomy
4 hours fall 3 ① 1 ③
Minute anatomy of wood and bark, variability of wood within and among species, wood-growth quality relationships, identification of wood and wood fibers, deterioration. Prerequisite: Bot 202; FP 210. KRAHMER.

FP 314 Physical Properties of Wood
4 hours winter 3 ① 1 ③
Hygroscopic nature of wood; wood-fluid relationships—principles and practices; electrical, thermal, and sonic properties of wood and fiber composites. Prerequisite: FP 311. MCKIMMY.

FP 321 Mechanical Properties I
4 hours spring 3 ① 1 ③
Statics and strength of materials; anisotropic properties of wood and wood-base materials; variation in properties of wood products such as functions of time, temperature, moisture content, and specific gravity; determination of properties of wood products. Prerequisite: Ph 201; Mth 200. POLENSEK.

FP 370
Introduction to Wood Chemistry
4 hours fall 3 ① 1 ③
Lignin, polysaccharides, and extractives of wood and bark; distribution, isolation, structure, and relationships with anatomy, properties, and uses. Prerequisite: Ch 213 or equivalent. LAVER.

FP 401 Research

FP 405 Reading and Conference

FP 406 Projects

FP 407 Seminar
Terms and hours to be arranged

FP 422 Mechanical Properties II (g)
4 hours fall 2 ① 2 ③
Standard tests and stress calculations; creep; strength and strength distribution; nondestructive testing; effect of density, moisture content, and temperature on strength; codes; standards; trade associations; design aids. Prerequisite: FP 321; Wr 327.

FP 441 Mechanical Conversion I (g)
4 hours spring 3 ① 1 ③
Wood breakdown and surface generation; processes; product quality; manufacturing plants; equipment selection, layout; production practices. Field trips required. Prerequisite: FP 210; junior standing. BROWN.

FP 442 Mechanical Conversion II (g)
4 hours fall 3 ① 1 ③
Adhesion principles and coating techniques; properties, quality, and uses of veneer, plywood, laminated products, hardboards, and particleboard; plant layout and design. Field trips required. Prerequisite: FP 210; senior standing. RESCH, WILSON.

FP 443 Pulp and Paper Processes (g)
4 hours winter 3 ① 1 ③
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; wet process fiberboard. Field trips required. Prerequisite: FP 370 or equivalent. BUBLITZ.

FP 452 Wood Industry Problems (g)
3 hours spring 2 ① 1 ③
Manufacturing problems in wood-using industries; raw material, types of products, production problems, cost analysis, residue utilization, and administration; plant visits. Prerequisite: FP 210; senior standing. FUNCK.

FP 453
Forest Products Merchandising (g)
4 hours winter 3 ① 1 ③
Trade practices and customs pertaining to distribution of forest products, wholesale and retail; architect interaction; case studies in forest products merchandising. Prerequisite: FP 210; senior standing. MCKIMMY.

FP 460 Advanced Pulp and Paper Technology (G)
4 hours spring 3 ① 1 ③
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; printing and conversion; air and water pollution problems. Prerequisite: FP 443. BUBLITZ.

Graduate Courses

See also courses marked (*g*) or (*G*) above.

FP 501 Research

FP 503 Thesis

FP 505 Reading and Conference

FP 506 Projects

FP 507 Seminar
Terms and hours to be arranged
Subject matter as required by graduate program. One-hour section graded P/N. RESCH.

FP 510 Wood Microtechnique
3 hours winter 3 ③
Preparation, sectioning or maceration, staining, and mounting of slides of wood and wood-base materials for microscopic study, photomicrography. Prerequisite: FP 311. KRAHMER.

FP 512 Wood Anatomy
4 hours fall 3 ① 1 ③
Development, structure, and function of cells and tissues in woody plants; cell types and distribution; interpretation of electron microscopy and other techniques used in the study of fine structure of wood. Prerequisite: FP 311. KRAHMER.

FP 513
Selected Topics in Wood Anatomy
3 hours winter 2 ① 1 ③
Current topics in wood and bark anatomy, including development and variability, wood-growth-quality relationships, heritability of wood properties and characteristics, foreign woods' anatomy and identification, fiber microscopy, and ultrastructural considerations in utilization. Prerequisite: FP 512. MCKIMMY, KRAHMER.

FP 514 Advanced Wood Physics
4 hours spring 3 ① 1 ③
Wood and fiber composites in terms of anisotropic elasticity; rheology; fracture; mass, heat, and charge transport; dielectric theories; thermodynamics; wood-fluid interaction; fiber optics; research techniques. Prerequisite: Mth 203; Ph 203; FP 314. WILSON.

FP 515
Selected Topics in Wood Physics
3 hours spring 3 ①
Advanced course in wood physics and its application to special fields of study, according to student need. Topics include: (1) advanced timber mechanics; (2) surface properties of wood and composites; (3) theories of dielectrics; (4) thermodynamics of wood and cellulose; (5) mass, heat, and charge transport; (6) wood-fluid relationships. Prerequisite: FP 514.

FP 516 Wood Chemistry
4 hours winter 3 ① 1 ③
Chemistry of wood polysaccharides, lignin, polyphenolics, and other extractives; present and potential utilization; analytical procedures specific to chemical constituents of wood and bark. Prerequisite: one year of organic chemistry; physical chemistry previously or concurrently. LAVER.

FP 531 Wood Industry Management
3 hours winter 3 ①
Application of communication theory, operations research, and modern management techniques to the unique problems and situations encountered in the forest products industry. The structure, analysis, and operation of wood-using firms. Prerequisite: FP 210; BA 302; IE 361 or equivalent. Offered alternate years. VAN VLIET.

FP 570
Selected Topics in Wood Chemistry
3 hours 3 ①
Recent advances in wood chemistry including biogenesis of cell wall and extractive components, advanced carbohydrate chemistry, "aging" in wood, heartwood formation, chemistry of flavonoids, tannins, wood resins, and terpenes. Prerequisite: FP 516. LAVER.

FOREST SCIENCE

The Department of Forest Science, through the Graduate School, offers programs leading to the Master of Science (M.S.), Master of Forestry (M.F.) in silviculture, and Doctor of Philosophy (Ph.D.) degrees. The M.S. and Ph.D. programs, structured specifically for those interested in careers in research, teaching, and specialized areas of forestry practice, are available in four areas of specialization: forest ecology, forest genetics, forest physiology, and silviculture. The Master of Forestry in silviculture program is administered jointly with the Department of Forest Management. Students prepare for careers as professional silviculturists capable of analyzing opportunities in the context of the tree-growing objectives of a landowner, with sensitivity to other forest resource values —physical, biological, economic, and environmental. A 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.

Research in the Department of Forest Science focuses on fundamental and applied research to support forest practices in areas of reforestation, silviculture of young 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 students are encouraged to participate actively in the department's large, diverse program.

Graduate Courses

See also courses marked (*g*) or (*G*) in Forest Management.

FS 501 Research

FS 503 Thesis

FS 505 Reading and Conference

FS 506 Projects

FS 507 Seminar
Terms and hours to be arranged

FS 521 Research Methods
3 hours fall 3 ①
Research project analyses and working plans, investigative procedures, principles and practices in scientific writing. GORDON.

FS 531 Ecosystem Approach to Forest Manipulation
4 hours to be arranged
Recent developments in bioecology of forest systems as they relate to manipulation of the forest by practicing silviculturists. Prerequisite: B.S. in forestry or related field and two years experience as a practicing silviculturist *or* B.S. in nonrelated field and five years experience as a practicing silviculturist.

FS 533 Forest Regeneration and Stand Management
4 hours to be arranged
Current forest biology information in conjunction with exercises to enhance the silviculturist's ability to gather and integrate information on forest sites, to establish alternatives for site manipulation, and to select the approach best suited for proper management of the site. Prerequisite: B.S. in forestry or related field and two years experience as a practicing silviculturist *or* B.S. in nonrelated field and five years experience as a practicing silviculturist.

FS 541 Environmental Physiology of Forest Trees
3 hours fall 3 ①
The physiological responses of trees to environmental factors. Photosynthesis, water relations, photoperiodism, temperature reactions, and allelopathy. Field trips required. ZAERR.

FS 542,543 Silviculture
3 hours winter, spring 2 ① 1 ③
Forest regeneration practices. Silvicultural practices in immature and mature stands. Field trips required. Need not be taken in order. LAVENDER, PERRY.

FS 544 Forest Genetics
3 hours spring 3 ①
Plant genetics principles applied to silvicultural practices. Field trips required. Prerequisite: F 341 or Bot 341; Gen 311. ADAMS.

FS 545 Ecology of Forest Disturbances
4 hours 2 ②
additional hour to be arranged
Dynamics of undisturbed forest ecosystems, responses of theoretical systems of perturbation, relation of herbicide properties to ecosystem response, optimization of response in management. Field trips required. Prerequisite: CrS 418; Mth 211. NEWTON.

FS 546
Ecosystem Analysis and Application
3 hours 2 ① 1 ③
The structure and function of forest and associated stream ecosystems. Field trips required. Prerequisite: F 341; Sls 210. WARING, SOLLINS.

RESOURCE RECREATION MANAGEMENT

The Department of Resource Recreation Management emphasizes the management of forest, range, and coastal resources for recreation use. Included are the study of natural resources, recreational users of these resources, and the planning and management necessary for providing quality recreational opportunities. Basic courses in arts and humanities, and social, physical, and natural sciences are used to augment the professional curriculum. Students are required to complete a minor program, which allows them to develop their intellectual and vocational interests. These minors prepare students for careers in the various areas of outdoor recreation planning and management with private and public organizations.

Students majoring in other programs at OSU may elect a minor in recreation resource management. This program provides basic knowledge about recreation resource planning and management.

Graduates find employment with private and government organizations. Employment opportunities are developing in the private sector with resorts, public utilities, guides and outfitter services, and concessionaires. Opportunities also exist with federal, state, and local governments.

Through the Graduate School, the department offers a graduate minor and participates in the Master of Arts in Interdisciplinary Studies (M.A.I.S.) degree program. A Master of Science degree with emphasis on outdoor recreation management is offered through the Department of Forest Management.

Lower Division Courses

RR 121 Leisure in America
3 hours 3 ①
An analysis of the expanding role of leisure in contemporary American life; factors influencing leisure; the relationship of leisure to learning, health, personality development, values, and changing lifestyle. Field trips required.

RR 199 Special Studies
Terms and hours to be arranged

RR 212
High Adventure Outdoor Recreation
3 hours 1 ③
Fundamentals of outdoor recreation adventures, designed to introduce students to a broad variety of activities, their social and psychological rewards, and resource management problems associated with increased use of resources.

RR 222 Concepts of Survival
3 hours 3 ①
Multiple aspects; state of mind, physical limitations, biological needs.

RR 251 Recreation Resource Management
4 hours 2 ②
Overview of recreation resource management including study of land and water resources used for outdoor recreation, human perception, and use of natural and cultural resources; planning and management of long-term resource productivity. Focus on rural and wildland areas of the forest, range, and coast. JACKSON, BROWN.

RR 263 Camp Leadership
3 hours 3 ①
Counselor training, responsibility in camp, camper problems, camp relationships. Three-day field trip.

RR 281
Park and Recreation Area Analysis
4 hours 1 ② 2 ③
Application of evaluative criteria to major areas and facilities comprising the recreation resource base. Prerequisite: RR 251; ALA 111. MANFREDO.

Upper Division Courses
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

RR 305 Reading and Conference
1-3 hours to be arranged

RR 306 Projects
1-3 hours to be arranged

RR 307 Seminar
1-3 hours to be arranged

RR 308 Workshop
1-3 hours to be arranged

RR 321 Social Behavior and Resource Management
4 hours 2 ②
Sociological implications of leisure, contemporary psychological dimensions, issues, and significant relationships. Prerequisite: RR 251; Soc 328. SHELBY.

RR 330 Selected Topics
1-3 hours to be arranged
Contemporary resource recreation management issues for undergraduate students. Topics vary from term to term. May be repeated for credit. Graded P/N.

RR 342 Wilderness Management
3 hours 3 ①
Historical analysis of American wilderness; wilderness history, preservation, camping, overuse, ecology, geographic areas, and wilderness as a leisure experience. MANFREDO.

RR 381 Recreation Resource Planning
3 hours 3 ①
Theory and function of recreation resource planning as a component of natural resource planning. Prerequisite: RR 251. BROWN.

RR 391
Natural Resource Interpretation
4 hours 2 ②
Basic principles of interpretation and its role in natural resource communication. Exploration of methods of interpretation currently used in natural and cultural settings. Prerequisite: RR 251.

[1]RR 405 Reading and Conference (g)

[1]RR 406 Projects (g)

[1]RR 407 Seminar (g)
Section B, Pre-internship seminar; Section C, post-internship seminar; 1 hour each, graded P/N.

[1]RR 408 Workshop (g)
Terms and hours to be arranged

RR 410 Recreation Resource Internship
12 hours to be arranged
Full-time supervised professional experience emphasizing functional proficiency under joint sponsorship of university and agency personnel. Prerequisite: RR 321,381,382,391. Graded P/N.

RR 430 Selected Topics (g)
1 to 4 hours
Contemporary resource recreation management issues for advanced undergraduates and graduate students. Topics vary; course may be repeated for credit. Prerequisite: senior standing.

[1] Graduate credit for RR 405,406,407, and 408 singly or combined may not exceed 9 hours.

RR 440 Cultural Resources Planning and Management (g)
4 hours 2 ②
Role of cultural resources in the outdoor recreation system. Historical background of the historic preservation movement in America, with special emphasis on the planning, management, and interpretation of historic resources today. Analysis of the legal basis for historic preservation and the compliance procedures required of local, state, and federal land-managing agencies. Historic properties as an integral component of the outdoor recreation system. Prerequisite: RR 321; senior standing. JACKSON.

RR 462 Economics of Outdoor Recreation (g)
4 hours 2 ②
Application of economic concepts to problems of outdoor recreation management and resource allocation. Use of economics in evaluating the demand, supply, and distribution of outdoor recreation. Economics applied to the outdoor recreation planning process at local, state, and national levels. Prerequisite: BA 131; Mth 163; Soc 328; Ec 213,214. GIBBS.

RR 471 History of Outdoor Recreation
(g) 4 hours 2 ②
Role of recreation resources in U.S. environmental history. Social, intellectual, and political implications of attitudes toward nature; evaluation of major governmental land and water policies; rural and wildland recreation as a part of the U.S. conservation movement; focus on Oregon and the Pacific Northwest, with a national perspective. Prerequisite. RR 251; senior standing. JACKSON.

RR 473 Outdoor Recreation Policy (g)
4 hours 2 ②
Policy formation and analysis of recreation resources with emphasis on feasibility for development, including economic and social influences, agency approaches to planning, policy, and development, and value determination. Prerequisite: RR 412,471; senior standing.

RR 475 Issues in Recreation Planning and Management (g)
3 hours 2 (1½)
Current problems and issues in planning and management of outdoor recreation resources. Specific topics change with new developments in the field. Prerequisite: RR 251; senior standing. SHELBY, STARKEY.

RR 483
Recreation Area Management (g)
3 hours 2 ① 1 ③
Application of principles and functions of public administration to the problems dealt with in recreation resource management; design of facilities through maintenance. Management exercises in a laboratory situation. Prerequisite: RR 321,382,391; senior standing. FREED.

RR 485
Park and Recreation Administration (g)
4 hours 2 ②
Organization, operation, and administration of public and private leisure delivery systems. Field trips required. Prerequisite: RR 371; senior standing.

RR 493 Environmental Interpretation
(g) 3 hours 2 ① 1 ③
Interpretation of natural, archeological, and historical features in parks, museums, and similar settings. Field trips required. Prerequisite: RR 391. FREED.

RR 496 Interpretive Methods and Site Development (g)
5 hours 2 ② 1 ③
Contemporary methods and techniques used in interpretive situations; design, development, and management of an interpretive operation within the framework of land limitations and human needs. Field trips required. Prerequisite: RR 493. FREED.

HEALTH AND PHYSICAL EDUCATION

FACULTY

As of January 1982

Michael G. Maksud, *Dean*

W. Arthur Koski, *Assistant Dean, Head Adviser*

Professors Emeritus Allman, C. L. Anderson, Bergstrom, Coleman, Foster, Long, Weir

Associate Professors Emeritus Cox, Hupprich, McKalip, Moe, Swan, Thompson

Assistant Professor Emeritus Gawer

Senior Instructor Emeritus H. Poling

Health *Professors* Phelps (department chair), G. W. Anderson, Ellis, Koski

Associate Professors Erickson, Houston, Lawson

Assistant Professors Anderman, Darcy, Smith

Instructors Porter, Thetford

Physical Education *Professors* Campbell, Dailey, Flath, Lambert, Maksud, O'Shea, Thomas

Associate Professors Dunn (department chair), Albin, Brust, Cramer, Dickinson, Drlica, Irvin, Kerr, Martin, Martinson, Masilionis, Megale, Michael, Pye-Petersen, D. Poling, Suttie, Tanselli, Torpey, Winkler, Wyckoff

Assistant Professors Boarman, Hancock, Heath, Ingram, McNeil, Soleau, Tillman

Instructors Carpenter, Cicierska, Fisher, Morehouse, Steele

Health Care Administration *Professor* Ellis (program director)

ADJUNCT FACULTY

The Departments of Health and Physical Education are fortunate in having a select group of health, medical, and human motion professionals who serve as special lecturers in undergraduate and graduate programs, and as consultants in research. Current adjunct faculty:

Brubaker, Deloss, M.S., A.T.; Corvallis
Gleason, Carol I., B.S.; Corvallis
Hall, Clifford A., M.D.; Corvallis
Heyden, Roger, B.S., M.Ed.; Corvallis
Knox, George R., M.D.; Corvallis
Krakauer, Lewis J., M.D.; Corvallis
Ladd, John R., M.D.; Corvallis
Miller, Charles L., M.H.A.; Portland
Morris, James, M.D.; Portland
O'Neill, Kevin, M.S., A.T.; Corvallis
Terhune, Charles A., M.D.; Corvallis
Thomas, Frank D., M.D.; Corvallis
Younger, Eldon W., M.D., Corvallis

The School of Health and Physical Education offers undergraduate degree programs in health and in physical education. Students may earn either the Bachelor of Arts (B.A.) or Bachelor of Science (B.S.) degree in health, with an emphasis in environmental health, health education, industrial hygiene, or safety studies; or in physical education, with an emphasis in athletic training, commercial and industrial fitness, pretherapy, school physical education, sports leadership, or applied physical education.

In addition, the school offers (1) graduate courses in health and in physical education which may be included in advanced degree programs; (2) teacher preparation programs leading to basic four-year and standard five-year teacher certification in health education, in driver education, and in physical education; (3) undergraduate and graduate courses in health and in physical education for students enrolled in other colleges and schools; (4) basic instruction in health and in physical education for all OSU students; and (5) intramural sports and recreational activities for all students, faculty, and staff members.

In addition to University and departmental requirements for baccalaureate degrees, all undergraduate students enrolled in the School of Health and Physical Education, with the exception of those in the teacher education area of emphasis, are required to complete one of the following advanced writing courses with a grade of C or better: Wr 222, 316, 323, or 327. Students in the teacher education area of emphasis are required to pass the School of Education's basic skill examination, which includes tests in spelling, language mechanics, and writing skills.

Professional Courses

The School of Health and Physical Education offers undergraduate and graduate courses in health and in physical education. Health, a collective, applied body of knowledge based on the life and social sciences, is concerned with the effect of people's activities and the environment on personal and community well-being. Physical education, an applied body of knowledge based on the sciences, social sciences, and humanities, is concerned with the effect of human movement and performance on people and society.

Qualified students with majors in other schools and colleges may elect courses in health and in physical education for individual interest. Students outside this school may complete a minor in safety studies, athletic administration, or athletic coaching. Technical minor programs in applied safety studies and in health sciences are offered for students majoring in journalism. Teacher preparation programs may combine certification in other fields with certification in health education or in physical education. Elementary teachers may complete an area of concentration in either health education or physical education. For information concerning courses and programs, consult with advisers in the school. For requirements for advanced degrees, see "Graduate School."

Interdisciplinary Programs

Health Care Administration, a joint program with the Schools of Business, Health and Physical Education, and Home Economics, offers professional preparation for administrative positions in long-term care facilities, or middle management careers in private health care organizations and public health agencies. See page 226 for a description of the program.

Administered through the School of Home Economics, the *Program on Gerontology* involves students and faculty in seven schools and fourteen departments throughout the University, including the Departments of Health and of Physical Education. 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. Undergraduate students may elect an emphasis in gerontology; graduate students an integrated minor. For further information regarding the program, contact the director in the Department of Human Development and Family Studies, School of Home Economics.

Teacher Education

Students who wish to student teach and to be recommended for certification as health education or physical education teachers must be formally admitted to the teacher education program following completion of 75 term hours and prior to completion of 90 term hours of academic work. The candidate's academic, professional, and personal qualifications are the basis for acceptance to upper division courses leading to recommendation for a teaching credential. Transfer students should consult with advisers in the school for application forms and further information.

Basic Instruction

Courses which satisfy the University graduation requirement in physical education are designated PEA 100-299. Professional activity courses (PE 194, 294, 394, and 494) taken by students enrolled in an area of emphasis, a minor, or an area of concentration in physical education satisfy the University physical education requirement. In addition to University requirements, a total of eight term hours of performance courses may be elected for the baccalaureate degree. Physical education 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.

When requested to do so, the Student Health Center advises the school in the assignment of students to activities in accord with their physical needs.

Intramural Sports and Recreational Activities

The Department of Intramural Sports and Recreational Activities conducts a comprehensive program of more than 30 team, dual, and individual activities, including flag football, softball, aquatic sports, tennis, golf, and the pentathalon. Programs are open to all full-time students and offer opportunities to participate in both competitive and recreational activities.

Use of Facilities

Regular registration fees entitle every student to use of gymnasiums, pools, showers, and other facilities. Also provided are towels, swimming suits, and gym clothing. Every student may keep a basket in the gymnasium for his or her exclusive use; students are urged to use recreational facilities extensively.

Health and Physical Education Curricula and Courses

HEALTH

The Department of Health offers study programs leading to baccalaureate and advanced degrees for nonmedical professional people seeking health careers. The department promotes research and expansion of knowledge in the areas of personal, community, and environmental health, disease control, aging, safety, and other fields of specialization.

Undergraduate Programs

The health curriculum meets University requirements for the baccalaureate degree and includes science, social science, and humanities courses fundamental to preparation for health careers. In addition to general education and specific health courses, each undergraduate must complete an area of emphasis selected from environmental health, health education, industrial hygiene, or safety studies.

All areas of emphasis require one term of student teaching or field experience. Before students may enroll in Student Teaching (Ed 416) or Field Experience (H 475), they must have a minimum grade-point average of 2.50 in the major field and 2.25 overall, and must not be on probation.

Areas of Emphasis

Depending on their specific professional goals, students select one area of emphasis to prepare for a professional health career in that field. Substitutions or changes in the courses listed in the core program or in each area of emphasis require approval of the faculty adviser, the department chair, and the dean.

ENVIRONMENTAL HEALTH

Students preparing for professional careers as sanitarians, food quality control specialists, air and water pollution control managers, or industrial health and pollution control specialists with government or private industry may select the environmental health area of emphasis.

The curriculum emphasizes the safeguarding of air, water, and food sources against the transmission of disease. Additionally, evaluation and control of health and safety hazards within the institutional and industrial environment are stressed. This curriculum is accredited by the National Environmental Health Association and meets the requirements for professional registration as a sanitarian.

Freshman Year	*Hours*
Personal Health (H 170)	3
General Biology (GS 101,102,103)	12
Calculus Preparation (Mth 110)	4
General Chemistry (Ch 201,202,203)	9
General Chemistry Lab (Ch 207)	2
Physical education	3
Arts and humanities	4
English Composition (Wr 121)	3
Informative Speaking (Sp 112)	3
Electives	5

Sophomore Year	
Soils (Sls 210)	5
Elem of Indus Hygiene (H 199D)	3
Contemporary Geology (G 200)	3
General Physics (Ph 201)	4
Organic Chemistry (Ch 331,332)	6
Social sciences	12
Arts and humanities	8
Electives	7

Junior Year	
Principles of Accident Prevention (H 181)	3
Communicable and Noncommunicable Diseases (H 320)	3
Community Health (H 321)	3
Man. Health, and Environment (H 344)	3
Institutional Hygiene (H 442)	3
Microbiology (Mb 302,303,304)	9
Insect Pest Management (Ent 311)	4
Soil Morphology and Survey (Sls 432)	4
Designated writing course	3
Electives	10

Senior Year	
Seminar: Pre-Field Experience (H 407)	1
Field Experience (H 475)	12
Health Data Analysis (H 424)	3
Epidemiology (H 425)	3
Public Health Admin (H 426)	3
Environmental Health (H 440)	3
Applied Environmental Health (H 443)	3
Vector Control and Solid Waste Mgmt (H 441x)	3
Chemical Behavior in the Environment (AC 430)	3
Electives	14

HEALTH EDUCATION

This area of emphasis provides a broad academic experience for students interested in a general background in health education. Students seeking a career in various health agencies, including private and public health agencies or schools, should elect this area of emphasis. The program provides course work and practical experience which can lead to state teacher certification for grades preprimary through 12 plus skills for employment in federal, state, and local health organizations, voluntary health agencies, and health education departments of hospitals.

Students wishing to elect the health education emphasis should consult the department chair for the curriculum.

INDUSTRIAL HYGIENE

The industrial hygienist is a competent, qualified individual educated in engineering, chemistry, physics, medicine, or a related biological science. Abilities may encompass three major areas: (1) recognition of the interrelation of environment and industry; (2) evaluation of the impairment of health and well-being by work and the work operations; and (3) the formulation of recommendations for alleviation of such problems.

Freshman Year	*Hours*
Personal Health (H 170)	3
Calculus (Mth 200,201)	8
Principles of Accident Prevention (H 181)	3
General Chemistry (Ch 201,202,203)	9
English Comp (Wr 121)	3
Informative Speaking (Sp 112)	3
Social science	6
Arts and/or humanities	3
Physical education	3
Electives	7
Sophomore Year	
General Physics (Ph 201,202)	8
Tech Report Writing (Wr 327)	3
Org Chemistry (Ch 331,332,333)	8
General Chemistry Lab (Ch 207)	2
Microbiology (Mb 302,303,304)	7
Elements of Industrial Hygiene (H 199)	3
Arts and/or humanities	3
Empl and Indust Health Practices (H 281)	3
Intro to Computer Science (CS 211)	4
Electives	7
Junior Year	
Hum Anat and Phys (Z 331,332)	6
Statistics (St 314)	3
Man, Health, and Environment (H 344)	3
Communicable and Noncommunicable Diseases (H 320)	3
Accident Hazards and Codes (H 383)	3
Political Science (PS 489)	4
Biochemistry (BB 350)	4
Drug Action (Phc 450)	3
Arts and/or humanities	6
Electives	12
Senior Year	
Toxicology (Phc 420)	4
Industrial Hygiene Instrumentation (H 446)	3
Health Data Analysis (H 424)	3
Epidemiology (H 425)	3
Industrial Hygiene (H 445)	3
Ventilation for Contaminant Control (H 407D)	3
Indus and Commun Noise (H 444x)	3
Chemical Analysis of Env Pollutants (AC 410)	3
Social science	2
Sem: Pre-Field Experience (H 407F)	1
Field Experience (H 475)	12
Electives	9

SAFETY STUDIES

Students seeking professional positions in occupational safety or other safety employment select the area of emphasis in safety studies. This curriculum investigates accident phenomena and their controls in transportation, industry, business, communities, and other environments. Principal objects of study include people, machines, and environmental factors performing as accurately and safely as possible under conditions frequently demanding adjustment and assumption of calculated risks.

Freshman Year	*Hours*
Personal Health (H 170)	3
Principles of Accident Prevention (H 181)	3
Approved physical science courses	8
Introductory Microbiology (Mb 130)	3
American National Govern (PS 101,102)	6
English Composition (Wr 121)	3
Informative Speaking (Sp 112)	3
Arts and humanities	6
Science or social science	3
Introduction to Data Processing (BA 131)	4
Physical education	3
Electives	3
Sophomore Year	
Employee and Industrial Health Practices (H 231)	3
Health electives	3
Basic Accounting and Financial Analysis BA 217)	3
Management Processes (BA 302)	3
General Psychology (Psy 201,202)	6
Behavior Analysis (Phy 221)	3
General Sociology (Soc 204)	3
Institutions and Social Change (Soc 205)	3
Arts and humanities	6
Electricity-Electronics (IEd 371L)	3
Agricultural Mechanics (AET 221)	3
Electives	9
Junior Year	
Communicable and Noncommunicable Diseases (H 320)	3
Man, Health, and Environment (H 334)	3
Fire Prevention and Control (H 381)	3
Accident Hazards and Codes (H 383)	3
Mat Handl Constr Safety (H 385)	3
First Aid and Emergency Care (H 386)	3
Technical Report Writing (Wr 327)	3
Organizational Behavior (BA 361)	4
Science or social science	6
Hum Anat and Phys (Z 331,332)	6
Arts and humanities	3
Electives	8
Senior Year	
Seminar: Instructor Competencies in Emergency Care (H 407C)	3
Seminar: Pre-Field Experience (H 407F)	1
Health Data Analysis (H 424)	3
Instructional Materials Prepar (Ed 436)	3
Indust and Commun Noise (H 444x)	3
Industrial Hygiene (H 445)	3
Field Experiences (H 475)	12
Problems in Safety (H 482)	3
Safety Program Management (H 483)	3
Acc Inves and Work Comp (H 484)	3
Personnel Management (BA 467)	3
Electives	8

Minors

The Department of Health offers an undergraduate minor in safety studies for students enrolled in other schools or colleges. See the requirements listed below.

Students enrolled in the Department of Journalism may elect a technical minor in applied safety studies or in health science. Required courses are listed by the Department of Journalism on page 63.

SAFETY STUDIES

The safety studies minor, which focuses on reduction of accidents and health hazards, serves students not majoring in the Department of Health. Safety studies deal with the understanding and solution of problems involving safety and health hazards, industrial hygiene, environmental hazard control, accident phenomena, safety practices, traffic safety, and other safety and accident prevention programs.

For the safety studies minor, students must complete a minimum of 27 hours of courses selected from the following:

Required Core Courses	*Hours*
Principles of Accid Prev (H 181)	3
Employee and Indust Hlth Prac (H 281)	3
Fire Prevention and Control (H 381)	3
Accident Hazards and Codes (H 383)	3
First Aid and Emerg Care (H 386)	3
Safety Program Management (H 483)	3
Additional required courses (a minimum of nine hours will be selected from the following):	
Man, Health, and Environment (H 344)	3
Safety Education (H 380)	3
Occupational Saf (IE 465)	4
Projects: Safety (H 406)	3
Seminar: Instr Compet in Emer Care (H 407)	3
Industrial Audiology (Sp 407)	3
Institutional Hygiene (H 442)	3
Safety in Industrial Educ (IEd 477)	3
Driver and Traf Saf Educ (H 480)	3
Programs in Traf Saf Educ (H 481)	3
Problems in Safety (H 482)	3
Accid Investigation and Eval (H 484)	3

Driver Education Program

Certification for driver education must be combined with certification in another endorsement area. The basic driver education/combined endorsement must include:

Safety Education (H 380) *or* Safety Program Manag (H 483)	3
Driver and Traffic Safety Educ (H 480)	3
Programs in Traffic Safety Educ (H 481)	3
Problems in Safety (H 482)	3

Graduate Programs

The Department of Health offers graduate work leading toward the Master of Arts, Master of Science, and Master of Education degrees, with a major in health education. Minors are offered in community health and in health education which can be combined with a major in general education to satisfy requirements for either the Ph.D. or the Ed.D. degrees. The graduate degrees are offered through the School of Education.

Health Courses

Lower Division Service Course

H 170 Personal Health
3 hours 3 ①
Health principles and practice in the promotion of personal and community health directed toward improvement in the quality of health, the extension of the prime of life and an increase in life expectancy. Specially directed to students needing a more extensive and intensive study of the subject. (Normally, students taking H 160 do not take H 170.)

Lower Division Professional Courses

H 181
Principles of Accident Prevention
3 hours 3 ①
Principles, concepts, and methodology of accident prevention programs; analyses of accident causation factors. General course providing safety background for proper safety practices.

H 199 Special Studies
Terms and hours to be arranged

H 262 Consumer Health
3 hours 3 ①
Health aspects of consumer protection; decision making regarding health products and services; superstitions and misconceptions, advertising, quackery, selection of medical and dental services, health insurance. Prerequisite: H 160 or 170.

H 263
Values, Attitudes, and Health Behavior
3 hours 3 ①
Value and attitudinal patterns which influence health behavior.

H 281
Employee and Industrial Health Practices
3 hours 3 ①
Employee and industrial health, including delivery and control systems for medical care, insurance, health standards, and industrial hygiene. Prerequisite: H 181.

Upper Division Professional Courses

Courses numbered 400-499 and designated (*g*) or (G) may be taken for graduate credit.

H 320 Communicable and Noncommunicable Diseases
3 hours 3 ①
Modern concepts of diseases; characteristics of common communicable diseases; chronic disease problems and programs of prevention and control. Prerequisite: H 160 or 170; one term of microbiology; one year of biological science.

H 321 Community Health
3 hours 3 ①
Principles of community health practice; survey of local, state, and national problems; organization of local, state, national, and international health programs and services. Prerequisite: H 320,344.

H 322
Community Health Education Processes
3 hours 3 ①
Nature of communication in health education; emphasis on group structure, leadership, and mass media. Prerequisite: Psy 200; J 318; Soc 361.

H 344 Man, Health, and Environment
3 hours 3 ①
Environmental hazards affecting people's health with emphasis on air, land, water, food, residential living, and vector control. Prerequisite: H 160 or 170; one term of microbiology; one year of biological science.

H 364 Contemporary Drug Problems
3 hours 3 ①
Drug use, misuse, abuse, and dependency; influences on use; emergency care for adverse responses; effective strategies for promoting prevention of drug abuse.

H 369 School Health Education
3 hours 3 ①
Developing ability of public school student to understand and guide personal health and to contribute to health of community. Prerequisite: H 160 or 170; one year of biological science.

H 380 Safety Education
3 hours 3 ①
All phases of safety: home, fire, industrial, water, rural, school, and traffic safety; elementary, secondary, and adult.

H 381 Fire Prevention and Control
3 hours 3 ①
Fire hazards and causes; codes and standards; prevention and control techniques; fire detection and extinguishing systems; storage and human safety. Prerequisite: H 181.

H 383 Accident Hazards and Codes
3 hours 3 ①
Occupational safety and health hazards; recognition, investigation, prevention, and control techniques. OSHA and state standards stressed. Prerequisite: H 181.

H 385 Materials Handling and Construction Safety
3 hours 1 ① 2 ②
Standards for materials handling; storage and warehousing operations; security and loss control measures. Principles of construction safety.

H 386 First Aid and Emergency Care
3 hours 2 ① 1 ②
Emergency treatment for various types of injuries; control of bleeding, artificial respiration, transportation, splinting, and bandaging. Course leads to Red Cross standard and advanced certification. Service course open to all students.

H 401 Research

H 401 Research (G)

H 403 Thesis

H 403 Thesis (G)

H 405 Reading and Conference

H 405 Reading and Conference (G)

H 406 Projects

H 406 Projects (G)

H 407 Seminar
Section F, Pre-Field Experience, 1 hour, graded P/N.

H 407 Seminar (G)

H 408 Workshop
Section B, CPR, 1 hour, graded P/N.

H 408 Workshop (G)
Terms and hours to be arranged

H 420 Health Agencies and Programs
(G) 3 hours 3 ①
Contemporary health problems; comprehensive health planning; community health aspects of medical care; analysis of local, state, and national health problems, programs, and services. Prerequisite: H 321; senior standing.

H 421 Mental Health (G)
3 hours 3 ①
Models for understanding human behavior; emphasis on developing mental health teaching skills and on implementing healthy classroom milieu. Prerequisite: Psy 201,202.

H 422 Control of Chronic Disease (G)
3 hours 3 ①
Nature of chronic diseases and application of established control measures. Prerequisite: H 320,344; senior standing.

H 423 Health Aspects of Gerontology
(G) 3 hours 3 ①
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. Prerequisite: H 320,344; senior standing.

H 424 Health Data Analysis (G)
3 hours 3 ①
Techniques of health data selection, presentation, and interpretation. Prerequisite: St 311 or 451.

H 425 Epidemiology (G)
3 hours 3 ①
Basic principles underlying the study and control of communicable and organic diseases in the general population. Prerequisite: H 320; senior standing.

H 426 Public Health Administration
(G) 3 hours 3 ①
The organizational, personnel, fiscal, legal, and public relations aspects of public health practice; regionalization planning and trends; systems approach to public health programming and management; proposal writing. Prerequisite: H 420.

H 427 Community Health Education
(G) 3 hours 3 ①
Nature, principles, and procedures of community health action in terms of the needs of people in the health and parahealth fields. Prerequisite: H 321,344; senior standing.

H 440 Environmental Health (G)
3 hours 2 ① 1 ②
Environmental factors affecting public health; application of principles of sanitation and health science to solution of environmental problems. Prerequisite: H 320,344; senior standing.

H 442 Institutional Hygiene (G)
3 hours 2 ① 1 ②
In-depth study of several environmental health problems in today's institutions. Community involvement with local institutions emphasized (e.g., universities, schools, hospitals, prisons). Prerequisite. H 344; senior standing.

H 443 Applied Environmental Health
(G) 3 hours 2 ① 1 ②
Environmental health problems facing the state and nation; application of sanitation and health science principles to implement action and evaluation. Prerequisite: H 440; senior standing.

H 445 Industrial Hygiene (G)
3 hours 3 ①
Effects of disease, toxic agents, and stresses on employees; emphasis on recognition, evaluation, and control of environmental factors or stresses arising in or from the workplace. Prerequisite: H 181,281,383.

H 446
Industrial Hygiene Instrumentation (G)
3 hours 2 ① 1 ②
Information and practice in routine sampling procedures and measurement techniques used to evaluate chemical, physical, and biological hazards in places of work. Prerequisite: H 281, 445.

H 460 Health of the School Aged Child
(G) 3 hours 3 ①
Special health problems and the school's opportunities and responsibilities. Prerequisite: H 320, 369; senior standing.

H 461 Sex Education (G)
3 hours 3 ①
Aspects of sex and reproduction fundamental to sex education; relation of the school to other community institutions. Development of teaching units for public school programs with emphasis on the normal. Prerequisite: H 369; senior standing.

H 462 Advanced Teaching Strategies in Health (G)
3 hours 3 ①
Advanced teaching strategies applicable to public school instruction in health education. Focus on materials and activities likely to stimulate and channel student behaviors, such as advanced value clarification, role playing, sociodrama, and simulation games. Prerequisite: H 475 or Ed 416 or equivalent.

H 463 School Health Administration (G) 3 hours 3 ①
Types of administrative control; program coordination; school health-public health integration; responsibilities of school health personnel; case study method and critical incident process; current health programs. Prerequisite: H 369; senior standing.

H 475 Field Experience (g)
Terms and hours to be arranged
Directed field experience with participating official and voluntary health agencies individually arranged to meet student needs. Limited to health majors. Maximum of 15 hours credit. Prerequisite: senior standing. Consent of instructor required. Graded P/N.

H 480
Driver and Traffic Safety Education (G)
3 hours 2 ① 1 ②
Driver and traffic safety instructional systems for high schools; need assessment, task analysis, dual-control car procedures, systems development. Prerequisite: H 181,380; senior standing.

H 481
Programs in Traffic Safety Education (G)
3 hours 2 ① 1 ②
Advanced driver and traffic safety programs; simulation models, multimedia systems, range programs, evaluative practices, and interrelationships of laboratory instruction. Prerequisite: H 480.

H 482 Problems in Safety (G)
3 hours 3 ①
Problems in safety and safety education; current research and countermeasures. Prerequisite: H 181,380,386; senior standing.

H 483 Safety Program Management (G) 3 hours 3 ①
Administering and supervising safety education, safety services, and environmental safety; integration of school and community safety programs. Prerequisite: H 181,380,386; senior standing.

H 484 Accident Investigation and Workers' Compensation (G)
3 hours 3 ①
Principles of accident investigations and evaluations; reports and records. Prerequisite: H 181, 281,383.

H 491 Selected Topics (G)
3 hours 3 ①
Recent changes and advances in health and their application to special fields of study. Topics vary from term to term and year to year. Prerequisite: senior standing.

Graduate Courses
See also courses marked (G) above.

***H 501 Research**

***H 503 Thesis**

***H 505 Reading and Conference**

***H 506 Projects**

***H 507 Seminar**

***H 508 Workshop**
Terms and hours to be arranged

HEALTH CARE ADMINISTRATION

See "Interdisciplinary Degree Programs."

* Credit earned in H 501—508, singly or combined, may not exceed 9 hours.

PHYSICAL EDUCATION

The Department of Physical Education offers programs leading to baccalaureate degrees for students seeking physical education careers in human movement and sport-related fields. The department promotes research and expansion of knowledge in the areas of exercise physiology, performance mechanics, therapeutic programs, athletic training, sport psychology, sport sociology, aesthetics of human performance, psychomotor learning, and other fields of specialization.

Undergraduate Program

The basic physical education curriculum meets University requirements for the bachelor's degree and provides general education in the sciences, social sciences, and humanities needed for professional preparation. In addition to the general education and professional courses listed in the core program, undergraduate major students complete an area of emphasis selected from athletic training, commercial and industrial fitness, pretherapy, school physical education, sports leadership, or applied physical education.

Areas of Emphasis

Major students select one area of emphasis appropriate for their career goals. Substitutions or changes in the courses listed in each area of emphasis require approval of the student's faculty adviser, the department chair, and the dean.

ATHLETIC TRAINING

Athletic training is an area of study which permits students to serve athletic teams through the prevention, treatment, and rehabilitation of athletic injuries.

Because of limited facilities, personnel, and other resources, the number of students participating in the athletic training curriculum is limited. All entering students must first apply for admission to the preathletic training curriculum. After completing five terms, students may apply to the athletic training curriculum.

To qualify for the licensing examination of the National Athletic Training Association, students must complete the baccalaureate degree and the curriculum listed below, including 800 clock hours of internship. Consult an adviser for application forms and information on NATA certification.

Requirements for the four-year program are listed below:

Freshman Year	*Hours*
Biological science	9–12
General chemistry sequence	13
Personal Health (H 160 or H 170)	2–3
English Composition (Wr 121)	3
Speech (Sp 112 or 113)	3
Professional Activities (PE 194 or 294)	4
Arts and/or humanities	3
Electives	7–11
	48

Sophomore Year	
Philosophical Basis of Human Movement (PE 211)	3
Human Movement Aesthetics (PE 212)	3
Hum Anat and Phys (Z 331,332)	6
Care and Prevention of Athletic Injuries (PE 356)	3
Professional Activities (PE 294 or 394)	2
First Aid and Emergency Care (H 358)	3
General Psychology (Psy 201,202)	6
General Physics (Ph 201,202)	8
Human Nutrition (FN 225)	4
Electives	10
	48

Junior Year	
Psychological Basis of Human Movement (PE 311)	3
Sociological Basis of Human Movement (PE 312)	3
Elementary Human Anatomy (PE 321,322)	6
Kinesiology (PE 323)	3
Physiological Basis of Human Movement (PE 324)	3
Athletic Training Internship (PE 357,358, 359)	9
Athletic coaching courses (PE 361-369)	6
Arts and/or humanities	3
Designated writing course	3
Electives	9
	48

Senior Year	
Physiology of Exercise (PE 433)	3
Athletic Training Programs (PE 442)	3
Adapted Physical Education (PE 444)	3
Therapeutic Physical Education (PE 445)	3
School Programs (PE 461)	4
Approved psychology courses	6
Arts and/or humanities	6
Science or social science	0–3
Electives	14–17
	48

COMMERCIAL AND INDUSTRIAL FITNESS

Students who seek careers providing leadership for instituting and managing physical fitness programs in business and industrial environments select the commercial and industrial fitness area of emphasis. In industry, the concern for physical fitness extends to all personnel. As a commercial endeavor, physical fitness activities are provided for people of all ages.

Requirements for the four-year program are listed below:

Freshman Year	*Hours*
Biological or physical science	9–12
English Composition (Wr 121)	3
Speech (Sp 112 or Sp 113)	3
Newswriting (J 111)	3
Professional Activities	2
Arts and/or humanities	9
Science or social science	6
Social science	6
Designated writing course	3
Electives	1–6
	48

Sophomore Year	
Hum Anat and Phys (Z 331,332)	6
Philosophical Basis of Human Movement (PE 211)	3
Human Movement Aesthetics (PE 212)	3
Fitness and Contemporary Life (PE 231)	3
Business Accounting and Financial Analysis (BA 217)	3
Business Law (BA 226)	4
Human Nutrition (FN 225)	4
General Psychology (Psy 201,202)	6
Science or social science	6–9
Physical education activity courses (PEA 100-299)	3
Electives	4–7
	48

Junior Year	
Elementary Human Anatomy (PE 321,322)	6
Kinesiology (PE 323)	3
Psychological Basis of Human Movement (PE 311)	3

Sociological Basis of Human Movement (PE 312)	3
Motor Development (PE 313)	3
First Aid and Emergency Care (H 386)	3
Physiological Basis of Human Movement (PE 324)	3
Professional Activities (PE 394C,394D)	4
Management Processes (BA 302)	4
Organizational Behavior (BA 361)	4
Care and Prevention of Athletic Injuries (PE 356)	3
Family Nutrition (FN 325)	3
Consumer Health (H 262)	3
Safety Education (H 380)	3
	48

Senior Year	
Physical Education Practicum (PE 333, 334)	4
Public Information Methods (J 318)	3
Physiology of Exercise (PE 433)	3
Physiological Basis of Strength Development (PE 434)	3
Cardiovascular Dynamics (PE 436)	3
Adapted Physical Education (PE 444)	3
Evaluation of Physical Education (PE 471)	3
Therapeutic Physical Education (PE 445)	3
Administration of Physical Education (PE 463)	3
Personnel Management (BA 467)	3
Health Aspects of Aging (H 423)	3
Social Behavior and Resource Management (RR 321)	4
Arts and/or humanities	3
Electives	7
	48

PRETHERAPY

Students who seek careers in physical, occupational, or corrective therapy select the pretherapy area of emphasis. (Also see Physical Therapy in "College of Science.") Admission to a therapy school for further education and licensing may be sought after completion of the second, third, or fourth year of the program.

The following program includes all requirements for the four-year curriculum in pretherapy:

Freshman Year	*Hours*
Biological science	9
General chemistry sequence	9–13
Pretherapy (PE 132)	2
Professional Activities (PE 194)	4
English Composition (Wr 121)	3
Speech (Sp 112 or Sp 113)	3
General Sociology (Soc 204,205,206)	9
Electives	5–9
	48

Sophomore Year	
General Physics (Ph 201,202,203)	12
Human Heredity and Evolution (Gen 111)	3
General Psychology (Psy 201,202)	6
Human Movement Aesthetics (PE 212)	3
Philosophical Basis of Human Movement (PE 211)	3
Hum Anat and Phys (Z 331,332)	6
Arts and/or humanities	9
Designated writing course	3
Electives	3
	48

Junior Year	
Psychological Basis of Human Movement (PE 311)	3
Sociological Basis of Human Movement (PE 312)	3
Kinesiology (PE 323)	3
Physiological Basis of Human Movement (PE 324)	3
Physical Education Practicum (PE 333, 334)	4
Professional Activity (PE 394)	2
Genetics (Gen 311)	4
Elementary Human Anatomy (PE 321,322)	6
Human Life Span Development (Psy 311)	3
Experimental Psychology (Psy 321,322)	8
Electives	9
	48

Senior Year	
Human Movement, Perception, and Cognition (PE 411)	3
Adapted Physical Education (PE 444)	3
Therapeutic Physical Education (PE 445)	3
Genetics Laboratory (Gen 411)	2
Human Adjustment (Psy 314)	3
Neuroroanatomy of Human Behavior (Psy 350)	3
Percception (Psy 415)	3
Physiological Psychology (Psy 451,452)	6
Behavior Deviations (Psy 462)	3
Introduction to Statistics (St 311)	3
Mental Health (H 421)	3
Arts and/or humanities	3
Electives	10
	48

WICHE Programs for Occupational and Physical Therapy

Students selecting the pretherapy area of emphasis in the Department of Physical Education 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 the state certifying officer, or to the WICHE Professional Student Exchange Program, P.O. Drawer P, Boulder, Colorado 80302.

SCHOOL PHYSICAL EDUCATION

Students seeking to become physical education teachers in schools from preprimary through grade 12 select the school physical education area of emphasis. This program includes those courses required for Oregon teacher certification. Students may combine certification in physical education with certification in other teaching fields such as health, science, or elementary education. (Consult with departmental advisers concerning requirements for dual certification programs.) Application for formal admission to the teacher education program must be made after completion of 75 hours and before completion of 90 term hours of academic work. A basic norm and cumulative GPA of at least 2.5 are necessary for admission to the teacher education program and for student teaching. Selection is based on both professional and personal qualifications of the candidate.

The following program includes all requirements for certification in school physical education from preprimary through grade 12:

Freshman Year	*Hours*
Biological or physical science	9–12
Social science	6
Arts and/or humanities	9
English Composition (Wr 121)	3
Speech (Sp 112 or Sp 113)	3
Professional Activities (PE 194,294)	6
Science or social science	3
Electives	6–9
	48

Sophomore Year	
Philosophical Basis of Human Movement (PE 311)	3
Human Movement Aesthetics (PE 212)	3
Hum Anat and Phys (Z 331,332)	6
Professional Activities (PE 294,394)	6
General Psychology (Psy 201, 202)	6
Theory and Practicum II: Field (Ed 309)	5
Theory and Practicum II: Media (Ed 309M)	1
Theory and Practicum II: Campus (Ed 311)	6
Written or oral communication	3
Arts and/or humanities	3
Science or social science	3
Electives	3
	48

Junior Year	
Psychological Basis of Human Movement (PE 312)	3
Sociological Basis of Human Movement (PE 312)	3
Motor Development (PE 313)	3
Elementary School Physical Education (PE 320C)	3
Elementary Human Anatomy (PE 321,322)	6
Kinesiology (PE 323)	3
Care and Prevention of Athletic Injuries (PE 356)	3
Theory and Practicum: Field (Ed 313H)	6
Science or social science	6–9
Professional activities (PE 394)	4
Electives	5–8
	48

Senior Year	
Physiological Basis of Human Movement (PE 324)	3
Adapted Physical Education (PE 444)	3
School Programs (PE 461)	4
Evaluation of Physical Education (PE 471)	3
Decision Making and the Consumer (FRM 250) or Personal Family Finance (FRM 341)	3
Special Secondary Methods: Physical Education (Ed 408H)	3
Reading and Composition in the Secondary School (Ed 451)	3
Seminar: Civil Rights Laws (Ed 407)	1
Theory and Practicum: Secondary Student Teaching (Ed 416)	12
Seminar: Student Teaching (Ed 407H)	3
Electives	10
	48

SPORTS LEADERSHIP

Students who seek careers in organizing and coaching various sports in public or private settings such as sports clubs, community centers, YMCA, YWCA, youth agencies, resort areas, recreation centers, and other places choose the sports leadership area of emphasis. This program provides well-trained personnel to fill leadership roles in nonschool sports programs for persons of all ages.

The following courses are required for the four-year program:

Freshman Year	*Hours*
Biological or physical science	9–12
Newswriting (J 111)	3
Speech (Sp 112 or 113)	3
English Composition (Wr 121)	3
Physical Education Foundations (PE 131)	3
Sports Leadership (PE 240)	3
Professional Activity/Movement Fundamentals (PE 194C)	2
Leisure in America (RR 121)	3
Arts and/or humanities	9
Electives	7–10
	48

Sophomore Year	
Philosophical Basis of Human Movement (PE 211)	3
Human Movement Aesthetics (PE 212)	3
Hum Anat and Phys (Z 331,332)	6
Professional Activities (PE 194,294,394)	4
Beginning Broadcast (BMC 262) or equivalent	3
General Psychology (PE 201,202)	6
Sociology (Soc 204,205)	6
Basic Accounting and Financial Analysis (BA 217)	3
Arts and/or humanities	3
Designated writing course	3
Electives	8
	48

Junior Year	
Psychological Basis of Human Movement (PE 311)	3

Sociological Basis of Human Movement (PE 312)	3
Motor Development (PE 313)	3
Kinesiology (PE 323)	3
Care and Prevention of Athletic Injuries (PE 356)	3
Athletic Coaching Course (PE 361-369)	2
Elementary Human Anatomy (PE 321,322)	6
Public Information Methods (J 318)	3
Human Development (Psy 311) or Human Differences (Psy 312) or Human Adjustment (Psy 314)	3
Science or social science	3–6
Electives	13–16
	48

Senior Year

Pre-Internship Seminar (PE 307)	1
Physiological Basis of Human Movement (PE 324)	3
Sport and Society (PE 452)	3
Field Experience (PE 410)	12–15
Elective phys ed theory course (400-level)	3
Sociology of Small Groups (Soc 430) or Collective Behavior (Soc 436) or Sociology of Minority Relations (Soc 437)	3
Upper division sociology or psychology	6
Electives	14–17
	48

APPLIED PHYSICAL EDUCATION

Qualified students who seek professional careers other than those described above may complete an area of emphasis of not less than 36 term hours of approved courses unified by the requirements of the professional goal. Such programs require the approval of the adviser and the department chair. Qualified students may arrange a program with greater concentration in business, communications, statistics, physiology, chemistry, environmental studies, or the arts where the courses are unified by the requirements of professional positions such as in dance, sports communications, or scientific research in human performance. The specific courses designed to meet baccalaureate degree requirements must be approved prior to completion of the last 45 term hours of course work for the degree.

Minors

Undergraduate minors in athletic coaching and in athletic administration are offered for students who complete undergraduate major programs in other colleges, schools, or departments.

ATHLETIC COACHING

The minor in athletic coaching provides professional preparation for teachers and others who seek athletic coaching assignments with schools, recreation programs, or private and community agencies. Upon request, the Department of Physical Education will provide written verification of successful completion of the program. Required courses in the athletic coaching minor are:

	Hours
Professional Activ (PE 194,294,394,494)	4
Motor Development (PE 313)	3
Elementary Human Anatomy (PE 322)	3
Kinesiology (PE 323)	3
Physical Education Practicum (PE 333)	2
Care and Prev of Ath Injur (PE 356)	3
Athletic coaching courses (PE 361-369)	4
Psychological Aspects of Coaching (PE 370)	3
Physiological Basis of Human Movement (PE 324)	3
	28

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. The expansion in participation, investment, and involvement by all society in the success of athletic programs requires increased competence from program administrators.

Required courses in the athletic administration minor are:

Phil Basis of Hum Movement (PE 211)	3
Physical Educ Practicum (PE 333,334)	4
Projects: Athletic Administration (PE 306)	6
Athletic Training Programs (PE 442)	3
Competitive Athletics (PE 451)	3
Sport and Society (PE 452)	3
Facilities (PE 455)	3
Administration of Physical Educ (PE 463)	3
Basic Accounting and Fin Anal (BA 217)	3
Behavior in Organizations (BA 361)	4
Newswriting (J 111)	3
Interpersonal Speech Comm (Sp 111)	3
	41

Graduate Program

Candidates for the Master of Education or Master of Science degree offered through the School of Education may complete a graduate minor in physical education. Doctoral degree candidates may complete a minor in physical education by completing physical education graduate courses as approved by the candidate's doctoral committee and the Graduate Council.

Physical Education Courses

PEA 100-299
Physical Education Activity Courses
1 hour 3 ①
Variety of required or elective activity courses taught for educational and recreational values. Fulfills University requirement and covers following activity fields:

Adaptives: Posture, relaxation, restricted activity, weight control.

Aquatics: Canoeing, crew, scuba, swimming, life saving, water polo, water safety instruction.

Combatives: Judo, self-defense, wrestling.

Conditioning: Fitness appreciation, conditioning, ski conditioning, weight training.

Individual Sports: Archery, badminton, billiards, bowling, cycling, fencing, golf, gymnastics, handball, racquetball, riding, skiing, tennis, track and field, tumbling.

Team Sports: Basketball, hockey, outdoor sports, rugby, soccer, softball, volleyball.

Dance: Ballet, ballroom, folk, jazz, modern, modern ballet, square, dance composition, dance performance.

Lower Division Courses

PE 131
Physical Education Foundations
3 hours 3 ①
Human movement as a scientific and humanistic field of study; career goals related to current societal needs.

PE 132 Pretherapy
2 hours 2 ①
Survey of qualifications associated with various therapies; emphasis on occupational therapy and physical therapy and relationship to the field of medicine.

PE 194 Professional Activities
2 hours any term, three terms 2 ②
Grades K-12: movement fundamentals, basic rhythms, track and field. *Elementary school:* sports skills, gymnastics. Not offered every year.

PE 199 Special Studies
Terms and hours to be arranged

PE 211
Philosophical Basis of Human Movement
3 hours 3 ①
Value systems related to human movement; historical background of philosophy, sport, dance and exercise; contemporary education philosophies; application of leading contemporary philosophical tendencies to persistent human movement problems.

PE 212 Human Movement Aesthetics
3 hours 3 ①
Human movement as an art form and a means of communication; perception and appreciation of the beauty of movement.

PE 231 Physical Fitness and Contemporary Living
3 hours 3 ②
Physiological, kinesiological, and energy aspects of movement activities and exercise related to hypokinesia and physical fitness; laboratory experiences in jogging, weight training, and swimming. Graded P/N.

PE 232 Orienteering and Backpacking
3 hours 2 ① 1 ③
Land navigation related to mountaineering, wilderness travel, and ski touring; backpacking for semi-expeditions; manpack equipment, energy expenditure, climatic factors, seasonal travel, and bivouac routine. Graded P/N.

PE 233 Mountaineering
3 hours 2 ① 1 ③
Mountaineering techniques for snow, ice, and rock climbing with emphasis on altitude physiology, glacier travel, crevasse and alpine rescue, and avalanche safety. Prerequisite: PE 232. Graded P/N.

PE 234 SCUBA Diving
3 hours 1 ① 2 ②
Basic survival skills and knowledge for SCUBA diving. Prerequisite: intermediate swimming skill.

PE 235 Life Saving
2 hours 1 ② 1 ②
Rescue skills, defenses and escapes, search and rescue, victim removal, and resuscitation.

PE 236 Water Safety
2 hours 1 ② 1 ②
Water safety instruction, equipment safety skills, skill development, and skill screening. Prerequisite: PE 235.

PE 237 Cycling for Sport and Fitness
2 hours 2 ②
Training, styles, time trials, equipment, planning, health, and fitness factors.

PE 240 Sports Leadership
3 hours 3 ①
Physical recreation programming, organization, and objectives; leadership principles and methods; selecting, financing, promoting, scheduling, and evaluating activities.

PE 294 Professional Activities
2 hours any term, three terms 2 ②
Grades K-12: basketball, volleyball, football, gymnastics, hockey, soccer. Prerequisite: competency.

Upper Division Courses

Courses numbered 400-499 and designated (g) may be taken for graduate credit.

PE 301 Research

PE 305 Reading and Conference

PE 306 Projects

PE 307 Seminar

PE 308 Workshop

Terms and hours to be arranged

PE 311
Psychological Basis of Human Movement
3 hours 3 ①
Motor performance and skill learning; perception and movement; personality and the performer; psychological concepts relating to physical performance, sport, and athletics. Prerequisite: Psy 201,202.

PE 312
Sociological Basis of Human Movement
3 hours 3 ①
Games, play, dance, and sport in contemporary society; relationships between movement forms and socialization processes; social control, conflict, change, and stratification. Prerequisite: sociology or anthropology course.

PE 313 Motor Development
3 hours 3 ①
Modifications in motor performance during the growth and development of children and young adults. Prerequisite: PE 322.

PE 320
Elementary School Physical Education
3 hours 3 ①
Purposes; progressive programs for grades K-9; attaining objectives; evaluation.

PE 321,322
Elementary Human Anatomy
3 hours fall, winter, or winter, spring
2 ① 2 ①
Introduction to human anatomy. Prerequisite: Z 201,202. Need not be taken in order.

PE 323 Kinesiology
3 hours 2 ① 1 ②
Action of muscles and skeleton in motor activities. Prerequisite: PE 321,322.

PE 324 Physiological Basis of Human Movement
3 hours 3 ①
Physiological effect of physical activity. Prerequisite: Z 332.

PE 333,334,335
Physical Education Practicum
2 hours each 4 ①
Field experience under professional supervision. Prerequisite: two terms of professional activity or PE 132. Need not be taken in order.

PE 340 Intramural Sports Programs
2 hours 2 ①
Program for schools and colleges; aims and objectives, organizing a program; program of sports, methods and units of competition, scoring plans, administration.

PE 351 Dance History
3 hours 3 ①
Origins and development of dance forms; role of dance in society. Not offered every year.

PE 356 Care and Prevention of Athletic Injuries
3 hours 2 ① 1 ②
Theoretical and practical aspects of the prevention, treatment, and rehabilitation of athletic injuries. Prerequisite: first aid certificate.

PE 357,358,359
Athletic Training Internship
3 hours each 1 ① 3 ②
Laboratory application of athletic training for prevention, treatment, and rehabilitation of athletic injuries. Prerequisite: PE 356. Need not be taken in order.

PE 360 Sports Officiating
3 hours 3 ①
Rules, mechanics, and procedures for officiating competitive sports; enforcement of rules; use of signals; duties of officials; code of ethics; procedures for official's rating.

PE 361 Volleyball Coaching
2 hours 1 ② 1 ②
Individual and team fundamentals; team organization; practice sessions; strategy and tactics. Prerequisite: PE 294 (volleyball).

PE 362 Tennis Coaching
2 hours 1 ② 1 ②
Coaching competitive tennis: strategy and tactics, physiological and psychological aspects, team organization. Prerequisite: professional activity (tennis).

PE 363 Gymnastics Coaching
2 hours 1 ② 1 ②
Developing competitive gymnastics teams; conducting meets; judging procedures, coaching problems; facilities and equipment; safety procedures. Prerequisite: professional activity (gymnastics).

PE 364
Swimming and Diving Coaching
2 hours 1 ② 1 ②
Stroke mechanics, coaching psychology, swimming physiology, meet operation, rule interpretations, pool design, and training programs. Prerequisite: professional activity (aquatics).

PE 365 Football Coaching
2 hours 1 ② 1 ②
Theory and practice, details of each position, training and managing, techniques of developing offensive and defensive tactics, comparison of various systems in football. Prerequisite: professional activity (football).

PE 366 Basketball Coaching
2 hours 1 ② 1 ②
Coaching and training of basketball teams beginning with fundamentals, passing, dribbling, and pivoting; psychology of the game; various methods of defense and offense. Prerequisite: professional activity (basketball).

PE 367 Baseball Coaching
2 hours 1 ② 1 ②
Batting, pitching, baseball strategy, how to play various positions; promoting the game; making schedules; points of inside baseball; care and construction of field; management. Prerequisite: PE 294.

PE 368 Track and Field Coaching
2 hours 1 ② 1 ②
How to train for events; form and technique; conduct of meets; construction, use, and assembling of equipment; development of specific types of individuals for certain events. Prerequisite: professional activity (track and field).

PE 369 Wrestling Coaching
2 hours 1 ② 1 ②
Offense and defense in modern wrestling; equipment and facilities; meets and tournaments; coaching problems; wrestling styles; weight training and conditioning. Prerequisite: professional activity (wrestling).

PE 370
Psychological Aspects of Coaching
3 hours 3 ①
Behavior and the athlete: personality traits, motivational factors, communication processes, behavioral changes, team controls, cultural and minority problems. Prerequisite: Psy 201,202.

PE 371 Movement Notation
3 hours 3 ①
Movement notation in dance, sport, and exercise; recording human movement; reading human movement notation. Not offered every year.

PE 394 Professional Activities
2 hours, any term, three terms 2 ②
Grades K-12: aquatics, developmental activities, self-defense, tennis, golf, wrestling.

[1]PE 401 Research (g)

[1]PE 405 Reading and Conference (g)

[1]PE 406 Projects (g)

[1]PE 407 Seminar (g)

[1]PE 408 Workshop (g)

Terms and hours to be arranged

PE 410 Field Experience
3-15 hours to be arranged
Planned experience at selected cooperating agencies, companies, or institutions, under direct supervision of the University and program personnel; supplementary conference, reports, and appraisals are required. Prerequisite: senior standing in physical education; two terms residence in program; cumulative GPA of 2.25; adviser approval.

PE 411 Human Movement, Perception, and Cognition (g)
3 hours 3 ①
Movement experience and cognitive growth relationships in child development; perceptual-motor programs; use of testing instruments. Prerequisite: Psy 201,202.

PE 412 Movement Skill Learning (g)
3 hours 3 ①
Performance limitations; learning, retention, and relearning of movement behavior; diagnosis, prescription, and experimental manipulation of learning variables. Prerequisite: PE 311. Not offered every year.

PE 423
Biomechanics of Motor Activities (g)
3 hours 2 ① 1 ②
Biomechanical concepts involved in analysis of motor activities; force, equilibrium, and motion. Prerequisite: Mth 102; physical science sequence; PE 323. Not offered every year.

PE 424 Gerokinesiatrics (g)
3 hours to be arranged
Gerontological influence of physical conditioning regimen on muscular, cardio-respiratory, and neuromuscular mechanisms. Prerequisite: GS 452; PE 433. Not offered every year.

PE 433 Physiology of Exercise (g)
3 hours 2 ① 1 ②
Physiological effect of physical activity. Prerequisite: PE 324.

PE 434 Physiological Basis of Strength Development (g)
3 hours 3 ①
Physiological and biochemical factors involved in strength development. Prerequisite: PE 323, 433. Not offered every year.

PE 436 Cardiovascular Dynamics (g)
3 hours 2 ① 1 ②
Physiological concepts involved in cardiovascular adaptation. Prerequisite: PE 433.

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[1] Credit for PE 401,405,406,407,408, singly or combined, must not exceed 9 hours in a graduate degree program.

PE 442 Athletic Training Programs
3 hours 3 ①
Medical-legal implications, professional personnel relationships, scope of employment, current issues and problems associated with athletic training. Prerequisite: PE 357.

PE 444 Adapted Physical Education
(g) 3 hours 3 ①; lab to arrange
Overview of cognitive, sensory, neurologic, and orthopedic impairments; organization and instruction of physical education programs for students with these disabilities. Prerequisite: PE 323, 324.

PE 445
Therapeutic Physical Education (g)
3 hours 3 ①
Principles and techniques of therapeutic exercises, activities and programs for a variety of conditions which require rehabilitation. Prerequisite: PE 444.

PE 446 Aging Adult Physical Activity Programs (g)
3 hours 3 ①
Organization and administration of physical activity programs for the aging adult in public and private agencies. Prerequisite: PE 433; H 433 or GS 452.

PE 447
Mainstreaming in Physical Education
(g) 3 hours 3 ①
Effectiveness of integrated physical education and sport experience on handicapped and nonhandicapped participants. Prerequisite: PE 444.

PE 451 Competitive Athletics (g)
3 hours 3 ①
Analysis of competitive athletic programs in schools and colleges with emphasis on new developments and findings. Prerequisite: PE 312.

PE 452 Sport and Society
3 hours 3 ①
Nature of sport in contemporary society; interrelationships between sport and cultural institutions. Prerequisite: 6 hours social science.

PE 454
History of Physical Education and Sport
(g) 3 hours 3 ①
History of physical education from early societies to modern times. Prerequisite: PE 211 or 312. Not offered every year.

PE 455 Facilities (g)
3 hours 3 ①
Planning construction of indoor and outdoor physical education facilities; relationship of staff, architect, and community; analysis of gymnasium and field spaces. Prerequisite: PE 461. Not offered every year.

PE 461 School Programs
4 hours 4 ①
Administrative policies and practices; curricular programs and variations from kindergarten through grade 12. Prerequisite: PE 311.

PE 463
Administration of Physical Education
(g) 3 hours 3 ①
Problems; organization of departments and of instructional and recreational programs; supervision of physical plant. Prerequisite: PE 461.

PE 465
Psychomotor Instructional Systems (g)
3 hours 3 ①
Planning, designing, and producing instructional systems to achieve predictable psychomotor learning. Prerequisite: PE 461.

PE 471
Evaluation of Physical Education
3 hours 3 ①
Techniques for evaluating knowledge, skill, attitudes, appreciations, and organic vigor through physical education instruction. Prerequisite: PE 311 or 312.

PE 473 Psychomotor Measurement
(g) 3 hours 3 ①
Tests and techniques for measuring psychomotor development: anthropometrics, somatotyping, body image, athletic motivation and attitude, strength flexibility, balance, and agility. Prerequisite: PE 412 or 471.

PE 474
Stress Physiology Instrumentation (g)
1 hour 1 ②
Instrumentation, calibration, validity, reliability of human performance measurement schedules; data reduction process. Prerequisite: PE 433. Not offered every year.

PE 475 Research in Human Movement
(g) 3 hours 3 ①
Investigation and evaluation of research applicable to human movement study and professional physical education. Prerequisite: PE 471 or 473.

PE 491 Selected Topics (g)
3 hours 3 ①
Impact of human movement developments on people, their movement behavior and environment. Topics vary from term to term and year to year. Prerequisite: senior standing.

PE 494 Professional Activities
2 hours 2 ②
Grades K-12: badminton, bowling, folk dance, modern dance. Prerequisite: competency.

HOME ECONOMICS

FACULTY

As of January 1982

Betty E. Hawthorne, *Dean*
Patricia Coolican, *Associate Dean for Extension*
Margy Woodburn, *Associate Dean for Research*
Elaine K. Carlson, *Assistant Dean*
Maryanne Staton, *Coordinator of Special Programs*
Constance Plants, *Coordinator, Learning Resource Center*
Elaine Cull, *Assistant to the Dean*

Professors Emeritus Anderson, Bailleaux, Baker, Brown, Carlin, Charley, Cleveland, Diedesch, Edaburn, Edwards, Fincke, Fulmer, Funk, Garrison, Grant, Harger, Kirkendall, Ledbetter, Mackey, Moser, Patterson, Petzel, Plonk, Scales, Sinnard, Storvick, Strawn, Tank, Taskerud, Van Horn, Ware, Wells, Yearick

Clothing, Textiles, and Related Arts *Professor* Henton
Associate Professors Gates (acting department head), Koester
Assistant Professors Bryant, Bubl, Jordan
Instructors Deveney, Fehringer, Leisinger, Ulrich

Family Resource Management *Associate Professors* Olson (department head), Badenhop, Morrow
Assistant Professors Brandt, Dickinson, Guthrie, Harter, Holyoak
Instructor Snider

Foods and Nutrition *Professors* Woodburn (department head), Bussard, Hawthorne, Sohn (courtesy)
Associate Professors Barte, East, Holmes, Johnson, Kelsey, Leklem, Miller, Peters
Assistant Professors Bakke, Cerklewski, Oh, Raab
Instructor Miner
Research Assistants Barstow, Hardin, Monaco

Home Economics Education *Professor* Lee
Associate Professors Grieve, Wallace
Assistant Professors Hall (acting department head), Mellen

Human Development and Family Studies *Professors* Henton (department head), Gravatt, Kuipers, O'Neill, Staton
Associate Professors Straatman, Sugawara
Assistant Professors Cate, Larzelere (courtesy), Nelson, Pratt, Schmall, Tomine
Instructor Kerr

Institution Management *Associate Professor* Messersmith (department head), Kelsey
Instructor Benriter

Interdisciplinary Degree Programs

Health Care Administration *Professor* Ellis (program director)

Hotel and Restaurant Management *Associate Professor* Soule (program director)
Instructors Behrendt (visiting), Kluge

The School of Home Economics provides professional education in the several areas of its curricula and contributes to the general education of undergraduate students of the University.

Family is the core of home economics, an interdisciplinary field concerned with the aesthetic, economic, physical, biological, psychological, and social needs of family members.

Home economics focuses on relationships, services, goods, and resources which help people function within the limits of their environment. Home economists help families and individuals deal with different and changing lifestyles as well as the local, national, and world conditions having an impact on families.

Home economists use theory and knowledge from relevant humanities and sciences to develop a research and empirical base for the various subject matter disciplines. Outcomes are used by individuals, families, and communities as they strive to set and attain their goals.

Specializations in the School of Home Economics are grouped into six departments:

- clothing, textiles, and related arts
- human development and family studies
- family resource management
- foods and nutrition
- home economics education
- institution management.

The departments are bound together by their common focus to create a comprehensive study of human needs, resources, and behavior. Resident instruction, research, Extension, and public service programs in these areas are applied to concerns of daily life.

The School of Home Economics is accredited by the Council for Professional Development of the American Home Economics Association.

Home Economics Degree Programs

The Bachelor of Science (B.S.) and Bachelor of Arts (B.A.) degrees are offered with a major in home economics. For either degree, the *common requirements* and one of the following *areas of concentration* must be satisfactorily completed: apparel and textile design, early childhood education, family economics and management, family studies, fashion merchandising, foods and nutrition, general home economics, home economics education, home economics with communication, housing, human development, institution management and dietetics, interior merchandising, textile science. The *area of concentration* will be indicated on the diploma.

Additional requirements for the Bachelor of Arts degree are listed on page 13.

Advanced degrees in home economics offered through the Graduate School are the Master of Science (M.S.), Master of Arts (M.A.), Master of Home Economics (M.H.Ec.), and Doctor of Philosophy (Ph.D.). The M.S. and M.A. degrees are offered in areas of all departments. A student may work toward the M.H.Ec. degree in general home economics only. The Ph.D. is offered in foods, nutrition, human development, family studies, and family resource management.

Graduate students in home economics may be involved with the faculty in various research projects. The school cooperates with the Agricultural Experiment Station in research programs and undertakes studies supported by federal, state, private, and general research funds.

Transfer students must take a minimum of 15 hours of home economics courses at Oregon State University. The department or committee responsible for the student's major will determine the courses to take.

Home economics courses may be challenged for advanced placement or credit by applying for a departmental examination. For details and fee schedule, see *Schedule of Classes.*

The student whose education is interrupted must take a minimum of 12 hours of home economics courses at Oregon State University within five years of graduation. The department or committee responsible for the student's major will determine the courses to take. This student must also take a minimum of 15 term hours of science and social science, with at least 4 term hours in each (not necessarily in residence at Oregon State University), within 10 years of graduation. The department or committee responsible for the student's major program will approve specific courses. Additional recency requirements for the several areas of concentration may be prescribed by the department or committee concerned.

The *University Honors Program* in the School of Home Economics is coordinated with the programs in other schools and colleges and administered by the director of the University Honors Program (see page 37). Information concerning eligibility and application forms may be obtained from the director.

Interdisciplinary Degree Programs

Health Care Administration, a joint program of the Schools of Business, Health and Physical Education, and Home Economics, offers professional preparation for administrative positions in long-term care facilities, or middle management careers in private health care organizations and public health agencies. See page 226 for a description of the program.

Hotel and Restaurant Management is a joint program with the Schools of Business and Home Economics. The program offers professional preparation for a variety of management careers in the lodging and foodservice industry, in hotels, motels, restaurants, clubs, condominiums, resorts, and residential developments. The program is described on page 227.

Special Programs

One-year and two-year students: Students interested in home economics but not in a degree program may plan, with the help of their advisers, combinations of courses to meet individual capabilities and interests. In such programs students may include various courses for which they have the necessary background in other schools and departments on the campus.

Correspondence study: A limited number of home economics courses are offered by correspondence through the OSU Division of Continuing Education independent study program.

Field study: Upper division students in home economics may earn credit for off-campus, supervised work experience related to their career goals. A maximum of 18 hours may be applied toward graduation. Applications for field study must be approved the term prior to proposed placement. Details are available from advisers and from the coordinator of special programs.

Affiliations for special studies: The School of Home Economics attempts to broaden the professional training of students by carrying affiliations with other academic units and institutes. For information about applications, see the assistant dean of the School of Home Economics.

Crippled Children's Division: As a part of the Oregon Health Sciences University, the Crippled Children's Division on the medical school campus in Portland administers the Child Development and Rehabilitation Center. Qualified students may be designated as trainees at the center and become involved in practicum experience training in the area of mental retardation and associated handicapping conditions. In addition to didactic training, trainees have opportunities to engage in evaluative, therapeutic, research, and teaching activities in an interdisciplinary setting. Students interested in any phase of child development, family relations, foods and nutrition, social service work, or early childhood education may apply for placement during their junior or senior year.

Preparation

A sound high school background in English, mathematics, sciences, and social sciences is necessary. Electives in home economics, a foreign language, art, and journalism are recommended.

Academic Advising

Academic advising is regarded as an important responsibility by faculty. Each student is considered an individual, and his or her study program is developed in personal consultation with a faculty adviser and based on the student's background, aptitudes, interests, and academic progress.

Common Requirements for Home Economics Majors

HUMANITIES, ARTS, AND COMMUNICATIONS ..... 27 hours
(must meet University general education requirements—page 13)

English Composition, Wr 121
Informative Speaking (Sp 112) or Introduction to Persuasion (Sp 113)
Three additional hours in written or oral English communication. Satisfactory completion of a basic writing skills test is required of juniors before completion of 120 hours. Satisfactory completion of term paper required, verified by department.
At least three other areas, one in depth (5 hours or more) to include Basic Design (Art 110) or The Visual Experience/An Introduction (Art 101). (This requirement is modified in the early childhood education program.) Others selected from American studies, architecture and landscape architecture, art, foreign languages, history, journalism, literature, music, philosophy, religious studies, women studies (no more than 3 hours in performing arts).

SOCIAL AND NATURAL SCIENCES ..... 45 hours

Social sciences (minimum, 13 hours), two areas selected from:
General Psychology (Psy 201,202), Sociology (Soc 204 + 3 hours), Principles of Economics (Ec 213,214), Introduction to Cultural Anthropology (Anth 106)
Natural sciences (modified in early childhood education program)
One laboratory sequence of at least three terms in a physical or biological science area and at least one course in the other area, selected from:
Physical sciences—chemistry, physical science, physics
Biological sciences—gen biology, bot, microbiol, physiology, zoology
Intermediate Algebra I (Mth 95) or demonstrated proficiency (two years of high school algebra with a grade average of B). Math requirement must be completed by the end of the sophomore year.
Additional social and/or natural sciences to fulfill 45-hour requirement

PHYSICAL EDUCATION ..... 3 hours

HOME ECONOMICS ..... 21 hours

Perspectives in Home Economics (HEc 101), 1 hour, or for transfer students, Home Economics Professions (HEc 230), 1 hour
Contemporary American Families (HDFS 240), 3 hours
Prenatal and Infant Development (HDFS 225), 3 hours
[1]Textiles (CT 250) or Clothing and Man (CT 211), 3 hours
Human Nutrition (FN 225), 4 hours
Family Housing and Its Environment (FRM 235), 3 hours
Decision Making and the Consumer (FRM 250), 3 hours
Contemporary Issues in Home Economics (HEc 412), 1 hour

Freshman Year

Freshmen in home economics usually take 48 hours during the three terms and in conference with their advisers select courses from the following:

	Hours
Perspectives in Home Economics (HEc 101)	1
Basic Design (Art 110) or The Visual Experience/An Introduction (Art 101)	4
Science sequence with laboratory	9–13
English Composition (Wr 121)	3
Informative Speaking (Sp 112) or Introduction to Persuasion (Sp 113)	3
Intermediate Algebra I (Mth 95), if not exempted	(4)
Human Nutrition (FN 225)	4
Prenatal and Infant Development (HDFS 225)	3
Textiles (CT 250) and/or Clothing and Man (CT 211)	3–6
Contemporary American Families (HDFS 240)	3
Decision Making and the Consumer (FRM 250)	3
Courses from humanities and/or arts, social sciences, or area of concentration	0–9
Physical education activities	3

Sophomore, Junior, and Senior Years

The curricula in the sophomore, junior, and senior years are designed to provide the professional proficiencies required by one or more of the several fields of home economics. A total of 60 upper division hours is required for graduation.

[1]A choice of Clothing and Man *or* Textiles is allowed in the following areas of concentration: family studies, foods and nutrition, institution management and dietetics, early childhood education, and human development *Textiles is required in all others.*

AREAS OF CONCENTRATION, Additional and/or Specific Requirements

APPAREL AND [1]TEXTILE DESIGN

Requirements

HUMANITIES, ARTS, AND COMMUNICATIONS

Basic Drawing (Art 105)	4
Basic Design (Art 110)	4
Hst of West Civ (Hst 101,102,103 *or* Hst 121,122)	9–10
Photojournalism (J 334)	3
Approved Gen Ed Comm, from: J 111, 212,223,317, Wr 214,222,233,234,235, 316,323,324,327, Sp 112,113 (may not duplicate school speech requirement)	3

SOCIAL AND NATURAL SCIENCES

Cultural Anth (Anth 106)	5
Prin of Econ (Ec 213,214)	8
Gen Psy (Psy 201,202)	6
Gen Soc (Soc 204 and 3 hours selected from Soc 206,211,220,312,341)	6
Gen Chem (Ch 104,105,106 *or* 201,202,203)	13 or 9

APPAREL AND TEXTILE DESIGN CORE

Clothing and Man (CT 211)	3
Construction Lab (CT 225)	1
Analysis of Apparel Const (CT 226)	3
Textile Laboratory (CT 251)	1
Fundamentals of Fashion (CT 270)	3
Hist/cultural courses from: Hist Costume (CT 362), Hist Tex (CT 460), World Tex (CT 461), Costume and Cul (CT 463)	6
Basic Acct and Fin Anal (BA 217)	3
Marketing (BA 312)	4

Additional Requirements for Each Option

Apparel Design Option

Apparel Construction (CT 227)	3
Fashion Design (CT 311)	3
Flat Pattern (CT 327)	4
Fashion Market Anal (CT 370)	3
Fashion Design (CT 411)	3
Clothing for Special Needs (CT 415)	3
Draping (CT 427)	3
Select from: Const with Spec Fab (CT 322), Tailoring (CT 328), Projects (CT 406)	3
Drawing/Figure (Art 205)	3
Lettering (Art 244) *or* Calligraphy (Art 249)	3
Select from: Bus Law (BA 226), Org Behavior (BA 361), Market Mgmt (BA 471), Mgmt of Market Comm (BA 473), Cons Behavior (BA 476)	4

[1] Textile Design Option

Tex Des: Weaving (CT 235)	3
Intro to Resident Inter (CT 341)	3
Tex for Interiors (CT 352)	2
Textile design studio courses from: Fiber Design: Intro (Art 321), Fiber Design: Const (Art 322), Fiber Design: Dye (Art 323), Tex Des: Multi-Harness Weave (CT 335), Tex Des: Dyeing (CT 336), Tex Des: Double Weave (CT 337), Tex Des: Weaving Studio (CT 435)	12
Tex Proc (CT 355) *or* Dev in Tex (CT 450)	3
Econ of Tex and App Indus (CT 475)	4
Business Law (BA 226)	3

Electives

Must include sufficient upper division courses to ensure total of 60 upper division hours 33–48

EARLY CHILDHOOD EDUCATION

(*Cooperative with School of Education*)

Requirements (subject to change to conform to certification requirements). In addition to the courses listed, a First Aid Certificate and a passing score in the Basic Competency Test are required.

HUMANITIES, ARTS, AND COMMUNICATIONS — *Hours*

U.S. history (any)	3
Informative Speaking (Sp 112) *or* Intro to Per (Sp 113)	3
Art in Elementary School (Art 313)	4
Music for Elementary Teachers (Mus 371)	4
Language arts (literature, drama, writing, speech, journalism)	7

[1] The textile design option has been temporarily suspended.

SOCIAL AND NATURAL SCIENCES

Social Sciences (minimum of 15 hours)

General Psychology (Psy 201,202)	6
Sociology (Soc 204 + 3 hours)	6
Electives (one term geography recommended)	3

Natural Sciences

Physical Science (GS 104)	4
Science (any)	4
General Biology (GS 101,102)	8
Math for Elem Teach (at least 2 terms selected from Mth 191,192,193; 6 hours additional math)	12
Elective: social *or* natural science	2

HEALTH AND PHYSICAL EDUCATION

School Health Ed (H 369)	3
Elem School Phys Ed (PE 320)	3

HOME ECONOMICS

Personal and Family Finance (FRM 341)	3
Dev in Early Child (HDFS 311)	3
Family Relationships (HDFS 322)	3
Parent Education (HDFS 423)	3

EARLY CHILDHOOD EDUCATION

Theory and Practicum II	
Dir Exp with Young Child (HDFS 326)	2
Theory and Prac: Campus (Ed 311)	6
Theory and Prac II: Media (Ed 406L)	2
Preschool Child Lab (HDFS 426)	2
Programs in Early Child (HDFS 427)	3
Theory and Practicum III	
Supervised Nursery School Exp (HDFS 429)	9
Theory and Practicum: Elem (Ed 367)	15
Research: Lang Arts (Ed 401F)	1
Methods in Reading: Elem (Ed 350)	6
Kindergarten Education (Ed 450)	3
Theory and Practicum: Elementary Student Teaching (Ed 415) and Seminar (Ed 407)	15–18
Civil Rights Laws in Ed (Ed 407A) *or* Teach and the Law (Ed 476)	1–3

Electives

Must include sufficient upper division courses to ensure total of 60 upper division hours 10–13

FAMILY ECONOMICS AND MANAGEMENT

Requirements

HUMANITIES, ARTS, AND COMMUNICATIONS

Common requirements only

SOCIAL AND NATURAL SCIENCES

Principles of Economics (Ec 213,214)	8
General Psychology (Psy 201,202)	6
Sociology (Soc 204 + 6 hours)	9
Principles of Statistics (St 311)	3

HOME ECONOMICS

Clothing and Man (CT 211)	3
Foods (FN 215)	5
Meal Management (FN 313)	3
Home Equip and Energy Manag (FRM 330)	3
Organ and Use of House Space (FRM 335)	3
Personal and Family Finance (FRM 341)	3
Fam Manag Systems (FRM 420)	4
Courses selected from: Consumer Economics (FRM 412), House Planning in Rel to Function (FRM 435), Housing Policy and Prog (FRM 465), Home Management Theory (FRM 440), Economics of the Family (FRM 441), Com Serv and Wel of Fam (FRM 470), Adv Personal Finance (FRM 481)	6
Home economics courses other than family resource management (to ensure 24 upper division hours in home economics)	6

Electives

Must include sufficient upper div courses to ensure total of 60 upper div hours 60

FAMILY STUDIES

Requirements

HUMANITIES, ARTS, AND COMMUNICATIONS — *Hours*

Common requirements only

SOCIAL AND NATURAL SCIENCES

General Psych (Psy 201,202)	6
Sociology (Soc 204 + 3 hours)	6
Upper division sociology, psychology or anthropology	9
Physiology (Z 332,333)	6

HOME ECONOMICS

Human Sexuality (HDFS 200)	3
Family and Human Develop (HDFS 215)	3
Marriage and Loving Relat (HDFS 222)	3
Interper and Fam Dynam (HDFS 233)	3
Studies in Fam and Human Develop (HDFS 312) *or* Prin of Stat (St 311)	3
Develop and Eval of Fam Life Prog (HDFS 315)	3
Family Relationships (HDFS 322)	3
Parenting (HDFS 325)	3
Proj (HDFS 406) or Field Exper (HDFS 410)	6–9
Perspect on Aging (HDFS 445)	3
Hum develop and fam studies electives	15
Family Nutrition (FN 325)	3
Personal and Fam Finance (FRM 341)	3
Seminar: Orient to Field Study (HEc 407)	3
Comm Serv and Welfare of Fam (FRM 470)	3

Electives

Must include sufficient upper division courses to ensure total of 60 upper division hours 33–36

FASHION MERCHANDISING

Requirements

HUMANITIES, ARTS, AND COMMUNICATIONS

Basic Design (Art 110)	4
Hst of Western Civ (Hst 101,102,103 *or* (Hst 121,122)	9–10
Written and oral communication from: J 111,212,223,317, Wr 214,222,233,234, 235,316,323,327, Sp 112, 113 (may not duplicate school speech requirement)	3

SOCIAL AND NATURAL SCIENCES

Gen Psych (Psy 201,202)	6
Prin of Econ (Ec 213,214)	8
Sociology (Soc 204 and 3 hours selected from Soc 206,211,220,312, or 341)	6
Cult Anth (Anth 106A or 106)	3–5

HOME ECONOMICS

Clothing and Man (CT 211)	3
Construction Lab (CT 225)	1
Anal of Apparel Const (CT 226)	3
Textile Lab (CT 251)	1
Fundamentals of Fash (CT 270)	3
Fash Market Analysis (CT 370)	3
Fash Merchand (CT 371)	3
Econ of Tex and App Ind (CT 475)	4
Per and Fam Fin (FRM 341)	3
Historic/Culture select from: Hist Costume (CT 362), Hist Tex (CT 460), World Tex (CT 461), Costumes and Cult (CT 463)	3
Textiles select from: Tex for Inter (CT 352), Tex Proces (CT 355), Dev in Tex (CT 450), Tex Fibers (CT 451), Eval of Tex Perform (CT 453)	2–3
Design select from: Tex Des: Weaving (CT 235), Fash Design (CT 311), Flat Pattern (CT 327), Tex Des: Dyeing (CT 336), Clothing for Spec Needs (CT 415)	3–4
Interiors select from: Tech Skills in Inter Illus (CT 241), Intro to Resident Inter (CT 341), Inter Merchand Proced (CT 342), Hist of Furn (CT 440), Elem of Inter Space Plan (ALA 223)	3

BUSINESS ADMINISTRATION

Intro to Bus Data Proc (BA 131) *or* Basic Acct and Fin Anal (BA 217)	3–4
Marketing (BA 312)	4
Business courses selected from: Bus Law (BA 226), Org Behavior (BA 361), Market Manage (BA 471), Manage of Market Commun (BA 473), Cons Behavior (BA 476), Bus and Its Environ (BA 495), Manage and Labor (BA 496)	12

Electives

Must include sufficient upper division courses to ensure total of 60 upper division hours 39–43

FOODS AND NUTRITION

General Requirements for All FN Options

HUMANITIES, ARTS, AND COMMUNICATIONS

No special requirements common to all options

SOCIAL AND NATURAL SCIENCES *Hours*

Prin of Econ (Ec 213,214) 8
General Chemistry (Ch 201,202,203 or Ch 104,105,106 or Ch 204,205,206)....9–15
Organic Chemistry (Ch 331,332,333 or Ch 334,335,336) 8–9
Introductory Microbiology (Mb 130) or General Microbiology (Mb 302,303) 3–5
Physiology (Z 332,333) 6

HOME ECONOMICS

Personal and Family Finance (FRM 341).. 3
Foods (FN 220,221 or FN 215,335) 8
Meal Management (FN 313) 3
Human Nutrition (FN 417,418,419) 8

Additional Requirements for Each Option

General Foods and Nutrition Option

General Chemistry Lab (Ch 107 or 207) 2
Organic Chemistry Laboratory (Ch 337) .. 2
Gen Psych (Psy 201,202) or sociology (Soc 204 + 3 hours) or Cult Anthrop (Anth 106) 5–6
Quantitative Analysis (Ch 234) 4
Elementary Biochemistry (BB 350) 4
Intermediate Algebra II (Mth 101) 4
Trigonometry (Mth 102) 4
(General Botany (Bot 201) recommended)
Major courses selected from:
Family Nutrition (FN 325), Food Demonstrations (FN 412), Family Food Purchasing (FN 411), Home Food Preservation (FN 414), Food Economics (FN 415), Cultural Aspects of Foods (FN 416), Nutrition in Disease (FN 420), Child Nutrition (FN 421), Advanced Foods (FN 425), Experimental Food Studies (FN 435), Research (FN 401), Reading and Conference (FN 405), Seminar (FN 407), Quantity Food Production (IM 311), Home Equip and Energy Manag (FRM 330) 12

Clinical and Therapeutic Dietetics and Community Nutrition Options (both meet American Dietetic Association academic requirements)

Common Requirements

Adv Exp Writing (Wr 316) or Tech Report Writing (Wr 327) 3
General Psychology (Psy 201,202) 6
Sociology (Soc 204) 3
Nutrition in Disease (FN 420) 3
Quantity Food Production (IM 311) 4
Org and Mgmt of Food Services (IM 445) 5
Ed Psych: Learning (Ed 312) or Strat of Nutr Ed (HEd 321) 3
Stat Methods (St 451) or Prin of Stat (St 311,312) 4–6

Clinical and Therapeutic Dietetics Option

Specific Requirements

General Chemistry Lab (Ch 107 or 207) 2
Organic Chemistry Laboratory (Ch 337).... 2
General Biochemistry (BB 450,451) 7
Intermediate Algebra II (Mth 101) 4
Trigonometry (Mth 102) 4
Child Nutrition (FN 421) 3
(Cultural Anthropology recommended)

Community Nutrition Option

Specific Requirements

Elementary Biochemistry (BB 350) 4
Family Nutrition (FN 325) 3
Seminar: Community Nutrition (FN 445) 4
Field Experience (FN 410) 3
Comm Serv and Welfare of Families (FRM 470) *or* Community Organization (Soc 475) 3
(Food Economics (FN 415) or Family Food Purchasing (FN 411) recommended)

Electives

Varies with option: must include sufficient upper division courses to ensure total of 60 upper division hours 25–57

GENERAL HOME ECONOMICS

Requirements

HUMANITIES, ARTS, AND COMMUNICATIONS *Hours*

Common requirements only

SOCIAL AND NATURAL SCIENCES

General Psychology (Psy 201,202) 6

HOME ECONOMICS

Clothing and Man (CT 211) 3
Construction Lab (CT 225) and Anal of Apparel Construc (CT 226) 3–4
Intro to Resident Inter (CT 341) 3
Devel in Early Childhood (HDFS 311) 3
Foods (FN 215 or 220,221) 5–8
Fam Nutrition (FN 325) or Meal Management (FN 313) 3
Personal and Family Finance (FRM 341) .. 3
Upper division courses
Clothing, tex, and related arts (3 hrs), Human devel and fam studies (3 hrs), Family resource management (3 hrs), Choice (5-6 hrs) 14–15

Electives

Must include sufficient upper division courses to ensure total of 60 upper division hours 54–59

HOME ECONOMICS EDUCATION

General Requirements for All Options

HUMANITIES, ARTS, AND COMMUNICATIONS *Hours*

Basic Design (Art 110) 4

SOCIAL AND NATURAL SCIENCES

General Psychology (Psy 201,202) 6
Sociology (Soc 204) 3
Physiology (Z 332,333) 6
Principles of Economics (Ec 213) 4
Sociology elective or Principles of Economics (Ec 214) 3–4

HOME ECONOMICS

Clothing and Man (CT 211) 3
Construction Lab (CT 225) 1
Devel in Early Childhood (HDFS 311) .. 3
Family Relations (HDFS 322) 3
Foods (FN 215) 5
Meal Management (FN 313) 3
Personal and Fam Finance (FRM 341) .. 3

EDUCATION

Theory and Prac II: Field (Ed 309) 5
Theory and Prac II: Media (Ed 309M) 1
Theory and Prac II: Campus (Ed 311) 6
Theory and Prac: Field (Ed 313) 6
Methods of Reading: Secondary (Ed 451) 3
Special Secondary Methods (Ed 411) 3
Organ and Admin of Homemaking Ed (HEd 422) 3
Sem: Problems of Beginning Teacher (HEd 407) 3
Theory and Prac: Student Teaching (Ed 416) 12
Civil Rights Laws in Ed (Ed 407) 1

Additional Requirements for Each Option

General Home Economics Option

Analysis of Apparel Const (CT 226) 3
Apparel Construction (CT 227) 3
Family Nutrition (FN 325) 3
Dir Exp with Preschool Child (HDFS 326) 2
Select 3-4 hours from each group:
Group I
Management in the Home (FRM 420) 4
Community Services and Welfare of Families (FRM 470) 3
Group II
Intro to Resident Inter (CT 341) 3
Household Equipment (FRM 330) 3
Organ and Use of House Space (FRM 335) 3

Occupational Option

Occupational Internship (VEd 410) 4
Occupational Prep in Home Ec Ed (HEd 427) 3

Foodservice Emphasis

Home Equip and Ener Manag (FRM 330) and Fam Food Purch (FN 411) or Equip Plan and Facil Des (IM 441) and Foodser Procur and Indust Sys (IM 442) 6
Quant Food Prod (IM 311) or Foodser Sys (IM 415) 3–4
Field Exper (IM 410) 4

Child Care Service Emphasis

Dir Exp with Preschool Child (HDFS 326) 2
Ed Prog in Early Child (HDFS 427) 3
Admin of Hum Serv (HDFS 435) 3
Preschool Child Lab (HDFS 426) 2

Electives

Varies with option: must include sufficient upper division courses to ensure total of 60 upper division hours 11–15

HOME ECONOMICS WITH COMMUNICATIONS

General Requirements for All Options

HUMANITIES, ARTS, AND COMMUNICATIONS *Hours*

Beginning Broadcast (BMC 262) 3
Journalism (J 111,212) 7
Upper division speech or journalism 3

SOCIAL SCIENCE, NATURAL SCIENCES

Prin of Economics (Ec 213,214) 8

HOME ECONOMICS

Clothing and Man (CT 211) 3
Intro to Resident Inter (CT 341) 3
Hum devel and fam studies elective 2–3
Home Equip and Ener Manag (FRM 330) 3
Personal and Family Finance (FRM 341) 3
Foods (FN 215) 5

Electives

Approved electives in speech, journalism, writing, art, and/or business administration 11
Business administration courses recommended: Intro to Business Data Processing (BA 131), Marketing (BA 312), Personnel Management (BA 467), Marketing Management (BA 471), Management of Marketing Communications (BA 473), Consumer Behavior (BA 476), International Marketing (BA 484).

Additional Requirements for Each Option

General Home Economics Option

Upper division courses in each of the following: foods and nutrition and/or institution management; clothing, textiles, and related arts; hum devel and fam studies; and family resource management 17–18

Clothing and Textiles Option

History of Western Civ (Hst 101,102,103 or 121,122) 9–10
Construction Lab (CT 225) and Analysis of Apparel Construction (CT 226) 3–4
Fashion Market Analysis (CT 370) 3
Historic Costume (CT 362) or Historic Textiles (CT 460) 3
Upper division courses in CTRA 11

Foods and Nutrition Option

General Chemistry (Ch 201,202,203 or Ch 104,105,106) 9–13
Physiology (Z 332,333) 6
Introductory Microbiology (Mb 130) or General Microbiology (Mb 302,303) 3–5
Meal Management (FN 313) 3
Family Nutrition (FN 325) 3
Family Food Purchasing (FN 411) 3
Food Demonstrations (FN 412) 3
Upper division courses in FN and/or IM (FN 335 recommended) 6

Consumer Affairs Option

Consumer Economics (FRM 412) 3
Economics of the Family (FRM 441) 3
Adv Pers and Fam Finance (FRM 481).... 3
Consum Serv and Welfare of Fam (FRM 470) 3
Family Manag Sys (FRM 420) 3
Marketing (BA 312) and Consum Behav (BA 476) (May be applied toward group electives above) 9
Interest Groups and Pub Opin (PS 326) or Pub Policy Prob (PS 334) (May be applied toward social science requirement) 5
400-level courses from two of the following areas: cloth, tex, and rel arts; foods and nutr; fam res manag 6–7

Electives

Varies with option: must include sufficient upper division courses to ensure total of 60 upper division hours 40–46

HOUSING

Requirements

HUMANITIES, ARTS, AND COMMUNICATIONS	*Hours*
Basic Design (Art 110)	4
Graphics (ALA 111)	3
Delineation (ALA 200)	3
House Planning and Arch Phil (ALA 178)	3
Arch Drawing (ALA 179)	3
Arch House Plan (ALA 180)	3
Construction (ALA 218)	3
Landscape Design Theory (ALA 280)	3
Landscape Design I (ALA 290,291)	6
Recommended: History sequence (Hst 101, 102,103 or Hst 121,122)	(9-10)

SOCIAL AND NATURAL SCIENCES

General Psychology (Psy 201,202)	6
Principles of Economics (Ec 213,214)	8
Sociology (Soc 204 + 3 hours)	6

HOME ECONOMICS

Textiles Lab (CT 251)	1
Intro to Resident Inter (CT 341)	3
Textiles for Interiors (CT 352)	3
Home Equip and Ener Manag (FRM 330)	3
Organ and Use of Household Space (FRM 335)	3
Personal and Family Finance (FRM 341)	3
House Planning in Relation to Function (FRM 435)	3
Hous for Spec Needs (FRM 455)	3
Hous Policy and Prog (FRM 465)	3
Family Relations (HDFS 322)	3
Projects (simulated or actual field experience) (CT 409 or FRM 410)	3–9

Electives

Must include sufficient upper division courses to ensure total of 60 upper division hours 44–50

HUMAN DEVELOPMENT

Requirements

HUMANITIES, ARTS AND COMMUNICATIONS	*Hours*
Common requirements only	

SOCIAL AND NATURAL SCIENCES

General Psych (Psy 201,202)	6
Sociology or anthropology, including General Sociology (Soc 204)	9
Upper division sociology, psychology, or anthropology	9
Physiology (Z 332,333)	6

HOME ECONOMICS

Human Sexuality (HDFS 200)	3
Family and Human Develop (HDFS 215)	3
Develop in Early Child (HDFS 311)	3
Studies in Fam and Human Develop (HDFS 312) *or* Prin of Stat (St 311)	3
Develop and Eval of Fam Life Prog (HDFS 315)	3
Parenting (HDFS 325)	3
Dir Exper with Young Child (HDFS 326)	2
Projects (HDFS 406) or Field Exper (HDFS 410)	6–9
Develop in Mid Child and Adoles (HDFS 413)	3
Adult Develop and Aging (HDFS 446)	3
Human develop and fam studies electives	15
Family Nutrition (FN 325)	3
Personal and Fam Finance (FRM 341) or Commun Serv and Welfare of Fam (FRM 470)	3
Seminar: Orient to Field Study (HEc 407)	3

Electives

Must include sufficient upper division courses to ensure total of 60 upper division hours 37–40

INSTITUTION MANAGEMENT AND DIETETICS

General Requirements for Both Options (both meet American Dietetic Association academic requirements)

HUMANITIES, ARTS, AND COMMUNICATIONS	*Hours*
Common requirements only	

SOCIAL AND NATURAL SCIENCES

General Psychology (Psy 201,202)	6
Prin of Economics (Ec 213,214) *or* Sociology (Soc 204 + 6 hours)	8–9
Ec 213 or Soc 204	3–4
General Chemistry (Ch 201,202,203 or Ch 104,105,106 or Ch 204,205,206)	9–15
Organic Chemistry (Ch 331,332 or Ch 334,335)	6
Elementary Biochemistry (BB 350)	4
Physiology (Z 332,333)	6
Introductory Microbiology (Mb 130) or Gen Micro (Mb 302,303)	3–5

HOME ECONOMICS

Foods (FN 215,335)	8
Meal Management (FN 313)	3
Human Nutrition (FN 417,418,419)	7
Quantity Food Production (IM 311)	4
Equip Plan and Facil Des (IM 441)	3
Foodser Procur and Invent Sys (IM 442)	3
Organ and Manag of Foodserv (IM 445)	5

Additional Requirements for Options

Educational Psychology (Ed 312) *or* Extension Methods (EM 411) *or* Adult Ed (Ed 496) *or* Strat in Nutr Ed (HEd 321)	3
Basic Acct and Finan Anal (BA 217)	3
Personnel Management (BA 467)	3

General Dietetics Option

Personal and Family Finance (FRM 341)	3
Nutrition in Disease (FN 420)	3
Upper division courses in foods and nutrition or institution management	3
Intro to Bus Data Proc (BA 131) *or* Intro to Comp Sci (CS 211) *or* Nature of Digit Comp (CS 101) *or* Self-Study Intro FORTRAN Progr (CS 190)	3–4

Management Option

Principles of Economics (Ec 213,214) *required sequence*	8
Labor Economics (Ec 427)	3
Intro to Bus Data Proc (BA 131) *or* Intro to Comp Sci (CS 211) *or* Nature of Digit Comp (CS 101) *or* Self-Study Intro FORTRAN Progr (CS 190)	3–4
Management Processes (BA 302)	4
Personal and Family Finance (FRM 341) or Home Equipment (FRM 330)	3
Field Exper (IM 410) or Projects (IM 406)	3–4

Electives

Varies with option; must include sufficient upper division courses to ensure total of 60 upper division hours 27–40

INTERIOR MERCHANDISING

Requirements

HUMANITIES, ARTS, AND COMMUNICATIONS	
Visual Experience (Art 101)	4
Basic Drawing (Art 105)	4
Basic Design (Art 110)	4
Graphics (ALA 111)	3
Housing and Arch Phil (ALA 178)	3
Delineation (ALA 200)	3
Hst of Western Civ (Hst 101,102,103, *or* Hst 121.122)	9–10
Approved Gen Ed Comm, from: J 111,212, 223,317, Wr 214,222,233,234,235,316, 323,327, Sp 112, 113 (may not duplicate school speech requirement)	3

SOCIAL AND NATURAL SCIENCES

Gen Psy (Psy 201,202)	6
Prin of Econ (Ec 213,214)	8

HOME ECONOMICS

Tech Skills in Inter Illus (CT 241)	3
Tex Lab (CT 251)	1
Intro to Resident Inter (CT 341)	3
Inter Merchand Proced (CT 342)	3
Text for Inter (CT 352)	2
Practicum (CT 409)	3
Hist of Furn (CT 440)	3
Contem Furnish (CT 441)	3
Hist Tex (CT 460) *or* World Tex (CT 461)	3
Select from: Org and Use House Space (FRM 335), Home Equip (FRM 330), Pers and Fam Fin (FRM 341)	3

BUSINESS ADMINISTRATION

Basic Accoun and Fin Anal (BA 217)	3
Marketing (BA 312)	4
Select from: Bus Law (BA 226), Org Behavior (BA 361), Marketing Manag (BA 471), Manag of Market Commun (BA 473), Bus and Its Envir (BA 495), Cons Behavior (BA 476), Manag and Labor (BA 496)	12

Electives

Must include sufficient upper division courses to ensure total of 60 upper division hours 38–39

TEXTILE SCIENCE

Requirements

HUMANITIES, ARTS, AND COMMUNICATIONS	
Basic Design (Art 110)	4
Hst of Western Civ (Hst 101,102,103 *or* Hst 121,122)	9–10
Tech Report Writing (Wr 327)	3

SOCIAL AND NATURAL SCIENCES

Gen Psy (Psy 201,202)	6
Princ of Econ (Ec 213,214)	8
Chemistry (Ch 104,105,106,107 *or* Ch 201,202,203,207 *or* Ch 204,205,206)	11–15
Org Chem (Ch 331,332,333,337) or (Ch 334,335,336,337)	10–11
Quantitative Anal (Ch 234)	4
Physics (Ph 201,202,203)	12
Microbiology (Mb 130 *or* 302)	3
Intermediate Alg II (Math 101)	4
Trig (Math 102) or Calculus Prep (Math 110)	4

HOME ECONOMICS

Clothing and Man (CT 211)	3
Construction Lab (CT 225)	1
Anal of App Constr (CT 226)	3
Tex Lab (CT 251)	1
Intro to Resident Inter (CT 341)	3
Tex Process (CT 355) *or* Dev Tex (CT 450)	3
Tex Fibers (CT 451)	3
Eval of Tex Perfor (CT 453)	3
Hist Tex (CT 460)	3
Econ of Tex and App Indust (CT 475)	4
Select from: Tex Des: Weaving (CT 335), Tex Des: Dyeing (CT 336), Tex for Inter (CT 352), Senior Sem (CT 407A), World Tex (CT 461), Costumes and Cult (CT 463), Research (CT 401), Read and Con (CT 405), Projects (CT 406)	3

Electives

Must include sufficient upper division courses to ensure total of 60 upper division hours 40–50

Program on Gerontology

Administered through the School of Home Economics, the Program on Gerontology offers course work to undergraduate and graduate students throughout the University. Through faculty from seven schools and 14 departments, the programs offers multidisciplinary course work on aging and prepares students for careers in programs on aging, or for work with the elderly as a specialty within a professional area.

Graduate students may earn an integrated minor of 18-36 hours in gerontology study. Undergraduate students may obtain a concentration in gerontology within their chosen discipline and may participate in the gerontology traineeship program. Long-term care administration, an area of concentration in health care administration, is closely related to the Program on Gerontology and helps students prepare for careers as administrators of nursing homes, retirement residences, and service facilities for the elderly.

For further information regarding the program, contact the program director in the Department of Human Development and Family Studies, School of Home Economics.

Special Emphases

Home Economics and Extension

Home economics majors interested in preparing for positions as Extension home economists may obtain a general background in home economics, such as general home economics, home economics education, or home economics with communications, or may elect one of the special areas of concentration. Election of chemistry, microbiology, languages, social psychology, consumer economics, and courses to enhance the student's understanding of communication, human behavior, social issues, special audiences, and teaching methods are recommended. For an Extension career, a master's degree is required in most states.

Home Economics and Community Services

Students interested in preparing for professional opportunities in community services, such as homemaker services, nutrition, youth and children's services, or casework, may add a community services emphasis to areas of concentration in family economics and management; housing; foods and nutrition; human development and family studies or general home economics. (A certificate in human services, an interdisciplinary program administered by the College of Liberal Arts, may be obtained by meeting specified requirements; see page 62. The election of selected courses in social sciences and home economics prepares the student to pursue graduate study in areas such as social work and public health nutrition.

Home Economics Courses

CLOTHING, TEXTILES, AND RELATED ARTS

The Department of Clothing, Textiles, and Related Arts offers undergraduate instruction in the areas of apparel and textile design, fashion merchandising, interior merchandising, and textile science. Advanced courses prepare students for positions in retailing of apparel and home furnishings, apparel production, freelance textile design, textile testing, promotional work for manufacturers, and for graduate work leading to research and college teaching.

The department offers both the M.S. and M.A. degrees. Areas of emphasis include behavioral science aspects of clothing and historic/cultural aspects of clothing and textiles.

Lower Division Courses

CT 191 Career Opportunities in Clothing, Textiles, and Related Arts
1 hour 1 ①
Career opportunities for graduates in clothing, textiles, and related arts; knowledge and skills required for entry-level positions. Self-analysis related to career choices possible with a major in CTRA. Field trip required. Graded P/N.

CT 199 Special Studies
Terms and hours to be arranged

CT 211 Clothing and Man
3 hours 2 ① 1 ①
Sociological, psychological, economic, and aesthetic factors affecting the selection of clothing.

CT 225 Construction Laboratory
1 hour 2 ①
Basic construction concepts and skills, the operation of the sewing machine, and terminology of construction techniques. Designed in units for individual progress. Required diagnostic tests administered first class meeting. Graded P/N.

CT 226 Analysis of Apparel Construction
3 hours 3 ①
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. Prerequisite: CT 225 or waiver, CT 211, 250.

CT 227 Apparel Construction
3 hours 3 ②
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. Prerequisite: CT 225 or waiver, CT 226.

CT 235 Textile Design: Weaving
3 hours 3 ②
Design of looms and projects in simple loom and non-loom techniques; emphasis on frame loom, card, and inkle weaving.

CT 241 Technical Skills in Interiors Illustration
3 hours 3 ①
Practical skills for preparation of interiors and their arrangement. Emphasis on a professional, nonmechanical approach for illustrating interior environments.

CT 250 Textiles
3 hours 3 ①
Properties, identification, selection, use, and care of textile fibers and fabrics.

CT 251 Textile Laboratory
1 hour 1 ②
Identification and analysis of fiber, yarn, fabric construction, color, and finish in textiles. Prerequisite or corequisite: CT 250.

CT 270 Fundamentals of Fashion
3 hours 3 ①
Fashion terminology. Influence of environment on fashion; fashion movement and dissemination; past and present fashion cycles. Use of fashion trade publications. Field trip required. Prerequisite: CT 211; sophomore standing.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

CT 311 Fashion Design
3 hours 1 ① 1 ②
Basic fashion illustration techniques; designing clothing using various sources of inspiration; American fashion designers and their role in the American fashion industry. Prerequisite: CT 226, 270; Art 110.

CT 322 Construction with Special Fabrics
3 hours 2 ③
Experimental methods for developing analytical skills and construction techniques in working with special fabrics. Projects adapted to individual student. Prerequisite: CT 227.

CT 327 Flat Pattern
4 hours 2 ① 2 ③
Pattern design using the flat pattern method; pattern drafting of various garment parts; advanced principles of fitting; development and construction of an individual design. Prerequisite: CT 227,250.

CT 328 Tailoring
4 hours 2 ① 2 ③
Principles of tailoring applied to the construction of a coat or suit. Prerequisite: CT 211,227, 250.

CT 335 Textile Design: Multi-Harness Weaving
3 hours 3 ②
Four-harness loom weaving covering draft analysis, basic weaves, and design of 2D and 3D fabrics. Prerequisite: Art 110; CT 235 or Art 321.

CT 336 Textile Design: Dyeing
3 hours 2 ③
Creation of surface design on textiles through batik, tie-dye, and blockprint, using various dyes and pigments. Prerequisite: Art 110.

CT 337 Textile Design: Double Weave
3 hours 2 ③
Problems in double and tubular weave emphasizing sculptural design; contemporary textile designers. Prerequisite: CT 335.

CT 341 Introduction to Residential Interiors
3 hours 3 ①
Decision making in the selection and use of home furnishings to meet human needs, including aesthetic and construction features, economic considerations, and arrangements of interior furnishings. Prerequisite: CT 250; FRM 235; Art 110.

CT 342 Interior Merchandising Procedures
3 hours 3 ①
Study of interior merchandising procedures: ethics, business, and legal aspects. Professional opportunities and preparation to seek professional positions related to individual competencies. Prerequisite: BA 217,312; CT 341.

CT 352 Textiles for Interiors
2 hours 2 ①
Types, qualities, and maintenance of functional and decorative fabrics for homes and public buildings. Use of specifications, standards, and legislation. Prerequisite: CT 250,251.

CT 355 Textile Processing
3 hours 3 ①
Processing and manufacturing of fibers, yarns, and fabrics. Field trip required. Prerequisite: CT 250. Not offered every year.

CT 362 Historic Costume
3 hours 3 ①
Relation of historic costume to the social and cultural environment. Prerequisite: CT 211,250; Hst 101,102,103.

CT 370 Fashion Market Analysis
3 hours 3 ①
Organization and operation of the domestic and international textile and apparel industries. Communication of merchandising information. Field trip required. Prerequisite: CT 226,270. Prerequisite or corequisite: BA 312.

CT 371 Fashion Merchandising
3 hours 3 ① winter and spring; 10 hours per week for 3 weeks fall
Selection, buying, promotion, and selling of clothing. Management and personnel responsibilities of buyers. Field trips to representative stores. Prerequisite: CT 370; Ec 213; BA 131 or 217, BA 312. Consent of department for fall term only.

CT 401 Research

CT 403 Thesis

CT 405 Reading and Conference

CT 406 Projects

CT 407 Seminar
Section B, Fashion Merchandising, 1 hour, graded P/N.

CT 407 Seminar (g)

CT 407 Seminar (G)

CT 408 Workshop

CT 409 Practicum
Terms and hours to be arranged

CT 410 Field Experience: Fashion Merchandising
12 hours to be arranged, fall
On-the-job experience in a retail store to integrate academic theory and apply knowledge in a work situation with supervision by employing store or department. Prerequisite or corequisite: CT 371. Written consent of department head required.

CT 411 Fashion Design (G)
3 hours 1 ① 2 ②
Fashion illustration techniques using a variety of media; designing clothing for men, women, and children; European fashion designers and their role in the European fashion industry. Prerequisite: CT 311.

CT 415 Clothing for Special Needs
(g) 3 hours 3 ①
Physical, social, psychological, economic, managerial, and aesthetic influences on clothing from infancy through old age and for the physically handicapped. Prerequisite: CT 211,250.

CT 427 Draping (G)
3 hours 1 ① 1 ② 1 ③
Garment design based on manipulation of fabric on a body form; emphasis on creative solutions to design problems and the interrelationships between fabric, design, and form. Prerequisite: CT 327.

CT 435 Textile Design: Weaving Studio (G)
3 hours 3 ②
Comprehensive problems in weaving based upon design and research. Development of portfolio and exhibition of creative work. Prerequisite: 6 hours of 300-level weaving courses. Prior written consent of department head required.

CT 440 History of Furniture (G)
3 hours 3 ①
Historic furnishings in relation to architectural styles and interiors. Prerequisite: CT 341; Hst 101,102,103. CT 460,461 recommended.

CT 441 Contemporary Furnishings
(G) 3 hours 2 ① 1 ②
Designers, materials, and manufacturers of furnishings. Field trips required. Prerequisite: CT 440; ALA 200.

CT 450 Developments in Textiles (G)
3 hours 3 ①
Analysis of recent literature on textile fibers, yarns, fabric construction, color, finishes, maintenance, and labeling. Prerequisite: Ch 106,203, or 206; CT 250; 3 hours upper division clothing, textiles, and related arts; CT 251 recommended.

CT 451 Textile Fibers (G)
3 hours 2 ① 1 ②
Composition and chemical properties; relation to certain structural and physical characteristics. Prerequisite: CT 250,251; Ch 333,337. Not offered every year.

CT 453 Evaluation of Textile Performance (G)
3 hours 1 ① 1 ② 1 ③
Investigations of physical properties of yarns and fabrics; evaluation of data in relation to serviceability. Prerequisite: CT 250,251; one upper division textile course; chemistry or physics sequence.

CT 460 Historic Textiles (G)
3 hours 3 ①
Textiles from ancient times to present from an appreciative and historical point of view. Prerequisite: CT 250; 3 hours of upper division clothing, textiles, and related arts; Hst 101, 102,103. Art 201,202,203 recommended.

CT 461 World Textiles (G)
3 hours 3 ①
National fabrics of past and present from each continent; tapestries, rugs, laces, embroideries, painted and printed fabrics. Prerequisite: CT 250; 3 hours of upper division clothing, textiles, and related arts; Anth 106.

CT 463 Costumes and Cultures (G)
3 hours 3 ①
Primitive, national, and peasant dress in relation to culture, climatic requirements, and available resources and technology. Prerequisite: CT 211,250; 5 hours of sociology or cultural anthropology.

CT 471 Merchandising Planning and Control
3 hours 3 ①
Theories and procedures relating to purchase planning and inventory control techniques in the profitable operation of a fashion department or store. Prerequisite: CT 371; Mth 95 or exemption.

CT 475 Economics of the Textile and Apparel Industries (G)
4 hours 4 ①
Trends in the production and consumption of textiles and apparel; economic analysis of the textile and apparel industries; factors affecting changes in output, price, location, and market structure. Prerequisite: CT 211,250; 3 hours of upper division clothing and textiles; Ec 213,214.

CT 490 Selected Topics in Clothing, Textiles, and Related Arts
3 hours
Topics of current importance. May be repeated for credit.

CT 499 Study Tour (g)
1-6 hours to be arranged
Prerequisite: Prior written consent of department head and advanced registration and deposit. Course prerequisites as appropriate to topic.

Graduate Courses
See also courses marked (g) and (G) above.

CT 501 Research

CT 503 Thesis

CT 505 Reading and Conference

CT 506 Projects

CT 507 Seminar

CT 508 Workshop
Terms and hours to be arranged

CT 512 Comparative Tailoring
4 hours 2 ① 2 ③
Comparison of tailoring methods used in custom-made garments; application of selected methods in construction of a tailored garment. Prerequisite: CT 328. Not offered every year.

CT 585 Clothing and Human Behavior
3 hours 3 ①
Application of theories from the social sciences to clothing selection and use. Prerequisite: 12 hours of psychology, sociology, and/or cultural anthropology.

CT 590 Selected Topics in Clothing, Textiles, and Related Arts
3 hours 3 ①
Topics of current importance. May be repeated for credit.

CT 593 Literature in Clothing, Textiles, and Related Arts
3 hours 3 ①
Review, interpretation, and significance of research studies. Identification and evaluation of researchable topics. Prerequisite or corequisite: statistics.

CT 594 Research Methods in Clothing, Textiles, and Related Arts
3 hours 3 ①
Philosophy and methodology for research. Prerequisite: 3 hours of statistics.

FAMILY RESOURCE MANAGEMENT

The Department of Family Resource Management offers undergraduate instruction in the areas of family and consumer economics, home management, housing, and household equipment. Graduate work leading to the M.A., M.S., and Ph.D. degrees is also available. At the master's level, majors include family and consumer economics, home management, housing, and institution management with an emphasis in food systems management. The doctoral program focuses broadly on family resource management and use as they affect individual and family well-being.

Lower Division Courses

FRM 235
Family Housing and Its Environment
3 hours 3 ①
Aesthetic, economic, and psychological factors affecting family needs in housing and its environment.

FRM 250
Decision Making and the Consumer
3 hours 3 ①
Rights and responsibilities of the consumer and forces involved in consumer decisions; involvement of management processes to meet individual and family needs.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

FRM 310 Practicum
3 hours to be arranged
Work experience to integrate and apply knowledge in community agency or business firm. Post-experience summary and evaluation. For intermediate-level students. Preplanned with instructor approval.

FRM 330 Home Equipment and Energy Management
3 hours 2 ②
Overview of selection, placement, use, and care of major and small kitchen, laundry, and cleaning equipment. Emphasis on the managerial, consumer, and energy aspects of technology related to household work.

FRM 335
Organization and Use of House Space
3 hours 2 ① 1 ②
Housing needs of families; optimum dimensions of activity areas; patterns for space units of family dwelling; evaluation of house plans and family needs. Prerequisite: FRM 235.

FRM 341 Personal and Family Finance
3 hours 3 ①
Protection through insurance: property, comprehensive, liability, automobile, health, and life. Understanding financial planning, income taxes, loans, credit, and housing costs. Increasing income through investments: time deposits, insurance and annuities, stocks and bonds, mutual funds, and real estate. Planning for retirement and estate transfer.

FRM 401 Research

FRM 403 Thesis

FRM 405 Reading and Conference

FRM 406 Projects

FRM 407 Seminar
Section A, Housing Related Careers, and Section B, Family Economics and Management Related Careers, both 1 hour, graded P/N.

FRM 407 Seminar (g)

FRM 407 Seminar (G)

FRM 408 Workshop
Terms and hours to be arranged

FRM 408 Workshop (g)

FRM 408 Workshop (G)

FRM 410 Field Experience
3-12 hours to be arranged
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. Application made and approved term preceding enrollment. May be repeated for a maximum of 15 hours.

FRM 412 Consumer Economics (g)
3 hours 3 ①
The consumer in the market place; basis for making choices; consumption patterns and trends in U.S.; consumer information and protection. Prerequisite: FRM 250; Ec 213.

FRM 420 Family Management Systems
4 hours 2 ① 1 ②
Application of management principles and allocation of resources in individual and family households with consideration of the family life cycle and special management problems. Prerequisite: FRM 250,341.

FRM 435
House Planning in Relation to Function (G) 3 hours 2 ① 1 ②
A case study approach to housing situations in relation to functional needs; dwellings and their environment. Prerequisite: FRM 335. Not offered every year.

FRM 440
Home Management Theory (G)
3 hours 3 ①
Theories and principles of home management; evaluation of related research. Prerequisite: FRM 420; Psy 202; 6 hours of sociology.

FRM 441 Economics of the Family (G) 3 hours 3 ①
The family and roles of its members in American economy; problems of setting, improving, and maintaining standards of living. Prerequisite: FRM 250,341; Ec 213,214.

FRM 455 Housing for Special Needs (G) 3 hours 3 ①
Emphasis on design of dwellings for special needs. Prerequisite: FRM 235. Not offered every year.

FRM 465 Housing Policy and Programs (G)
3 hours 3 ①
Socioeconomic aspects of housing in relation to family living. Prerequisite: FRM 235; Ec 213, 214; Soc 204; senior or graduate standing. Not offered every year.

FRM 470 Community Services and Welfare of Families (G)
3 hours 3 ①
Impact of businesses, agencies, and informal associations in society on family well-being. Prerequisite: FRM 250; Soc 204.

FRM 481
Advanced Personal and Family Finance (G) 3 hours 3 ①
Advanced study of personal financial management during different stages of the family life cycle and at different income levels. Topics include family budgets, housing, debt, insurances, savings, investment, financial planning, taxation, and federal programs affecting family finances. Prerequisite: FRM 341; Ec 213,214.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

FRM 501 Research

FRM 503 Thesis

FRM 505 Reading and Conference

FRM 506 Projects

FRM 507 Seminar

FRM 508 Workshop
Terms and hours to be arranged

FRM 510 Internship
3-12 hours to be arranged
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 hours may be applied to a master's degree program.

FRM 520 Philosophy and Application of Home Management
3 hours 3 ①
Current home management philosophy and its use in analyzing managerial problems facing homemakers today. Prerequisite: FRM 440. Not offered every year.

FRM 540,541,542 Selected Topics in Family Resource Management
3 hours each 3 ①
Consent of instructor required. Need not be taken in order.

FOODS AND NUTRITION

The Department of Foods and Nutrition offers basic courses in human nutrition, in the application of scientific principles to the preparation of foods, and in meal management. Advanced and specialized upper division courses are offered for students with specific professional interests. The general foods and nutrition option is offered for students with professional interests in food product development and promotion, adult education, and graduate study. Undergraduate options in clinical and therapeutic dietetics and in community nutrition meet the academic requirements for a specialized internship or experience and membership in the American Dietetic Association.

Also offered are programs leading to the M.A., M.S., and Ph.D. degrees. Master's programs may emphasize either foods or nutrition but include both areas. The doctoral degree program may be either in foods or nutrition. Graduate programs in food systems management are offered in cooperation with the Department of Institution Management.

Lower Division Courses

FN 199 Special Studies
Terms and hours to be arranged

[1]FN 215 Foods
5 hours 3 ① 2 ③
Components of foods; their functional properties and interactions in food preparation. Prerequisite: FN 225; one year of physical or biological science.

[1]FN 218 Food Preparation
3 hours 2 ① 1 ②
Basic principles of food preparation, meal planning, and service.

[1]FN 220,221 Foods
4 hours each 2 ① 2 ②
Chemical and physical principles applied to the study of foods. Prerequisite: FN 225; prerequisite or corequisite: Ch 331,332. Must be taken in order. Not offered every year.

FN 225 Human Nutrition
4 hours 3 ① 1 ①
The relationship of food and its components to health with emphasis on the young adult; current national and international concerns.

[1] Credit granted for only one of the following: FN 215, 218, 220-221.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

FN 310 Practicum
3 hours to be arranged
Work experience to integrate and apply knowledge in community agency or business firm. Post-experience summary and evaluation. For intermediate-level students. Pre-planned with instructor approval.

FN 313 Meal Management
3 hours 2 ① 1 ③
Principles of foods and nutrition applied to meal planning, preparation, and service; economic, aesthetic, nutritional, and managerial aspects. Prerequisite: FN 215, 218, or 221; FN 225.

FN 325 Family Nutrition
3 hours 3 ①
Principles; maternal nutrition, nutrition of the infant and child through growth period; geriatric nutrition. Prerequisite: FN 225.

FN 335 Science of Foods
3 hours fall, spring 2 ① 1 ①
Structure of foods; chemical nature and physical changes in components. Prerequisite: Ch 332; FN 215.

FN 401 Research

FN 403 Thesis

FN 405 Reading and Conference

FN 406 Projects

FN 407 Seminar
Terms and hours to be arranged

FN 407 Seminar (g)

FN 407 Seminar (G)

FN 410 Field Experience
3-12 hours to be arranged
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. Application made and approved term preceding enrollment. May be repeated for a maximum of 15 hours.

FN 411 Family Food Purchasing (g)
3 hours 1 ① 1 ② 1 ③
Principles of economics applied to buying food for the home; laws protecting the consumer, criteria for selection of food at different income levels. Prerequisite: FN 313; Ec 115,215, or 213. Offered alternate years. Not offered 1982-83.

FN 412 Food Demonstrations
3 hours 1 ① 1 ② 1 ③
Principles and techniques of communication with emphasis on classroom, Extension, and commercial demonstration. Prerequisite: FN 313; a speech course or Ed 416, or equivalent. Graded P/N.

FN 414 Home Food Preservation
(g) 3 hours 1 ① 1 ② 1 ③
Principles and methods, including freezing, canning, curing, pickling, and preserving with sugar. Prerequisite: FN 313; Mb 130 or 302, 303. Offered alternate years. Offered 1982-83.

FN 415 Food Economics (G)
3 hours 3 ①
Economic principles applied to the consumption of food and the provision of adequate nutrition; production and marketing aspects. Prerequisite: sequence in principles of economics; one course in nutrition.

FN 416 Cultural Aspects of Foods
(g) 3 hours fall 2 ① 1 ③
Regional, ethnic, and religious influences on food patterns. Laboratory experience with food from several cultures. Prerequisite: FN 313 or consent of instructor.

FN 417 Human Nutrition (g)
3 hours fall 2 ① 1 ①
Fundamentals; application of biochemistry and physiology to nutrition of the individual and family. Prerequisite: biochemistry; physiology; one course in nutrition. FN 419 needed to complete sequence.

FN 418 Human Nutrition Laboratory
(g) 2 hours winter 1 ① 1 ②
Taken concurrently with FN 419.

FN 419 Human Nutrition (g)
3 hours winter 2 ① 1 ①
Continuation of FN 417, which is prerequisite.

FN 420 Nutrition in Disease (G)
3 hours spring 2 ① 1 ②
Adjustment of the normal diet to meet the demands imposed by disease. Prerequisite: FN 419.

FN 421 Child Nutrition (G)
3 hours spring 3 ①
Nutritional needs from prenatal life through childhood: maternal dietary requirements. Prerequisite: FN 419.

FN 425 Advanced Foods (G)
4 hours winter 3 ① 1 ②
Polysaccharides, lipids, and proteins; structures and functional properties in foods. Prerequisite: FN 221 or 335; Ch 332.

FN 435 Experimental Food Studies
(G) 5 hours fall 2 ① 1 ① 2 ②
Subjective and objective evaluation techniques applied to individual studies using the experimental approach. Prerequisite: FN 221 or 335; Ch 332. Not offered every year.

FN 445 Community Nutrition
4 hours spring 2 ②
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 nutritionists. Prerequisite: Soc 475 or FRM 470; FN 215. Prerequisite or corequisite: FN 325.

Graduate Courses

See also courses marked (g) and (G) above.

FN 501 Research

FN 503 Thesis

FN 505 Reading and Conference

FN 507 Seminar
One-hour sections for continuing students and for new students graded P/N.

FN 508 Workshop
Terms and hours to be arranged

FN 510 Internship
3-12 hours to be arranged
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 hours may be applied to a master's degree program.

FN 517,518
Metabolic Interrelationships in Nutrition
3 hours each 3 ①
Identification of interrelationships between nutrients and metabolism as influenced by external and internal factors and environment. Prerequisite: FN 419. Must be taken in order. Offered alternate years.

FN 521 Readings in Nutrition
3 hours fall 3 ①
Research studies reviewed; interpretations and significance. Prerequisite: FN 419. Not offered every year.

FN 522 Research Techniques
4 hours 1 ① 2 ③
Methods and techniques for the analysis of nutrients and metabolites in foods and other biological materials, including blood studies. Prerequisite: Ch 234; prerequisite or corequisite: FN 419.

FN 523
Techniques in Nutrition Research
3 hours 2 ③
Assessment of nutritional status in humans; balance of nutrients and metabolites. Prerequisite: FN 522. Not offered every year.

FN 531 Techniques in Foods Research
3 hours 2 ③
Study of the physical aspects of food quality. Prerequisite: FN 425,435,522. Not offered every year.

FN 532 Advanced Foods
3 hours 3 ①
Components and organization of plant and animal tissues as related to properties of foods; color and flavor components included. Prerequisite: FN 425; biochemistry. Not offered every year.

FN 535 Selected Topics in Foods
3 hours 3 ①
Prerequisite: Ch 228,229; FN 425 or FN 435. Not offered every year.

FN 551 Selected Topics in Nutrition
2-4 hours 2 ①, 3 ①, or 4 ①
Topics vary but include protein and amino acid metabolism, lipid metabolism, hormone and vitamin interrelationships, intermediary metabolism. Emphasis on recent advances in human nutrition. May be repeated for maximum of nine credits. Prerequisite: FN 419. Not offered every year.

[2]FN 590T
Principles of Foods for Teachers
3 hours summer 2 ① 1 ③
Chemical, physical, and structural properties of food materials as they relate to the characteristics of the finished product. For teachers in secondary schools and Extension. Prerequisite: general chemistry, nutrition, foods, and meal management. Offered alternate years.

[2]FN 591T
Principles of Nutrition for Teachers
3 hours summer 3 ①
Principles and recent developments in nutrition and their applications. For teachers in secondary schools and Extension. Prerequisite: general chemistry; physiology: FN 325. Offered alternate years.

HEALTH CARE ADMINISTRATION

See "Interdisciplinary Degree Programs."

HOME ECONOMICS EDUCATION

Professional preparation for teachers of home economics is provided by the Department of Home Economics Education. A student in either the School of Home Economics or the School of Education may meet certification requirements. Two undergraduate options are available to home economics education majors: general home economics and occupational. Before registering for teacher prep-

[2] Course may not be counted as part of the requirement for a graduate major in foods and nutrition.

aration courses, each student should receive permission for registering and guidance for selection of courses from the home economics education staff. (For requirements for the State Teachers' Certificates and listing of courses see "School of Education.")

The department offers majors and minors in an M.S. program and advises home economics educators choosing the Master of Education, Option C. Home economics teachers with a master's degree can pursue a Ph.D. or Ed.D. with a major in vocational education through the School of Education.

HOME ECONOMICS EXTENSION

Professional preparation for the position of Extension home economist is offered by the School of Home Economics. Courses taught by staff members of the Extension Service include classroom work in methods used by Extension to disseminate information, as well as practical experience with county Extension staff. For description of courses see Extension Education in "School of Education."

HOME ECONOMICS, GENERAL

General home economics is an undergraduate area of concentration drawing on courses from several School of Home Economics departments.

A professional graduate degree, Master of Home Economics, is offered in general home economics. The program is designed primarily for high school teachers and Extension personnel.

Lower Division Courses

HEc 101
Perspectives in Home Economics
1 hour 2 ①
Current developments in home economics professions. Students assess their special interests, capabilities, and career potential. Graded P/N.

HEc 199 Special Studies
Terms and hours to be arranged

HEc 230 Home Economics Professions
1 hour 1 ①
Exploration of professional opportunities in home economics. For transfer students. Graded P/N.

Upper Division Courses

HEc 310 Practicum
3 hours to be arranged
Work experience to integrate and apply knowledge in community agency or business firm. Post-experience summary and evaluation. For intermediate-level, students. Preplanned with instructor approval.

HEc 405 Reading and Conference

HEc 407 Seminar
Section B, Interdisciplinary, 1 hour, graded P/N.

HEc 407 Seminar (g)
Terms and hours to be arranged

HEc 410 Field Experience
3-12 hours to be arranged
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. Application made and approved term preceding enrollment. May be repeated for a maximum of 15 hours.

HEc 412
Contemporary Issues in Home Economics
1 hour 1 ①
Perspectives on the development of home economics and current roles of home economists in society. Prerequisite: senior standing; HEc 101 or 230.

Graduate Courses

HEc 505 Reading and Conference

HEc 507 Seminar
Section B, Interdisciplinary, 1 hour, graded P/N.

HEc 508 Workshop
Terms and hours to be arranged

HEc 510 Internship
3-12 hours to be arranged
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 hours may be applied to a master's degree program.

HOTEL AND RESTAURANT MANAGEMENT

See "Interdisciplinary Degree Programs."

HUMAN DEVELOPMENT AND FAMILY STUDIES

The Department of Human Development and Family Studies offers courses in development across the human life span, family studies and educational programs for preschool children. The specialization in early childhood education is offered in cooperation with the School of Education and leads to teacher certification for grades K-9. Courses taken in the department also prepare students for work in professional programs in preschool education, social service and youth agencies, and for graduate study. Two on-campus child development laboratories are used to extend instructional programs beyond the classroom. Men and women in any field are welcome to supplement their personal or prefessional development with courses in human development and family studies.

Graduate programs leading to the M.S., M.A., and PhD. degrees are also offered. These programs may emphasize human development, family studies, and early childhood education, each of which includes an intervention component designed to prepare students for work in applied professional programs. Primary emphasis is on training for research and teaching.

Lower Division Courses

HDFS 199 Special Studies
Terms and hours to be arranged

HDFS 200 Human Sexuality
3 hours 2 (1½)
Psychological, sociological, and physiological aspects of sexuality throughout the life cycle. Lectures on the various aspects of human sexuality set a framework for interpretation of information concerning relationships, sexual expression, pregnancy, childbirth, and related topics. Graded P/N.

HDFS 215
Family and Human Development
3 hours 3 ①
Developmental study of American families. Multidisciplinary view of individuals throughout their life span as they relate and interact in marital, parental, and other family roles.

HDFS 222
Marriage and Loving Relationships
3 hours 2 (1½)
Development of adult relationships from initial encounter to permanent commitments. Major focus on interaction patterns in loving relationships. Graded P/N.

HDFS 225
Prenatal and Infant Development
3 hours 2 (1½) 1 ①
Study of the young child, ranging from prenatal development through infancy. Observations in a child development laboratory.

HDFS 233
Interpersonal and Family Dynamics
3 hours 2 (1½)
Competencies in interpersonal and family communication and conflict resolution.

HDFS 240
Contemporary American Families
3 hours 3 ①
The family as an influence in the socialization and general development of individuals; contemporary family practices, styles, and issues as developmental forces.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

HDFS 310 Practicum
3 hours to be arranged
Work experience to integrate and apply knowledge in community agency or business firm. Post-experience summary and evaluation. For intermediate-level students. Preplanned with instructor approval.

HDFS 311
Development in Early Childhood
3 hours 3 ①
Behavior and development in the early childhood years. Observations in a child development laboratory. Prerequisite: Psy 201,202; HDFS 225.

HDFS 312 Studies in Family and Human Development
3 hours 3 ①
Theory and basic research in the areas of family and human development. Prerequisite: 3 hours of human development and family studies, psychology, sociology, or anthropology.

HDFS 315 Development and Evaluation of Family Life Programs
3 hours 3 ①
Introduction to the design, implementation, and evaluation of programs for enhancing individual, interpersonal, and family life for all age groups. Prerequisite: junior standing; 6 hours of human development and family studies, psychology, or sociology.

HDFS 322 Family Relationships
3 hours 3 ①
Stages and adjustments in the family cycle; the family and the community. Prerequisite: 3 hours of human development and family studies, psychology, or sociology.

HDFS 325 Parenting
3 hours 3 ①
Developing insight into child behavior and child-adult relationships. Emphasis on guidance principles.

HDFS 326 Directed Experience with Young Children
2 hours 2 ②
Participation in a preschool education program to apply guidance techniques and to develop leadership ability with young children. Prerequisite: HDFS 311; registration one term in advance.

HDFS 401 Research

HDFS 403 Thesis

HDFS 405 Reading and Conference

HDFS 406 Projects

HDFS 407 Seminar
Section B, Senior Seminar, graded P/N.

HDFS 407 Seminar (g)

HDFS 407 Seminar (G)

HDFS 408 Workshop
Terms and hours to be arranged

HDFS 410 Field Experience
3-12 hours to be arranged
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. Application made and approved term preceding enrollment. May be repeated for a maximum of 15 hours.

HDFS 413 Development in Middle Childhood and Adolescence (G)
3 hours 3 ①
Growth and development in middle and late childhood and early adolescence. Prerequisite: HDFS 311.

HDFS 423 Parent Education (G)
3 hours 1 ① 1 ②
Relationships of parents and children: resources for meeting problems with emphasis on discussion as a method. Prerequisite: HDFS 311.

HDFS 426 Preschool Child Laboratory
(G) 2 hours 2 ②
Participation in a preschool education program to apply curriculum techniques of educational program models. Must be taken concurrently with, or after, HDFS 427; preregistration one term in advance.

HDFS 427
Programs in Early Childhood (G)
3 hours 1 ③
Analysis of program models in early childhood and application in various settings. Prerequisite: HDFS 311.

HDFS 429
Supervised Nursery School Experience
(g) 9-12 hours
Full participation in a preschool education program and its administration; field experiences arranged. Prerequisite: HDFS 426; registration one term in advance.

HDFS 430
Understanding Child Behavior (G)
3 hours 3 ①
Observation of young children as a basis for developing insight into human behavior. Prerequisite: HDFS 311.

HDFS 435 Administration of Human Services Across the Life Span (G)
3 hours 2 (1½)
Organization and administration of programs for children, families, and the elderly. Focus on policy and program planning, proposal writing, community and agency relationships, staff management and supervision. Prerequisite: 6 hours of upper division human development and family studies, psychology, or sociology.

HDFS 445 Perspectives on Aging (g)
3 hours 3 ①
Analysis of the social, economic, physical, and psychological factors influencing the processes and consequences of aging. Prerequisite: HDFS 322 or 9 hours of sociology, psychology, and/or anthropology.

HDFS 446
Adult Development and Aging
(g) 3 hours 2 (1½)
Theoretical approaches in the study of gerontology; development and adjustments in the later years. Prerequisite: 9 hours of sociology, psychology, and/or anthropology.

HDFS 481
Selected Topics in Family Relationships
(G) 3 hours, maximum 6 hours 3 ①
Current literature, research, and theories on family relations. Prerequisite: HDFS 322 or 9 hours upper division social science. May be repeated for credit.

Graduate Courses
See also courses marked (g) and (G) above.

HDFS 501 Research

HDFS 503 Thesis

HDFS 505 Reading and Conference

HDFS 506 Projects

HDFS 507 Seminar

HDFS 508 Workshop
Terms and hours to be arranged

HDFS 510 Internship
3-12 hours to be arranged
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 hours may be applied to a master's degree program.

HDFS 511,512
Methods of Behavioral Research
3 hours each 3 ①
Philosophy and methods of behavioral research with emphasis on application of concepts to problems in child development and family relations. Must be taken in order. HDFS 512 not offered every year.

HDFS 520
Philosophy of Early Childhood Education
3 hours 3 ①
Philosophy of procedures in early childhood education; role of teachers. Prerequisite: HDFS 311.

HDFS 523
Topics in Preschool Education
3 hours 3 ①
Review of research studies with emphasis on significance and interpretation. Not offered every year.

HDFS 531,532
Life Span Developmental Processes
3 hours each 1 ③
HDFS 531: theoretical and research perspectives on primary and secondary socialization—infancy, childhood, adolescence, and adulthood. *HDFS 532:* measurement and evaluation of physical and mental development across the life span.

HDFS 533
Topics in Human Development
3 hours 3 ①
Research studies reviewed; focus on interpretation. Significance and integration with theory. Not offered every year.

HDFS 534
Human Development Theories
3 hours 2 (1½)
Critical evaluation of human development theories which allows for development of a theoretical framework for understanding human behavior. Prerequisite: 6 hours of upper division course work in human development and family studies or the behavioral sciences.

HDFS 541 Family Theories
3 hours 2 (1½)
Investigation and comparison of major theoretical frameworks used in family analysis and research. Prerequisite: 6 hours of upper division course work in human development and family studies or the behavioral sciences.

HDFS 542 Family Interactions
3 hours 1 ③
Analysis of relevant literature associated with establishing and maintaining interpersonal and family relationships. Prerequisite: 6 hours of upper division course work in human development and family studies or the behavioral sciences.

HDFS 543 Topics in Family Studies
3 hours 3 ①
Research studies reviewed; focus on interpretation. Significance and integration with theory.

HDFS 544 Family Systems
3 hours 1 ③
Analysis of the family system and its interaction with the individual, subcultural, and environmental systems. Prerequisite: 6 hours of upper division course work in human development and family studies or the behavioral sciences.

INSTITUTION MANAGEMENT

Food systems management is the primary focus of the Department of Institution Management. The department's course work is included in curricula for dietetics, health care administration, home economics education, and hotel and restaurant management. General dietetics and management options meet the academic requirements for professional experience and membership in the American Dietetic Association.

Career opportunities include managing or working with foodservice programs in college or university residences, public and private schools, hospitals, restaurants, and industry; participating with marketing, health care, and consulting teams; and teaching and research in universities and food industries after graduate study.

Graduate programs in food systems management, leading to the M.S. and the Ph.D. degrees, are offered through the Departments of Foods and Nutrition and Family Resource Management.

Lower Division Course

IM 199 Special Studies
Terms and hours to be arranged
Graded P/N.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

IM 310 Practicum
3 hours to be arranged
Work experience to integrate and apply knowledge in community agency or business firm. Post-experience summary and evaluation. For intermediate-level students. Preplanned with instructor approval.

IM 311 Quantity Food Production
4 hours 2 ① 2 ③
Quantity food production methods; standardized formulae and costing; equipment; menu planning; safety and sanitation. Prerequisite: FN 313.

IM 401 Research

IM 403 Thesis

IM 405 Reading and Conference
Section C, Credentials, 1 hour, graded P/N.

IM 406 Projects

IM 407 Seminar
One-hour seminar for seniors graded P/N.

IM 407 Seminar (g)

IM 407 Seminar (G)

IM 408 Workshop
Terms and hours to be arranged

IM 410 Field Experience
3-12 hours to be arranged
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. Application made and approved term preceding enrollment. May be repeated for a maximum of 15 hours.

IM 415 Foodservice Systems: Organization and Operations (g)
3 hours 2 ① 1 ① 1 ②
Basic concepts of food service systems and their operations. For prospective vocational food service teachers and managers of facilities that have a foodservice. Not open to institution management/dietetic or hotel and restaurant management majors. Prerequisite: FN 313 or a course in management.

IM 441 Foodservice Equipment Planning and Facility Design (g)
3 hours 3 ①
Planning, selecting, costing, and arranging equipment in foodservice facilities; product and consumer flow as related to facility design. Prerequisite: IM 311 or 415.

IM 442 Foodservice Procurement and Inventory Systems (g)
3 hours 3 ①
Selecting, packaging, and storage of food items in foodservice. Forecasting and inventory control systems as related to food quality and cost. Prerequisite: IM 311 or 415.

IM 445 Organization and Management of Foodservices (g)
5 hours 3 ① 1 ① 1 ⑤
Philosophy and functions of management applied to foodservice organizations; utilization of resources: personnel, space and equipment, time and money; evaluation of food systems. Prerequisite: IM 311,441,442. (Five-hour lab to be arranged.)

IM 455 Computer-Assisted Food Systems Management (G)
2 hours 2 ①
Management of foodservice facilities using computer applications to supplement information needed for decision making, with emphasis on controlling the flow of materials, food quality, and costs. Prerequisite: IM 311,442; BA 131 or CS 211 recommended.

Graduate Courses

See also courses marked (g) and (G) above.

IM 501 Research

IM 503 Thesis

IM 505 Reading and Conference

IM 506 Projects

IM 507 Seminar

IM 508 Workshop
Terms and hours to be arranged

IM 510 Internship
3-12 hours to be arranged
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 hours may be applied to a master's degree program.

IM 520
Advanced Foodservice Management
3 hours winter 3 ①
Interpretation of management principles and current research in relation to administration of foodservice organizations at the policy-making level. Prerequisite: IM 440,445. Not offered every year.

OCEANOGRAPHY

FACULTY

As of January 1982

G. Ross Heath, *Dean*

George H. Keller, *Associate Dean*

Wayne V. Burt, *Associate Dean*

Victor T. Neal, *Assistant Dean*

Professors J. Allen, Bodvarsson, Burt (emeritus), Byrne, Caldwell, Dymond, Frolander, Hedgpeth (emeritus), Komar, Kulm, C. Miller, Morita, Neshyba, Niiler, Paulson, Pearcy, Pytkowicz, Schrader, L. F. Small, R. L. Smith, Suess

Associate Professors Beasley, Carey, Chen, Corliss, Couch, de Szoeke, Gonor, Gordon, Huyer, R. Johnson, S. J. Johnson, Levi, Mesecar, D. M. Nelson, Pak*, Pillsbury*, Quinn* (emeritus), Richardson*, Scheidegger, Simoneit, Wheeler, Zaneveld

Assistant Professors Abbott, Baross*, Bibee, Boehlert, Dillon, Duncan, Enfield*, Fehler, Frey*, Garber, Good, Hancock*, Holman, Holton*, Jacobson, Levine*, Mate*, Menke, Pisias, Richman, Siebenaller, Strong (emeritus)

Research Associates Collier, Hogan, Lyle, Newberger, Stein

Instructors Gemperle, Palfrey

* Senior research faculty

The School of Oceanography, established in 1972, has a short but impressive history of growth and development at Oregon State University. Since its inception in 1959 as a department with one specialist, it has grown to include a staff of more than 60 scientists with over 100 support personnel.

Before 1959 very little was known about Oregon's coastal or estuarine areas, their animals and plants, or the earth beneath them. Since that time, the school (initially a department) has directed major research effort to the Pacific Ocean off the Oregon Coast. In recent years, the territory of interest has widened to include all the oceans of the world.

Mission

The school has a three-fold mission: to prepare men and women for careers in oceanography and related fields; to broaden, through research and Extension, regional knowledge about the marine environment; and to further national oceanic endeavors.

Teaching and Research

Teaching and research programs emphasize the interdependence of the biological, chemical, geological, geophysical, and physical processes in and under the sea. In the school each of these disciplines is represented by a number of scientists. This interdisciplinary approach encourages and makes possible the rapid exchange of ideas often necessary for the solution of a research or management problem. Graduate students play an essential part in carrying out such research.

Degree Programs

Although there are some undergraduate courses, only graduate degrees are offered in oceanography. Programs available lead to the Master of Science (M.S.), Master of Arts (M.A.), and Doctor of Philosophy (Ph.D.) degrees in biological, chemical, geological, and physical oceanography, as well as in geophysics.

In addition, the school offers master's degree options in marine resource management and in air-sea interaction.

Job Opportunities

The school helps students prepare for research, teaching, and management positions. Branches of the federal government that employ 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. oceanographic effort is still centered around federal programs or federally funded programs. Therefore, most of the oceanographic research at universities is supported by federal grants and contracts. Career opportunities in marine education and marine research exist in colleges and universities, especially at those institutions in the coastal and Great Lakes states. Opportunities for research also exist with private enterprise, especially with those involved with development of marine and coastal resources.

Admission Requirements

Requirements for admission to graduate study:

1. A bachelor's degree with a major (40 term hours or more) in a basic natural science (such as physics, mathematics, chemistry, biology, or geology) or engineering. Marine resource management majors must also have a bachelor's degree, but the major may be in the social sciences (economics, political science, etc.), business administration, the natural sciences, fisheries, or engineering.
2. A minimum cumulative grade-point average of approximately 3.00 on a 4.00 scale.
3. One year each of undergraduate course work in physics, chemistry, and calculus.
4. Graduate record examination (GRE) scores (general and advanced).
5. Three letters of recommendation.

Students may apply for admission any term. Early application is recommended.

General Program Requirements

Students majoring in oceanography or marine resource management are required to take prescribed core courses in each of the following fields: biological, chemical,

geological, and physical oceanography. Geophysics majors are normally required to take one or more courses in physical and geological oceanography in addition to their geophysics courses.

Oceanography and geophysics majors usually minor in some other field of science, mathematics, statistics, or engineering. Marine resource management majors have multidisciplinary programs and do not declare minor programs.

All students are expected to participate in seagoing projects. Students normally consult with their major professors to make arrangements to obtain experience on research vessels.

Master's Programs

All students must satisfy the minimum program requirements (45 hours including six hours 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 programs normally have 69 hours of course work including nine hours of internship. (No thesis is required in the marine resource management program, but an internship normally is required.)

A two-hour, final oral examination is required upon completion of the master's program.

Marine Resource Management Program

The master's degree option in marine resource management is designed to prepare students for careers in resource management. The program, which usually can be completed within two years, generally consists of basic courses in oceanography, economics, fisheries, and business administration. Additional courses may be taken in the Schools of Engineering and Agriculture and the Colleges of Science and Liberal Arts. Each program is adjusted to the needs of the individual. No thesis is required.

An applicant's bachelor's degree should be in natural science, social or political science, business administration, fisheries, or engineering. College physics, chemistry, and calculus are required.

The Western Interstate Commission for Higher Education (WICHE) has selected the marine resource management program as one of the unique or specialized graduate programs it coordinates in the Northwest. Residents of Alaska, Idaho, Montana, and Washington who major in this program pay resident tuition rates at OSU.

Air-Sea Interaction Program

For the master's degree, students may elect an option in air-sea interaction, offered jointly by the School of Oceanography and the Department of Atmospheric Sciences in the College of Science.

This integrated curriculum emphasizes physical oceanography and atmospheric sciences, but may also include work in mathematics, statistics, and engineering. Students who wish to select this option for their master's degree program may seek admission to either the School of Oceanography or the Department of Atmospheric Sciences.

Doctor of Philosophy Program

The Ph.D. program is determined by the individual student and his or her committee. Specific University requirements are formulated by the Graduate School. Approximately 80 hours of oceanography courses (including the core courses and 30 to 35 hours of thesis) are usually included in the major. A first and second minor or an integrated minor totaling 40 to 50 hours is common. Some graduate credits earned at other institutions may be accepted in the major and minor. There are no set requirements on the number of course hours 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 oceanography.

Oceanography courses taken as a part of the master's program at Oregon State are normally transferable into the Ph.D. program.

Geophysics Program

Programs in geophysics have been developed within the school with the cooperation of the Departments of Physics, Geology, and Mathematics in the College of Science. A student studying for a degree under this program works out with his or her committee a course of study which must include a minimum of two courses in oceanography. The remainder of the program is selected from geophysics courses and related fields.

Oceanography Minor Programs

Master's candidates who wish to minor in oceanography must take one course in descriptive physical oceanography and from 8 to 15 hours 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 hours of oceanography.

Summer Programs

Programs are usually offered at the Marine Science Center in Newport as well as on the main campus in Corvallis, and vary from year to year. For further information on summer programs at the coast write to: Director, Marine Science Center, Newport, Oregon 97365.

Courses offered on the Corvallis campus each summer are normally graduate-level courses for nonmajors, such as high school teachers. Distinguished visiting oceanographers occasionally offer short courses or seminars which are usually open to majors and nonmajors. For further information on summer programs write to the director of OSU's Summer Term Office.

Research Vessels

The school's major research vessel, the *R/V Wecoma*, is based at the Marine Science Center in Newport, 50 miles (90 kilometers) from the Corvallis campus. The ship, which came into service in early 1976, is 177 feet long (54 meters) and has space for 16 scientists. She is especially designed for oceanographic research and is used mainly for deep ocean work.

The school also maintains small vessels for nearshore, estuarine, and limnological research.

Oceanography Courses

Not all courses are offered every year. Consult the Schedule of Classes *or the School of Oceanography for current offerings.*

GENERAL COURSES

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Oc 199 Special Topics
1, 2, or 3 hours 1 ①, 2 ①, or 3 ①

Oc 331 Introduction to Oceanography
3 hours 3 ①
Marine ecosystems; geological and geophysical aspects of the seafloor; physical and chemical properties of seawater; waves, tides, currents, ocean circulation; related topics.

Oc 405 Reading and Conference (g)

Oc 406 Projects (g)

Oc 407 Seminar (g)

Oc 408 Workshop (g)
Terms and hours to be arranged.
Not offered every year.

Oc 471 Physical Limnology (g)
3 hours 3 ①
Geological and physical processes in lakes, rivers, and reservoirs; procedures for field studies in physical limnology. Prerequisite: college algebra; 18 hours of science. Offered alternate years.

Oc 499
Special Topics in Oceanography (G)
1, 2, 3, 4, or 5 hours
1 ①, 2 ①, 3 ①, 4 ①, or 5 ①

Graduate Courses

See also courses marked (*g*) and (*G*) above.

Oc 501 Research

Oc 503 Thesis

Oc 505 Reading and Conference

Oc 506 Projects

Oc 507 Seminar
Section M, Resource Management, graded P/N.

Oc 508 Workshop
Terms and hours to be arranged.
Not offered every year.

Oc 510 Internship
1-9 hours to be arranged
Planned and supervised experience with selected, cooperating governmental agencies, private organizations, or business firms. Supplementary conferences, reports, and evaluations. Consent of instructor required.

MARINE RESOURCE MANAGEMENT

Graduate Courses

See also courses marked (*g*) and (*G*) above.

Oc 512 Marine Transportation
3 hours 3 ①
National and international aspects of maritime commerce. Vehicles, ports, navigation, economics, social and legal aspects, management problems and trends. Prerequisite: Ec 499; Oc 431 or equivalent.

Courses from other departments accepted for major credit:

Mb 450
Marine Microbiology (G)
3 hours 3 ①
See Microbiology in "College of Science."

BIOLOGICAL OCEANOGRAPHY

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Oc 442 Marine Zooplankton (G)
3 hours 3 ①
Small animal life in the sea, population and production, regional distribution, physiology, sampling. Prerequisite: two years of biology or Oc 490 or Oc 541. Offered alternate years. Not offered 1982-83.

Oc 443
Marine Zooplankton Laboratory (G)
2 hours 2 ③
Oc 442 to be taken concurrently. Offered alternate years. Not offered 1982-83.

Oc 490
Principles of Biological Oceanography
(g) 3 hours 3 ①
The ocean as a living environment: importance of temperature, salinity, density, circulation, light, nutrients, and dissolved gases to life in the sea; adaptations of organisms living in the ocean; productivity; food web; ocean pollution problems. For nonoceanography majors. Prerequisite: 8 hours of upper division science.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

Oc 521 Marine Radioecology
3 hours 3 ①
Artificial radionuclides in the marine environment, their measurement, identification; their uptake and transference through marine food chains. Prerequisite: radioecology. Offered alternate years. Offered 1982-83.

Oc 529
Special Topics in Marine Radioecology
1, 2, or 3 hours 1 ①, 2 ①, or 3 ①
Not offered every year.

Oc 541
Biological Oceanography
4 hours 3 ① 1 ③
The ocean as an ecosystem; interaction of the physical, chemical, and biological factors; plant and animal populations; methods of sampling, identification, and analysis. Prerequisite: Oc 431,551.

Oc 542 Marine Nekton
3 hours 3 ①
Biology of oceanic and deep sea fishes, squids, and shrimp, including sampling methods, vertical distribution and migration, bioluminescence, buoyancy, locomotion, migration, special adaptations, and relationships with oceanographic processes. Prerequisite: Oc 490 or Oc 541 or equivalent. Offered alternate years. Offered 1982-83.

Oc 543 Marine Nekton Laboratory
1 hour 1 ③
To be taken concurrently with Oc 542. Offered alternate years. Offered 1982-83.

Oc 544 Marine Phytoplankton Ecology
3 hours 3 ①
Floating plant life in the sea and estuaries; systematics and distribution; physiology; population dynamics; environmental factors; artificial cultivation; effect upon environment and position in food webs. Prerequisite: Oc 331 or Oc 490 or Oc 541 or two years of biology.

Oc 545
Marine Phytoplankton Physiology
3 hours 3 ①
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. Prerequisite: Oc 544. Offered alternate years. Offered 1982-83.

Oc 546
Early Life History of Marine Fishes
4 hours 3 ① 1 ②
Ecology, behavior, physiology, and development of egg, larval, and juvenile sttages, with special reference to adaptations for survival in larval rearing, egg and larval sampling methods. Laboratory work with systematics of larval fishes; particular emphasis on identification of eggs and larvae of marine fishes of the California current system. Prerequisite: FW 313 or 571 or consent of instructor.

Oc 548 Marine Benthic Ecology
4 hours 3 ① 1 ③
Ecology of the marine bottom environment; marine and estuarine bottom communities; effects of the environment on distribution and abundance of fauna; adadptations to the environment; population dynamics. Prerequisite: Z 451,452. Offered alternate years. Not offered 1982-83.

Oc 549 Special Topics in Biological Oceanography
1, 2, or 3 hours 1 ①, 2 ①, or 3 ①
Not offered every year.

CHEMICAL OCEANOGRAPHY

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Oc 493
Principles of Chemical Oceanography
(g) 3 hours 3 ①
Chemical composition of seawater; methods of analysis; chemistry of solutions; salinity, pH, dissolved gases, nutrients, and other factors important to people; pollution problems; extraction of materials useful to people. For nonoceanography majors. Prerequisite: college algebra and one year of chemistry or consent of instructor. Offered alternate years. Offered 1982-83.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

Oc 551 Chemical Oceanography
3 hours 3 ①
Chemistry of the oceans; the chemical processes which take place within them and between them and the biosphere, lithosphere, and atmosphere. Chemistry of marine pollution. Not for chemistry or chemical oceanography majors. Prerequisite: Ch 203 or 205.

Oc 552 Chemical Oceanography
3 hours 3 ①
Chemistry of the oceans for chemists. Seawater as a complex electrolyte solution. The nature and rates of chemical reactions occurring in seawater and between the oceans and the biosphere, lithosphere, and atmosphere. Chemical models of seawater and the oceans. Prerequisite: undergraduate degree in chemistry.

Oc 553
Descriptive Chemical Oceanography
4 hours 4 ①
Reasons for observed distributions and cycles of chemical species in seawater. Applications of these distributions to the study of water masses, exchange with the atmosphere, biological production, and sedimentation. Prerequisite: Oc 551 or 552. Not offered every year.

Oc 554
Theoretical Chemical Oceanography
4 hours 4 ①
Thermodynamics of chemical reactions in seawater at atmospheric and at high pressures, illustrated mainly by the carbon dioxide-carbonate system. Physico-chemical properties of seawater. Prerequisite: one year of physical chemistry. Not offered every year.

Oc 555
Chemical Oceanography Laboratory
2 hours 1 ④
Selected methods of chemical analysis of seawater. Prerequisite or corequisite: Oc 551 or 552. Offered alternate years. Offered 1982-83.

Oc 559 Special Topics in Chemical Oceanography
1, 2, or 3 hours
Not offered every year.

GEOLOGICAL OCEANOGRAPHY

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Oc 492
Principles of Geological Oceanography
(g) 3 hours 3 ①
Sedimentation processes, geological features of the oceans and continental margins, minerals found in or on the sea floor, sea floor spreading, present day research. For nonoceanography majors. Prerequisite: 8 hours of upper division science. Offered alternate years. Offered 1982-83.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

Oc 511
Littoral Processes and Sedimentation
3 hours 3 ①
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. Prerequisite: general physics; integral and differential calculus. Offered alternate years. Not offered 1982-83.

Oc 560 Geological Oceanography
4 hours 3 ① 1 ②
Structure of ocean basins, plate tectonics and sea floor spreading, marine sedimentation, history of ocean basins, and analysis of geological and geophysical data. Prerequisite: one year of physics and chemistry or science background.

Oc 561 Plate Tectonics and Structure of Ocean Basins
3 hours 3 ①
Evidence and predictions of plate tectonic model; structure and evolution of the divergent and convergent plate margins; metrology of oceanic crust and upper mantle; lithosphere-mantle interaction; evolution of oceanic lithosphere; models for development of continental margins. Required for majors in geological oceanography. Prerequisite: one year each of physics, calculus, and geology or permission of instructor.

Oc 562 Sediment Transport and Continental Margin Sedimentation
3 hours 3 ①
Fundamentals of sediment transport processes including fluid flow and drag, sediment threshold, and sedimentary bed forms. Currents and waves and their resulting sedimentary deposits in estuaries, the continental shelf and slope, and the deep sea. Recommended for majors in geological oceanography. Prerequisite: one year each of physics, calculus, and geology or permission of instructor.

Oc 563 Deep-Sea Sediments
3 hours 3 ①
Nature and distribution of deep-sea deposits; factors controlling the distribution of terrigenous, volcanic, biogenic, and authigenic components; diagenesis and redistributon at the ocean floor; ancient deep-sea sediments.

Oc 564
Mineralogy of Marine Sediments
3 hours 2 ① 1 ③
Identification and quantitative determination of fine-grained minerals in marine, especially deep-sea, sediments; structural characteristics and genesis of important mineral groups; application of laboratory techniques, particularly x-ray diffraction, to specialized research problems. Not offered every year.

Oc 565 Biostratigraphy of Marine Sediments 3 hours 1 ③
Curation and description of marine deep sea sediments; identification and quantitative determination of major biogenic components; biostratigraphy of marine microfossils; structure and texture of sediments; application of laboratory techniques. Consent of instructor required.

Oc 566 Isotopic Marine Geochemistry
3 hours 3 ①
Radioactive and stable isotope systems and their application to problems involving seawater, marine sediments, and oceanic rocks. Consent of instructor required. Not offered every year.

Oc 567 Marine Micropaleontology I: Foraminifera
4 hours 2 ① 2 ③
Systematics and taxonomy; laboratory identification and classification; field and laboratory techniques, use of literature; numerical analysis of faunas; familiarization with bathymetric and zoogeographic index species of benthic and planktonic foraminifera; specialized research problems.

Oc 568 Marine Micropaleontology II: Siliceous Microfossils 6 hours 1 ② 4 ②
Stratigraphic distribution; systematics and taxonomy of Radiolaria, Silicoflagellatae, Diatomaceae; distribution of floras and faunas during the Cainozoic; laboratory preparation, identification, and classification. Consent of instructor required.

Oc 569 Special Topics in Geological Oceanography
1, 2, or 3 hours 1 ①, 2 ①, or 3 ①
Not offered every year.

Oc 581 Igneous and Metamorphic Processes in the Ocean Basins
2 hours 2 ①
Topics concerning the 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 alternation 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. Not offered every year.

Oc 582 Analysis of Geologic Data Bases
4 hours 3 ① 1 ①
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. Prerequisite: one year of statistics and one year of computer science or consent of instructor. Not offered every year.

PHYSICAL OCEANOGRAPHY

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

Oc 431 Physical Oceanography (G)
3 hours 3 ①
Introduction to the physics of the ocean. Physical properties of seawater; dynamics governing motion in the ocean: equations of motion, time, and space scales of motion, geostrophy, turbulence; wind and tides: generation and propagation of wind waves, internal waves, tidal theory and prediction, tsunamis; propagation of light and sound in the ocean. Prerequisite: one year college physics; one year calculus.

Oc 432 Currents and Water Masses
(G) 3 hours 3 ①
Heat budget of the ocean, air-sea interaction processes, planetary heat budget; water masses, conservation laws, distribution of conservative and non-conservative properties, water mass formation; wind-driven circulation, the major surface current systems; abyssal circulation, thermohaline circulation, formation of deep and bottom water; coastal and estuarine oceanography. Prerequisite: Oc 431 or Oc 571.

Oc 433
Estuarine and Coastal Oceanography
(G) 3 hours 3 ①
Dynamics of estuarine and coastal waters. Tides, waves, wind-driven currents, upwelling, fronts and plumes, sedimentary processes, surges, temporal and spatial distriubtion of variables and the effects of human activities. Prerequisite: Oc 431 or 491.

Oc 438 Underwater Acoustics (G)
3 hours 3 ①
Sound propagation in an ideal fluid, including plane and spherical waves; sound transmission in the ocean; ray tracing, attenuation; acoustical measurements of the sea floor; active and passive bicoustics; transducers and arrays; signal processing theory and techniques. Prerequisite: one year calculus; one year physics. Not offered every year.

Oc 491
Principles of Physical Oceanography (g)
3 hours 3 ①
Physical properties of seawater, interrelationships between atmosphere and ocean, heat budget, water mass formation, ocean circulation, waves, tides, coastal processes. For nonoceanography majors. Prerequisite: college algebra; physics or physical science or consent of instructor.

Graduate Courses

See also courses marked *(g)* and *(G)* above.

Oc 531
Descriptive Physical Oceanography
3 hours 3 ①
Physical properties of seawater; air-sea interaction; light transmission; heat, water, and salt budgets and water mass formation; distribution of temperature, salinity, and density; sound transmission; surface circulation; deep circulation and mixing processes. Prerequisite: one year of college physics; differential and integral calculus. Not offered every year.

Oc 535 Optical Oceanography
3 hours 3 ①
Absorption, scattering, and attenuation properties of pure water; dissolved and suspended materials; distribution of optical properties; reflection; albedo; ocean color; irradiance; elementary radiative transfer; visibility; determination of total suspended mass, particle size distribution, nature of particles; remote sensing of ocean color. Prerequisite: one year of college physics; differential and integral calculus.

Oc 539
Regional Physical Oceanography
3 hours 3 ①
Detailed study of selected regions of the world ocean: mesoscale wind and ocean circulation; budgets of conservative and non-conservative properties; historical and current literature review; research and discussion of interdisciplinary questions. Successive terms may cover different regions; thus course may be taken more than once (with consent of instructor) for additional credits. Prerequisite. Oc 431,432. Not offered every year.

Oc 571
Theoretical Physical Oceanography I
4 hours 3 ① 1 ①
Fundamentals of fluid dynamics: conservation laws of mass, momentum, and energy; constitutive relations; viscous flow, dynamic similarity, boundary layers; the inviscid approximation, vorticity dynamics, irrotational flow; compressibility effects, sound waves. Prerequisite: one year of college physics; mathematics through differential equations and vector calculus.

Oc 572
Theoretical Physical Oceanography II
4 hours 3 ① 1 ①
Geophysical fluid dynamics: perturbation methods; dynamics of rotating and stratified fluids, conservation of potential vorticity, geostrophic motion, Ekman layers, the β-plane, Rossby waves; topographic waves; two-layer and continuously stratified models, geostrophic adjustment, baroclinic instability. Prerequisite: Oc 571. Offered alternate years. Offered 1982-83.

Oc 573
Theoretical Physical Oceanography III
4 hours 3 ① 1 ①
Ocean circulation theory: scale analysis; parameterization of small-scale motions; barotropic and baroclinic wind driven circulation; Sverdrup's theory; western boundary currents; abyssal circulation; the thermocline models; laboratory models; temporal variability, mid-ocean eddies, seasonal and climatic variability. Prerequisite: Oc 572. Offered alternate years. Offered 1982-83.

Oc 574
Theoretical Physical Oceanography IV
4 hours 3 ① 1 ①
Stratified flow, waves, and instabilities: principles of waves, hyperbolic waves, dispersive waves, phase and group velocity; surface gravity waves; dynamics of stably stratified fluids, internal waves, lee waves, finite amplitude motions; hydrodynamic stability; thermal instability, Rayleigh number; stability of parallel flows, Orr Summerfeld equation; effect of stratification on stability, Richardson number. Prerequisite: Oc 471. Offered alternate years. Not offered 1982-83.

Oc 575
Theoretical Physical Oceanography V
4 hours 3 ① 1 ①
Dynamics of turbulence: dimensional analysis; Reynolds averaging, derivation of turbulence moment equations; turbulent transport; turbulent boundary layers; statistical description; spectral dynamics; applications to geophysical problems. Prerequisite: Oc 571. Offered alternate years. Not offered 1982-83.

Oc 579
Special Topics in Physical Oceanography
1, 2, or 3 hours 1 ①, 2 ①, or 3 ①
Consent of instructor required. Not offered every year.

Geophysics Courses

Gph 501 Research

Gph 503 Thesis

Gph 505 Reading and Conference

Gph 507 Seminar
Terms and hours to be arranged

Gph 521 Planetology
3 hours 3 ①
Review of relevant topics in physics; theory of the internal constitution of cold gravitating bodies; observational data; models of the earth and other planets involving density, pressure, seismic parameters, chemistry, and temperature; topics in astrophysics and cosmology. Consent of instructor required. Offered alternate years. Offered 1982-83.

Gph 528 Physics of the Earth
3 hours 3 ①
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; processes within the earth with special reference to their effect on earthquakes, isostasy, crustal structure, island arcs. Prerequisite: differential equations; two years of physics; one year of geology. Offered alternate years. Offered 1982-83.

Gph 536 Theoretical Seismology
3 hours 3 ①
Wave propagation in one-dimensional structures; stress and strain in liquids and solids; propagation of waves in linearly elastic solids; basic solutions, body waves, surface waves, and propagation of elastic energy; theory of guided waves and waves in layered media. Fundamental oscillation modes of the earth. Prerequisite: differential equations; complex functions. Offered alternate years. Offered 1982-83.

Gph 537 Earthquake Seismology
3 hours 3 ①
Description of earthquakes; types of earthquakes; seismograph theory; seismic ray paths; velocity determinations; shallow and deep earthquakes; magnitude and energies of earthquakes; locating earthquakes; microseisms; seismicity. Prerequisite: Gph 536. Offered alternate years. Not offered 1982-83.

Gph 538 Applied Seismology
3 hours 3 ①
Methods and techniques used in research and exploration seismology: reflection methods, refraction methods, data reduction, deconvolution, filtering, stacking, interpretation, instrumentation, and field procedures. Consent of instructor required. Offered alternate years. Not offered 1982-83.

Gph 540 Geothermology
3 hours 3 ①
Geology, physics, and chemistry of geothermal systems; reservoir mechanics, exploration, production, and utilization of geoheat. Consent of instructor required. Offered alternate years. Offered 1982-83.

Gph 557
Paleomagnetism and Rock Magnetism
3 hours 3 ①
Principles of paleomagnetism and their application to geological and geophysical problems; field procedures and laboratory techniques; origin of remanent magnetism in rocks and the physical and chemical processes which control and affect it; properties of ferri-magnetic minerals that occur in rocks. Prerequisite: one year of calculus and one year of physics or consent of instructor. Offered alternate years. Offered 1982-83.

Gph 558 Geomagnetics
3 hours 3 ①
Geomagnetic field and magnetic potential; the geodynamo and the origin of the earth's magnetic field; geomagnetic phenomena of internal and external origin; secular variation polarity reversals; crustal magnetic anomalies. Prerequisite: differential equations; two years of physics; one year of geology. Consent of instructor required. Offered alternate years. Not offered 1982-83.

Gph 568 Earth's Gravity Field
3 hours 3 ①
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. Prerequiste: differential equations; two years of physics; one year of geology. Consent of instructor required. Offered alternate years. Offered 1982-83.

Gph 570 Geoelectricity I
3 hours 3 ①
Fundamentals of electromagnic theory, Maxwell's equations, individual field equations; stationary fields in a layered half-space; theory of the D. C. methods of exploration, field procedures, and applications. Prerequisite: Ph 431, 432,433 (electromagnetic theory and optics) or consent of instructor. Offered alternate years. Offered 1982-83.

Gph 571 Geoelectricity II
3 hours 3 ①
Maxwell's equations in the long-wave approximation; diffusion of electromagnetic fields in layered solids; theory of the magneto-telluric and other A.C. methods of geophysical exploration, field procedures, and applications; electromagnetic fields in weak plasmas; topics in aeronomy. Consent of instructor required. Offered alternate years. Not offered 1982-83.

Gph 587
Geophysical Time Sequence Analysis
3 hours 3 ①
Linear systems theory applied to the analysis of geophysical data. Topics include transforms, rational filters, spectral resolution, theory of least-squares fitting, and multichannel time series. Methods specifically applied to seismic wave propagation, marine magnetic anomalies, and other geophysical data. Prerequisite: St 521. Consent of instructor required. Offered alternate years. Not offered 1982-83.

Gph 589 Special Topics in Geophysics
1, 2, or 3 hours 1 ①, 2 ①, or 3 ①
Consent of instructor required.

PHARMACY

FACULTY

As of January 1982

Richard A. Ohvall, *Dean*

George H. Constantine, *Assistant Dean and Head Adviser*

Lyman T. Lais, *Representative to Graduate Council*

Douglass J. Stennett, *Coordinator of Externship*

Professors Emeriti R. F. Doerge, R. W. Sager, C. O. Wilson

Instructor Emeritus E. C. Lee

Professors Ohvall (Pharmacy Administration); Ayres (Pharmacy); Block, Fullerton (Pharmaceutical Chemistry); Constantine (Pharmacognosy); Fink (Pharmacology); Larson (Toxicology)

Associate Professors Hermann, Simonson, Sisson, Stennett, Wanke (Pharmacy); Schultz (Pharmaceutical Chemistry); Moldowan (Pharmacology)

Assistant Professors Butcher, Christenson, Parrott, Vorce-West (Pharmacy); Lais (Pharmacology)

Senior Instructor Summy (Pharmacy)

Instructors Samuels, Stadsvold (Pharmacy)

The School of Pharmacy at Oregon State University 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 school 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 a Department of Pharmacy at Oregon State College in 1898. The department grew steadily and in 1917 became the School of Pharmacy. The Pharmacy Building, which was designed and constructed specifically for pharmaceutical education, was built in 1925 and extensively remodeled and expanded in 1966.

Holders of the Bachelor of Science in Pharmacy degree can qualify for a wide variety of professional positions. Most graduates engage in the community practice of pharmacy; some eventually become owners or part-owners of pharmacies. Opportunities also exist for pharmacists in hospital and clinic pharmacies; as medical representatives for pharmaceutical manufacturers; as production, control, and research pharmacists in the manufacture of medicinal and pharmaceutical products; as personnel in wholesale drug distribution; as food and drug control chemists or inspectors for local, state, and federal health agencies; as pharmacists in the Public Health Service, the Veterans Administration, the armed forces, and other government agencies; and in pharmaceutical journalism.

Graduates of this school are privileged to become licensed either by examination or reciprocity in all states except California, Florida, and Hawaii, which permit licensure by examination only.

ADJUNCT FACULTY

The School of Pharmacy utilizes practicing pharmacists and physicians as lecturers in the clinical teaching program, in the hospital pharmacy program, in pharmacy management, and in graduate education. Current adjunct faculty:

Adams, Robert, B.S., R.Ph., Lebanon
Anderson, John, B.S., R.Ph., Portland
Anderson, Rodney, B.S., R.Ph., Lebanon
Arle, William, B.S., R.Ph., Portland
Baron, Stan, B.S., R.Ph., Portland
Beard, John D., B.S., R.Ph., Portland
Bensei, James, B.S., R.Ph., Portland
Bessey, Lola, B.S., R.Ph., Gresham
Bogardus, Dave, B.S., R.Ph., Salem
Bogdan, M. Nan, B.S., R.Ph., Salem
Bourinskie, James, Pharm.D., R.Ph., Portland
Bowman, Harrison F., Jr., B.S., R.Ph., Portland
Bronson, Michael, B.S., R.Ph., Corvallis
Brooks, Bob L., B.S., R.Ph., Salem
Brown, Ronald, M.S., R.Ph., Portland
Brunscheon, John, B.S., R.Ph., Portland
Brunscheon, Ralph, B.S., R.Ph., Junction City
Carpenter, Robert, B.S., R.Ph., Salem
Clayton, George, B.S., R.Ph., Eugene
Coberly, Ronald W., M.S., R.Ph., Coos Bay
Comer, William F., M.S., R.Ph., Portland
Cotter, Evva, B.S., R.Ph., Salem
Curry, Dale, B.S., R.Ph., Eugene
Day, Ronald, B.S., R.Ph., Corvallis
Dayton, Greg, B.S., R.Ph., Salem
Deer, Charles, B.S., R.Ph., Eugene
DeVoe, Gary, B.S., R.Ph., Salem
Eisler, Michael, B.S., R.Ph., Albany
Erickson, Eldon L., M.D., Corvallis
Fetrow, Sharyn B., B.S., R.Ph., Salem
Foulke. T. E., M.D., Corvallis
Fry, Larry, B.S., R.Ph., Portland
Furst, John N., M.D., Corvallis
Gerding, George, B.S., R.Ph., Portland
Graham, Robert, B.S., R.Ph., Portland
Gross, Linda, B.S., R.Ph., Portland
Gustafson, Richard, B.S., R.Ph., Portland
Haas, Helmut, M.D., Portland
Haas, Milo, B.S., R.Ph., Milwaukie
Hall, Clifford A., M.D., Corvallis
Hanson, Les, B.S., R.Ph., Portland
Hartman, Stanley, B.S., R.Ph., Portland
Hatch, Elsie, B.S., R.Ph., Portland
Hatch, Wayne M., B.S., R.Ph., Portland
Heisel, Carl, B.S., R.Ph., Portland
Henderson, H. J., M.S., R.Ph., Salem
Hibbard, James F., B.S., M.S., R.Ph., Portland
Hill, Norman, B.S., R.Ph., Eugene
Hubert, Mary Jo, B.S., R.Ph., Portland
Huckestein, LouAnn, B.S., R.Ph., Albany
Huey, Nadine, B.S., R.Ph., Portland
Jones, Tom, B.S., R.Ph., Portland
Jungnickel, Paul, M.S., R.Ph., Portland
Kelso, Edward, B.S., R.Ph., Lebanon
Kiel, Barry, Pharm.D., R.Ph., Roseburg
Kitchel, Vern, B.S., R.Ph., Salem
Kendrick, Alan R., B.S., R.Ph., Pendleton
Kovach, Christine, B.S., R.Ph., Portland
Krakauer, Lewis J., M.D., Corvallis
Ladd, John R., M.D., Corvallis
Lafrance, Richard A., M.D., Corvallis
Larson, David, B.S., R.Ph., Springfield
Lundgren, Richard, B.S., R.Ph., Salem
Luse, Richard, B.S., R.Ph., Portland
Magnuson, Rodger, B.S., R.Ph., Salem
Maples, Charles, B.S., R.Ph., Portland
Marino, George, M.S., R.Ph., Albany
Marriot, William, M.D., Corvallis
Mass, Robert E., M.D., Portland
McCann, Joe, B.S., R.Ph., Portland
McDonald, W., M.D., Portland
McLeod, Richard, B.S., R.Ph., Springfield
Monsen, Rodney, B.S., R.Ph., Eugene
Morris, J. F., M.D., Portland
Muilenburg, Norm, B.S., R.Ph., Portland
Myers, W. Michael, B.S., R.Ph., Portland
Nelson, Janis, B.S., R.Ph., Portland
Neville, Stephen V., M.D., Corvallis
Neumann, Holm W., M.D., Corvallis
Ogle, Tom, B.S., R.Ph., Portland
Owings, Gary, M.S., R.Ph., Portland
Parksion, George, B.S., R.Ph., Eugene
Pirtle, Roscoe, B.S., R.Ph., Portland
Poole, Robert R., M.D., Corvallis
Powers, Fred, B.S., R.Ph., Portland
Raffensperger, Paul, B.S., R.Ph., Corvallis
Rauch. Lawrence, B.S., R.Ph., Portland
Reynolds, Rozanne, B.S., R.Ph., Corvallis
Ritzmann, L. W., M.D., Portland
Roberts, Leroy, B.S., R.Ph., Eugene
Robertson, K. B., M.D., Corvallis
Saegaert, Gilbert, B.S., R.Ph., Corvallis
Sahli, Rick, B.S., R.Ph., Portland
Sanger, James M., M.S., R.Ph., Porltand
Schuetze. David, B.S., R.Ph., Portland
Schutz, Diane, Pharm.D., R.Ph., Portland
Shefchek, Carl, B.S., R.Ph., Eugene
Simonson, Roger, B.S., R.Ph., Philomath
Sinnard, Jenni, B.S., R.Ph., Portland
Smith, F. W., M.D., Portland
Steele, Robert E., M.D., Corvallis
Steinbach, Howard, B.S., R.Ph., Portland
Stout, William, B.S., R.Ph., Portland
Stratton, Michael, B.S., R.Ph., Springfield
Sturgeon, Chris K., B.S., R.Ph., Cottage Grove
Swayzie, Robert, B.S., R.Ph., Portland
Taylor, Anthony W., B.S., R.Ph., Eugene
Tefft, Robert R., B.S., R.Ph., Eugene
Terhune, Charles A., M.D., Corvallis
Terjeson, Jenny, B.S., R.Ph., Salem
Thomas, Frank D., M.D., Corvallis
Turner, Fredrick E., M.S., R.Ph., Portland
Tutor. Susan, B.S.,, R.Ph., Portland
Van Dreisch, Kenneth, B.S., R.Ph., Salem
Walker, David, B.S., R.Ph., Salem
Wallace, Logan, B.S., R.Ph., Portland
Walsh, John R., M.D., Portland
West, N. R., M.D., Corvallis
Whitaker, Madalyn, B.S., R.Ph., Portland
White, Robert, B.S., R.Ph., Portland
Wilborn, Virginia, B.S., R.Ph., Portland
Williams, Bruce, M.D., Corvallis
Wilson, Robert D., M.D., Corvallis
Wolfe, Jay, B.S., R.Ph., Portland
Wong, Michael L., M.D., Corvallis
Woodson, Gary, B.S., R.Ph., Portland
Yoder, Les, B.S., R.Ph., Lebanon
Zahler, John, B.S., R.Ph., Portland

Pharmacy Information

A young man or woman beginning a career in pharmacy needs a combination of natural attributes, education, training, and experience. A pharmacist has a position of considerable responsibility in the health professions. Carelessness can endanger lives; thus, a student going into pharmacy must be neat, orderly, accurate, and careful with details.

Formal pharmacy education is divided into two parts—two years of prepharmacy and three years of professional pharmacy. After successful completion of this five-year course of study, the graduate receives the B.S. degree and becomes eligible to complete the internship requirements described below and to take the examination given by the state Board of Pharmacy. After successful completion of these requirements, the graduate is granted a license to practice pharmacy.

The Prepharmacy Program

The courses required in the freshman and sophomore years (see curriculum on page 219) 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 pharmacy office *prior* to taking the course.)

If a high school graduate fulfills the requirements for admission to OSU (see page 10), the graduate may be admitted to the prepharmacy program in the School of Pharmacy as a freshman. He or she does not need to have taken any specific high school courses, but mathematics, chemistry, physics, and biology, as well as typing and speech communication are recommended.

Students from community colleges, from other colleges and universities, or from other schools at OSU may transfer into the prepharmacy program at the beginning of any term during their freshman or sophomore year. If they plan to apply for the professional pharmacy program, it is recommended that they transfer into the School of Pharmacy as early as possible, but they may take as many as two complete years elsewhere.

The Professional Pharmacy Program

The three-year professional pharmacy program (see curriculum on page 219)* provides a broad scientific base with room for a wide variety of elective courses. Students often take additional courses in business and economics, in various fields of pharmacy, or advanced work in mathematics and chemistry, especially if they are interested in community, industrial, institutional (hospital, Public Health Service), or research pharmacy.

Through judicious selection of elective courses, a student may concentrate in such areas as general pharmacy practice, clinical pharmacy, administrative pharmacy, or industrial pharmacy, or may prepare for graduate study.

Enrollment in the three-year professional program is limited. A student who has completed the prepharmacy requirements must apply for admission to the professional pharmacy program. Students who have completed the prepharmacy program at other institutions must apply to *both* the OSU Admissions Office and to the School of Pharmacy. Acceptance by *both* offices is required for admission to the professional program. Application forms and information about admission policies are available from the School of Pharmacy.

Once admitted to the junior year in pharmacy, students should register for a regular sequence of work as outlined on page 219. The sequence of both professional and nonprofessional required courses must be maintained. Students may register for only those courses for which they have completed the stated prerequisite courses. Students are advised that part of their course work may require living away from the Corvallis campus for one to two academic quarters (10-20 weeks) in their third professional year.

With an assigned faculty adviser, each student reviews his or her career objectives and determines a program of study. The adviser must approve the student's proposed schedule before preregistration each term.

* Because pharmacy is a rapidly changing discipline, it is likely that curricular modifications will occur from time to time. Thus, the School of Pharmacy reserves the right to alter its curriculum in accordance with professional and institutional standards during the tenure of any given student.

Academic Requirements

To assure that all pharmacy students graduating from the OSU School of Pharmacy have the best possible educational background, with no deficiencies in any area of study, the faculty has adopted the rules listed below.

(a) Students must attain a passing grade in and complete all required core courses with a grade-point average of 2.00 or higher to be eligible for graduation.
(b) A student will be placed on probation in the School of Pharmacy for two D grades in required pharmacy courses in one quarter, or a D grade in a pharmacy subject area in each of two successive quarters, including spring, fall.
(c) A student will be suspended from the School of Pharmacy (See "Readmission Policy") for being on probation for two successive terms; receiving a D grade in three or more required pharmacy courses in any quarter; or receiving an F grade in two or more required pharmacy courses in any quarter.
(d) A student who has been reinstated in the School of Pharmacy normally repeats the courses in which D or F grades were received and attains at least a C grade in them to be eligible to progress to the next higher class.
(e) Courses in which a D or F was earned may be repeated once. Pharmacy courses in which a grade of B or C was earned may not be repeated for the purpose of raising the pharmacy grade-point average.
(f) E grades and I grades in required pharmacy courses must be removed within three weeks after the next term begins.
(g) A student who has any academic deficiency will not be allowed to serve on any School of Pharmacy committee.

In establishing these rules, the faculty recognizes that there may be extenuating circumstances for inadequate academic performance and reaffirms the policy that any student may petition the School of Pharmacy Academic Requirements Committee for deviation from the school's academic requirements.

Readmission Policy

Any student leaving the School of Pharmacy via withdrawal or suspension (see "Academic Requirements") must comply with the following before he or she is readmitted.

Withdrawal

The student must complete an "Application for Readmission to the School of Pharmacy" and submit this form to the Admissions Committee at least two weeks prior to the term for which he or she wishes to re-enroll. Transcripts of all classwork attempted after withdrawal must accompany the application. Students must reapply and be readmitted before they will be allowed to re-enroll in School of Pharmacy classes.

Students may be readmitted on probation status or denied readmission if course work in the School of Pharmacy at the time of withdrawal is unsatisfactory in two or more classes (see "Academic Requirements").

Suspension

Students suspended for failure to meet academic requirements must meet with the head adviser and the Academic Requirements Committee to outline a program of study intended to improve their background in the perceived area of difficulty.

Once this program of study has been completed, the student must complete an "Application for Readmission to the School of Pharmacy" and submit this form to the Admissions Committee at least two weeks prior to the beginning of the term for which he or she wishes to re-enroll. Transcripts of all classwork attempted after withdrawal must accompany the application. Students must reapply and be readmitted before they will be allowed to re-enroll in the School of Pharmacy classes.

Field Trips

Upperclassmen make several annual field trips. Students may tour several Midwest or California pharmaceutical plants with transportation their only expense; as guests of the pharmaceutical firms, they are provided with lodging and meals. Visits to hospitals, wholesale houses, manufacturers in Oregon, and visiting lecturers help acquaint students with the scope of pharmacy.

WICHE Program

Oregon State University's School 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 School of Home Economics, the Program on Gerontology involves students and faculty from seven schools and fourteen departments throughout the University, including the School 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. Undergraduate students may elect an emphasis in gerontology, graduate students an integrated minor. For further information regarding the program, contact the director in the Department of Human Development and Family Studies, School of Home Economics.

University Honors Program

The Honors Program in this school is coordinated with the programs in other schools and administered by the director of the University Honors Program (see page 37). Information concerning eligibility and application forms may be obtained from the director.

Licensure

Public health laws require that the pharmacist be licensed before being permitted to compound and dispense drugs and medicines on the prescriptions of licensed medical practitioners. To become licensed in Oregon a person must be at least 18 years of age, of good moral character, be a graduate of an accredited school or college of pharmacy recognized by the Board of Pharmacy, complete the internship requirements, and pass the Board of Pharmacy examination.

Internship in the various areas of pharmacy under the supervision of a registered pharmacist is required for one calendar year. No internship may count until after the student has finished the junior year in pharmacy at OSU. All of the internship may be completed after graduation, but at least 400 hours must be taken after graduation. At the option of the state Board of Pharmacy, the externship in the third professional year may be counted for up to 400 hours of internship credit.

Baccalaureate Degree Programs

The Bachelor of Arts (B.A.) and the Bachelor of Science (B.S.) degrees are offered in the five-year undergraduate program in pharmacy. A degree candidate must satisfy University requirements (see page 13) and complete a total of at least 240 term hours of university-level courses including the approved prepharmacy and professional pharmacy curricula. To graduate, a student must also have a grade-point average of 2.00 (C) or higher in all professional pharmacy course work.

Graduate Study

Persons with education beyond the B.S. degree are needed to fill positions in industrial research and development, college teaching, government service, hospital pharmacy, and pharmaceutical distribution. The School of Pharmacy offers Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees in pharmacy with dissertation fields in pharmaceutical chemistry, pharmaceutical science, pharmaceutics, biopharmaceutics, pharmacognosy, pharmacology and toxicology, and pharmacy administration. An M.S. with emphasis in hospital pharmacy is also offered. All advanced degrees are granted through the Graduate School. The School of Pharmacy can provide additional information, including brochures, about graduate study in pharmacy.

Candidates for admission to graduate study must hold a bachelor's degree; acceptance is determined by the Graduate Studies Committee of the School of Pharmacy. Candidates must have attained a creditable scholastic average in undergraduate work and have determined a definite objective to be attained through advanced study. Advanced degree programs are developed with faculty advisement to meet the interests and objectives of the individual candidate.

Professional Associations

In order to broaden the preparation for professional activities and civil responsibilities, students are encouraged to join professional organizations. At OSU they may choose from among the following:

Oregon-American Pharmaceutical Association—Open to all students in pharmacy; includes the student branches of both the American Pharmaceutical Association and Oregon State Pharmaceutical Association.

Oregon Society of Hospital Pharmacists—Open to all students in pharmacy; includes membership in the American Society of Hospital Pharmacists and the Oregon Society of Hospital Pharmacists.

Rho Chi—Eligibility for membership in Beta chapter of Rho Chi, national pharmaceutical honor society, is based on high scholastic achievement.

Kappa Psi—Membership in the Beta Zeta chapter of this national professional pharmacy fraternity is limited to qualified men who meet the scholastic requirements.

Lambda Kappa Sigma—Membership in Rho chapter of this international pharmacy sorority is limited to qualified women who meet the scholastic requirements.

Loans

Students of ability and promise may have part of their college expenses paid through one of various scholarship or loan funds.

In addition to general scholarships awarded to OSU students, the "General Information" section of the catalog lists scholarships available to pharmacy students. (Also see that section for pharmacy honors and awards.) The special loan funds listed here are also available.

Oregon State Pharmaceutical Association Loan Fund. Loans available to pharmacy students through the Financial Aid Office.

Loan Funds. Loans established through the courtesy of the Burroughs Wellcome pharmacy education program available to pharmacy students.

Charles O. Wilson Loan Fund. Established for the assistance of prepharmacy students.

Pharmacy Curriculum

PREPHARMACY CURRICULUM

May be taken at any accredited college or university

First Year

	Hours
General Chemistry (Ch 204,205,206) or equivalent one-year sequence in freshman chemistry for chemistry majors	15
English Composition (Wr 121, graded P/N) or equivalent	3

Second Year

Organic Chemistry (Ch 331,332,333,337) or equivalent or more advanced one-year sequence in basic organic chemistry; must include at least one quarter of lab. Survey course which includes biochemistry unacceptable	10
Biological science (Z 201,202 and Bot 201) or equivalent courses in basic biology (Bi 211,212) must not include more than five hours of botany. Courses for nonscience majors unacceptable	10
Microbiology (bacteriology) (Mb 302,303) or equivalent microbiology/bacteriology lecture/lab course	5
General Physics (Ph 201,202) or equivalent one-year sequence in basic physics for science majors; must include lab	8

First and/or Second Year

(*Distribution at student's discretion*)

Calculus (Mth 163) or equivalent introductory calculus course	4
Communication skills: includes one course emphasizing verbal communication—Sp 112/113 or equivalent. Sp 112 recommended for students with no public speaking experience. College level dramatics course may not be used to meet this requirement. Also includes one course emphasizing written communication (e.g., journalism, advanced writing). Wr 121 may not be used to satisfy this requirement	4 6
Behavioral and social sciences: must include at least six hours of courses in both sociology and psychology	12
General economics: (Ec 213,214) or equivalent—sequence including both macro- and microeconomics	8
Physical education: any three activity courses	3
Electives: selected according to the student's interests. Students encouraged to consider courses to meet the general education requirements in humanities and/or arts	4–10
Total hours (It is advisable to have earned at least 96 credit hours to avoid necessity of registering for more than 16 credit hours per quarter during professional curriculum)	90-96

PROFESSIONAL CURRICULUM

Junior Year

	F		W		S	
	Lecture	*Lab*	*Lecture*	*Lab*	*Lecture*	*Lab*
Anatomy (Z 341,342,343)	..	1(2)	..	1(2)	..	1(2)
Physiology (Z 431,432)	3	2(3)	3	2(3)	..	.....
Drug Information (PSc 380)	3	.....	..	.....	..	.....
Pharmaceutical Chemistry (PCh 323,324,325)	4	.....	4	.....	3	.....
Medical Care (PSc 345)	4	.....	..	.....	..	.....
Pharmaceutical Tech. (PSc 317,319)	..	.....	4	1(3)	4	1(3)
Pharmacy Law (PSc 451)	..	.....	2	.....	..	.....
Pharmacology (Phc 390)	..	.....	..	.....	3	.....
Pharmacognosy (Phc 330)	..	.....	..	.....	3	1(2)
	16		16		15	

Senior I Year

	F		W		S	
	Lecture	*Lab*	*Lecture*	*Lab*	*Lecture*	*Lab*
Pharmacology (Phc 411,412,413)	5	.....	5	.....	5	.....
Biopharmaceutical Chemistry (PCh 450,451)	4	.....	4	.....	..	.....
Pharmacokinetics and Biopharmaceutics (PSc 470)	5	.....	..	.....	..	.....
Chemotherapy (Phc 431,432)	..	.....	4	.....	3	.....
Pharmacy Practice (PSc 454)	..	.....	..	.....	3	.....
Pharmacy Practice (PSc 455)	..	.....	..	.....	5	.....
Pharmacy Management (PSc 349)	..	.....	3	.....	..	.....
	14		16		16	

Senior II Year

	F		W		S	
	Lecture	*Lab*	*Lecture*	*Lab*	*Lecture*	*Lab*
Externship[1] (PSc 410)	0–15	.....	0–15	.....	0–15	.....
Profession options	0–12	.....	0–12	.....	0–12	.....
Electives	0–15	.....	0–15	.....	0–15	.....

[1] May be taken fall, winter, spring, or summer term.

Pharmacy Courses

PHARMACEUTICAL CHEMISTRY

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

PCh 323,324,325
Pharmaceutical Chemistry
4 hours first and second terms,
3 hours third term 4 ①, 4 ①, 3 ①
Organic and inorganic chemicals and their preparations used in pharmacy and medicine; correlation between chemical and physical properties and use; quality control and drug standards. Prerequisite: *for PCh 323,* third-year standing; concurrent enrollment in Z 431; *for PCh 324,* PCh 323; *for PCh 325,* PCh 324.

PCh 401 Research

PCh 403 Thesis

PCh 405 Reading and Conference

PCh 407 Seminar
Terms and hours to be arranged

PCh 440,441,442
Selected Topics (g)
3 hours each 3 ①
Recent developments in pharmaceutical chemistry and their application to pharmaceutical practice. Topics include: hormones, vitamins, chemotherapeutic agents, CNS depressants and stimulants, cardiovascular drugs. Not all topics covered each year. Prerequisite: PCh 325. Need not be taken in order.

PCh 443 Analytical Toxicology
3 hours 2 ① 1 ③
Detection of common inorganic and organic poisons; emphasis on alkaloids and synthetics. Prerequisite: PCh 325.

PCh 450,451
Biopharmaceutical Chemistry
4 hours each 4 ①
Chemistry of metabolic processes and products with emphasis on their pharmaceutical and medical applications. Prerequisite: *for 450,* Z 432, concurrent registration in PCh 323; *for 451,* PCh 450.

PCh 461,462,463
Special Analytical Methods (g)
3 hours each 1 ① 2 ③
Advanced quantitative methods, both chemical and physical, as applied to drugs and their dosage forms. Prerequisite: PCh 325. Need not be taken in order.

PCh 485 Drug Design (G)
3 hours 3 ①
Physical and chemical considerations in the design of drugs and other biologically active molecules. Prerequisite: PCh 325 and senior standing in pharmacy, or senior standing in chemistry or in a biological science.

PHARMACEUTICAL SCIENCE

Lower Division Course

PSc 201 Pharmacy Orientation
2 hours 2 ①
Open to nonpharmacy students.

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

PSc 310 History of Pharmacy
2 hours 2 ①
A study of early pharmacy in the Pacific Northwest.

PSc 317 Pharmacy Practice I: Pharmaceutical Technology A
5 hours 3 ① 1 ① 1 ②
Introduction to dispensing practices, responsibilities of pharmacists, practice options, liquid dosage forms, calculations, and medical terminology. Prerequisite: third-year standing.

PSc 319 Pharmacy Practice II: Pharmaceutical Technology B
5 hours 3 ① 1 ① 1 ②
Physical pharmacy with emphasis on formulation requirements for drug dosage forms. Prerequisite: third-year standing; PSc 317.

PSc 345 Pharmacy in the Health Care Systems
4 hours 4 ①
Organization, delivery, and financing of health services. Prerequisite: third-year standing.

PSc 351 Pharmacy Law
2 hours 2 ①
Federal, state, and local laws regulating pharmacy practice. Prerequisite: third-year standing.

PSc 380 Drug Information Sources
3 hours 2 ① 2 ②
Selection, evaluation, and dissemination of drug information. Prerequisite: third-year standing.

PSc 401 Research

PSc 403 Thesis

PSc 405 Reading and Conference

PSc 407 Seminar
Terms and hours to be arranged

PSc 410 Externship
15 hours
Supervised education in inpatient and outpatient pharmacy practice environments, emphasizing the application of biomedical and pharmaceutical sciences in the patient care area. Concurrent enrollment in these three sections: (a) hospital pharmacy, 6 hours; (b) community pharmacy, 6 hours; (c) therapeutics, 3 hours. Maximum credit: 15 hours. Prerequisite: PSc 454,455. Graded P/N.

PSc 411 Drug Information Clerkship
(g) 6 hours
Drug information services for health professionals, taught in a four-week block. Prerequisite: PSc 380; Phc 412.

PSc 412 Poison Control Clerkship
(g) 6 hours
Application of pharmacology, toxicology, and communication principles to management and prevention of poisoning incidents, taught in a four-week block. Prerequisite: PSc 380; Phc 412.

PSc 413 Therapeutics Clerkship
15 hours
Supervised professional education in appropriate inpatient practice environments emphasizing the application of biomedical and pharmaceutical sciences in the patient care area. Prerequisite: PSc 410C. Graded P/N.

PSc 415 Human Communication in Pharmacy Practice
3 hours 2 (1½)
Enhancement of the pharmacy student's understanding of interpersonal communication as an area of study basic to professional practice; emphasis on student's ability to communicate effectively with the patients and health care professionals. Prerequisite: PSc 317,345.

PSc 417 Geriatric Pharmacy Practice
3 hours 3 ①
The study of aging as it pertains to the elderly consumer of medication and the practice of pharmacy. Prerequisite: eligibility for Oregon pharmacy intern license.

PSc 420 Health Center Pharmacy Experience
1 hour 1 ③
Graded P/N. Corequisite: PSc 317. Consent of instructor required.

PSc 425 Drugs and the Elderly (g)
3 hours 1 ③
An examination of the use and effects of medications in the elderly population. For nonpharmacy majors only. Prerequisite: one year of biological science; HDFS 445 or H 422.

PSc 430 Prescription Compounding
1 hour 1 ②
Advanced prescription compounding techniques; application of basic compounding knowledge to current compounding practice and problems. Graded P/N. Prerequisite: PSc 319.

PSc 431 Applied Biopharmaceutics and Pharmacokinetics (G)
3 hours 3 ①
Application of biopharmaceutic and pharmacokinetic theory as seen in patient care environments. Prerequisite: PSc 470.

PSc 435 Computers in Pharmacy Practice
3 hours 2 ① 1 ②
Introduction to the applications of computers in pharmacy practice. Evaluation and comparison of available computer systems. Prerequisite: PSc 317.

PSc 449 Pharmacy Management
3 hours 3 ①
Management principles and factors affecting short- and long-term operation of hospital and community pharmacies. Prerequisite: PSc 345.

PSc 454 Pharmacy Practice IV
3 hours 2 ① 1 ②
Technical and legal information and skills required to accurately dispense prescription medications, manage problems which occur in contemporary practice, and advise patients on the proper use of nonprescription medications and supplies. Prerequisite: all required professional core courses (Phc 413, 432, and PSc 455 may be taken concurrently).

PSc 455 Pharmacy Practice V
5 hours 4 ① 1 (1½)
Introduction to patient medical records, as found in institutional practice settings; common laboratory tests used in modern clinical practice. Study of selected diseases and integration of previously acquired knowledge into a framework of clinical practice. Prerequisite: all required professional core courses except PSc 454 (Phc 413,432 may be taken concurrently).

PSc 457 Pharmacy Planning
3 hours 2 ① 1 ③
Activities associated with location and layout of a pharmacy. Prerequisite: PSc 345,349,351.

PSc 458 Intravenous Additive Systems
2 hours 1 ① 1 ③
Design, development, and maintenance of intravenous additive programs. Prerequisite: PCh 450. Consent of instructor required.

PSc 460 Hospital Pharmacy
3 hours 2 ① 1 ③
Limit 20. Prerequisite: PSc 345, 380. Consent of instructor required.

PSc 461,462 Nursing Home Pharmacy Practice
3 hours each 1 ① 2 ③
Role of the pharmacist in nursing homes: monitoring drug therapy; case presentations; discussion of medications, diseases, and pathologic conditions; establishment of a pharmacy service; inservice programs. Prerequisite: *for PSc 461*, PSc 417; *for PSc 462*, PSc 461. Consent of instructor required.

PSc 470 Pharmacy Practice III: Pharmacokinetics and Biopharmaceutics
(G) 5 hours 5 ①
Influence of pharmaceutical formulations on bioavailability of drugs. Prerequisite: PSc 319.

PSc 480 Drug Information Services
(G) 3 hours 1 ① 2 ③
Location, evaluation, and dissemination of information on drugs and drug therapy. Prerequisite: PSc 380.

PHARMACOLOGY AND TOXICOLOGY

Upper Division Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Phc 315 Safety in Use of Drugs
2 hours 2 ①
Origin and development of drugs, their purpose, uses and shortcomings, dangers, and misuse. Prerequisitet: sophomore standing. For nonpharmacy majors.

Phc 330 Pharmacognosy
4 hours 3 ① 1 ③
Official and important nonofficial drugs of biological origin; macroscopic, microscopic, and microchemical identification. Prerequisite: third-year standing.

Phc 390 Pharmacology
3 hours 3 ①
Pharmacodynamics, toxicity, and therapeutic uses of drugs. Prerequisite: Z 432.

Phc 401 Research

Phc 403 Thesis

Phc 405 Reading and Conference

Phc 407 Seminar
Terms and hours to be arranged

Phc 411,412,413 Pharmacology and Therapeutics
(g) 5 hours each 5 ①
Pharmacology, toxicity, therapeutic use of drugs and pharmacotherapeutics. Prerequisite: for *Phc 411*, Phc 390; *for Phc 412*, Phc 411; *for Phc 413*, Phc 412.

Phc 414 Pharmacology Laboratory (g)
1, 2, or 3 hours 1 ③, 2 ③, or 3 ③
May be repeated for credit. Prerequisite: Phc 390.

Phc 420 Toxicology (G)
4 hours 4 ①
Principles of toxicology; tissue and organ responses to toxicant effect; acute and chronic toxicities of agents found in the home, industry, and the environment. Prerequisite: Phc 412 or equivalent.

Phc 431 Chemotherapy I (g)
4 hours 4 ①
Chemical and biological properties of antiviral drugs, vaccines, antifungals, and parasiticides; treatment and prevention of neoplastic disorders. Prerequisite: Phc 390; PCh 323; concurrent registration in PCh 451.

Phc 432 Chemotherapy II (g)
3 hours 3 ①
Chemical and biological properties of antibiotics; treatment and prevention of infectious and communicable diseases. Prerequisite: Phc 390; PCh 323.

Phc 433 Hormones
3 hours 3 ①
Development, dosage forms, use, and stability. Prerequisite: fifth-year standing.

Phc 434 Anti-infectives
3 hours 3 ①
Development, dosage forms, use, and stability of drug products used to treat infections and infestations. Prerequisite: fourth-year standing.

Phc 450 Drug Action (G)
3 hours winter 3 ①
Principles of drug actions and how these actions are influenced by animal systems. Prerequisite: Z 432.

Phc 471,472
Pharmacognostical Techniques (G)
3 hours 1 ① 2 ③
Phc 471: Microscopic techniques. *Phc 472:* Research methods. Prerequisite: Phc 330; PCh 323. Need not be taken in order.

Phc 475 Antimicrobial Chemotherapy
(g) 2 hours winter 2 ①
Survey of agents for the treatment of bacterial diseases; indications and limitations. For nonpharmacy majors. Prerequisite: Mb 430.

Phc 476 Plant and Animal Poisons
3 hours 3 ①
Toxicology of plant and animal constituents potentially hazardous to people. Prerequisite: Phc 330,390.

Phc 481 Cancer Medicine (G)
3 hours 3 ①
Theories of etiology, pathogenesis, natural history, and current treatments of malignant neoplasms. For upper division and graduate students in pharmacy, veterinary medicine, and the biological sciences. Prerequisite: Phc 412 or equivalent.

Phc 495 Biological Products
3 hours 3 ①
Vaccines, serums, antitoxins, and related products. Prerequisite: fourth-year standing.

GRADUATE STUDIES

The School of Pharmacy offers graduate work leading to the Master of Science and Doctor of Philosophy degrees. Graduate programs may include research and thesis in any of the fields of pharmacy education.

See also courses marked (g) or (G) in each of the three departments above.

Phr 501 Research

Phr 503 Thesis

Phr 505 Reading and Conference

Phr 507 Seminar
Terms and hours to be arranged
One-hour section graded P/N.

Phr 510,511,512
Pharmaceutical Chemistry
3 hours each 3 ①
Natural and synthetic sources of medicinal agents; theoretical bases of biological responses to applied agents; correlation of molecular structure with biological activity. Prerequisite: PCh 325; Phc 390. Need not be taken in order.

Phr 515,516,517
Pharmaceutical Chemistry Laboratory
2 hours each 2 ③
To be taken in conjunction with Phr 510, 511, 512.

Phr 530 Physical Pharmacy
3 hours 2 ① 1 ③
Physico-chemical properties of pharmaceutical systems.

Phr 531 Manufacturing Pharmacy
3 hours 1 ① 2 ③
Unit operations in manufacture of pharmaceuticals.

Phr 533,534,535 Hospital Pharmacy
3 hours each 3 ①
The organization and operation of a hospital pharmacy. Need not be taken in order.

Phr 536,537,538 Product Development
3 hours each 1 ① 2 ③
Current and noval dosage forms; product stability; therapeutic designs. Need not be taken in order.

Phr 539 Hospital Pharmacy Residency
3 hours
A 12-month, postgraduate program of organized training and learning that meets the requirements set forth and approved by the American Society of Hospital Pharmacists Accreditation. Prerequisite: acceptance by a participating hospital.

Phr 540,541,542 Natural Products
3 hours each 2 ① 1 ③
Laboratory work concerned with isolation, purification, and estimation of active components of medicinal plants. *Phr 540:* glycosides; *Phr 541:* alkaloids; *Phr 542:* volatile oils, resins, related compounds. Prerequisite: Phc 432. Need not be taken in order.

Phr 550,551,552 Biogenesis of Medicinal Plant Constituents
3 hours each 3 ①
Phr 550: Glycosides. Possible metabolic pathways. *Phr 551: Alkaloids.* Nitrogen metabolism within plants and formation of alkaloids. *Phr 552: Lipids, Resins, and Related Compounds.* Formation within living plant. Prerequisite: BB 450,451,452, or equivalent. Need not be taken in order.

Phr 564,565,566
Advanced Pharmacology
2 hours each 2 ①
Lectures and conferences on advanced concepts and applications of pharmacologic actions of drugs. Prerequisite: Phc 390,411,412,420. Need not be taken in order. Offered alternate years.

Phr 567,568,569
Advanced Pharmacology Laboratory
1 hour each 1 ③
To be taken in conjunction with Phr 564, 565, 566.

Phr 570,571 Advanced Toxicology
3 hours each 2 ① 1 ③
Lectures, conferences, and laboratories on advanced concepts and mechanisms of toxicity of drugs and other chemicals. Prerequisite: Phc 420. Need not be taken in order. Offered alternate years.

Phr 575 Pharmacometrics
3 hours 2 ① 1 ③
Evaluation of drug activity by various pharmacologic techniques, screening methods, official and other bioassays. Prerequisite: St 452; Phc 390,411,412.

VETERINARY MEDICINE

FACULTY

As of January 1982

E. Edward Wedman, *Dean*

Norman E. Hutton, *Associate Dean*

Professors Emeritus Bone, Dickinson, Muth, Peterson, Reynolds, Shaw

Professors Dost, Helfer, Hutton, Patton, Schmitz, Shires, Wedman

Associate Professors Appell, Chapman, Lassen, Matsumoto, Mattson, Pearson, Smith

Assistant Professors Blythe, Craig, Crisman, Engel, Ferries, Grumbein, Kajikawa, Kaneps, Kerkvliet, Riebold, Sims, Watrous, Zimmerman

Instructors Hughes, Myrin, Ullrich

Associate Clinical Professor of Psychiatry McCulloch

The School of Veterinary Medicine at Oregon State University was established in 1975 with three major areas of responsibility—teaching, research, and public service.

Teaching

The school's professional education program began in 1979. Each year, 28 residents of Oregon and eight residents from the Western Regional Compact states (Alaska, Arizona, Hawaii, Montana, Nevada, New Mexico, Utah, and Wyoming) are selected to enter the OSU School 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 April in their third year, they transfer back to OSU to finish their third year of instruction and to take their fourth and final year of study.

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.

Accreditation of veterinary medical educational programs is through the Council on Education of the American Veterinary Medical Association. OSU's School of Veterinary Medicine currently carries the accreditation status of "provisional." The school is slated for full accreditation as the program progresses to full development.

Research

Biomedical research and research training is conducted by the school and cooperatively with the OSU Agricultural Experiment Station, Environmental Health Sciences Center, and the Sea Grant College Program. This research is of economic and public health significance, as it aims to develop new information to improve the health of animals and people.

The school 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 school 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, parasitology, 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 also described in this catalog under the Extension Service, Agricultural Experiment Station, Environmental Health Sciences Center, and Sea Grant College Program.

Public Service

The service programs focus on the prevention, treatment, and control of animal diseases. The school 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 and food animal patients. Patients are admitted directly from animal owners and through referral 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, symptoms, 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.

Providing continuing education for veterinarians is also considered a major responsibility of the school. One- to three-day intensive courses of instruction on specific topics are offered regularly.

Career Opportunities in Veterinary Medicine

Opportunities for employment in veterinary medicine are excellent. Nearly 70 percent of the professionally active veterinarians in the United States are engaged in private practice. Some practices are limited to particular groups of animals such as food animal, equine, or companion animal practices. Others involve specialties such as surgery, opthalmology, cardiology, or radiology. In addition to private practice, there are numerous teaching and research opportunities in academic, governmental, and industrial institutions. 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 by universities.

Admission to the Professional Program

Applicants for admission to the School of Veterinary Medicine should have at least 112 quarter hours of acceptable credit from an accredited college or university. The 112 hours 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 112 hours are courses in written communication, the arts and humanities, and the social sciences. Also included are

68 hours of physical and biological sciences, with courses in chemistry, including organic and biochemistry; mathematics through college-level algebra; applied animal nutrition; physics including electricity, optics and sound; and zoology or general biology. Completion of the general aptitude section of the Graduate Record Examination is also required. In addition to the academic requirements, the applicant must have been employed by, worked on a volunteer basis for, or by some other means gained significant contact with a graduate veterinarian.

Applications

Students seeking to enter the four-year professional veterinary medical education program must complete both an Oregon State University application for "admission in veterinary medicine" and an application for admission to the WOI Program of Veterinary Medical Education. Both applications plus a $25 application fee and official, sealed transcripts of all college credits must be sent to the Office of the Dean, School of Veterinary Medicine, Oregon State University, between September 1 and November 1 preceding the fall term in which the applicant wishes to enroll.

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 School 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 for admission to the School 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 School of Veterinary Medicine, preference is given to qualified Oregon residents and to qualified residents certified and financed by the WICHE compact states (see below).

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. Acknowledgement 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 School of Veterinary Medicine, the admitted student must pay a deposit of $75 not later than two weeks following notice of acceptance to reserve a place in the entering class.

Applications from WICHE Students

The School 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, Utah, and Wyoming. Under the terms of this compact, 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 compact states must apply to their home state for certification in addition to making application to the Office of Student Services, College of Veterinary Medicine, Washington State University, Pullman, Washington 99164. 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 School of Veterinary Medicine or who is dropped for cause must make written application for reinstatement to the school 30 or more days prior to the opening of the term in which the student desires readmission.

Veterinary Student Expenses

Students registered in the School of Veterinary Medicine who are residents of Oregon, Washington, or Idaho will pay tuition and fees of approximately $900 per quarter. Students from the compact states will pay the same fees as Oregon resident students.

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 for 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.

Oregon residents desiring additional information about veterinary medicine should write to the Office of the Dean, School of Veterinary Medicine, Oregon State University, Corvallis, Oregon 97331. Residents from other states should write to the Office of Student Services, College of Veterinary Medicine, Washington State University, Pullman, Washington 99164.

Graduation Requirements

A total of 220 quarter hours is required for graduation. To be awarded the degree of Doctor of Veterinary Medicine, candidates must have passed all courses in the veterinary curriculum, have a 2.00 grade-point average in the veterinary curriculum, have a bachelor's degree, and pass the prescribed comprehensive examinations during the fourth year of professional study.

Veterinary Medicine Curricula and Courses

Typical Preveterinary Curriculum at Oregon State University

Oregon State University courses that will meet the preveterinary academic requirements (see general education requirements, page 13, for details on the first four areas):

	Quarter hours
Communication	9
Arts and humanities	12
Social sciences	12
Physical education (3 terms)	3
Physical and biological sciences	
General Chemistry (Ch 104,105,106,107 or 204,205,206)	15
Organic Chemistry (Ch 331,332,333, 337)	10
Mathematics (Mth 101,102)	8
General Physics (Ph 201,202,203)	12
Biology or zoology (Bi 211,212,213 *or* Z 201,202,204 and Bot 202)	13–15
Biochemistry (BB 350 or 450 and 451)	4–7
Applied animal nutrition (AnS 311 and 211 or 313)	6–7
Electives (directed toward major)	

Professional Curriculum Leading to the D.V.M. Degree

FIRST YEAR

Fall—17 quarter hours
(at Oregon State University)

Veterinary Microscopic Anatomy (VM 614)	6
Veterinary Gross Anatomy (VM 611)	4
Veterinary Physiology (VM 617)	6
Veterinary Medicine Orientation (VM 609)	1

Winter—19 quarter hours
(at Oregon State University)

Veterinary Microscopic Anatomy (VM 615)	5
Veterinary Gross Anatomy (VM 612)	4
Veterinary Physiology (VM 618)	5
Veterinary Neurosciences (VM 616)	5

Spring—18 quarter hours
(at Oregon State University)

Veterinary Gross Anatomy (VM 613)	4
Veterinary Physiology (VM 619)	3
Veterinary Immunology (VM 620)	5
Veterinary Pathology (VM 621)	6

SECOND YEAR

Semester I—22 semester hours
(at Washington State University)

Systematic Pathology (V Pa 446)	5
Bacteriology (V Mic 432)	5
Pharmacology (V Ph 531)	4
Parasitology (V Pa 451)	5
Toxicology (V Ph 532)	3

Semester II—17 semester hours
(at Washington State University)

Virology (V Mic 431)	3
Pharmacology/Anesthesiology (V Ph 533)	3
Laboratory Diagnosis (V Ms 460)	3
Radiology (V Ms 481)	3
Small Animal Medicine I (V Ms 463)	4
Intro to Surgery (V Ms 471)	1

THIRD YEAR

Term I—18 semester hours
(at Washington State University)

Small Animal Medicine II (V Ms 464)	5
Small Animal Surgery (V Ms 472)	4
Large Animal Medicine I (V Ms 461)	5
Public Health (V Mic 433)	3
Large Animal Clinic Orientation (V Ms 377)	1

Term II—8 semester hours
Block system (4 weeks/block)
(at Washington State University)

Small Animal Medicine (V Ms 562)	4
Small Animal Surgery (V Ms 567)	4

Term III—25 quarter hours
(at Oregon State University)

Large Animal Medicine II (VM 622)	8
Large Animal Surgery (VM 624)	5
Theriogenology (VM 626)	7
Special Animal Medicine (VM 628)	5

FOURTH YEAR

Period I—6 quarter hours
(at Oregon State University)

Special Surgery (VM 633)	1
Clinical Pathology (VM 630)	1
Clinical Radiology (VM 631)	1
Practice Management (VM 675)	1
Clinical Practice (VM 629)	2

Period II—38 quarter hours
Block system (4 weeks/block)
(at Oregon State University)

Required blocks (6)

Clinical Medicine I (VM 632)	6
Clinical Surgery I (VM 634)	6
Rural Veterinary Practice I (VM 635)	6
Clinical Service I (VM 636)	6
Externship I (VM 680)	1
Externship II (VM 680)	1

Elective blocks (2)

Clinical Medicine II (VM 652)	6
Clinical Surgery II (VM 654)	6
Rural Veterinary Practice II (VM 655)	6
Clinical Service II (VM 656)	6
Small Animal Surgery and Medicine Topics (VM 657)	6
Clinical Theriogenology (VM 670)	6
Herd Health and Preventive Medicine (VM 671)	6
Sheep and Goat Medicine and Surgery (VM 672)	6
Avian Medicine (VM 673)	6
Laboratory Animal Medicine (VM 674)	6

Vacation blocks (2)

Veterinary Medicine Courses

VETERINARY SCIENCE COURSES

(Not applicable to the D.V.M. degree)

Lower Division Course

VM 50 Preveterinary Medicine
1 hour fall 1 ①
Introduction to the profession's role in society. Graded P/N.

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit.

VM 320,321 Anatomy and Physiology of Domestic Animals
4 hours fall and winter 3 ① 1 ②
Structure and function of domestic animals and wildlife. Need not be taken in order. Prerequisite: 1 year of biology or Z 202; 1 year general chemistry.

VM 411 General Pathology (g)
3 hours fall 3 ①
General principles of pathology: cell injury and death, inflammation and tissue repair, abnormalities of cell growth, and structures and mechanisms of disease. Offered alternate years. Not offered 1982-83.

VM/P 431
Anatomy and Physiology of the Fowl (g)
3 hours spring 3 ①
Structure and function of fowl. Prerequisite: VM 320,321 or equivalent. Offered alternate years. Offered 1982-83.

VM 441 Animal Diseases and Control (g) 5 hours spring 3 ① 2 ②
Predisposing and primary causes of disease, epizootiology and practical disease control. Prerequisite: senior standing.

VM 451 Avian Diseases (g)
3 hours fall 3 ①
The pathology of avian diseases; programs for control. Prerequisite: VM/P 431. Offered alternate years. Offered 1982-83.

VM 461 Parasitic Diseases of Domestic and Game Animals (G)
5 hours winter 4 ① 1 ②
Characteristics, life cycles, pathogenesis, immunity, epizootiology, control, and treatment of animal parasites that cause disease in domestic and game animals. Prerequisite: two years of biology; parasitology.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

VM 501 Research
Graded P/N.

VM 503 Thesis

VM 505 Reading and Conference

VM 507 Seminar
Terms and hours to be arranged
One-hour section graded P/N.

VM 551,552,553
Selected Topics in Veterinary Medicine
3 hours each 3 ①
Topics vary from term to term; check *Schedule of Classes* for particular topics. Prerequisite: graduate standing; consent of instructor.

PROFESSIONAL COURSES

VM 609
Veterinary Medicine Orientation
1 hour fall 1 ①
An overview of veterinary medicine with emphasis on historical development, current veterinary medical issues, employment opportunities, and professionalism. Prerequisite: first-year standing in veterinary medicine. Graded P/N.

VM 611,612,613
Veterinary Gross Anatomy
4 hours each 1 ① 3 ③; 1 ① 3 ③; 1 ① 3 ③
Systematic and topographic study and dissection of the dog, cat, horse, ruminant, pig, and chicken. Prerequisite: first-year standing in veterinary medicine. Must be taken in sequence.

VM 614,615
Veterinary Microscopic Anatomy
6 hours fall, 5 hours winter
4 ① 2 ③; 3 ① 2 ③
Structure and development of cells, tissues, organs, and organ systems of animals. Prerequisite: first-year standing in veterinary medicine. Must be taken in sequence.

VM 616 Veterinary Neurosciences
5 hours winter 4 ① 1 ③
Structural and functional relationships of the nervous system and organs of special sense with emphasis on general clinical application. Prerequisite: first-year standing in veterinary medicine.

VM 617,618,619 Veterinary Physiology
6 hours fall, 5 hours winter, 3 hours spring 5 ① 1 ③; 4 ① 1 ③; 2 ① 1 ③
Physiology of body fluids, excretion, respiration, acid-base balance, blood, muscle, bone, cardiovascular system, digestion, metabolism, endocrine system, reproduction, and lactation. Prerequisite: first-year standing in veterinary medicine. Must be taken in sequence.

VM 620 Veterinary Immunology
5 hours spring 4 ① 1 ③
Clinical and diagnostic aspects of immunological mechanisms, serological reactions, hypersensitivity, allergy, and disorders of the immune system. Prerequisite: first-year standing in veterinary medicine.

VM 621 Veterinary Pathology
6 hours spring 4 ① 2 ③
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. Prerequisite: first-year standing in veterinary medicine.

VM 622 Large Animal Medicine II
8 hours spring 4 ②
Diagnosis and treatment of large animal diseases. Prerequisite: third-year standing in veterinary medicine.

VM 624 Large Animal Surgery
5 hours spring 1 ② 3 ②
Large animal surgical techniques and procedures. Prerequisite: third-year standing in veterinary medicine.

VM 626 Theriogenology
7 hours spring 5 ① 2 ③
Diagnosis, symptomatology, and treatment of reproductive disorders. Prerequisite: third-year standing in veterinary medicine.

VM 628 Special Animal Medicine
5 hours spring 5 ①
Diagnosis, treatment, and management of special animals, including the common laboratory animals. Prerequisite: third-year standing in veterinary medicine.

VM 629 Clinical Practice
2 hours
General clinical assignments and orientation to veterinary hospital activities. Prerequisite: fourth-year standing in veterinary medicine.

VM 630 Clinical Pathology
1 hour
Selected principles of clinical hematology and clinical chemistry in domestic animals. Prerequisite: fourth-year standing in veterinary medicine.

VM 631 Clinical Radiology
1 hour
Selected radiological procedures and techniques as related to domestic animals. Prerequisite: fourth-year standing in veterinary medicine.

VM 632 Clinical Medicine I
6 hours, four-week period
Clinical medicine training in diseases of food animals and horses; clinic rounds and diagnostic procedures. Prerequisite: fourth-year standing in veterinary medicine.

VM 633 Special Surgery
1 hour
Selected surgical techniques and procedures as related to food animals and horses. Prerequisite: VM 624.

VM 634 Clinical Surgery I
6 hours, four-week period
Clinical surgery, treatment, and care of food animals and horses; clinic rounds; training in surgery, lameness, and diagnostic procedures. Prerequisite: fourth-year standing in veterinary medicine.

VM 635 Rural Veterinary Practice I
6 hours, four-week period
Rural practice training in diseases of food animals and horses. Prerequisite: fourth-year standing in veterinary medicine.

VM 636 Clinical Service I
6 hours, four-week period
Clinical experience in radiology, clinical pathology, microbiology, and necropsy. Prerequisite: fourth-year standing in veterinary medicine.

VM 652 Clinical Medicine II
6 hours, four-week period
Additional clinical medicine training. Prerequisite: VM 632.

VM 654 Clinical Surgery II
6 hours, four-week period
Additional clinical surgery training. Prerequisite: VM 634.

VM 655 Rural Veterinary Practice II
6 hours, four-week period
Additional rural practice training. Prerequisite: VM 635.

VM 656 Clinical Service II
6 hours, four-week period
Advanced clinical experience in radiology, clinical pathology, microbiology, or necropsy. Prerequisite: VM 636.

VM 657 Small Animal Surgery and Medicine Topics
6 hours, four-week period
Small animal medicine and surgical techniques and procedures. Prerequisite: fourth-year standing in veterinary medicine.

VM 670 Clinical Theriogenology
6 hours, four-week period
Clinical experience related to reproduction in animals. Prerequisite: fourth-year standing in veterinary medicine.

VM 671
Herd Health and Preventive Medicine
6 hours, four-week period
Preventive medicine; environmental, housing, nutrition, management, and agribusiness practices related to farm animals. Prerequisite: fourth-year standing in veterinary medicine.

VM 672
Sheep and Goat Medicine and Surgery
6 hours, four-week period
Clinical experience related to diseases of sheep and goats. Prerequisite: fourth-year standing in veterinary medicine.

VM 673 Avian Medicine
6 hours, four-week period
Clinical experience related to diseases of poultry. Prerequisite: fourth-year standing in veterinary medicine.

VM 674 Laboratory Animal Medicine
6 hours, four-week period
Clinical experience related to diagnosis, treatment, and management of laboratory animals. Prerequisite: fourth-year standing in veterinary medicine.

VM 675 Practice Management
Hours to be arranged
Ethical, legal, regulatory, and economic aspects of veterinary practice. Prerequisite: fourth-year standing in veterinary medicine.

VM 680 Veterinary Medical Externship
1 hour, four-week period
Theory of practice of veterinary medicine in a nonuniversity situation. May be repeated for credit for a maximum of 4 hours. Prerequisite: fourth-year standing in veterinary medicine. Graded P/N.

VM 681
Seminar in Veterinary Medicine
Hours to be arranged
Seminars and case discussions on selected topics by students, staff, and others.

VM 690 Clinical Experience
Terms and hours to be arranged

INTERDISCIPLINARY DEGREE PROGRAMS

Described below and on the following page are interdisciplinary, undergraduate degree programs sponsored by two or more schools. A number of other jointly sponsored programs, usually administered by departments of two different schools (agricultural education, for example), are described under one of the sponsoring schools or colleges and cross-referenced by the other.

HEALTH CARE ADMINISTRATION

Health care administration is an interdisciplinary, undergraduate degree program jointly sponsored by the Schools of Business, Health and Physical Education, and Home Economics. This program provides students with professional preparation for administrative positions in long-term care facilities or administrative and middle-management careers in private health care organizations and public health service agencies. A working relationship is maintained with official and professional organizations and agencies. A selected group of health care administrators and paramedical professionals serve as special lecturers, program consultants, and supervisors for internships and practica.

Common Requirements

The program of study comprises a core of common requirements combined with one of the following elective areas of concentration: long-term care administration, public health service administration, or private health care administration. Common core requirements include courses in business management, science, social science, communications, human relations, community health, and family resource management.

Areas of Concentration

Long-term care administration emphasizes knowledge of the social, psychological, and biological foundations of aging; facility management and administration; foodservice management; physical and social environment of long-term care facilities; patient care and welfare; and government regulations. This emphasis prepares students for careers as administrators of nursing homes, retirement residences, and multiservice facilities for the elderly. Students pursuing the long-term care concentration area are encouraged to elect an emphasis in gerontology. Requirements for this program appear under the School of Home Economics.

Public health service administration emphasizes public health administration, public financing, political science, and health planning and resources development. Students electing this area of concentration prepare for careers as administrators, middle managers, health planners, or program managers for such agencies as local and state health departments, departments of human services, and various health agencies.

Private health care administration provides additional emphasis on business management, cost accounting, management and labor, and facilities design and maintenance. This emphasis prepares students for administrative or middle-management positions with such organizations as medical clinics, group medical practices, hospital departments, health maintenance organizations, and group health insurance agencies.

Internship

The health care administration program provides internships for qualifying students in an approved facility or agency for one term of full-time administrative experience upon successful completion of the major portion of course work. Internships have been established throughout the state in medical clinics, hospitals, nursing homes, adult residential care facilities, and multiservice centers for the elderly. Such internships enable students to integrate and apply academic theory and principles of specialization with practical work in their area of concentration, and are often instrumental in job placement upon graduation.

Advising

Since requirements for the B.S. degree are the same in all three sponsoring schools, students may register in the School of Business, the School of Health and Physical Education, or the School of Home Economics. The curriculum is integrated and coordinated by the health care administration program director, who is responsible for student advising as well as the implementation of program policies and procedures.

Curriculum

Common Requirements—142 hours

Business—47 hours

Intro to Bus Data Processing (BA 131)	4
Financial Accounting (BA 211)	4
Managerial Accounting (BA 212)	4
Business Law (BA 226)	4
Quantitative Bus Methods (BA 235)	4
Management Processes (BA 302)	4
Operations Management (BA 311)	4
Marketing (BA 312)	4
Finance (BA 313)	4
Organizational Behavior (BA 361)	4
Personnel Management (BA 467)	3
Business Policy (BA 499)	4

Health Care Administration—4 hours

Governmental Regulations in Health Care Admin (HCA 420)	3
Perspectives in Health Care Administration (HCA 101)	1

Science and Social Science—37 hours

Intermediate Algebra II (Mth 101)	4
Mth for the Bio, Mgm, and Social Sciences (Mth 161,162)	4
Approved electives in chemistry or life sciences	9
Introductory Microbiology (Mb 130)	3
General Sociology (Soc 204) or anthropology (Anth 106)	3
General Psychology (Psy 201,202)	6
Principles of Economics (Ec 213,214)	8

Humanities Electives 12

Family Management—12 hours

Decision Making and the Consumer (FRM 250)	3
Contemporary American Families (HDFS 240)	3
Community Services and Welfare of Families (FRM 470)	3
Perspectives in Aging (HDFS 445)	3

Health—18 hours

Human Nutrition (FN 225)	4
Personal Health (H 160)	2
Man, Health, and Environment (H 344)	3
Communicable and Noncommunicable Diseases (H 320)	3
Community Health (H 321)	3
Selected Topics: National Health Policy (H 491 N)	3

Communications—9 hours

English Composition (Wr 121)	3
Technical Report Writing (Wr 327)	3
Informative Speaking (Sp 112)	3

Physical Education 3

Areas of Concentration

Long-Term Care Administration

Quantity Food Production (IM 311)	4
Foodserv Procure and Inven Syst (IM 442)	3
Admin Hum Serv Across Lifespan (HDFS 435)	3
Food for the Elderly (FN 407)	3
Adult Development and Aging (HDFS 446)	3
Health Aspects of Gerontology (H 423)	3
Institutional Hygiene (H 442)	3
Practicum in Long-Term Care (HCA 310)	3
Patient Care Management (HCA 415)	3
Science or social science electives	8
Electives	14

Public Health Service Administration

American National Government and Politics (PS 101 or 102)	3
State Governments and Politics (PS 313)	3
Probs and Issues in Pub Admin (PS 413)	3
Epidemiology (H 425)	3
Public Health Administration (H 426)	3
Health Data Analysis (H 424)	3
Admin Hum Serv Across Lifespan (HDFS 435)	3
Cost Accounting (BA 421)	4
Electives	26

Private Health Care Administration

Mth for the Bio, Mgm, and Social Sciences (Mth 163)	4
Introduction to Management Sciences (BA 338)	4
Cost Accounting I (BA 421)	4
Management and Labor (BA 496)	4
Management Planning (BA 497)	4
Facilities Design and Maintenance (HRM 350)	4
Science or social science electives	4
Electives	22

Lower Division Courses

HCA 101 Perspectives in Health Care Administration

1 hour 1 ①

Survey of career opportunities in the field of health care administration, including long-term care facilities, private health care organizations, and public health service delivery systems.

HCA 199 Special Studies

Terms and hours to be arranged

Upper Division Courses

HCA 310
Practicum in Long-Term Care
3 hours to be arranged

Work experience in all departments of a long-term health care facility under the supervision of the facility administrator. Weekly progress reports and post-experience summary and evaluation. Preplanned with instructor approval. Prerequisite: junior standing.

HCA 401 Research

HCA 405 Reading and Conference

HCA 406 Projects

HCA 407 Seminar
Terms and hours to be arranged

HCA 410 Internship
6-15 hours to be arranged

Supervised administrative work experience in long-term care facility, medical clinic, hospital, or public health agency. Supplementary conferences, readings, reports. Supervised by administrative personnel of facility or agency and instructor. Prerequisite: senior standing; consent of instructor; HCA 411. Appplication made and approved no later than the beginning of the term preceding term of enrollment. Maximum of 15 hours.

HCA 411 Pre-Internship
1 hour 1 ①

Required of health care administration majors approved for internship placement. Prerequisite: approval of program director.

HCA 415 Patient Care Management
3 hours 2 (1½)

Concept and process of patient care planning and management in a long-term care facility; individual and team roles of medical, paramedical, and supportive personnel; patient and family considerations; long-term care facility coordinating systems. Prerequisite: junior standing.

HCA 420 Governmental Regulations in Health Care Administration
3 hours 2 (1½)

Rules and regulations governing in-patient care in hospitals and long-term care facilities; licensure and certification processes and procedures; Medicaid and Medicare certification processes and procedures; federal contracts with states and intermediaries; professional standards and review for quality assurance; cost accounting processes and procedures; roles of official and private agencies and organizations; and impact of rules and regulations on administrative decision making and operations. Prerequisite: junior standing.

HOTEL AND RESTAURANT MANAGEMENT

Students in this program, which is jointly offered by the Schools of Business and Home Economics, prepare for a wide variety of management careers in the rapidly growing lodging and foodservice industry, in hotels, motels, restaurants, clubs, condominiums, resorts, and residential developments. Professional course work is primarily in business administration and in foodservice operations. Students may elect additional course work related to their special interests within the hotel and restaurant field. See recommended electives below.

Since requirements for the B.S. degree are the same in both schools, students may register in either the School of Business or the School of Home Economics.

The hotel and restaurant management program is fortunate to have a selected group of experienced professionals who serve as special lecturers in undergraduate classes, as consultants in research, and as supervisors for internships and practice requirements.

Curriculum

Freshman Year—48 hours

Intro to Hotel and Restaurant Management (HRM 105)	3
Hotel and Restaurant Org (HRM 106)	3
Intro to Bus Data Process (BA 131)	4
Mathematics (Mth 101,162,163)	12
Laboratory science	12
Written and oral communication (Wr 121, Sp 112)	6
Physical education	3
Electives	5

Sophomore Year—48 hours

Financial Accounting (BA 211)	4
Financial Controls for Hotels and Restaurants (HRM 215)	4
Nutrition (FN 225)	4
Business Law (BA 226)	4
Hotel Law (HRM 230)	1
Quan Business Methods (BA 235)	4
Introductory Microbiology (Mb 130)	3
Principles of Economics (Ec 213,214)	8
Foods (FN 215)	5
Textiles (CT 250)	3
Arts and humanities	5
Electives	3
[1]Practice requirement	0

Junior Year—48 hours

Management Processes (BA 302)	4
Quantity Food Production (IM 311)	4
Meal Management (FN 313)	3
Marketing (BA 312)	4
Finance (BA 313)	4
Technical Report Writing (Wr 327)	3
Facilities Design and Maint (HRM 350)	4
Marketing Hospitality Services (HRM 360)	4
Organizational Behavior (BA 361)	4
[2]Social science electives	4
Arts and humanities	3
Electives	7
[1]Practice requirement	0

Senior Year—48 hours

Projects: Restaurant Operations (HRM 406)	3
Food Law (FST 421)	3
Business and Its Environment (BA 495)	4
Equip Plan and Facility Design (IM 441)	3
Foodserv Procure and Inven Syst (IM 442)	3
Management and Labor (BA 496)	4
Restaurant Management (HRM 450)	4
Lodging Management (HRM 460)	4
Arts and humanities	4
Electives	16

Recommended Electives

Anthropology Today (Anth 107)	3
Basic Design (Art 110)	4
Consumer Behavior (BA 476)	5
Cultural Aspects of Foods (FN 416)	3
General Psychology (Psy 201,202)	6
General Sociology (Soc 204)	3
Housing and Arch Philosophy (ALA 178)	3
Intro to Modern Politics (PS 101)	5
Introduction to Philosophy (Phl 100)	4
Meal Management (FN 313)	3
Meats (AnS 351)	3
Textile Laboratory (CT 251)	1
Wholesale and Retail Meat (AnS 352)	3

Lower Division Courses

HRM 105 Introduction to Hotel and Restaurant Management
3 hours 2 (1½)

Cultural aspects, managerial problems and practices in the hospitality industry; includes orientation to the program and exploration of career opportunities.

[1] As part of degree requirements, each student must complete a minimum of 600 hours of industry work experience.

[2] Institutional requirements of 36 hours in science or 36 hours in social science, or 45 hours in science and social science together must be satisfied.

HRM 106
Hotel and Restaurant Organization
3 hours 1 ③

Hotel and restaurant organization, including functions and departmentalization. Field trips to representative enterprises. Prerequisite: HRM 105.

HRM 199 Special Studies
Terms and hours to be arranged

HRM 215 Financial Controls for Hotels and Restaurants
4 hours 2 ②

Accounting techniques and systems in the hospitality industry; uniform systems recommended by industry associations. Financing food and lodging facilities; generation and use of financial data. Prerequisite: BA 211; HRM 106.

HRM 230 Hotel Law
1 hour 1 ①

Laws and regulations applicable to lodging and food service organizations; management responsibilities to guests, tenants, invitees, and trespassers, and liability for personal injury or property loss; concession agreements, leases, credit, and collection practices, and legal relationships with public and private agencies. Prerequisite: BA 226; HRM 106.

Upper Division Courses

HRM 350
Facilities Design and Maintenance
4 hours 2 ②

Planning, designing, constructing, equipping, and maintaining service facilities in hotels, restaurants, and clubs. Prerequisite: IM 311; HRM 215.

HRM 360
Marketing Hospitality Services
4 hours 2 ②

Organization and management of the marketing and public relations function for lodging and foodservice organizations. Analysis of the travel industry and development of techniques and procedures for serving groups and individuals. Prerequisite: BA 312; HRM 106.

HRM 405 Reading and Conference

HRM 406 Projects

HRM 407 Seminar
Terms and hours to be arranged

HRM 450 Restaurant Management
4 hours 2 ②

Advanced integrative analysis of top management decisions, executive responsibilities, and company objectives; social, political, economic, legal, ethical, and other environmental considerations; managerial problems and policies evaluated through cases and examples from the foodservice industry. Prerequisite: HRM 350, 360; BA 302, 312, 313; IM 311.

HRM 460 Lodging Management
4 hours 2 ②

Advanced integrative analysis of top management decisions, executive responsibilities, and company objectives; social, political, economic, legal, ethical, and other environmental considerations; managerial problems and policies evaluated through cases and examples from the lodging, club, and resort industries. Prerequisite: HRM 450.

RESERVE OFFICERS TRAINING CORPS

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, a Cadet Corps was organized about 1872 and was continued thereafter under the direction of a U.S. Army officer assigned to the faculty. Cadets trained in the early years served as officers in the Spanish-American War.

On June 3, 1916, Congress passed an act which brought about the reorganization of the cadet regiment into a Reserve Officers Training Corps (ROTC) unit in 1917. In World War I and II and in subsequent international conflicts, OSU graduates have served with distinction and have given proof of the high quality of their preparation and the value to the nation of such military instruction.

At the end of World War II, on September 17, 1945, the secretary of the Navy commisioned the Department of Naval Science (NROTC) on this campus to provide for the training of both Navy and Marine Corps officers. On July 1, 1949, the U. S. Air Force activated an AFROTC unit that is now called the Department of Aerospace Studies. Oregon State is now one of the 30 or so colleges and universities that offer 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 in military and naval science.

Mission and Objectives. The ROTC selects and prepares young men and women, through a program of instruction coordinated with the students' normal academic curriculum, to serve as officers in the regular and reserve components of the Army, Navy, Air Force, and Marine Corps. Each of the units on this campus strives to develop in students a capacity for leadership, to develop them morally, mentally, and physically, and to provide them with the basic working knowledge required of a young officer.

Uniforms and Allowances. Students in each of the units receive uniforms to be worn at drill periods and on special occasions. During the final two years, students receive $100 a month subsistence pay for up to 20 months. 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 $100 a month subsistence pay for up to 40 months.

Flight Training. Eligible students in Air Force ROTC participate in flight training during their senior year. This training, provided at government expense, leads to flight training as commissioned officers.

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.

Department of Aerospace Studies

Personnel detailed from U.S. Air Force as of January 1982

Professor Colonel D. J. Karpen, Commander

Associate Professor Major Guinn

Assistant Professors Captain Hodges, Captain Latham

Instructors Staff Sergeant Zalanka, Technical Sergeant Dykes, Sergeant Schwartz

Air Force ROTC allows University students to compete for commissions as officers in the United States Air Force. Opportunities exist for well-qualified students from all fields, with scholarship opportunities especially bright for students with scientific, engineering, and mathematics-related majors. The Air Force is particularly interested in students who are interested in aviation careers, as pilots or navigators. There are both two- and four-year programs.

Four-Year Program. Students register for AS I (AS 111) during fall term of their freshman year and continue throughout the four-year curriculum. The curriculum consists of 30 credit hours in Aerospace Studies I (AS 111,112,113); Aerospace Studies II (AS 211,212,213); Aerospace Studies III (AS 311, 312,313); AS 314 (four weeks field training); and Aerospace Studies IV (AS 411,412,413).

Previous military experience (ROTC, academy, or military service) may allow the professor of aerospace studies to waive all or part of the general military course (freshman and sophomore years) for students enrolled in the four-year AFROTC program.

Two-Year Program. This program provides an opportunity for students who did not elect the four-year ROTC program upon entering college. Application is made early during fall term of the student's sophomore year. Processing is accomplished during winter term and selections are made in spring term of the sophomore year.

Selectees attend mandatory six-week summer field training (AS 214) 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 is 24 credit hours in AS 214 (six-week field training); Aerospace Studies III (AS 311,312,313); and Areospace Studies IV (AS 411,412,413).

Commitments. Cadets in the four-year program incur no obligation during their first two years in AFROTC. The student agrees to accept a commission, if offered, only after enrolling in AS 311. Upon accepting their commission, pilots incur an obligation of six years after completion of pilot training; navigators

incur a five-year obligation after initial training; all others agree to serve for four years following commissioning.

Scholarships. A limited number of scholarships are available for qualified students. High school seniors interested in applying should consult their high school counselors in their junior year or early in their senior year. University cadets already in the four-year AFROTC program compete at the end of each term in the freshman and sophomore years on the basis of grade-point average, Air Force Officer Qualifying Test scores, and an interview board's evaluation. Students receiving scholarships must be able to complete the Air Force ROTC program, receive a degree, and be commissioned by age 25 (29 for veterans). Each scholarship covers the cost of tuition, laboratory fees, incidental expenses, textbooks, and an allowance of $100 a month.

Field Training. Under either Air Force ROTC program, the student takes only one summer field training session. 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.

Standards. Cadets must be U. S. citizens of sound physical condition and high moral character. Before graduation, cadets must complete a three-credit course in English composition and another in mathematical reasoning. They must complete ROTC and receive a degree prior to age 26½ (27½ for veterans) if designated for flight training, or otherwise prior to age 30, to be recommended for commissioning as Air Force officers. Veterans may request an age waiver up to age 35.

Further Educational Opportunities. After completion of AFROTC requirements, advanced degrees may be sought by delaying active duty commitments. Some commissioned officers continue advanced studies with the Air Force Institute of Technology. Special provisions are available for medical, law, and meteorology students. For further information, contact the Air Force ROTC, 308 McAlexander Fieldhouse.

Lower Division Courses

AS 111,112,113 Aerospace Studies I
1 hour each 1 ① 1 ①
General Military Course (GMC): The doctrine, mission, and organization of the USAF; U.S. strategic offensive and defensive forces, their mission, function, and employment of weapons; civil defense; aerospace defense; missile defense; U.S. general purpose and aerospace support forces; the mission, resources, and operation of tactical air forces, with special attention to limited war; review of Army, Navy, and Marine Corps general purpose forces. Leadership laboratory: leadership, discipline, tradition, and courtesies of the service. Need not be taken in order.

AS 211,212,213 Aerospace Studies II
1 hour each 1 ① 1 ①
General Military Course (GMC): The development of air power; changes in the nature of military conflict; development of air power into an element of national security; development of concepts and doctrine governing employment of air power; technology affecting growth and development of air power; the changing mission of the defense establishment, with emphasis on the U.S. Air Force; air power as employed in military, non-military, and strategic operations. Leadership laboratory. Need not be taken in order.

AS 214 Field Training
6 hours summer
Six-week training (for two-year program applicants); education and training comparable to that received by the four-year program cadet during the freshman (AS I) and sophomore (AS II) years on campus and the four-week field training period (AS 314). Conducted at an Air Force base. Prerequisite: qualify for POC.

Upper Division Courses

AS 311,312,313 Aerospace Studies III
3 hours each 3 ① 1 ①
Professional Officer Course (POC): Professionalism; leadership and management theory, practice, tools, and controls; responsibilities; communication skills; human relations; personnel policies; channels of communication; problem solving. Leadership laboratory to continue officer development. Must be taken in order.

AS 314 Field Training
6 hours summer
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. Prerequisite: AS II or III.

AS 350 Aerospace Studies
3 hours spring 1 ③
Principles of flight, weather, and navigation; flight computers; flight planning; and federal aviation regulations. Preparation for FAA private pilot's written test. Prerequisite: none except AS 312 for Air Force pilot candidates.

AS 405 Reading and Conference
Terms and hours arranged by instructor
Supervised individual work. Consent of instructor required.

AS 411,412,413 Aerospace Studies IV
3 hours each 3 ① 1 ①
Professional Officer Course (POC): National security forces in contemporary American society; military justice; civil-military relations and environmental context in which U.S. defense policy is formulated and effected; role of the professional military leader-manager in a democratic society; social attitudes towards the armed forces; requisites for maintaining adequate national security forces; political, social, economic constraints on national defense structure; impact of technological and international developments on strategic preparedness and the overall policy-making process. Leadership laboratory. Prerequisite: AS III. Must be taken in order.

Department of Military Science

Personnel detailed from U.S. Army as of January 1982

Professor Colonel Curtis W. Rosler (Armor), Commander

Associate Professor Major Pool (Adjutant General's Corps)

Assistant Professors Major Suess (Transportation Corps), Captain Cuff (Field Artillery), Captain Syhre (Air Defense Artillery)

Instructors Sergeant Major Coleman, Sergeant First Class Ball, Staff Sergeant Baker

Instruction in the military science department is designed to produce junior officers for the United States Army in both the reserve and regular components. The basic military education in this department provides, in conjunction with the student's regular course of study, the background and attributes essential to the Army officer.

The Army ROTC commissioning program is comprised of (1) either the Basic Course (a combination of classroom instruction and outdoor adventure training) or Basic Summer Camp (six weeks at Fort Knox, Kentucky) or the Summer Basic Orientation Course; (2) the Advanced Course; (3) the Advanced Summer Camp; and (4) authorized electives from other schools of the University. Upon completion of the four-year military science course, the student will have received up to 33 credit hours, all of which are reflected in his or her University grade-point average.

The Basic Course is characterized by multiple entry points and a flexible program of instruction which can be tailored to each cadet's needs. Cadets generally follow one of the following tracks: (1) freshman classes (one credit each term) and sophomore classes (two credits each term); (2) a three-credit class spring term of the sophomore year; (3) six weeks of Basic Summer Camp (six credits) at Fort Knox, Kentucky, at government expense, with pay; (4) the Summer Basic Orientation Course (six credits), combination of classroom instruction and field training; (5) completion of Basic Training as a member of the Army Reserve or Army National Guard; (6) previous honorable active duty service in the Army, Navy, Marine Corps, Coast Guard, Air Force, National Guard, or Army Reserve.

The Advanced Course is less flexible and taught in much greater depth. Cadets receive three credits each term their junior and senior years.

Each student enrolled in the Advanced Course of the ROTC must: (1) be selected by the professor of military science and the president of Oregon State University; (2) be able to complete requirements for commission before reaching 30 years of age (may be waived for applicants who have demonstrated exceptional ability); (3) have successfully completed any survey and general screening tests prescribed; (4) have completed the Basic Course or received credit in lieu thereof; (5) be a citizen of the United States; (6) be physically qualified under standards prescribed by the Department of the Army. Due allowances are made for those defects that are correctable before the student becomes eligible for appointment as a commissioned officer; (7) be accepted by Oregon State as a regularly enrolled, full-time student; (8) execute a written agreement with the United States to complete the Advanced Course, contingent upon remaining in college; attend summer camp at time specified unless deferred for cogent reasons; accept a commission if offered; and satisfy the service obligation after graduation.

The Advanced Summer Camp, normally attended between the cadet's junior and senior years, lasts six weeks, and six credit hours are awarded for it by the University.

Comajors. A student may submit military science as a comajor for a baccalaureate degree if he or she includes credit hours of PMS-approved 400-level PS courses as electives to increase hours creditable to military science to a total of 36.

Successful completion of the program in military science leads to a commission as an officer in one of fifteen branches of the Army.

Pay. Cadets attending the Basic or Advanced Camps are paid at a rate specified by law and a mileage allowance or the cost of an airline ticket to and from the camp. Advanced Course cadets receive a living allowance at the rate of $100 each school month excluding the Advanced Camp period.

Commissions. For an Army reserve commission, a student must hold a baccalaureate degree and have successfully completed the course in military science. The branch of service in which the student is commissioned is determined by his or her academic standing, individual desires, and the needs of the Army.

Having received a reserve commission, an individual may be selected for three years of extended active duty or may, in certain instances, be assigned to Reserve Forces Duty. Commissions in the National Guard or the U.S. Army Reserve are available through the simultaneous membership program (SMP). Under the SMP, a qualified student may be commissioned as early as the summer following the sophomore year.

Distinguished military students may apply for appointment as commissioned officers in the regular Army. They must possess outstanding qualities of military leadership, high moral character, and definite aptitude for the military services; be between the ages of 21 and 30 years; and meet physical standards. If selected, they serve for at least three years.

Scholarships. Army ROTC offers four types of scholarships. Each pays full tuition, book costs, laboratory and incidental fees, and $100 subsistence pay each school month for the term of the scholarship. (This is not paid in addition to the subsistence pay that all Advanced Course cadets get, but is an alternative financial aid program.) The four-year scholarships are awarded to selected applicants from among high school seniors.

Three-year, two-year, and one-year scholarships are available to selected freshman, sophomore, and junior ROTC cadets. Full information on Army ROTC scholarships may be obtained by contacting the Department of Military Science of the University.

Lower Division Courses

MS 111 Military Science: ROTC and the U.S. Army
1 hour 2 ①
Organization and purpose of ROTC; outline of ROTC at OSU; how ROTC functions as part of the U.S. Army.

MS 112 Military Science I: The Army Officer
1 hour 2 ①
Description of an Army officer, including leadership and management fundamentals; types of jobs available to Army officers.

MS 113 Military Science: Land Navigation
1 hour 2 ①
How to read a topographic map and use a magnetic compass; includes practical exercises.

MS 211 Military Science II: American Military History
2 hours 3 ①
History of the American soldier from 1775 to present; weaponry and tactics of the American Army.

MS 212 Military Science II: Leadership Development
2 hours 3 ①
A close look at effective leadership; includes practical exercises through use of case studies.

MS 213 Military Science II: Basic Military Operations
2 hours 3 ①
A short outline of basic U.S. Army tactics in a variety of situations, plus skills necessary to accomplish the missions.

MS 214 Basic Summer Camp
6 hours
Six weeks of instruction at Fort Knox, Kentucky; substitute for the first two years of the ROTC program.

MS 215 Fundamentals of Military Science
3 hours 3 ①
Leadership and management fundamentals: techniques, responsibilities, and communication. The role of Army ROTC; land navigation; the role of the military in American history; squad tactics; leadership laboratory.

MS 216 Basic Military Science
6 hours 5 ②
Introduction to leadership and management; organization of the Army and ROTC; the Army as a profession; communication methods; map reading and land navigation; military tactics; function, duties, and responsibilities of junior leaders. Offered summer term only.

Upper Division Courses

MS 311 Military Science III: Organizational Leadership
3 hours 4 ①
Leadership communication methods; review of current leadership theory to include aculturization, group dynamics, organization theory, bureaucratic processes, and professional ethics.

MS 312 Military Science III: Small Unit Tactics
3 hours 4 ①
The philosophy of modern warfare, modern offensive and defensive small unit tactics, patrolling, advanced land navigation, combat communications and markmanship (M16).

MS 313 Military Science III: Troop Leading Procedures
3 hours 4 ①
Offensive and defensive operations at the platoon and company level, commander's estimate, combat orders, operations plan, branches of the Army, advanced camp preparation.

MS 314 Advanced Summer Camp
6 hours
Practical and theoretical instruction for five to nine weeks at a military installation. Prerequisite: MS 311,312,313.

MS 405 Reading and Conference
Terms and hours to be arranged
Consent of professor required.

MS 411 Military Science IV: Theory and Dynamics of the Military Team 3 hours 4 ①
Leadership and management of military organizations with emphasis on the principles and functions of line and staff organizations; capabilities, components, and roles of the elements of the military team.

MS 412 Military Science IV: The Military in American Society 3 hours 4 ①
Examines the role of the U.S. defense establishment in national security policy making and the position of the United States in the international arena.

MS 413 Military Science IV: Unit Administration and Military Justice 3 hours 4 ①
Fundamentals of small unit administration and an introduction to the philosophy, purpose, and functioning of the military justice system.

Department of Naval Science

Personnel detailed from United States Navy and Marine Corps as of January 1982

Professor Captain James G. Williams III, (USN), Commanding Officer

Associate Professor Commander Frank M. Burleson (USN), Executive Officer

Assistant Professors Major William N. Myers (USMC); Lieutenants Thomas L. Hagen (USN), Kevin M. Lees (USN), Spencer T. Nakaguma (USN), William E. Cheeseman (USN)

Instructors Senior Chief Quartermaster Paul D. Witmer (USN), Senior Chief Storekeeper Jim W. Jones (USN), Gunnery Sergeant Rufus E. Arthur (USMC), Yeoman First Class Herbert L. Robertson (USN)

Scholarship Students. *Four-Year Scholarship Program* students are selected through national competition and are appointed Midshipman, USNR, by the secretary of the Navy. Most of the students receiving this scholarship are high school seniors. During their four years in college, they receive the financial benefits described below and attend three four-week summer cruises.

Two-Year Scholarship Program students are selected through national competition. Applicants must be in their second year of college or third year of a five-year curriculum and in good standing with not less than a "C" average. Selectees for enrollment in this program attend the Naval Science Institute, where they receive instruction in naval science and drill, during July and August after their selection. Successful completion of the Naval Science Institute program qualifies students for enrollment in the advanced course of the NROTC program. Two-year scholarship students attend a four-week cruise between their junior and senior years.

For scholarship students, the Navy pays tuition, cost of textbooks, other fees of an instructional nature, and subsistence allowance of $100 a month for each nine-month school year. Graduates are offered regular commissions as ensign, United States Navy, or second lieutenant, United States Marine Corps, 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. *Four-Year College Program* students are selected by the Department of Naval Science at OSU from voluntary applicants. While enrolled in the advanced course (the last two years of college), successful applicants receive subsistence pay amounting to $100 a month. Graduates are offered commissions as ensigns, U.S. Naval Reserve, or second lieutenant, U.S. Marine Corps Reserve, and are required to serve on active duty for three years.

Two-Year College Program students are selected on a national basis from nominations submitted by the professor of naval science. Selectees for enrollment in this program attend the Naval Science Institute (see Two-Year Scholarship Program). Top performers there are awarded scholarships.

College Program students are eligible to receive full scholarship benefits upon nomination by the professor of naval science and selection by the chief of Naval Education and Training.

Applications for the College Program may be obtained from any NROTC unit.

Any University student may, with the prior approval of the professor of naval science, take naval science courses for credit. However, such students are classified as naval science students and are not enrolled in the NROTC program.

Requirements. Every acceptable NROTC candidate applying for any of the NROTC programs must: 1) be a citizen of the United States; 2) be accepted for admission or enrolled in the University; 3) be at least 17 years of age upon enrollment and under 25 years (27½ for College Program) on June 30 of the calendar year in which eligible for commissioning; (4) be physically qualified in accordance with the standards established by the Department of the Navy; (5) possess a satisfactory record of moral integrity and have potential officer characteristics; (6) have no moral obligations or personal convictions preventing 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 at sea training periods.

The program of study fits into curricula leading to first baccalaureate degrees. All midshipmen are required to take three credits of naval science per term. Additionally, scholarship students must complete three terms of calculus by the end of their sophomore year and three terms of physics by the end of their junior year.

Naval science (including summer training) pursued for four years in one of the undergraduate curricula constitutes a comajor with all of the majors offered in degree-granting divisions of schools. NROTC students may also request participation in graduate programs.

Lower Division Courses

NS 111,112,113 Naval Science I
3 hours each 5 ①
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, 113—Naval Ships Systems:* Structure, stability, propulsion, and operation of naval ships. Recommended to be taken in order.

NS 211,212,213 Naval Science II

3 hours each 4 ①

NS 211, 212—Naval Weapons: Weapons department organization, management, and equipment. *NS 213—Seapower and Maritime Affairs:* Investigation of needs and characteristics of seapower and its effects on U.S. maritime affairs. Recommended to be taken in order.

Upper Division Courses

NS 311,312,313 Naval Science III

3 hours each 5 ①

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. Recommended to be taken in order.

NS 321,322,323 Naval Science III: Marine Corps Option

3 hours each 4 ①

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. Recommended to be taken in order. Offered alternate years.

NS 350 Aviation Ground School

3 hours **2** ②

Principles of flight, weather, and navigation; aerodynamic reactions; flight computers; flight planning; and associated federal air regulations.

NS 405 Reading and Conference

1 hour

To prepare midshipmen returning from a leave of absence from the naval science program for commissioning and entrance into the fleet.

NS 411,412,413 Naval Science IV

3 hours each 4 ①

Naval Management: Management motivational theories, decision-making processes, and leadership principles in the context of junior naval officer responsibilities. Recommended to be taken in order.

NS 421,422,423 Naval Science IV: Marine Corps Option

3 hours each **4** ①

Amphibious Warfare and Administration: Theory of amphibious operations in World War II and Korean conflict; administration; leadership; and military justice. For U.S. Marine Corps candidates. Recommended to be taken in order. Offered alternate years.

NS 450 At-Sea Training

6 hours any term

Six- to eight-week training cruise taken aboard naval ships as arranged by professor of naval science.

GRADUATE SCHOOL

ADMINISTRATION

Lyle D. Calvin, *Dean*
John C. Ringle, *Associate Dean*
Henry P. Hansen, *Dean Emeritus*

GRADUATE COUNCIL

Gordon Anderson, George Boehlert, Lyle Calvin, John Gardner, Lyman Lais, Denis Lavender, Donald Mattson, Edward McDowell, Ann Messersmith, Daniel Selivonchick, Bruce Shepard, Arthur Stonehill, Howard Wilson (chair).

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 students' programs are responsibilities of the departments, under the general rules and requirements of the Graduate School.

For more detailed information on programs, degrees, and regulations, students should consult the *Graduate School Catalog*, available through the Graduate School office.

Organization and Administration

The graduate faculty consists of the president of the University, the academic deans, the chairs of the departments in which advanced degrees are offered, and other members of the faculty who have been elected to the graduate faculty. Formulation of Graduate School policies is carried out by the Graduate Council, members of which represent their respective schools and colleges. Members of the graduate faculty are represented through their respective school graduate committees, which are made up of representatives from departments in the school or college. Graduate faculty members offer graduate courses, conduct seminars, serve on graduate committees, advise students on their theses, and serve on preliminary and final examination committees. The dean of the Graduate School is an ex officio member of all graduate committees.

History

Oregon State University granted its first advanced degrees (A.M.) in 1876. In 1897 residence requirements for the master's degree were announced. In 1910 graduate study was placed under a standing committee of the faculty. In 1933 all graduate work in the State System of Higher Education was placed in an interinstitutional Graduate Division; graduate work at Oregon State was placed under immediate charge of an associate dean and an institutional graduate council. The first degrees of Doctor of Philosophy were conferred by Oregon State in 1935. In October 1946, the State Board of Higher Education returned to the institutions direct responsibility for their programs of graduate study, and assigned graduate work on this campus to 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. Information on fields of specialization is contained in the *Graduate School Catalog*.

Majors in which the doctoral and master's degrees are offered

Agricultural and Resource Economics
Animal Science
Atmospheric Sciences
Biochemistry
Biophysics
Botany and Plant Pathology
Chemical Engineering
Chemistry
Civil Engineering
College Student Services Administration
Computer Science
Counseling
Crop Science
Education
Electrical and Computer Engineering
Entomology
Family Life
Family Resource Management
Fisheries
Food Science and Technology
Foods and Nutrition
Forest Engineering
Forest Management
Forest Products
Forest Science
General Science
Genetics
Geography
Geology
Geophysics
Guidance and Counseling
Horticulture
Industrial Engineering
Mathematics
Mechanical Engineering
Microbiology
Nuclear Engineering
Oceanography
Pharmacy
Physics
Poultry Science
Rangeland Resources
Resource Economics
Science Education
Soil Science
Statistics
Veterinary Medicine*
Vocational Education
Wildlife Science
Zoology

Majors in which only the master's degree is offered

Adult Education—Ed.M.
Agriculture—M.Agr.
Agricultural Education—Ed.M.
Agricultural Engineering—A.E.
Business Administration—M.B.A.
Business Education—Ed.M.
Clothing, Textiles, and Related Arts—M.A., M.S.
Elementary Education—Ed.M.
General Home Economics—M.H.Ec.
Health Education—Ed.M.
Home Economics Education—Ed.M
Industrial Arts Education—Ed.M.
Interdisciplinary Studies—M.A.I.S.
Management Science—M.S.
Materials Science—M.Mat.S.
Metallurgical Engineering—Met.E.
Ocean Engineering—M.Oc.E.
Reading—Ed.M.
Trade and Industrial Education—Ed.M.
Veterinary Science—M.S.

* D.V.M. degree offered through the School of Veterinary Medicine.

Minors

Any of the majors listed above may also be taken as minor fields of study as part of a student's graduate study program. In addition, graduate minors in the following fields are offered.

Agricultural Engineering Technology
Anthropology
Art
College and University Teaching
Community College Education
Community Education
Community Health
Economic Geography
Economics
English
Extension Methods
Foreign Languages and Literatures (French, German, Spanish)
Gerontology
History
Journalism (technical)
Music
Philosophy
Physical Education
Political Science
Psychology
Religious Studies
Resource Recreation Management
Sociology
Speech Communication
Water Resources

GENERAL REGULATIONS

Admission

A student desiring to enter the Graduate School at Oregon State University will send (or arrange to have sent) to the Office of Admissions: (1) admission forms (available from the Admissions Office); (2) official, sealed transcripts of all previous college or university work; (3) a letter indicating the special fields of interest and (4) a nonrefundable $25 application fee. The applicant should contact the major department for any special requirements such as GRE scores. 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, and other evidence that indicate the ability to do satisfactory graduate work. The Admissions Office will determine whether the general conditions for admission have been met. The major and minor departments 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. The student is then notified by the Office of Admissions as to the action taken.

Test of English as a Foreign Language (TOEFL)

This test is required of all foreign applicants whose native language is not English. The minimum acceptable score is 500.

Admission Status

Students may be admitted to the Graduate School under the following categories:

1. Advanced Degree Students (Regular Graduate Students)

a. *Classified* are those who have been accepted by the University and by a major department to work toward an advanced degree.

b. *Unclassified* are those who have met all requirements for classified status but have not declared a major. Only a limited number of students are admitted to this status. They must enroll for a reasonably full load, and they should apply for classified status after no more than two quarters of graduate work.

2. Provisionally Accepted Graduate Students

Students who have not met the formal 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 provisionally admitted as follows:

a. *Students from nonaccredited institutions* must complete at least one quarter of satisfactory work at Oregon State, after which they may be admitted with full standing to the Graduate School. Credit will be allowed for graduate courses they have completed acceptably while registered as provisional students.

b. *Students whose preparation does not warrant full admission* to the Graduate School but who may prove acceptable later must satisfactorily complete at least two quarters of study to demonstrate their ability to carry out graduate-level work. If at the end of two quarters they fail to show promise as graduate students, they will be dismissed from the Graduate School.

3. Postbaccalaureate Students

Students admitted under this category work toward (a) a second baccalaureate degree or (b) teacher certification. Postbaccalaureate students must hold a baccalaureate degree, make application to the Admissions Office, and be accepted by the Graduate School office and their major department. Students working toward teacher certification must be approved by the School of Education. A maximum of 18 hours of graduate work may be reserved for graduate credit during completion of work for the second baccalaureate degree.

Postbaccalaureate students may not hold appointments as teaching or research assistants. They may elect to take courses on an S-U basis only if those courses will not be used on a graduate degree program or for the removal of deficiencies.

Applicants are discouraged from using the postbaccalaureate category as a means of qualifying for admission as advanced degree students. Those postbaccalaureate students who have had a change in objectives and who wish to be reclassified as advanced degree students must follow the procedure referred to below in "Reclassification of Postbaccalaureate and Special Students."

4. Special Students

The special student category may be used by those holding a baccalaureate degree who do not wish to pursue an advanced degree. Those special students who wish to be reclassified as advanced degree students must follow the procedure described below.

Reclassification of Postbaccalaureate and Special Students

A postbaccalaureate or special student (graduate) 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 special student, he or she is eligible for admission consideration at any time.

b. If the student, prior to entering as a postbaccalaureate or special student, had been denied graduate admission, or would have been ineligible for graduate admission as determined *a posteriori* by the graduate admissions committee, the postbaccalaureate or special student must complete 24 credit hours in graduate or undergraduate courses approved in writing by the department in which the student intends to major and filed with the Graduate School. The student is to obtain this approval *prior* to registration for any course to be used for the 24-credit requirement. Each of these courses must be completed with a grade of B or better before the student is *eligible to apply* for graduate admission. Any course to be considered for an advanced degree program must be among those approved in writing by the major department for meeting the 24-credit requirement. Students working toward reclassification should select courses that eliminate deficiencies and demonstrate ability to do satisfactory graduate work in the field of interest. Such courses should be carefully selected in consultation with an academic adviser.

Reclassification decisions employ the same procedures and requirements as those for admission. Postbaccalaureate and special students who seek reclassification must be acceptable

both to the graduate admissions committee and the department in which the student plans to major. The University does not have the capacity to accommodate all who meet the minimum requirements for regular graduate student status; when selecting among students who meet minimum requirements, students requesting reclassification are treated no differently than those applying for admission as regular graduate students.

Dismissal from Graduate School

Classified (including provisional) 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 asked by the major department to terminate work, students may be dismissed from the Graduate School. Students who fail their final oral examinations will be dismissed from the Graduate School.

Academic dishonesty also may serve as grounds for dismissal from the Graduate School.

Unclassified students who fail to attain a grade-point average of at least 3.00 after two quarters of graduate work may be subject to review by a committee of the Graduate Council and possible dismissal.

Grievance procedures for graduate students desiring to appeal matters relating to their graduate education are outlined in "Grievance Procedures for Graduate Students at Oregon State University," available from the Graduate School.

Requirements and Options

Reserving Credits

Graduate credit is not granted for undergraduate courses taken in excess of the requirements for a baccalaureate degree, but undergraduate students taking graduate courses in excess of baccalaureate requirements may have such credits reserved for possible future use under the following conditions:

a. Only credits with A or B grades, earned within 45 hours (60 hours for five-year baccalaureate programs) of graduation, may be reserved for graduate credit.

b. Request for reservation must be made early in the term in which the student completes baccalaureate requirements.

c. A maximum of 18 hours may be reserved for graduate credit.

d. Before more than 15 term hours of credit are earned. the student must select a graduate major and minor, pass qualifying examinations, be assigned a major professor, and formulate an approved graduate program.

e. A minimum of two quarters of residence in the Graduate School is required for the master's degree, regardless of the number of credits reserved.

Preparation Required

Preparation for a graduate major must be an undergraduate major in the same subject or a fair equivalent. Preparation for a graduate minor must be at least one year of upper division work in addition to foundation courses in the subject.

Qualifying Examinations

Some departments require graduate students working for advanced degrees to take an examination in their major and minor fields designed to determine their overall preparation and background. This examination is in effect a guidance examination, the results of which are used in setting up the graduate study program. Poor showing in any of the areas tested may result in students' taking undergraduate courses without credit to give them the necessary background to go on with their graduate programs.

The examination may be oral or written or both and must be taken during the first quarter of graduate enrollment, preferably before the beginning of fall quarter, but not later than one month after the beginning of the quarter. In lieu of their own qualifying examination, departments may accept a satisfactory showing in the Graduate Record Examination or some other standard test.

Term Credit Load

The maximum load for graduate students devoting all of their time to graduate study is 16 hours. Petitions to take more than 16 hours must be approved by the Graduate School. For teaching and research assistants, the maximum load is 12 hours per term (if appointed on a .30 or .50 FTE). The minimum load is 9 term hours; fellows may carry the maximum load. A minimum load of 9 term hours may be necessary to qualify for purposes of veterans' benefits, visa requirements, etc.

A student should be enrolled for a reasonable number of credits sufficient to represent his or her use of University resources. At minimum, this is 3 term hours in any quarter the student uses University space and facilities or faculty time. Registration solely for the purpose of taking the final oral exam for the master's or doctoral degree is not required.

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 are not accepted for graduate credit.

Graduate Courses

All courses numbered in the 500s carry graduate credit, as do those in the 400s which have been approved by the Graduate Council. Approved courses in the 400s are designated in the catalog by (G) or (g) following the course title. Courses designated (G) may form a part of either a major or minor. Courses designated (g) may be taken as part of a minor, and one (g) course may be applied toward a major in a master's program. Two (g) courses may be applied toward a major in a doctoral program.

Blanket numbers 501, 503, 505, 506, 507, and 508 may be repeated to the maximum as indicated below. Number 503 covers both the thesis research and the writing. Number 501 is for research which is not part of the thesis, and data obtained from such research should not be incorporated in the thesis. Reading and Conference (505) and Projects (506) are used for special work not given under a formal course number. They may include specified reading, laboratory work, field work, or compilation of information essential in the student's program.

The work done under these numbers may be reported either in writing or orally to the instructor concerned. Seminar (507) is used both for departmental seminars and for special group work not given in a formal course. A maximum of 6 hours of blanket numbers other than thesis, or research in lieu of thesis for nonthesis degrees, may be used on the master's degree program; 15 such hours may be used toward the doctorate.

Meetings and Exam Schedules

Program meetings and preliminary and final examinations may be held during any period when school is in session. This excludes the periods between the regularly scheduled quarters and during official vacations.

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. The student will be advised of the decision on his or her petition. To arrive at a decision, the advice of the Graduate Council may be sought. Action taken on petitions will not be considered as a precedent for any future action.

Application for Degree

Students expecting to complete requirements for advanced degrees should apply for graduation at the Graduate School office by the first week of spring term preceding commencement.

GRADUATE FEES

Graduate students registered for 9 term hours of work or more pay tuition and fees in accordance with the schedule printed in the General Information section of this catalog. Students holding teaching or research assistantships of .15 FTE or greater receive tuition remission but must pay fees. Graduate students registering for 8 hours of work or less (minimum three credit hours) pay the graduate part-time fee. Payment of the fee entitles the student to all services maintained by OSU for the benefit of students.

Deposits. Persons who enroll for academic credit (except staff members) must make a deposit of $25 payable once each year at the time of first registration. This is required as a protection against loss or damage of institutional property such as laboratory equipment, library books, or residence hall equipment. If at any time the balance of this deposit drops to $10 or less, the student will be required to re-establish a $25 balance.

Microfilming. All doctoral candidates pay a fee of $30 for microfilming of the doctoral dissertation.

Graduate Work by Staff Members

Staff members of Oregon State University holding rank above that of instructor cannot receive advanced degrees from OSU. Full-time staff members normally may not register for more than 6 hours per term at staff fee rates. Further information may be obtained from the Department of Personnel Services.

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, classified graduate student, enrolled as a full-time student in the Graduate School concurrently with the assistantship appointment, and making satisfactory progress on an advanced degree. Excluded from eligibility for graduate assistantships are all other categories of students, including specials, undergraduates, and postbaccalaureates. Graduate assistants must complete a minimum of 9 hours during each term of appointment. Persons interested in assistantships should write directly to the department concerned.

Research assistantships are also sponsored through the Agricultural Experiment Station, Oregon Cooperative Wildlife Research Unit and Oregon Cooperative Fishery Unit, Engineering Experiment Station, Forest Research Laboratory, and the Sea Grant College program.

Student Services Assistantships, with stipends ranging from $3,200 to $3,900 depending on the level of experience and the number of hours of work required weekly, are available in the following areas: residence halls, Memorial Union, student activities, recreational sports, financial aid, and general student services.

Fellowships sponsored by 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 hours, and pay full tuition. The following fellowships are open to Oregon State University graduate students.

Atlantic Richfield Foundation: $1,000 for graduate fellowships in chemical engineering.

Lenore Bayley Memorial Fellowship: Annual grant of $1,500 to a graduate student enrolled at Oregon State University.

Boise Cascade Fellowship: $5,500 to support graduate students in forest management (preference given to qualified minorities and women).

John Lind Ching Memorial Fellowship: Two $500 graduate fellowships, provided by the Dr. Kim K. Ching Family, to support research and study in forestry.

Dean's Graduate Research Award: Provides financial assistance toward student's research expenses for a master's thesis or doctoral dissertion in home economics.

D. B. DeLoach Memorial Fellowship: $1,500 awarded annually. Limited to graduate students in agricultural and resource economics alternate years; open to others every other year.

Dow Chemical Company Fellowship: $2,500 provided by the Dow Chemical Company for graduate fellowships in chemical engineering; a senior may be selected.

Dubois Memorial Thesis or Dissertion Award: $75 to an M.S. candidate in home economics education or a doctoral candidate in vocational education with an undergraduate degree in home economics education.

DuPont Grant: Annual awards up to $4,000 to assist graduate students in chemical engineering.

Eric Englund Memorial Postgraduate Scholarship: Annual awards up to $8,000 for several scholarships for graduate study in agricultural economics or home economics. Graduates of any Oregon State University degree program are eligible to apply.

Exxon Foundation: Annual award of $2,000 to assist graduate programs in chemical engineering.

General Foods Fellowship: Two fellowships of $2,500 for study toward master's or doctoral degree. May be awarded as one $5,000 fellowship for study toward doctoral degree.

Jess Hanson Graduate Scholarship in Poultry Science: Approximately $4,000 to $5,500, depending on degree.

Hubbard Farms Charitable Foundation Scholarship: $1,000 for a graduate student in poultry science.

Johnson Research Fellowship: Income from a trust fund left by the late Robert Johnson, placed with First National Bank of Portland, to graduate student for study, research, and investigation in agricultural and resource economics. Approximately $6,500 annually.

Mary J. L. McDonald Fellowships in Forestry: Annual grants of $500 to $1,500 each to assist graduate students in forestry.

Pacific Egg and Poultry Association Scholarships: A number of $750 scholarships for qualified students specifically interested in poultry.

President's Graduate Fellowships: Annual fellowships to encourage outstanding students to attend Oregon State University for their graduate work. Basic stipend is $8,000 for a 12-month period.

Shell Aids in Chemical Engineering: $7,500 for the advancement of graduate education in chemical engineering.

South Santiam Educational Research Project Fellowships: A number of $600 to $1,200 fellowships to be added to assistantships for students in forestry provided by the Louis W. and Maud Hill Foundation.

Stauffer Chemical Company Grant: Annual awards up to $2,500 to assist graduate students in chemical engineering.

Buena M. Steinmetz Scholarship: $225 to be awarded a junior, senior, or graduate student majoring in child development or family relationships at OSU.

Lucille D. and Faye H. Stewart Fellowship: Award of $4,000 to qualified graduate students in forest engineering.

Ruth Kennedy Tartar Award: $600 for research in nutrition or related subject area. Limited to graduate students enrolled in a department of the School of Home Economics at OSU.

Texaco Fellowship: $4,800 plus tuition for graduate study in oceanography in petroleum technology.

U. S. Bureau of Mines Research Fellowships: Stipends in chemistry, physics, geology, and engineering for research at the Albany, Oregon, plant. Master's degree candidates devote one year to research, doctoral candidates two years. Compensation based on up to 50 percent of GS-5 and GS-7 pay.

Weyerhaeuser Company Foundation Fellowship: $9,000 to a graduate student in forest science or forest products.

Weyerhaeuser Company Foundation Fellowship: $8,000 to a graduate student in chemical or mechanical engineering.

Chester M. Wilcox Memorial Scholarship: Income from a trust fund left by A. D. Wilcox in honor of his brother to two graduate students for research in poultry science. Approximately $6,000 to $6,500 annually.

Research Grants: Various departments of the College of Science and other research organizations on the campus, including the Engineering Experiment Station and Agricultural Experiment Station, annually receive grants from federal and state agencies, foundations, and private companies for research projects. Many include stipends for graduate students. Application made through department concerned.

DEGREE PROGRAMS

Master of Arts and Master of Science

Credit Requirement

All master's degrees require a minimum of 45 graduate credit hours (some Ed.M. degrees require higher minima) including the thesis (6 to 12 hours) or paper (3 to 5 hours) when required. Credit hours used in one master's program may not be used in an additional master's program. Approximately two-thirds of the work (30 term hours) must be in the major and one-third (15 term hours) in the minor. One small (g) course is allowed in the major. General regulations for the master's program are cited here, with certain exceptions provided for the master's degrees in the professional areas listed below.

Residence Requirements

The residence requirement for the master's degree is 30 term hours on this campus after admission as a graduate student. (This does *not* include hours taken as a postbaccalaureate or special student.) Deviation in the residence requirement requires a petition to the dean of the Graduate School.

Transferred Credit

A maximum of 15 quarter hours of graduate work done at another accredited institution or through the Division of Continuing Education of Oregon State University may be transferred, provided that: (1) the work fits into a logical program for the degree; (2) the transfer is approved by the department and by the Graduate Council; (3) grades of A or B have been earned. Credit granted for work done at another institution is tentative until validated by work in residence. Credit for out-of-state extension, correspondence, television, or "institute" courses is not given; these courses are not acceptable to the Graduate School. For complete information, students should contact the Graduate School office.

Language Requirements

For the Master of Arts degree, the student must show, by examination or by adequate undergraduate course work (not less than two years), a reading knowledge of one foreign language. There is no foreign language requirement for the Master of Arts in Interdisciplinary Studies degree. For a Master of Science degree there is no foreign language requirement, unless a language is needed in the individual student's program.

Graduate Study Program

A classified master's degree student must file a study program with the Graduate School by the end of the second quarter of residence or before the completion of 18 hours of courses that will be used on the program—whichever occurs first. A student who does not file a program by the specified deadline will not be allowed to register for the next term.

The program is worked out under the guidance of the major and minor professors and signed by the major and minor professors and the chairman of the academic unit before filing in the Graduate School office. The graduate program of each candidate should include a substantial amount of work with at least three faculty members offering graduate instruction. Changes to the program may be made by submitting a "Petition for Change" form, available 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

A copy of the master's thesis in either final draft or final form must be presented to the Graduate School office at least one week prior to the final oral examination.

A thesis presented in final draft form must be accompanied by an "Approval to Schedule Final Oral Examination with Thesis" form, available in the Graduate School office. This copy of the thesis is forwarded by the office to the Graduate Council representative. Additional copies of the thesis and abstract are distributed by the student to other members of the examining committee.

Within six weeks after the final oral, two copies of the thesis for the library, including copies of the abstract, are deposited unbound in the Graduate School office. The student must obtain the original signatures of the major professor and the head of the major department on the thesis approval page. The signature of the dean of the Graduate School will be obtained by the Graduate School office.

Full information concerning the prescribed style for thesis is given in the booklet, "Preparation of the Thesis," available at the OSU Book Store.

The credit allowed for the thesis, including the research and the preparation of the manuscript, varies from 6 to 12 term hours. In certain departments, the thesis requirement for the

Master of Science and Master of Arts degrees is optional, to be determined in each case by the department and major professor. Students should check with the major department.

Final Examinations

A final oral examination is required of every candidate for the master's degree. Some departments may also require a written exam. When a thesis is involved, the examination must be at least two hours, with the examining committee consisting of at least four members of the faculty—two in the major field, one in the minor field, and a Graduate Council representative. When no thesis is involved, the final oral examination must be at least one hour, with the examining committee consisting of three members of the graduate faculty. One dissenting vote is permitted for both thesis and nonthesis degrees. 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 concurrently registered in all courses required by the student's program.

The examining committee is nominated by the student's adviser and department head, subject to the approval of the department chair or head and the dean of the Graduate School, who is an ex officio member of all examining committees.

Students writing a thesis must have a Graduate Council representative on their committee. It is the student's responsibility to select his or her own representative. Official forms for this purpose may be obtained in the Graduate School office. Selection must be made at least one week prior to scheduling the final exam.

Final oral examinations must be scheduled in the Graduate School office no later than five weeks before June commencement and must be completed about four weeks before commencement. Exact dates will be published. Corrected copies of the thesis or abstract must be in the Graduate School office at least three weeks before commencement.

Other Master's Degrees

Master of Agriculture

The program for the Master of Agriculture degree provides a broader training in several fields for high school agriculture teachers, veterans' instructors, Extension personnel, and other professional agricultural workers who do not desire the specialized training of the Master of Science degree. Forty-five hours are required in at least three agricultural or agriculturally related fields with not more than 21 hours in any one field. At least 15 hours must be in 400 (G) or 500 courses.

An advisory committee of graduate faculty selected from these departments will select the major professor from the department of the student's major interest. The program must be approved by the committee within three weeks from the date the student registers under the program. No thesis is required, but a paper demanding 3 to 5 credit hours of work must be submitted to be registered as Reading and Conference (505) in the field of major interest. A final oral examination is required.

Master of Arts in Interdisciplinary Studies

This degree is granted for attainment of a broad, advanced knowledge and achievement integrated from three fields of study. At least one field must be selected from among the departments in the College of Liberal Arts. A minimum of nine hours in each of the three fields of study is required; at least 12 hours must be taken in the College of Liberal Arts. No more than 21 hours (excluding thesis or project hours) will be taken in any field unless the total program exceeds 45 hours. A minimum of 30 hours must be earned as resident credit through Oregon State University. A final oral examination is required.

There are two options under the program:

Option A: (thesis): The thesis must coordinate work in the three fields. The requirement is 6 to 9 hours of Thesis (503) to be registered in the field of emphasis or in ISt (Interdisciplinary Studies) if the department does not offer 503. The thesis adviser must be a member of the graduate faculty and be authorized to direct master's theses.

Option B: A program-oriented paper of 4 to 7 credit hours is required, registered as Research (401) (G) or (g) or (501), as Reading and Conference (405) (G) or (g) or (505) in the field of major interest, or as ISt (501) or (505).

Master of Business Administration

The Master of Business Administration degree is designed for students holding undergraduate degrees, either in business administration or in a nonbusiness area, who seek professional education which will aid them ultimately to develop into competent and responsible executives in business, industry, or government, or to carry on research related to business problems and operations. The program involves a broad study of business administration rather than intensive work in any one specialized area.

The M.B.A. program consists of 45 term hours of graduate work, up to 15 of which may be devoted to a nonbusiness minor. Prerequisite to M.B.A. graduate courses is course work in business and economics.

The time required by a full-time student to complete the program varies from one to two years, depending on the extent to which the prerequisites are met prior to admission. M.B.A. candidates whose undergraduate degrees were earned in business administration normally will be able to complete the requirements for the M.B.A. degree within one year.

The M.B.A. degree requires no thesis.

Master of Education

The Master of Education is a professional degree. For the degree a minimum of 45 term hours in graduate courses (including a maximum of 6 term hours of blanket-numbered courses) must be completed; additional hours may be required by the School of Education. A maximum of 9 term hours of Selected Topics in Education (Ed 521) is permitted on a graduate degree program. A minimum of 12 additional hours in graduate courses approved by a departmental adviser is required for a master's degree and for certification at the professional level in guidance and counseling. A minimum of 9 additional term hours in graduate courses is required for the master's degree in college student services administration (CSSA). A minimum of 30 term hours (not to include thesis or field studies) must be earned on the Corvallis campus after official admission as a graduate student.

A candidate for the Master of Education degree must qualify under one of these options:

a. The student submits a thesis, which meets all standards for a master's thesis, on some applied or professional aspect of education. For the thesis the student receives 6 term hours of credit. He or she must complete the 24 required hours of Option C.

b. The student majors in guidance and counseling and completes 41 hours of prescribed courses and 16 hours of electives. Electives will be selected under the direction of the guidance adviser.

c. The student completes 45 term hours with 24 term hours in specific courses for the major. The remaining 21 hours are elective under the direction of an adviser. No thesis or field studies are required. The final examination will be either an oral or written comprehensive examination.

There are six Option C areas which deviate from the above requirements: adult, business, health, home economics, industrial arts, and vocational education. Majors in these areas

must take a minimum of 30 hours in their respective fields and a minor of at least 15 hours in general education. The minor may be integrated around Research Procedures in Education (Ed 512); a course in one of the following: Principles and Practices in Remedial Reading (Ed 468), Reading in the Elementary School: Advanced (Ed 467), or Reading and Composition in the Secondary School: Advanced (Ed 590); or a sequence of not less than nine hours in administration, guidance and counseling, or curriculum construction. In each case a minimum of 45 term hours is required.

d. For reading, the student completes 45 term hours in specific courses in reading, special education, and psychology. Options are available to prepare reading specialists at the elementary, secondary, and community college levels. The remaining 9 hours are elective under the direction of an adviser. No thesis is required. There is a written final examination.

e. Student majors in college student services administration complete a minimum of 39 hours in the major and 15 hours in a minor for a total of 54 hours minimum requirements.

Master of Engineering

This degree is applicable only to those engaged in authorized off-campus graduate instruction. A minimum of 45 term hours is required, divided into approximately 30 hours for a major and 15 hours for a minor. Included for a variable number of hours within the major is a formal report in lieu of thesis, the scope and content of which is approved by the major professor. Prerequisite to study for the degree is a degree from an undergraduate curriculum in engineering and admission to the Graduate School. The general requirements for the degree are the same as for the Master of Science except for those related to the thesis and formal report.

Master of Forestry

The Master of Forestry degree is intended for potential administrators and technologists in public and private organizations where persons of broad ability and broad technical training are demanded. At least 21 hours are to be selected within a major field of forestry, and as many as 24 hours may be elected from other related fields outside of forestry. The electives must contribute to a unified program which will meet the specific objective of the student. A thesis is not required, but a technical report, correlated with courses in the major fields or assigned or approved topics, must be submitted. A final oral examination is required.

Master of Home Economics

The Master of Home Economics is a professional degree which is of interest primarily to high school teachers and Extension Service personnel. The degree is offered in general home economics only.

The curriculum for a Master of Home Economics degree in general home economics is 48 hours, including 27 term hours of specified graduate courses, i.e., 6 hours in clothing, textiles, and related arts, 6 hours in human development and family studies, 6 hours in foods and nutrition, 6 hours in family resource management, and 3 hours in statistics or a research methods course; and 21 additional graduate hours selected from these same basic areas of home economics and their related disciplines, home economics education, education, Extension methods, communications, or institution management. To ensure breadth, not more than 18 hours of the total program may be from any one department or its related discipline. At least 18 hours must be in 400 (G) or 500 courses. Each student's program must be approved by the graduate committee of the School of Home Economics.

Comprehensive written and oral examinations are required during the last term, but a thesis is not required.

Requirements relating to residence, transferred credit, filing of graduate study programs, and time limit are the same as for the Master of Science degree.

Master of Science in Management Science

Management science is a separate field of study in which mathematics and scientific methods are applied for the solution of business problems.

Management science encompasses areas such as management and information systems, operations research. forecasting, programming, computer systems, and Bayesian decision making.

Candidates who have completed all background prerequisites in business and mathematics are usually able to complete the program in one calendar year. Graduates may enter positions related to operations research and management systems or go directly into management.

Master of Materials Science

Graduate study in materials science is organized on an interdepartmental basis under the direction of an administrative committee. The Departments of Chemical Engineering, Chemistry, Mechanical Engineering, and Physics cooperate in the program. A minimum of 45 term hours is required for the degree with approximately 30 hours for a major, including thesis, and 15 hours for a minor. A final oral examination is required.

Master of Ocean Engineering

Ocean engineering is an interdisciplinary program offered in cooperation with the School of Oceanography and other disciplines which may relate to ocean science. The program requires 45 term hours, usually with a major in one of the engineering disciplines and a minor in oceanography, and is administered by an interdepartmental School of Engineering committee. A student may be admitted to one of the engineering departments. A study program is designed to fit the student's professional objectives and to encourage a high degree of engineering competence pertinent to the ocean environment. A final oral examination is required.

Engineer Degrees

For the degrees of agricultural engineer, chemical engineer, civil engineer, electrical engineer, industrial engineer, mechanical engineer, metallurgical engineer, and nuclear engineer, the candidate must meet one of the following sets of requirements:

a. Those who hold a baccalaureate or master's degree from Oregon State University must have at least five years of successful professional practice following graduation. Graduate study may be substituted for professional practice to a maximum of three years, and at the approximate rate of 12 term hours of graduate credit in lieu of each year of professional practice. No thesis credit will be permitted in such substitution, but the candidate must present a satisfactory thesis upon a subject of his or her professional experience and compatible with the designation of the degree.

b. Those who do not hold baccalaureate or master's degrees from Oregon State University are subject to the same requirements as above, with the additional stipulation that at least 12 term hours of graduate work must be completed in an Oregon State program.

In both cases, on or before January 1 of the academic year in which the degree is desired, the candidate submits to the chairman of the appropriate department a complete statement of his or her professional experience and graduate academic credit since receipt of the last degree. Accompanying the statement should be a thesis title and sufficient description or outline of thesis content to provide a basis for evaluation. After the statement has been approved by the chairman of the department, the school graduate committee, and the Graduate Council, the candidate is instructed to prepare and submit the thesis.

The thesis must be of high order and is subject to the same scrutiny and regulations as other graduate theses. Upon acceptance of the thesis, the candidate is recommended for the degree in the usual manner.

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 is required. A minimum of one full-time academic year should be devoted to the preparation of the thesis. A student who has had all of his or her undergraduate and graduate training at Oregon State University must obtain approval from the Graduate School prior to admission for a doctoral degree.

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. The program meeting is scheduled in the Graduate School one week in advance. The other members of the doctoral committee are approved by the major department or the interdepartmental committee and the Graduate School. If a minor is declared, the representative is approved by the minor department. When approved by the doctoral committee, the program is filed with the Graduate School office, and it becomes the obligation of the student to complete the requirements as formulated. Changes to the program may be made by submitting a "Petition for Change" form available in the Graduate School office. No more than 15 term hours of blanket-numbered courses, other than thesis, may be included in the doctoral program.

A classified graduate student who holds a master's degree must file a study program with the Graduate School by the end of the second quarter of residence as a doctoral student.

A classified 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 residence as a doctoral student.

Residence

For the doctoral degree, the equivalent of at least three years of full-time work beyond the bachelor's degree is required, of which at least one academic year (usually the last) must be spent in continuous residence at Oregon State University. A minimum of 36 hours of graduate work is required in residence. 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, subject to the same approval required for the graduate study program, and is so designated on the official doctoral program. However, in order to have completion of French, German, Spanish, or Russian indicated officially on the transcript, a student must pass the Graduate Student Foreign Language Test formulated by the Educational Testing Service. Foreign language requirements must be completed before the oral preliminary examination.

Preliminary Examinations

The student working toward the doctorate must pass a group of comprehensive preliminary examinations (at least partly oral) in his or her major and minor subjects. Under normal circumstances, the preliminary oral examination should be scheduled for two hours. Advancement to candidacy is contingent on passing these preliminary examinations. If more than one negative vote is recorded by the examining committee, the candidate will have failed the examination. Most departments require that a written comprehensive examination be taken before the oral preliminary examination. Oral preliminary examinations must be scheduled in the Graduate School office one week in advance. At least one complete academic term must elapse between the time of the oral preliminary examination and final oral exam.

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 thesis must be a real contribution to knowledge, based on the candidate's own investigation. It must show a mastery of the literature of the subject and be written in creditable literary form. The preparation of an acceptable dissertation will require at least one academic year. The booklet "Preparation of the Thesis" is available at the bookstore. If thesis material is to be published prior to the final oral examination, the student should request permission to do so in order to protect his or her rights to the originality of the material.

Regulations concerning the doctoral dissertation are the same as those for the master's degree with the following exceptions: A copy of the thesis in final form or final draft form 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 an 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.* Candidates for the Doctor of Philosophy and Doctor of Education degrees pay a fee of $30 for microfilming of the thesis in its entirety by the University Microfilms and publication of the abstract in *Dissertation Abstracts.* The student, upon completing the doctorate, is requested to complete the form for survey of earned doctorates.

Final Examination

After having completed or being currently 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 final oral examination usually is scheduled for two hours. The examining committee consists of the student's doctoral committee and any additional members, including professors from other institutions, whom the major department may appoint. 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.

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.

Final oral examinations must be scheduled in the Graduate School office at least two weeks in advance. During the spring term, the final oral must be scheduled at least *seven weeks before June commencement* and must be *completed about four weeks before commencement.* Exact dates will be published. Two final copies of the dissertation and one extra copy of the abstract must be in the Graduate School office not later than *three weeks* before commencement.

Doctor of Education

The Ed.D. degree emphasizes applied studies in education. This degree is used to prepare for positions in supervision, curriculum development, classroom teaching, or in administration (principal or department chairman). In some cases the Ed.D. degree will equip a candidate for a career in teacher

education at a college, university, or within public school systems.

A master's degree or equivalent preparation is a prerequisite for all candidates for the degree. All admission requirements of the University and of the appropriate division of the School of Education must be met. For the Doctor of Education degree with a major in education or science education, at least two years of successful, paid full-time teaching experience in the general area of intended preparation is required at appropriate levels in an approved elementary or secondary school or in a community or junior college. For the major in vocational education, at least two years of successful teaching or appropriate experience in the general area of intended preparation is required. For the major in guidance and counseling, a minimum of two years of paid counseling experience is required in addition to the teaching experience required for majors in education or science education. For the degree with a major in college student services administration, a minimum of two years of paid experience in college student service is normally required. College teaching or work with young adults may be approved as satisfying this requirement for admission.

Each candidate must complete a major in the School of Education of not less than 50 hours *plus* a dissertation (25 hours). Major fields offered are college student services administration, education (emphasis on elementary, secondary, or community college curriculum and instruction), guidance and counseling, science education, and vocational education.

A Ph.D. candidate must complete 36 hours of course work outside the School of Education on the doctoral program. An Ed.D. candidate must complete 24 hours of course work outside the School of Education on the doctoral program. The Ed.D. and Ph.D. candidate majoring in education must also have a minimum of one three-hour course in each of the core areas: history/philosophy of education, educational sociology, education and anthropology, human development, learning theory, measurement and evaluation, or curriculum theory/instructional methodology.

All candidates must include Research Procedures in Education (Ed 512) and Statistical Methods for Research Workers (St 451) or the equivalent in their programs.

A maximum of 9 term hours of Selected Topics in Education (Ed 521) is permitted on a graduate degree program.

Candidates must also complete a *first minor* of at least 36 hours. Minors are usually selected from a specialized field of education. A substantive field may be used subject to approval of School of Education graduate studies committee. Minors are offered in the major fields listed above as well as in the following specialized areas: adult education, agricultural education, business education, health education, home economics education, industrial education, reading, and physical education.

Each candidate is required to complete a *second* minor of at least 24 hours in a substantive field outside the School of Education.

Procedures and requirements for preliminary final examinations and thesis are similar to those for the Doctor of Philosophy degree. Residency requirements are the same. Thesis problems may involve either a research study or an approved field study in the area of specialization.

SPECIAL GRADUATE SCHOOL PROGRAMS

The following special and interdepartmental programs are offered by the Graduate School of Oregon State University. Courses and degrees which apply specifically to these programs are listed here rather than in other sections of this catalog.

Concurrent Enrollment

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. Complete details of policies and procedures are available in the Registrar's Office.

Genetics

Professors Peter Dawson (chairman), Kim Ching, David England, William Hohenboken, Warren Kronstad, Paul Roberts, Maxine Thompson

Associate Professors Lyle Brown, Dallice Mills, David Mok, George Pearson, Henry Shaup

Assistant Professors W. Thomas Adams

The College of Science administers the University program in genetics, with faculty drawn from qualified geneticists throughout the University. The program provides students with an integrated program leading to a Master of Science or Doctor of Philosophy degree in genetics. Students may also enroll in graduate programs emphasizing genetics in departments of the College of Science and the professional schools. These programs lead to the degrees of those departments.

A student enrolling in the genetics program should have completed one year of physics and biology, two years of chemistry, an introductory genetics course, and mathematics through calculus. For the Ph.D. degree in genetics, the minimum requirements are the core genetics courses, biochemistry, (equivalent to BB 450,451), statistics (equivalent to St 451,452,453), four graduate-level genetics courses chosen from the list prepared by the genetics faculty, a physiology course, and four seminars. Requirements for the master's degree are the same, except only two graduate-level genetics courses are required and there is no specific requirement for seminars. Students participate in research designed to prepare them for careers in the forefront of the science of genetics. They are provided with a sequence of courses by faculty doing work in genetics in the major biological subdisciplines.

For further information see page 97.

Graduate Work at Los Alamos and Richland

Los Alamos: Arrangements have been made whereby a very restricted number of students may complete theses for the Ph.D. degree at Los Alamos, New Mexico.

Richland: Oregon State University is one of three Northwestern universities cooperating with the University of Washington Joint Center for Graduate Study located in Richland, Washington. The other institutions are Washington State University and the University of Washington. Qualified employees of Battelle Northwest and other contractors in the Hanford area may earn graduate credits toward advanced degrees at Oregon State University.

Each program at the joint center is sponsored by an academic department at one of the three universities. The mechanical engineering department at OSU is the single sponsoring department on this campus. Resident and part-time mechanical engineering faculty at the Richland Center have affiliate rank at OSU.

Students in the mechanical engineering graduate program in Richland need not establish residence in Corvallis for the M.S. degree.

All requirements for the Ph.D. degree from Oregon State University, including residency, must be fulfilled.

Individual course offerings at Richland follow, to the extent possible, those available on the Corvallis campus. A separate catalog available from the Joint Center for Graduate Studies should be consulted for course numbers and descriptions.

Interdisciplinary Studies

The Interdisciplinary Studies Program at Oregon State University is supervised by the assistant dean of the Graduate School. In addition to courses chosen from the offerings of the several schools or colleges and departments, the following courses are available for the interdisciplinary studies student. The thesis requirement for the Master of Arts degree is optional.

Graduate Courses

ISt 501 Research

ISt 503 Thesis

ISt 505 Reading and Conference
Terms and hours to be arranged

ISt 555 Methods of Plant Analysis
1-2 hours per unit to be arranged
Specialized advanced laboratory units on field and laboratory methods of characterizing plant constituents, metabolism, and growth processes. Students have flexibility in selection of experimental plants. Limited enrollment. Consent of instructor required. Prerequisite: 20 hours of graduate plant science, including graduate plant physiology and/or biochemistry. May be repeated for credit.

Joint Master's Degree in Counseling

The Master of Science degree in counseling is offered cooperatively by the School of Education at Oregon State University and by the Department of Education at Western Oregon State College in Monmouth. Programs drawing on the resources of both institutions are available in a variety of areas. For this program a student may apply and be admitted to either institution.

Joint-Campus Program

Regularly enrolled graduate students at Oregon State University may enroll in graduate courses of the University of Oregon in Eugene when these courses are a part of their approved graduate programs. The joint-campus program offers the OSU graduate student access to the specialized instructional and research resources of two major universities through a single matriculation and registration. Students participating in the joint-campus program are considered students of their home university.

Students follow the standard advising and registration procedures, irrespective of whether work is taken on one or both campuses. Courses to be taken at the University of Oregon will be identified on registration materials by the symbol "JC 510 UO" preceding the course prefix, number, and title as listed in the U of O catalog. Credit earned on either campus by OSU students will be recorded in the OSU Registrar's Office. 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. A maximum of 15 such credits may be applied toward a graduate degree program at Oregon State University.

Tri-University Doctoral Program in Community College Education (Ed.D.)

Primarily for the preparation of community college personnel, a cooperative Ed.D. degree program is offered by the School of Education at Oregon State University, the College of Education at the University of Oregon, and the School of Education at Portland State University. A student may apply and be admitted to any one of these universities and pursue a program of study using the relevant resources of all three.

WICHE Regional Graduate Programs

The following degrees are offered under WICHE (Western Interstate Commission for Higher Education) regional graduate programs at OSU: M.S. in marine resource management (School of Oceanography), Ph.D. in family resource management (Department of Family Resource Management), and Ph.D. in foods and nutrition (Department of Foods and Nutrition).

Students from Alaska, Idaho, Montana, and Washington 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 school or department indicated.

RESEARCH

George H. Keller, *Acting Dean of Research*

Advancement of 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 and schools as a part of normal academic activity as well as in separately organized units. Research is supported by appropriations to experiment stations, institutes, and centers; by grants from private and public agencies for institutional and individual projects; and by instructional budgets.

The General Research Fund and institutional grant from Public Health Service (PHS) are 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

Computer Center
Environmental Health Sciences Center
International Plant Protection Center
Laboratory Animal Resources
Marine Science Center
Oregon Productivity Center
Radiation Center
Survey Research Center
Western Rural Development Center

Research Institutes

Climatic Research Institute
Energy Research and Development Institute
Nuclear Science and Engineering Institute
Nutrition Research Institute
Transportation Research Institute
Water Resources Research Institute

Research Consortia

Consortium for International Development (CID)
Consortium for International Fisheries and Aquaculture Development (CIFAD)
The Institute of Ecology
University Corporation for Atmospheric Research (UCAR)

The dean of research coordinates efforts of the various research organizations of the University. The dean encourages and assists faculty members in the development of research programs and in handling grant 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 service for research staff who identify new devices and 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. With the advice of the Research Council, the dean allocates funds from the PHS grant and other general research funds. The dean also coordinates administration of grant and contract operations with the director of business affairs to aid the work of research personnel and to ensure compliance with University, state, and federal regulations.

Directed Research

Directed research funds are appropriated to provide increased opportunity to initiate and carry out research programs. Funds are used for staff salary to provide for released time from teaching, usually for one term of the academic year. Details can be obtained from the Research Office.

General Research

General research includes faculty research that does not fall into the organized and directed programs of other research agencies. With the advice of the Research Council, the dean prepares and submits annually a budget for the support of general research and is authorized to receive, examine, and act upon requests for grants-in-aid from funds allowed.

Applications are received from individual staff members, or groups, holding the rank of instructor or higher. Grants-in-aid are awarded for problems that give promise of results of general significance. Grants may be used for equipment, supplies, and wages.

Grants are not intended to provide data for theses leading to advanced degrees, or subject matter for a specific course, or information of restricted though useful nature for administrative functions. Each recipient of a grant is required to submit a written final report to the Research Office.

PHS Institutional Grant

An institutional grant program was initiated by the Public Health Service in 1966 for support of health-related research. The PHS recommends that the institutional grant be used to meet emerging opportunities in research, to explore new and unorthodox ideas, to recognize and support scientific talent earlier and in general, to utilize funds flexibly and in ways that will be catalytic both for improving and for fostering additional health research consistent with broader academic objectives. This grant complements rather than displaces other PHS awards, and supplements institutional funds already devoted to health-related research or research training.

Faculty members may submit applications to the Research Council for support from institutional grants at any time.

Agricultural Experiment Station

John Rowland Davis, *Director*

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 nine branch stations located in the major crop and climate areas of Oregon, so that the research program is close to the people and the needs of Oregon agriculture.

The station serves as the principal agricultural research agency in the state. Its mission is to contribute through research in the agricultural, biological, environmental, and social sciences: (1) to ensure a stable and productive agriculture through wise management of the natural resources of the state; (2) to protect crops and animals from insects, diseases, and other hazards, and to improve the efficiency of agricultural production; (3) to develop new and improved agricultural products and processes and enhance product quality; (4) to strengthen and improve the marketing of Oregon's agricultural products; (5) to protect the consumer and improve the nutrition and well-being of the people of the state; (6) to promote community development and economic and public services for both rural and urban people of Oregon; and (7) to protect and improve the environment and quality of living.

The station conducts research in the following departments and schools: agricultural and resource economics, agricultural chemistry, agricultural engineering, animal science, botany

and plant pathology, crop science, entomology, fisheries and wildlife, food science and technology, home economics, horticulture, microbiology, poultry science, rangeland resources, soil science, statistics, and veterinary medicine. The branch stations are Central Oregon (Redmond), Eastern Oregon (Union), Klamath (Klamath Falls), Malheur (Ontario), Mid-Columbia (Hood River), North Willamette (Aurora), Columbia Basin Agricultural Research Center (Pendleton), Southern Oregon (Medford), and Squaw Butte (Burns). The station also maintains permanent field units or laboratories at Newport for marine sciences, at Astoria for seafood processing, and at Brookings for lily bulb production.

The station cooperates with the U.S. Department of Agriculture, U.S. Department of Interior, the School of Agriculture's international agriculture program, and other federal and state agencies on research programs of interest to the state, the Pacific Northwest, the nation, and other countries.

Climatic Research Institute

W. Lawrence Gates, *Director*

The Climatic Research Institute was established in 1976 in recognition of the increasingly important impact of climate on human activities and the consequent need for coordinated and intensified climatic research. To these ends, the institute conducts a broad climatic research program, with emphasis on the design, testing, and application of mathematical-physical climate models, on the assembly and analysis of climate data, and on the study of the mutual impacts of climate and people. Model simulations and supporting theoretical research are currently underway on the nature of past, present, and possible future climates, including studies of the climatic roles of the ocean, ice, and land surface, and of the climatic effects of increased atmospheric CO_2. Other research is focused on the diagnosis of climate change mechanisms and on the statistical analysis and display of climatic data.

The institute operates a PDP-11/70 minicomputer system providing terminal access to high-speed computers. These facilities are available for cooperative use by University faculty and other qualified investigators engaged in research relevant to climate. Through its publications, seminars, and conferences, as well as through active participation in national and international research programs, the institute seeks to promote greater interest in and understanding of all aspects of climate.

Computer Center

T. L. Yates, *Director*

The Computer Center provides a focal point for computer-related activities on campus. Its functions include computational services, systems planning and development, consulting services, and research basic to computers and computer systems.

The principal computers at the center are a Control Data Cyber 170/720 and a Honeywell DPS 440. A network of more than 500 remote computer consoles has been installed on the OSU campus and at other colleges in Oregon to make facilities more readily accessible. These consoles permit direct access to the center's computers.

The Computer Center is a major node in the Oregon State System of Higher Education's computing network, ONLINE. Remote job entry terminals at several other institutions have access to the center's facilities, which include "front end" switching equipment permitting users to select the host computer they require.

Other machine services offered by the center include remote job entry linkups with other centers; graphics production ranging from interactive displays to small drum plotters to large flat bed plotters; optical mark scanning for use in data collection and test scoring; and digitizing equipment for conversion of data from analog graphical form to digital form on magnetic tape.

In addition to computational facilities, the Computer Center provides technical consulting services for the formulation and analysis of problems and for considerations for new computer systems. A variety of instructional materials, including video tapes, has been prepared to assist students, faculty, and others to acquire an understanding of computers and a facility with the many specialized programs and languages available.

Administrative, computer-based systems are also supported by the center. Developments in this area include computer-assisted registration, on-line systems for admissions processing, library acquisitions, financial aid distribution, and dormitory assignment and billing.

Faculty members associated with the center are engaged in research and development activities in computer science and in use of computer systems, including projects in communication networks, statistical analysis systems, remote sensing applications, graphics, and computer-assisted instruction.

Consortium For International Development (CID)

Ernest J. Briskey, Ludwig M. Eisgruber, *OSU Representatives*

The Consortium for International Development, incorporated in the state of Utah in 1972, is a continuation of the founding organization known as CUSUSWASH, which dates back to 1967. The consortium is composed of the following universities: Arizona, California, Idaho, California State Polytechnic, Colorado State, Montana State, New Mexico State, Oregon State, Texas Tech, Utah State, and Washington State. It is a nonprofit corporation governed by two trustees from each member university, appointed by the president of the member university. Under the direction of the board of trustees, its activities are managed by an executive director, secretary/treasurer, deputy directors, and other staff as required.

CID is concerned with assisting the orderly development, management, and use of the limited resources of the world. The goal of increasing world food supplies through better management of water and soil and the many other factors affecting production provides a constant, urgent challenge to the ability and collective strength of the consortium. The consortium is, therefore, primarily interested in working as a nonprofit corporation to facilitate agricultural development programs at home and abroad and to participate in educational pursuits. In this capacity, it serves the international program needs of its member universities.

The consortium has projects in the following countries: Bolivia, Peru, Upper Volta, Egypt, Niger, Cape Verde, Sudan, Senegal, and Yemen. Projects are pending in Saudi Arabia and Sri Lanka.

Consortium for International Fisheries and Aquaculture Development (CIFAD)

Harvey L. Moore, *Coordinator*

The consortium was established in 1979 to provide a more effective, coordinated program of fisheries and aquaculture research and technical assistance to the less-developed nations of the world. The members of the consortium are Arkansas at Pine Bluff, Hawaii, Michigan, Michigan State, and Oregon State. Coordination and contracting for the consortium is centered at OSU.

CIFAD members are committed to working together in a complementary way by using skills in research, training, and Extension to assist other nations with fisheries problems.

Funding of projects is through organizations such as the Agency for International Development, Asian Development Bank, World Bank, and other agencies providing aid to the less-developed nations. Through its computerized data bank of staff from member institutions and cooperating entities, CIFAD provides immediate access to information on each individual's scientific expertise, language capabilities, experience, and availability for short- or long-term assignments in various parts of the world.

In addition, a reservoir of competence in many allied disciplines is readily available on the campuses for participation and consultation. Persons with particular capabilities in Extension and advisory services are also available. Special emphasis is placed on training Extension personnel from other nations both in the United States and in the home country to aid in direct delivery of technology to people in need.

Energy Research and Development Institute

Robert W. Thresher, *Director*

The Office of Energy Research and Development, originally established in 1974, received official recognition of the Oregon State System of Higher Education and was formally named the Energy Research and Development Institute in 1980. The institute's objectives are to promote and coordinate energy-related research and development activities within the University; to enhance educational and training programs in energy-related areas; to promote conservation of energy and development of energy resources; to serve as a center for interaction between the University, federal and state agencies, industry, and the general public on energy problems and programs; to assemble pertinent information on energy research and development and distribute information to the public; to identify programs for which funding is available and to seek funding for proposals developed by the faculty; and to work with interested faculty to develop disciplinary and interdisciplinary research and training programs.

Engineering Experiment Station

Fredrick Joseph Burgess, *Dean, Director*

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:

- To serve the industries, utilities, professional engineers, public departments, and engineering teachers by making investigations of significance and interest to them.
- To stimulate and elevate engineering education by developing the research spirit in faculty and students.
- 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 School of Engineering. All staff members and laboratory facilities of the engineering school are available for the investigative work of the station. The 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. The assistant dean acts as administrator of the Engineering Experiment Station and as technical editor of publications.

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.

Research activities cover broad aspects of energy, environment, transportation, structures, chemical processing, computers, and a variety of other subjects.

Environmental Health Sciences Center

Donald J. Reed, *Director*

The Environmental Health Sciences Center was established in 1967 as an organizational unit under the dean of research to provide coordination and stimulation of environmental health training and research.

The problem of environmental quality and its effect on human welfare is becoming increasingly complex. Assessment of the impact of chemicals on human health, including prediction of short- and long-term effects of chemicals, is a major focus of the center. Alteration of the environment by people is a continuous process that requires constant evaluation. Therefore, life in modern society requires determination of how exposure to many chemicals affects risk for the health of individuals. The ultimate solution to environmental problems requires interdisciplinary efforts from many fields, both to develop persons qualified in this field and to generate new knowledge.

The Environmental Health Sciences Center currently brings together faculty, students, and staff from many departments with a wide variety of professional capabilities in such areas as chemistry, biochemistry, toxicology, biology, food science, fisheries and wildlife, veterinary medicine, pharmacology, statistics, and engineering.

The broad mission of the center is to encourge research, training, and support of qualified graduate students; sponsor conferences, symposia, and meetings for both student training and public communication; and serve as an interdisciplinary resource on problems relating to people's health and the environment.

Examples of specific areas of interest include toxicology of environmental chemicals, cellular and biochemical toxicology, naturally occurring toxins, carcinogenesis of environmental chemicals, movement of chemicals in the environment, solid waste and chemical waste disposal, environmental engineering, and mathematical modeling of environmental problems.

The administrative office of the center is located in Weniger Hall; however, the research facilities are a part of and are located in the various cooperating departments.

Environmental Remote Sensing Applications Laboratory

Barry J. Schrumpf, *Director*

The Environmental Remote Sensing Applications Laboratory (ERSAL) was founded in 1972 with a grant from the National Aeronautics and Space Administration to engage in the development and application of remote sensing technology for gathering, analyzing, and using information needed for programs in natural resource management, agriculture, land-use planning and development, and environmental monitoring. To achieve this purpose, the ERSAL staff collaborates with colleagues from other University departments, public agencies, and private industry in cooperative endeavors which focus on the fulfillment of information needs through the integration of appropriate combinations of techniques for gathering information in an economical, accurate, and timely manner. These endeavors use techniques for inventory design, computer-assisted analysis of satellite digital data, photographic interpretation of aerial and satellite photography, statistical sampling and analysis, aerial reconnaissance, vegetation and geographic analyses, and cartography.

Under continuing state and federal support, ERSAL programs in research and operational applications test and evaluate the use of reconnaissance data, photography, and electronic

imagery acquired by aircraft and earth-orbiting satellites for in-place mapping and sample-based inventories. Educational programs offered by ERSAL include workshops on aerial photographic interpretation, computer-assisted analysis of satellite data, and use of information generated from data bases acquired by satellite and aircraft.

Forest Research Laboratory

Carl Henry Stoltenberg, *Dean, Director*

The Forest Research Laboratory is Oregon's forestry research agency; its director is the dean of Oregon State University's School 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 throughout Oregon.

Activities are organized within six program areas which draw upon faculty expertise in the School of Forestry's Departments of Forest Engineering, Forest Management, Forest Products, Forest Science, and Resource Recreation Management; and, to a lesser extent, from 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; integrated protection of forests and watersheds; evaluating forest uses, practices, and policies; efficiencies in wood and energy use; and assuring product and structure 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.

The 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 wood products, water, forage, fish, wildlife, and recreation; wood products are 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 forestry science research in North America.

The Institute of Ecology

R. H. Waring, *OSU Representative*

Oregon State University is a member and sponsor of the Institute of Ecology, a western hemisphere consortium established in 1971 to foster ecological research, environmental studies, and policy analysis. The institute, headquartered at Butler University in Indianapolis, Indiana, offers a number of cooperative ecological intern programs and serves as a major consultant to a variety of foundations and government agencies. In 1979, scientists from OSU worked with the institute to help establish a new program of the National Science Foundation for long-term ecological research.

International Plant Protection Center

S. F. Miller, *Director*

The International Plant Protection Center (IPPC) was chartered in 1969 to increase Oregon State University's capability to develop and administer effective plant protection programs in developing countries. The program was also conceived to support improvement of teaching, research, and Extension activities in plant protection within the University.

To date, IPPC's principal programs have been development and evaluation of weed control systems, primarily involving the Departments of Crop Science and Agricultural and Resource Economics, with additional support from several other departments. Operations of the center involve not only close coordination with the University, but also with the federal government, United Nations, international agricultural research centers, and various foundations—all of which are involved in agricultural assistance programs in developing countries. IPPC also maintains contacts with leading industrial firms.

The center is recognized as one of the world's leading technical information clearinghouses for weed research and control technology and for pesticide application equipment. IPPC publishes and widely distributes publications related to weed research as well as a free, award-winning newsletter.

Laboratory Animal Resources

Nephi M. Patton, *Director*

Laboratory Animal Resources, a University-wide service organization, was established in 1972. The office is housed in the Laboratory Animal Resources Center, which was completed in 1976. 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 which house approximately 10,000 animals. In addition, the following services are provided: procurement and quarantine of all warm-blooded laboratory animals; constant health monitoring of animals and personnel; consultation with investigators on experimental design, special procedures, and beneficial animal models.

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 130,000 square feet of office, library, classroom, and fresh and salt water laboratory space and include a public auditorium, aquarium, and museum. Other buildings house the offices and laboratories of the Oregon Department of Fish and Wildlife, the Newport Aquaculture Laboratory and Research Support Facility of the National Marine Fisheries Service, and ship support facilities of the School of Oceanography. Dock areas serve the OSU ships *Wecoma*, *Sacajawea*, and smaller boats from several agencies. There are housing and self-service kitchen facilities for up to 48 students and visiting staff members.

Research projects currently involve more than 125 staff members from the Schools of Agriculture, Oceanography, and Pharmacy, College of Science, the Extension Service, the U.S. Environmental Protection Agency, the National Marine Fisheries Service, and the Oregon Department of Fish and Wildlife. 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 350,000 visitors annually, including about 15,000 elementary and high school students. Potential users of center facilities are invited to write to the director, outlining their needs.

Nuclear Science and Engineering Institute

Chih H. Wang, *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

Suk Y. Oh, *Director*

Established in 1965, this institute recognizes that food and resource needs constitute a growing problem for mankind. The institute is dedicated to the advancement of nutrition knowledge and its effective application to the improvement of the health and welfare of mankind. Its broad objectives are the stimulation, encouragement, facilitation, and coordination of research in varied fields of nutrition practiced in the departments and schools of the University. The institute sponsors interdepartmental and institutional seminars, symposia, and methodology workshops; it supports promising preliminary research and acquisition of laboratory equipment. The institute also encourages entry of qualified scientists and graduate students into nutrition research through their particular disciplines. More than 60 faculty members from 18 departments are involved with the institute.

Oregon Productivity Center

James L. Riggs, *Director*

The Oregon Productivity Center was established in October 1980 to encourage improved productivity in industrial and service organizations. It is supported by the Economic Development Administration of the U.S. Department of Commerce.

The center provides technical and other assistance to improve effectiveness and efficiency of Oregon businesses, Services include publication of a monthly newsletter, *The Productivity Primer*, consultation on specific production problems, organization of in-plant productivity and employee involvement programs, implementation of productivity measurement, and presentation of short courses on productivity awareness and improvement techniques.

Although primarily service oriented, the center conducts research in productivity for some firms. The center is closely associated with the Schools of Engineering and Business and draws on both students and faculty in its operation. Work is coordinated with the Oregon State Department of Economic Development, other government agencies, and the productivity divisions of several professional societies.

Radiation Center

Chih H. Wang, *Director*

The Radiation Center is a campus-wide research and training facility designed to accommodate programs involving the use of radioisotopes and radiation. Housed in the center are major nuclear and radiation devices, including a TRIGA-II research nuclear reactor (licensed to be operated at 1,000 Kw steady-power level and 3,000 Megawatts in the pulsing mode), a 500 Curie cobalt-60 source, a 300 kVp X-ray generator, a number of multichannel analyzers and associated detectors, a 14 MeV neutron generator, neutron diffraction apparatus, fast motion and still neutron radiography facility, and a variety of instruments for radiation measurement and monitoring. Special facilities include laboratories for large and small animal experiments and plant experiments.

Staff members of the Radiation Center receive joint appointments in the center and the appropriate academic departments. The staff provides services in such areas as consultation on the feasibility of design and execution of radioisotope and radiation experiments; hazard evaluation of experiments or devices involving use of radioisotopes or other ionizing radiation; nuclear engineering; nuclear power plants; nuclear chemistry; radiation chemistry; neutron activation analysis; neutron radiography; neutron diffraction experiments; radiation effects on biological systems; radiation dosimetry; production of short-lived radioisotopes; radiation shielding; and problems of nuclear instrumentation and radioactive waste disposal.

The center's laboratories and instruments are available to all campus research workers and instruction programs requiring such facilities.

Sea Grant College Program

William Q. Wick, *Director*

The Oregon State University Sea Grant College Program is supported by a grant from the National Oceanic and Atmospheric Administration of the U.S. Department of Commerce and is funded through a combination of federal and state appropriations and by contributions from industry and local government. The program involves research, education and training, and advisory and Extension activities.

Major programs are conducted in aquaculture; fish and shellfish diseases; ocean productivity and fisheries; marine product development; coastal processes; coastal engineering; professional, technical, and public education; international Sea Grant; and marine advisory programs. Multi- and interdisciplinary in focus, the Sea Grant College Program involves faculty and students in the College of Liberal Arts, College of Science, School of Agriculture, School of Engineering, School of Oceanography, and School of Forestry. Participants in the program also include the School of Law at the University of Oregon, Clatsop Community College, Lewis and Clark College, the University of Idaho, and Washington State University.

Communications support is provided to all the program's participants by a small staff of specialists who operate from within Sea Grant administration and draw upon the resources of the information community within Oregon State University.

Through the OSU Sea Grant College Program, University resources are applied to the solution of ocean problems as identified by the users of Oregon's marine resources. An 11-member Sea Grant Advisory Council of Oregon marine industry leaders provides continuing external review of program emphasis and progress. An executive committee, comprised of senior administrators, performs a similar role within the University.

Although major portions of the Sea Grant College Program are conducted on the main campuses in Corvallis (Oregon State University), Eugene (University of Oregon), and Astoria (Clatsop Community College), several research centers on the Oregon coast provide facilities. These include the OSU Marine Science Center in Newport, the Seafoods Laboratory in Astoria, and the Netarts Bay Fisheries Culture Station.

Survey Research Center

Lyle D. Calvin, *Director*

The Survey Research Center, established in 1973, operates as a service center to conduct surveys for other agencies and organizations and as a center for research on survey methodology. Activities range from advice on surveys to the

handling of all parts of the survey, including survey design, sample selection, questionnaire construction, personal interviewing, mail questionnaires, telephone interviewing, editing and coding, data processing and analysis, and writing of reports for distribution 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. 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.

Although the center's primary interest is with surveys of human populations, other populations of interest include plants, animals, land areas, and other populations for which surveys can provide useful information.

Transportation Research Institute

R. G. Hicks, *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 research and multidisciplinary research, and also serves as a clearinghouse and central source of transportation-related information.

The institute consists of a highly qualified professional and academic staff drawn from the Schools of Engineering, Forestry, Agriculture, Oceanography, Business, and the Colleges of 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; socio-political and behavioral factors; and environmental and energy factors. An advisory committee of professionals familiar with the transportation issues and problems in the Northwest provides policy guidance as well as suggestions to the TRI staff.

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 an electrohydraulic closed-loop servo-system (MTS), 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 School of Forestry.

University Corporation for Atmospheric Research (UCAR)

George H. Keller, W. Lawrence Gates, *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 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 computing facility built around a CRAY-1 computer which is accessible to member institutions. NCAR also operates facilities for scientific ballooning and an instrumented research aircraft, and maintains 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

Peter C. Klingeman, *Director*

The Water Resources Research Institute was established in 1960 to foster, encourage, and facilitate research and education related to all factors that affect the quantity and quality of water available for beneficial use. The institute is administered through the Schools of Agriculture, Engineering, and Forestry. The membership, which includes all people in higher education in Oregon who are engaged in water resources research and training, currently numbers about 200 persons in 30 different departments.

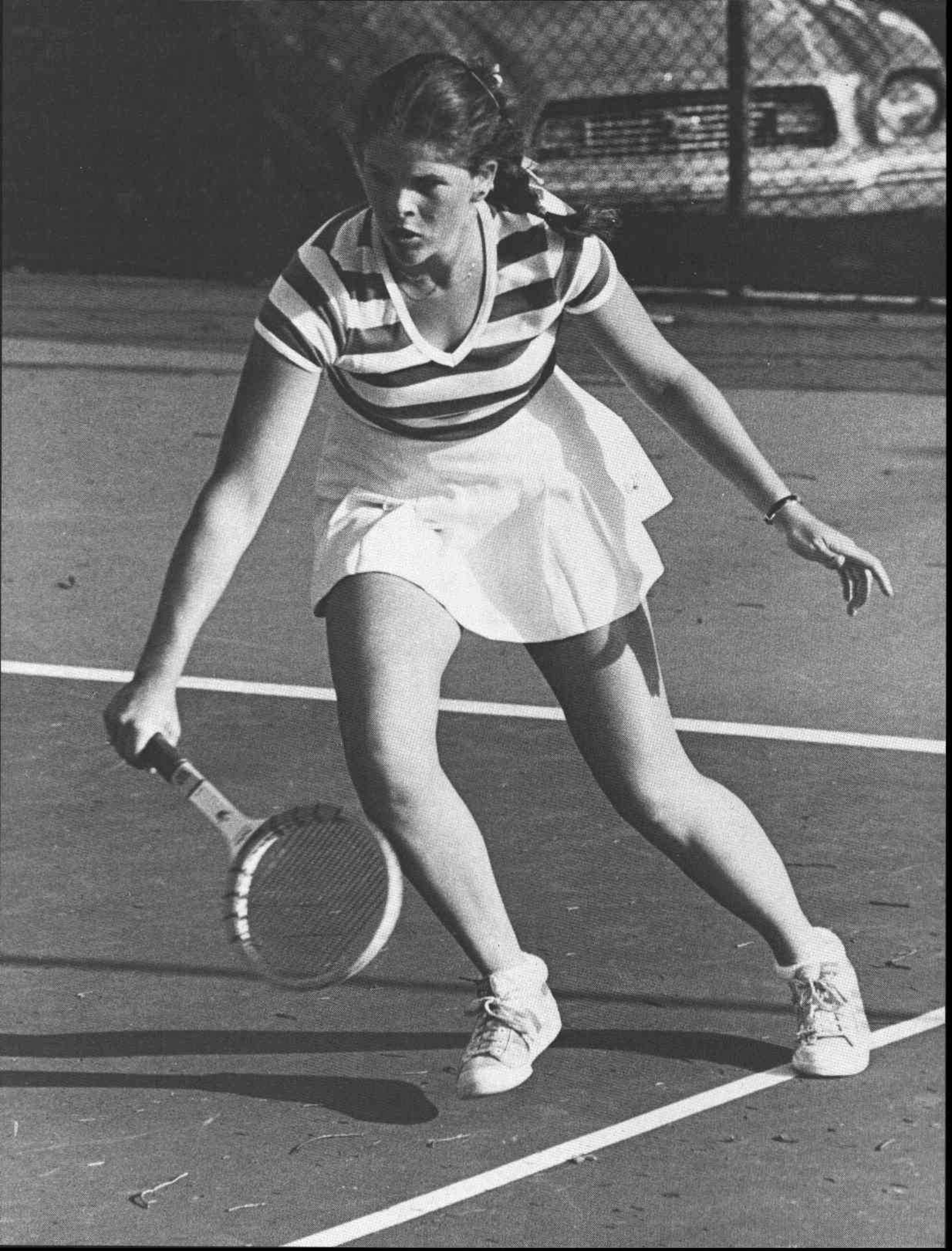
Extensive facilities are available to institute members and students for research and training. These include forested watershed lands and associated field equipment, soils laboratories, water and waste treatment plants, experimental waste treatment facilities, freshwater and marine science laboratories including oceanographic research vessels, experimental streams, an electronic computing center, a hydraulics laboratory, and a radiation center. Research assistantships and fellowships are available through many of the member departments, and the institute provides support for selected portions of the research and training program in water resources.

The institute works closely with federal and state agencies. Seminars are sponsored during fall and spring terms and resulting papers are published. A periodic newsletter is distributed both on and off campus, and special reports are given wide distribution. Research projects are underway in the areas of water supply and quality, planning and management, systems analysis, legal complexities, and hydroelectric development.

Western Rural Development Center

Russell C. Youmans, *Director*

This center, federally funded through the 13 Western Agricultural Experiment Stations and Cooperative Extension Services, supports regional research and Extension education programs on rural development issues in the western United States. The center 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.



OREGON STATE UNIVERSITY FACULTY

As of January 1982

THIS FACULTY ROSTER includes the Oregon State University officers of administration, instruction, research, and extension and those who hold courtesy faculty appointments in acknowledgment of their participation in the instructional and research programs of the University. Also listed are a few on-campus staff members with faculty appointments in other state system agencies. The following abbreviations are used:

Prof for Professor
Assoc Prof for Associate Professor
Asst Prof for Assistant Professor
Instr for Instructor
Res Assoc for Research Associate
Res Asst for Research Assistant
—(formerly Research Assistant Unclassified)
Extn for Oregon State University Extension Service
U for University
C for College

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.

A

Abbott, Mary Eunice 1959 Prof Emeritus (State Extn Agent)

Abell, John Richard 1979 Extn 4-H and Youth Specialist (Assoc Prof). BS Michigan State 1964; MS Indiana U 1965

Abendschein, George R. 1974 Instr Political Science, Resident Adviser Student Housing. BS Oregon State 1974, MA 1975

Abrassart, Arthur Eugene 1966Assoc Prof Business Admin, Chairman Management Science. BSME Illinois Institute of Technology 1963; MA Illinois 1964, PhD 1967

Adair, John 1953 Senior Instr Animal Science. BS Oregon State 1950

Adams, Darius Mainard 1974 Assoc Prof Forest Management. BS Humboldt State 1966; MFS Yale 1968; PhD California at Berkeley 1972

Adams, David Gordon 1972 Multnomah County Extn Agent (Prof). BS Michigan State 1959, MS 1962; PhD Oregon State 1966

Adams, Frank William 1953 Asst Prof Chemistry, Agricultural Chemistry. BS Montana State 1948; MS Oregon State 1950, PhD 1965

Adams, Gerard Conery 1981 Res Assoc Botany and Plant Pathology. BS California at Davis 1975, MS 1978, PhD 1981

Adams, Holyoke P. 1971 Extn Dairy Specialist (Prof) BS Maine 1944; MS Wisconsin at Madison 1948, PhD 1952

Adams, Patricia L. 1978 Hood River County Extn Agent (Instr). BA Michigan State 1958; BS Oregon State 1976

Adams, Paul William 1980 Extn Watershed Management Specialist (Asst Prof) Forest Engineering. BS Vermont 1975; MS Michigan 1978, PhD 1980

Adams, Richard 1981 Assoc Prof (Courtesy) Agricultural and Resource Economics. BS California at Davis 1968, MS 1971, PhD 1975

Adams, Richard Fletcher 1979 Asst Prof Electrical Engineering. BEE Cornell 1964; MS California at Berkeley 1965, PhD 1968; MD New York at Syracuse 1973

Adams, Ronald L. 979 Asst Prof Mechanical Engineering. BS Oregon State 1970, PhD 1977; MS MIT 1971

Adams, Wesley Thomas 1978 Asst Prof Forest Genetics. BS Humboldt State C 1968; MS North Carolina State at Raleigh 1970; PhD California at Davis 1974

Adolf, Leonard Allen 1955 Prof History, BA Washington 1946, PhD 1953

Ahearn, Kerry David 1976 Asst Prof English. BA Stanford 1967; MA Ohio U 1968, PhD 1974

Ahearn, Mary Clare 1980 Instr Agricultural and Resource Economics. BS Florida 1975; MS Pennsylvania State 1978

Ahern, Julie A. 1981 Res Asst Biochemistry and Biophysics. BS Oklahoma State 1980

Ahmad, Moghisuddin 1981 Res Assoc Food Science and Technology. BSc Aligarh Muslim U (India) 1971, MSc 1973, MPhil 1975, PhD 1978

Aho, Paul Eugene 1979 Asst Prof Forest Science. BS Massachusetts 1956; MF Yale 1957; PhD Oregon State 1976

Ahrendt, Kenneth Martin 1971 Assoc Prof Education. BA Arizona State 1959, MA 1962; EdD British Columbia 1969

Airth, Gerald Lee 1979 Instr Industrial and General Engineering. BS Utah State 1967; MS Stanford 1971

Akay, Hasan 1981Res Asst Forest Products. BS Middle East Technical U 1976, MS 1979

Alaback, Paul B. 1980 Res Assoc Forest Science. BS Washington 1976, BS 1976; PhD Oregon State 1980

Albert, Arthur Lemuel 1923 Prof Emeritus Electrical and Computer Engineering

Albin, Betty Jean 1963 Assoc Prof Physical Education. BS Illinois 1947, MS 1950

Albrandt, Pennie J. 1979 Jefferson County/Warm Springs Extn Agent (Instr).BS California Polytechnic at San Luis Obispo 1973

Alexander, Cassandra J. 1976 Res Asst Environmental Remote Sensing Applications Laboratory. BS Oregon State 1976

Alexander, Gerald Corwin 1955 Assoc Prof Electrical and Computer Engineering. BS Oregon State 1951; ScM MIT 1959; PhD California at Berkeley 1973

AliNiazee, Mohammed Taskeen 1972 Assoc Prof Entomology. BScAgric AP Agricultural U (Hyderabad, India) 1966; PhD California at Riverside 1970

Aliotti, Nicholas Joseph 1980 Asst Football Coach. BS California at Davis 1975

Allen, Adrianne 1981 Res Asst Forestry. Bs California at Berkeley 1965, MS 1971

Allen, James Reeve 1975 Res Assoc Biochemistry and Biophysics. BA New York U 1965; PhD California at Berkeley 1973

Allen John Sharer, Jr. 1973 Prof Oceanography. BSE Princeton 1959, PhD 1968

Allen, Thomas Cort, Jr. 1962 Prof Plant Pathology. BS Wisconsin at Madison 1953; PhD California at Davis 1956

Allison, Ira Shimmin 1928 Prof Emeritus Geology

Allman, Delmar Isaac 1937 Prof Emeritus Physical Education

Allmaras, Raymond Richard 1972 Prof Soil Science, Columbia Plateau Conservation Research Center, Pendleton (Courtesy). BS North Dakota State 1952; MS Nebraska 1956; PhD Iowa State 1960

Allyn, Margaret Marie 1954 Asst Prof Emeritus (Columbia County Extn Agent)

Amandi, Antonio 1979 Res Asst Microbiology. BS Portland State 1971; MS Oregon State 1977

Amano, Matt Matsukichi 1967 Prof Business Administration. BA Meiji Gakuin U (Japan) 1959; MBA UCLA 1962, PhD 1966

Amberg, John W., Jr. 1967 Res Asst Laboratory Animal Resources, BS Oregon State 1967

Amort, Donald Louis 1959 Assoc Prof Electrical and Computer Engineering. BS Oregon State 1954, MS 1960

Anderman, William H., Jr. 1978 Asst Prof Health. BA California at Santa Barbara 1959; MA California State at Los Angeles 1963; PhD UCLA 1981

Andersen, Wilbert Lowell 1950-51 1956 Extn Specialist 4-H/Community Development; Assoc Prof Extension Education. BS Oregon State 1950, MAgr 1970

Anderson, Arthur Wallace 1953 Prof Emeritus Microbiology

Anderson, Carl Leonard 1949 Prof Emeritus Health

Anderson, Craig Hedges 1980 Production Coordinator Classroom TV (Instr). BA San Jose State 1978

Anderson, Donald Eugene 1944-45 1950 Assoc Prof Emeritus (Extn Dairy Specialist)

Anderson, Edwin LeRoy 1970 Assoc Prof Education. BS Kansas 1952; MEd Washington 1959; PhD Oregon State 1970

Anderson, Elsa Maria 1974 Instr Mathematics. BA State U of New York at Albany; MA Teachers C, Columbia 1953

Anderson, Gordon Wilcox 1962 Prof Health. BSEd Central Washington State C 1943; MA Northern Colorado U 1949; EdD New York U 1961

Anderson, James Edward 1964Asst Basketball Coach, Intercollegiate Athletics. BS Oregon State 1959, MEd 1962

Anderson, Jennifer Annette 1981 Res Asst Zoology. BS California State at Long Beach 1975; MS Maryland 1981

Anderson, Nelson Christian 1946 Prof Emeritus (Polk County Extn Agent)

Anderson, Norman Herbert 1962 Prof Entomology. BSA (Honors) British Columbia 1955; MS Oregon State 1958; Diploma Imperial C (London) 1961; PhD London 1961

Anderson, Roberta Frasier 1959 Prof Emeritus (Extn Family Life Specialist)

Anderson, Sonia R. 1968 Prof Biochemistry and Biophysics. BS Nebraska 1961; PhD Illinois 1964

Anderson, Wayne Stanley 1962 Res Asst Plant Pathology. LBS Oregon State 1959

Andrews, Robert Duane 1965 Director, Division of Continuing Education, Prof Education. BEd Colorado State 1951; MA Wyoming 1956, PhD 1960

Andrick, Virginia 1979 Asst Prof Architecture. BA Michigan State 1956

Andros, Dee Gus 1965 Director Intercollegiate Athletics (Prof). BS Oklahoma 1950, MS 1952

Anglemier, Allen Francis 1956 Prof Food Science and Technology. BS Fresno State 1953; MS Oregon State 1955, PhD 1957

Anselone, Philip Marshall 1963 Prof Mathematics. BA Puget Sound 1949, MS 1950; PhD Oregon State 1957

Anthony, Robert G. 1977 Assoc Prof (Courtesy) Wildlife Ecology, Asst Leader Oregon Coop Wildlife Research Unit. BS Fort Hays Kansas State U 1966; MS Washington State 1968; PhD Arizona 1972

Anton, Peter 1956 Prof Philosophy. AB Indiana 1952, MA 1954, PhD 1960

Appell, Loren Howard 1981 Assoc Prof Veterinary Medicine. DVM Iowa State 1966; MS Minnesota 1974

Apple, Jeanne Debons 1980 Res Asst Botany and Plant Pathology. BS SUNY 1979, MS 1980

Apple, Spencer Butler, Jr. 1950 Prof Emeritus Horticulture

Appleby, Arnold Pierce 1959 Prof Crop Science. BS Kansas State 1957, MS 1958; PhD Oregon State 1962

Arbogast, Brian L. 1974 Res Asst Agricultural Chemistry. BA Southern Oregon State 1974

Armitage, Dale L. 1980 Lane County Extn Agent (Asst Prof). BA California at Santa Barbara 1974; MA Oregon State 1977

Armstrong, Daniel Paul 1979 Instr English. BA Marian C 1966; MA Indiana 1969, PhD 1976

Armstrong, Donald James 1974 Assoc Prof Botany. Ab Marshall 1959, MA 1961; PhD Wisconsin at Madison 1967

Arnold, Bradford Henry 1947 Prof Emeritus Mathematics

Arnold, David Scott 1981 Instr Religious Studies. BS Oregon State 1972; MRel Claremont 1974; MA Oregon 1977

Arscott, George Henry 1953 Prof Poultry Science (Nutrition), Head of Department. BS Oregon State 1949; Maryland 1950, PhD 1953

Arthur, Jeffrey Lee 1977 Asst Prof Statistics. BS Purdue 1973, MS 1975, PhD 1977

Arthur, Rufus E. 1980 Instr Naval Science

Asbury, Elizabeth Kilbuck 1975 Res Asst Oceanography. BS Oregon State 1941, MA 1972

Ashkenas, Linda R. 1979 Res Asst Zoology. BA Cornell 1976; MA Boston U 1979

Ashton, David F. 1980 Res Asst Civil Engineering

Atherton, George H. 1961 Prof Forest Products (Mechanical Engineer). BS Oregon State 1950, MS 1966

Atteberry, Pat Herman 1966 Prof Emeritus Industrial Education

Avery, Martha E. 1981 Res Asst Forest Science. BS Washington 1974

Avezzano, Joseph W. 1979 Head Football Coach (Prof). BS Florida State 1965

Axelsson, Eber Karl Gösta 1981 Visiting Instr Industrial and General Engineering. MS Linköping School of Education (Sweden) 1972; MS Linköping Institute of Technology (Sweden) 1980

Ayres, James Walter 1970 Prof Pharmacy. BS Idaho State 1965; PhD Kansas 1970

B

Bachelor, Gilbert Arthur 1961 Instr Computer Science, BA Eastern Washington State C 1953; MS Oregon State 1955

Badenhop, Art F. 1979 Extn Food Technologist (Assoc Prof) Food Science and Technology. BS Ohio State 1963, PhD 1966

Badenhop, Suzanne B. 1980 Extn Family Resource Management Specialist (Assoc Prof). BS Ohio State 1963, MS 1966; PhD Cornell 1970

Badiei, Amir A. 1981 Asst Prof Horticulture. BSc U of Tehran 1956; MSc Nevada 1962; PhD Oklahoma State 1965

Baggett, James Ronald 1956 Prof Horticulture. BS Idaho 1952; PhD Oregon State 1956

Baham, John Eustis 11979 Asst Prof Soil Science. BS Sonoma State, 1975; PhD California 1980

Bailes, Jack Clayton 1972 Assoc Prof Business Administration. AB Stanford 1968; MBA Columbia 1970; PhD Washington 1973

Bailey, Deborah B. 1981 Res Asst Forest Science. BS University College of North Wales; MS Virginia Polytechnic Institute 1981

Bailey, George Samuel, Jr. 1979 Assoc Prof (Senior Research) Food Science and Technology. AA El Camino, 1963; BS Southern California 1965; PhD California at Berkeley 1969

Bailey, Leeds Crim 1941 Assoc Prof Emeritus (Malheur County Extn Agent)

Bailey, Samuel Hall 1947 Director of Information (Prof). BS Utah State 1942; MS Wisconsin at Madison 1947

Bailleaux, Muriel Woodring 1946-50 1955 Senior Instr Emeritus Foods and Nutrition

Bain, George William 1946-52 1953 Assoc Prof Emeritus (Malheur County Extn Agent)

Baisted, Derek John 1964 Prof Biochemistry and Biophysics. BSc Exeter U (England) 1957, PhD 1960

Baker, Edwin Stuart 1978 Res Asst Agricultural Engineering. BS Oregon State 1978

Baker, George Seymor 1979 Instr Military Science, Staff Sergeant US Army

Baker, Katherine Haskell Read 1941 Prof Emeritus Human Development and Family Studies

Baker Kenneth F. 1977 Plant Pathologist (Courtesy Prof), Botany and Plant Pathology. BS Washington State 1930, PhD 1934

Baker, Robert Steven 1969 Systems Analyst Library (Asst Prof). BS (Mathematics) BS (General Science) Oregon State 1964, MS 1973. On sabbatical 1981-82

Baker, Robert Walker 1975 Res Asst Atmospheric Sciences. Ba Washington State 1967; MS Oregon State 1976

Baker, Warren Stannard 1980 Washington County Extn Agent (Asst Prof). BA Illinois 1964; PhD Edinburgh 1976

Bakke, Margaret Lewis 1971 Extn Nutrition Specialist (Asst Prof). BS Utah 1956; MS Oregon State 1972

Bakkum, Florence Stahl 1942-51 1954 Asst Prof Emeritus Mathematics

Ball, Charles D. 1981 Instr Military Science

Ballantine, Charles S. 1960 Prof Mathematics. BS Washington 1953; PhD Stanford 1959

Banowetz, Gary M. 1980 Res Asst Botany and Plant Pathology. BA Northern Iowa 1972; MS Oregon State 1974, PhD 1978

Barbour, James F. 1965 Res Asst Food Science and Technology. BA Linfield 1962

Barnard, Nanette Adel 1978 Lane County Extn Agent (Asst Prof). BS Oregon State 1975, MEd 1977

Barnes, Robert Kent 969 Asst Director Office of Budgets (Asst Prof). BA Oregon 1964; MA Portland State 1970

Baron, Lloyd Carl 1945-46 1957 Prof Emeritus Washington County Extn

Baron, Robert Benjamin Denis 1954 Prof Emeritus Education

Baross, John A. 1971 Asst Prof (Senior Research) Oceanography. BA San Francisco State 1963, MS 1966; PhD Washington 1972

Barr, Robert D. 1982 Dean of Education, Prof Education. BA Texas Christian 1961; MS North Texas State 1965; PhD Purdue 1969

Barstow, Dennis Alan 1964 Res Asst Oceanography. BS Oregon State 1964

Barstow, Lynda I. 1977 Res Asst Foods and Nutrition. BS Oregon State 1968

Barte, Georgene Violette 1959 Assoc Prof Foods and Nutrition. BS New Mexico 1946; MS Iowa State 1948

Barth, Berle I. 1981 Physician Student Health Center (Assoc Prof). BA State Teachers C 1951; MD Chicago 1959

Bates, Earl M. 1969 Advisory Agricultural Meteorologist, Crop Science (Asst Prof). BS Portland State 1965

Batker, Kenneth Edward 1981 Prof (Courtesy) General Science. BA Wartburg C 1957; MA Colorado 1961, PhD 1971

Baughman, Jo Ann 1967 Res Assoc Computer Center. BA Eastern Oregon State C 1961, BA 1961

Baumann, Eleen Ann 1979 Asst Prof Sociology. BA Vassar C 1971; MA Southern California 1976, PhD 1981

Baumann, Richard J. 1978 Res Asst Oceanography. BA Willamette U 1970; MS Oregon State 1978

Baumgartner, Donald John 1967 Assoc Prof Civil Engineering (Courtesy), U.S. Environmental Protection Agency. BS Illinois 1955; MS MIT 1958; PhD Oregon State 1967

Bayne, Christopher Jeffrey 1971 Assoc Prof Zoology. BS U of Wales 1963, PhD 1967

Bayne, H. Berkeley M. 1978 Res Asst Zoology. GCE Bishop Ansteys (Trinidad) 1958

Beachley, Michael L. 1976 Asst Prof Speech Communication. BA San Francisco State 1970, MA 1971; PhD U of Denver 1976

Beals, Eric Lee 1978 Res Asst Fisheries. BA San Francisco State 1978

Beals, Kenneth Louis 970 Assoc Prof Anthropology. BA Oklahoma 1965, MA 1967; PhD Colorado 1971

Beals, Lester Miller 1962 Prof Emeritus Education

Beasley, Thomas Miles 1976 Assoc Prof Oceanography. BA Whitman C 1956 MS Oregon State 1960, PhD 1968

Beaton, John Malcolm, Jr. 1970 Res Asst Media Services Manager, Forestry Media Center. BS Oregon State 1970

Beatty, Joseph John 1979 Instr Biology Program. BS Missouri at Columbia 1970, MA 1973; PhD Oregon State 1978

Beaudreau, George Stanley 1963 Prof Chemistry, Agricultural Chemistry. BS Washington State 1949; MS Oregon State 1951, PhD 1954

Beavers, Darrell V. 1964 Assoc Prof Food Science and Technology. BS California at Berkeley 1940

Beck, Richard Charles 1975 Washington County Extn Agent (Asst Prof). BA Colgate 1971; MS Oregon State 1973

Becker, Boris William 1970 Prof Business Administration. BS California at Berkeley 1962, MBA 1967, PhD 1970

Becker, Gerald Lester 1968 Program Director Counseling and Guidance, Assoc Prof Education. BS Idaho 1950, MS 1951; EdD Oregon 1967

Becker, Manning Henry 1948 Extn Farm Management Specialist; Prof Agricultural and Resource Economics. BS Oregon State 1947, MS 1948

Becker, Robert Richard 1962 Chairman Biology Program, Prof Biochemistry. BS North Dakota 1948; MS Wisconsin at Madison 1951, PhD 1952

Beckwith, Roy Charles 1975 Res Assoc Entomology (Courtesy). BS New York State C of Forestry 1951, MS 1952

Bedell, Thomas Erwin 1966-70 1973 Extn Rangeland Resources Specialist (Assoc Prof). BS California State Polytechnic 1953; MS California at Berkeley 1957; PhD Oregon State 1966

Beekman, George E. 1980 Instr Computer Science. BA Missouri 1969; MS Oregon 1972

Beeler, Catherine Revell 1981 Res Asst Veterinary Medicine. BS California at Davis 1978; MS Kansas State 1981

Beer, Frank M. 1947 Prof Emeritus General Science

Beilstein, Michael Allan 1979 Res Asst Agricultural Chemistry. BA Oregon State 1973

Bell, J Richard 1962 Prof Civil Engineering. BSCE Purdue 1952; MSCE 1956, PhD 1963

Bell, John Frederick 1959 Prof Forest Management. BSF Oregon State 1949; MF Duke 1951; PhD Michigan 1970

Bell, Thomas Evans 1979 Res Asst Forest Science. BS Harverford C 1972

Bella, David Andrew 1967 Prof Civil Engineering. BS Virginia Military Institute 1961; MS New York U 1964; PhD 1967

Bengtson, George W. 1979 Associate Dean School of Forestry, Prof Forestry. BS Louisiana State 1952; MF Duke 1955; PhD Yale 1961

Bennett, Casey Wayne 1978 Instr Chemistry. BS San Jose State 1975; MS California at Davis 1977

Bennett, Cleon Vernon 1958 Prof Speech Communication. BS Murray State C (Kentucky) 1955; MA Southern Illinois 1958; PhD Wisconsin at Madison 1971

Bennett, Mary Lou 1974 Instr Speech Communications. BS Oregon State 1974, MS 1978

Bennion, Noel Lindsay 1937 Prof Emeritus (Extn Poultry Specialist)

Benriter, William J. 1976 Manager, Residence Hall Food Service (Instr). BS Eastern Michigan 1972, MS 1976

Beran, Kurt 1975 Asst Prof Business Administration. BS Temple U 1950; MBA Pennsylvania 1962; PhD Oregon 1974

Berg, Alan Ben 1961 Prof Emeritus Forest Science

Berg, Helen M. 1975 Project Coordinator Survey Research Center (Res Asst)

Bergeron, Daniel Jimmie 1974 Clatsop County Marine Agent (Assoc Prof). BA Bemidji State 1962, BS 1963; MA Oregon State 1969

Berggren, Dale 1977 Instr Business Administration. BA Chadron State C 1971; MBA Oregon State 1976

Bergstron, Robert William 1941-42 1946-47 1950 Prof Emeritus Physical Education

Beringson, Donald Lee 1971 Assoc Prof Business Administration. BS North Dakota 1962, MS 1966, PhD 1971

Berkeley, Norborne 1946 Prof Emeritus History

Berlage, Arnold G. 1980 Assoc Prof (Courtesy) Agricultural Engineering. BS Oregon State 1959; MS Michigan State 1962

Bernard, David Raymond 1978 Asst Prof (Senior Research) Fisheries. BS Iowa State 1971; MS Utah State 1976; PhD Virginia Polytechnic Institute 1978

Bernier, Paul Emile 1947 Prof Emeritus Poultry Science (Genetics)

Berry, Donald Wilson 1954 Prof Emeritus (Jackson County Extn Agent)

Berry, Ralph Eugene 1968 Prof Entomology. BS Colorado State 1963, MS 1965; PhD Kansas State 1968

Beschta, Robert Lee 1974 Assoc Prof Forest Hydrology. BS Colorado State 1965; MS Utah State 1967; PhD Arizona 1974

Besse, Ralph Stephen Jr. 1963 Assoc Director International Agriculture (Prof). BS Oregon State 1943, MAg 1971

Best, Richard Lindell 1980 Columbia County Extn Agent (Asst Prof). AB Northern Colorado 1969; MS Colorado State 1974; PhD Iowa State 1979

Beuter, John Herman 1970 Prof Forest Management. BS Michigan State 1957, MS 1958; PhD Iowa State 1966

Bever, Dale Nestrud 1961 Prof Emeritus Forest Management

Bhattacharya, Pallab K. 1978 Asst Prof Electrical and Computer Engineering. BSc Calcutta U 1968, B Tech 1970, M. Tech 1971; M. Eng U of Sheffield 1976, PhD 1978

Bibee, Leonard Dale 1979 Asst Prof Oceanography. BA California at San Diego 1974, PhD 1979

Bible, Thomas D. 1977 Asst Prof Economics. AB California State 1969; MA California at Davis 1972, PhD 1976

Bierlmaier, Frederick A. 1977 Res Asst Forest Science. BS Vermont 1974

Bierman, Herman Eldon 1952 Asst Prof Emeritus (Umatilla County Extn Agent)

Bigelow, John 1977 Asst Prof Business Administration. BS Washington 1961; PhD Case Western Reserve U 1977

Bilsland, Douglas M. 1980 Res Asst Agricultural Engineering. BS Oregon State 1975

Binder, Julius Floyd 1952 Assoc Prof Emeritus (Jefferson County Extn Agent)

Binney, Stephen Ellis 1973 Assoc Prof Nuclear Engineering. BS Oregon State 1964; MS California at Berkeley 1966, PhD 1970

Birdsall, Robert Hill 1952 Prof Journalism. BA Idaho State 1949; MA Stanford 1952

Birkes, David Spencer 1974 Asst Prof Statistics. BS Stanford 1964; MS Chicago 1966; PhD Washington 1969; MS Oregon State 1972

Birkholz-Lambrecht, Anne F. 1977 Res Asst Zoology. BS Carroll C 1974; MS Wisconsin at Madison 1976

Bishop, Norman Ivan 1963 Prof Plant Physiology. BS Utah 1951, MS 1952, PhD 1955

Black, Harold Mayfield 1949 Prof Emeritus (Multnomah County Extn)

Blackwell, Eva 1924 Asst Prof Emeritus (Asst Registrar)

Blanch, Grant Etherington 1945 Prof Emeritus Agricultural and Resource Economics

Blaustein, Andrew R. 1978 Asst Prof Zoology. BA Southampton C 1971; MS Nevada at Reno 1973; PhD California at Santa Barbara 1978

Block, John Harvey 1966 Prof Pharmaceutical Chemistry. BS BPhr Washington State 1961, MS 1963; PhD Wisconsin at Madison 1966

Bloomfield, Stefan David Assoc Prof Business Administration, Assoc Director Institutional Research. BES Johns Hopkins 1966; MS Stanford 1968, PhD 1972

Bluhm, Wilbur L. 1957 Marion County Extn Chairman (Prof). BS Nebraska 1947; MS Purdue 1964

Blumenfeld, Charles Henry 1962 Assoc Prof Emeritus (Asst to the President)

Blythe, Linda Lou 1978 Asst Prof Veterinary Medicine. BS California at Davis 1972, DVM 1974, PhD 1979

Boals, Alfred J. 1981 Visiting Assoc Prof Computer Science. BS Western Michigan U 1961; MS Michigan State 1963, PhD 1968

Boarman, Alice Marie 1975 Asst Prof Health and Physical Education. BS Kent State 1963; MS Pennsylvania State 1967; EdD Oregon State 1977

Bobo, Jacqueline Dovie 1977 Instr Speech Communication. BA UCLA 1971; MA San Francisco State 1980

Bodenroeder, Pamela K. 1969 Res Asst Survey Research Center. BA Oregon State 1969

Bodvarsson, Gunnar 1964 Prof Mathematics and Geophysical Oceanography. BS Technical U of Berlin 1943; PhD California Institute of Technology 1957

Bodyfelt, Floyd Walter 1964 Prof Food Science and Technology, Extn Dairy Processing Specialist. BS Oregon State 1963, MS 1967

Boedtker, Olaf Alexander 1963 Assoc Prof Physics, Director Engineering Physics, Head Adviser College of Science. BS Swiss Federal Institute of Technology 1949; MS California Institute of Technology 1958, PhD 1961

Boehl, Laurada J. 1980 Area Coordinator Housing (Instr). BA Albion C 1978; MA Pacific Lutheran U 1980

Boehlert, George Walter 1979 Asst Prof Oceanography. BA California at Santa Barbara 1972; PhD California at San Diego 1977

Boersma, Larry 1960 Prof Soil Science. MS The Netherlands U 1955; PhD Cornell 1959

Bogart, Ralph 1947 Prof Emeritus Animal Genetics

Bohnaker, William John 1979 Instr English. BA Oregon C of Education 1967; MA Iowa 1969

Boice, Charles Allan 1966 Assoc Prof Department of Information; Editor *Oregon Stater*. BS Oregon 1942, MS 1950

Boldt, William Gregory 1980 Extn 4-H/EFNEP Youth Specialist (Asst Prof). BS Oregon 1971, MS 1975, EdD 1980

Bollen, Walter Beno 1929 Prof Emeritus Microbiology

Boller, Craig Wesley 1979 Asst Football Coach, BS Iowa State 1970

Bolton, Floyd Eugene 1967 Assoc Prof Agronomy. BS Oklahoma State 1959, MS 1961; PhD Colorado State 1968. On leave 1981-83

Bond, Carl Eldon 1949 Prof Fisheries. BS Oregon State 1947, MS 1948; PhD Michigan 1963

Bond, Turner Hanks 1943-48 1950 Prof Emeritus (Extn Community Development Specialist)

Bondi, Michael Charles 1978 Extn Agent (Asst Prof). BS Iowa State 1973; MS U of Canterbury (New Zealand) 1977

Bone, Jesse Franklin 1950 Prof Emeritus Veterinary Medicine

Bonham, Earl Edward 1955 Wasco County Extn Agent (Assoc Prof). BS Oregon State 1950

Booster, Dean Emerson 1956 Prof Agricultural Engineering. BS Oregon State 1954, MS 1956

Boots, Donald S. 1977 Director and Physician Student Health Center (Prof). BS Oregon 1952; MD U of Oregon Medical School

Borg, Leslie Lundborg 1979 Instr English. BA Concordia C 1976; MA Chicago 1977

Borg, Marcus J. 1979 Asst Prof Religious Studies. BA Concordia C 1964; Diploma Oxford U 1966, PhD 1972

Borgir, Tharald 1967 Assoc Prof Music. MM Yale 1960; PhD California at Berkeley 1971

Born, Steven Paul 1979 Res Asst Botany and Plant Pathology. BA California State at Northridge 1976

Bose, Bella 1980 Asst Prof Computer Science. BE Madras 1973; ME Indian Institute of Science 1975; MS Southern Methodist 1979, PhD 1980

Bostwick, David Arthur 1953 Assoc Prof Emeritus Geology

Bottero, Joseph Sheldon 1969 Res Asst Oceanography. BS Portland State 1962; MS Oregon State 1969

Bottomly, Peter James 1979 Asst Prof Microbiology, Soil Science. BS Liverpool (England) 1972; PhD Dundee (Scotland) 1975

Bottoms, Richard Michael 1981 Gilliam County Extn Agent (Asst Prof). AA Santa Rosa C 1972; BS California Polytechnic at San Luis Obispo 1974, MS 1977

Boubel, Richard William 1954 Prof Mechanical Engineering, Director Air Resources Center. BS Oregon State 1953, MS 1954; PhD North Carolina 1963

Boucot, Arthur James 1969 Prof Geology. AB Harvard 1948, AM 1949, PhD 1953

Bourget, Edwin 1981 Visiting Assoc Prof Zoology. BS Laval U 1969, MS 1971; PhD U of North Wales 1974

Bowers, John Edward 1972 Res Asst Oceanography. BSEE Illinois 1970

Bowers, Waldo 1963 Assoc Prof Emeritus (Assoc Director Emeritus Admissions)

Bowman, Donald M. 1975 Assoc Director, Division of Continuing Education; Assoc Prof Education. BBA Oregon 1952, MS 1956

Bowman, Marian Y. 1964 Prof Art, BFA Texas at Austin 1946, MFA 1964

Boyle, James Reid 1981 Prof Forest Management. BS Iowa State 1962; MF Yale 1963, PhD 1967

Brackett, Doris 1981 Jefferson County Extn Agent (Instr). BS Oregon State 1981

Brady, James Joseph 1937 Prof Emeritus Physics

Braker, Majorie Jean 1979 Tillamook County Extn Agent (Asst Prof). BS Wisconsin at Stout 1967; BS Wisconsin at River Falls 1970; MS Wisconsin at Stout 1979

Branch, Harrison 1972 Assoc Prof Art. BFA San Francisco KLArt Institute 1970; MFA Yale 1972

Brandenburg, Norman Robert 1950 Assoc Prof Agricultural Engineering (Courtesy), Agricultural Engineer USDA. BS Colorado 1944; MS Oregon State 1951

Brandt, Jeanette Ann 1973 Asst Prof Family Resource Management. BS Washington State 1967; MS Oregon State 1972, PhD 1981

Brandt, Patricia Elizabeth 1959-61 1964 Asst Head Social Sciences and Humanities, Library (Prof). BS Mt Angel C 1955; BMusEd Williamette 1957, MMusEd 1958; MA Denver 1959

Brandt, William Henry 1956 Assoc Prof Botany. BA Montana 1950; MSc Ohio State 1951, PhD 1954

Brandt-Erichsen, David 1979 Res Asst Botany. BA San Francisco State 1969

Brauner, David Ray 1977 Asst Prof Anthropology. BA Washington State 1969, MA 1972, PhD 1976

Brauner, Julie Anne 1974 Res Asst Veterinary Medicine. BS Washington State 1970

Brazee, Edward Brooks 1964 Social Sciences and Humanities Librarian (Assoc Prof). BA Oregon 1962; M Librarianship Washington 1963; MA Oregon 1973

Breen, Patrick Joseph 1974 Assoc Prof Horticulture, BS C of St Thomas 1960; MS Minnesota 1963, PhD 1967

Breese, Wilbur Paul 1953 Prof Fisheries, Marine Science Center, Newport. BS Oregon State 1951, MS 1953

Bregar, William Samuel 1975 Assoc Prof Computer Science. BA Miami (Ohio) 1963; MS Wisconsin at Madison 1969, PhD 1974. On sabbatical 1982-83

Bregenzer, Dave Douglas 1980 Instr Mathematics. BS Washington U 1975; MS Southern Illinois 1978

Brennan, William James 1966 Asst Dean of Students (Assoc Prof). BS Oregon State 1962, MEd 1966

Brenne, Robert Nelson 1965 Instr Computer Center. BA Reed 1953

Brenneman, Karen Anne 1981 Lincoln County Extn Agent, (Instr). BS Oregon State 1968

Brewer, Donald Haden 1957 Extn Certification Specialist (Assoc Prof), Crop Science. BS Oregon State 1955; MS Missouri 1967

Brewer, Jo Ann 1981 Asst Prof Education. BS Texas Technical U 1966, MEd 1973, EdD 1980

Brewster, Bill Densmore 1975 Senior Instr Crop Science. BS Oregon State 1970, MS 1972

Briskey, Ernest Joseph 1979 Dean School of Agriculture, Prof Animal Science and Food Science and Technology. BS Wisconsin 1952; MS Ohio State 1955; PhD Wisconsin 1958

Britt, Jeffrey L. 1979 Extn Plant Clinic Technician (Res Asst). BS Washington 1977; MS Washington State 1979

Britton, Gwyneth Elaine 1965 Assoc Prof Education. BS Lewis and Clark C 1957; MEd Oregon 1963; EdD Oregon State 1968

Brock, Marjorie Braker 1979 Tillamook County Extn Agent (Asst Prof). BS Wisconsin at Stout 1967; BS Wisconsin at River Falls 1970; MS Wisconsin at Stout 1978

Brodie, Ann E. 1975 Res Assoc Biochemistry and Biophysics. BS Purdue 1965; PhD California at Berkeley 1970

Brodie, John Douglas 1975 Assoc Prof Forest Management. BSF Toronto 1961; MS Syracuse 1963; PhD California at Berkeley 1971

Brog, Gerald Walter 1956 Extn Area Surpervisor (Prof). BS Oregon State 1954; MS Michigan State 1964

Broich, William A. 1980 Res Asst Microbiology. AS Central Oregon Community C 1974; BS Oregon State 1980

Brokken, Ray Franklin 1965-69 1971 Prof Agricultural and Resource Economics (Courtesy), Economic Research Service USDA. BS Iowa State 1958, PhD 1965

Brookes, Victor Jack 1956 Prof Entomology. BA Michigan 1950; MS Illinois 1951, PhD 1956

Brookhyser, Evelyn Anne 1966 Lincoln County Extn Chairman (Assoc Prof). BS Stout State 1966; EdM Oregon State 1974

Brooks, Kristina M. 1975 Library Information Retrieval Service Coordinator (Instr). BA Washington 1970; MAT New Mexico State 1972; MLS Oregon 1975

Brooks, Royal Harvard 1967 Prof Agricultural Engineering. BS Utah State 1952; MCE Colorado State 1960, PhD, PE 1965

Broome, Janice Marie 1978 Lane County Extn Agent (Instr). BS Oregon State 1976

Brougher, Joy E. 1962 Lane County Extn Agent (Assoc Prof). BS Oregon State 1959, MHEc 1970

Brown, Clinton Allen 1970 Assoc Prof Art. BFA Wisconsin at Milwaukee 1965; MA Wyoming 1966; MFA Southern California 1968

Brown, Daniel Joe 1974 Assoc Prof Business Administration. BA Washington 1966; MBA California State at Fresno 1969; PhD Iowa 1974

Brown, Dorothy Furtick 1955 Prof Emeritus Extn Home Economics

Brown, Evelyn Stowell 1960 Asst Prof Emeritus (Lincoln County Extn Agent)

Brown, George Wallace 1966 Prof Forest Hydrology, Head of Forest Engineering Department. BS Colorado State 1960, MS 1962; PhD Oregon State 1967

Brown, Gordon George 1916 Assoc Prof Emeritus Horticulture (Mid-Columbia Experiment Station)

Brown, Kenneth Neil 1963 Marion County Extn Agent (Assoc Prof). BS Oregon State 1961, MAg 1971

Brown, Lyle Richard 1970 Assoc Prof Microbiology. BA Willamette U 1963; PhD Tulane 1968

Brown, Marda Kay 1973 Res Asst Biochemistry and Biophysics. BA Willamette U 1963

Brown, Michael Don 1981 Res Asst Oceanography. BS Oregon State 1975, BS 1979

Brown Perry Joe 1979 Asst Dean of Forestry, Prof and Department Head Resource Recreation Management BS Utah State 1967, MS 1968, PhD 1971

Brown, Robin Franklin 1979 Res Asst Oceanography. BS San Diego State 1975; MS Oregon State 1980

Brown, Terence Daniel 1975 Assoc Prof Forest Products, Extn Forest Products Specialist. BS Colorado State 1970; BS Utah 1971; PhD Colorado State 1975

Brown, William Galen 1955 Prof Agricultural and Resource Economics. BS Kansas State 1950; MS Iowa State, 1953, PhD 1955

Browne, William Griest 1968 Department Chairman Marketing, Finance and Production; Prof Business Administration. BSEE Case Institute of Technology 1960; MBA Washington 1965; PhD Michigan 1968

Brownell, Philip Harry 1979 Asst Prof Zoology. BA California at Berkeley 1969; PhD California at Riverside 1976

Brubaker, Deloss Allen 1979 Asst Athletic Trainer. BS Manchester C 1970; MS Indiana State 1979

Brunk, Hugh Daniel 1969 Prof Statistics. BA California at Berkeley 1940; MA Rice 1942, PhD 1944

Brunk, Jean Young 1969 Instr English, BA Rice 1943; MA Missouri at Columbia 1958

Brust Velda Jean 1964 Assoc Prof Physical Education. BS Oregon State 1953; Certificate in Occupational Therapy, Southern California 1955; Registered Occupational Therapist 1956; EdM Oregon State 1961

Bryan, M. Edward 1972 Director of Student Housing and Residence Programs, Student Services (Assoc Prof). BA Southern Illinois 1956, MA 1958; PhD Michigan State 1977

Bryant, Nancy Owens 1974 Asst Prof Clothing, Textiles, and related Arts. BA Washington 1968; MS Minnesota 1974. On sabbatical 1980-81

Brye, Joseph Chester 1947 Prof Music. BM Northwestern 1940, MM 1941

Bubl, Charles Edward 1978 Columbia County Extn Chairman (Asst Prof). BS Oregon State 1973, MS 1978

Bubl, Janet Laird 1946-48 1959 1960 Asst Prof Clothing and Textiles. BA Vassar 1940; MS Minnesota 1941

Bublitz, Walter John 1966 Prof Pulp and Paper Chemistry, Forestry. BS Arizona 1941; MS Institute of Paper Chemistry 1947, PhD 1949

Buccola, Steven Thomas 1980 Asst Prof Agricultural and Resource Economics. BA Saint Mary's C of California 1966; MS California at Davis 1972, PhD 1976

Buck, Kenneth J. 1979 Instr Business Administration. BBA Western Michigan 1954, MA 1959; PhD Claremont Graduate School 1970

Buckhouse, John Chapple 1975 Assoc Prof Rangeland Resources. BS California at Davis 1966; MS Utah State 1968, PhD 1975

Buckley, Patricia M. 1978 Asst Prof (Senior Research) Zoology. BS Ohio U 1948; MS Oregon State 1958, PhD 1964

Buckley, William Harry 1962 Asst Prof Emeritus (Water Resources Institute)

Bucolo, Richard John 1974 Asst Prof Electrical and Computer Engineering. BSEE California State Polytechnic 1967; MSEE Southern California 1968, PhD, BME 1974

Bucy, David Alvin 1955 Director of Planning and Institutional Research, Assoc Prof Mechanical Engineering. BSCE Oregon State 1955; Registered Professional Engineer, State of Oregon 1959; MSMetE Washington 1969

Buettner, Mark Roland 1979 Research Agronomist Klamath Experiment Station (Asst Prof). BS Idaho 1972, MS 1975; PhD Purdue 1978

Buffa, Dudley W. 1980 Asst Prof Business Administration. BA Michigan State 1963; MA Chicago 1968, PhD 1980; JD Wayne State U 1979

Buhler, Donald Raymond 1967 Prof (Senior Research) Agricultural Chemistry. BS Oregon State 1950, MS 1953, PhD 1956

Bullis, DeLoss Everett 1917 Prof Emeritus Agricultural Chemistry

Bunch, Thomas R. 1961-62 1964 Crook County Extn Chairman (Prof). BS Oregon State 1961, MS 1965

Burch, David Stewart 1958 Prof Physics. BS Washington 1950, MS 1954, PhD 1956

Burger, William Frederick 1978 Asst Prof Mathematics. BA Carleton C 1967; MS Ohio State 1969, PhD 1974

Burgess, Frederick Joseph 1953 Prof Civil Engineering, Dean of School of Engineering. BS Oregon State 1950; MS Harvard 1955

Burgett, Dennis Michael 1974 Assoc Prof Entomology. BS Edinboro State 1966; MS Cornell 1971, PhD 1973

Burke, Peter M. 1981 Assoc Prof Mechanical Engineering. BS Stanford 1956, MS 1957, PhD 1968

Burkhart, Betty Jane 1963 Washington County Extn Agent (Assoc Prof). BS Oregon State 1945. MS Oregon C of Education 1979

Burkhart, David James 1961 Hood River County Extn Chairman (Prof). AB Northwest Nazarene C 1951; MAgr Oregon State 1971

Burkhart, Harry Ray 1972 Asst Prof Animal Science. BS Colorado State 1939; MS Texas A&M 1948; PhD Oregon State 1972

Burkhart, Wilbur Willis, Jr. 1947 Assoc Prof Emeritus (Area Extn Agent)

Burleson, Frank M. 1981 Assoc Prof Naval Science. MS George Washington U 1972

Burnett, Charles R. 1981 Res Asst Agricultural Malheur Experiment Station. BS Arizona 1981

Burr, James Almon 1951-52 1960 Malheur County Extn Agent (Prof). BS Oregon State 1951

Burridge, Judith Ann 1960-62 1971 Benton County Extn Agent (Assoc Prof). BS Oregon State 1960, MS 1971. On leave 1980-82

Burrill, Larry C. 1962 Senior Weed Control Specialist, Asst Prof (Senior Research) Crop Science, International Plant Protection Center. BS Oregon State 1959, MS 1973

Burris, Nedry Valentine 1968 Asst to Director of Business Affairs (Asst Prof). LLB Northwestern C of Law (Portland) 1951

Burt, George Sherwin 1966 Assoc Prof Psychology. AB San Jose State 1957, MA 1962; PhD Arizona State 1972

Burt, John Grinnell 1973 Polk County Extn Agent (Asst Prof). BS California at Davis 1969; MS Arizona 1972

Burt, Lawrence Andrews 1979 Extn Agricultural Resource Economist (Asst Prof). BS California State Polytechnic at Pomona 1973; MA Washington State 1976, PhD 1979

Burt, Wayne Vincent 1954 Prof Emeritus Oceanography

Burtner, Dave Kirk 1980 Clackamas County Extn Agent (Instr). BA Portland State 1975

Burton, Robert M., Jr. 1977 Asst Prof Mathematics. BA Washington 1972; PhD Stanford 1977

Bushnell, Dwight J. 1976 Assoc Prof Mechanical Engineering. BS Utah 1967, MS 1968; PhD Brigham Young 1974

Bussard, Marie Harris 1957 Extn Specialist, Coordinator of Expanded Food and Nutrition Education Program (Prof), BS Montana State 1956, MS 1957

Butcher, Bill B. 1978 Asst Prof Pharmacy, Director Pharmacy Services Oregon Health Science University 1971

Butcher, Karyle Sue 1981 Sociology/Humanities Librarian (Instr). BA California at Berkeley 1964; MS Southern California 1965

Butler, David Allen 1975 Assoc Prof Statistics. BS Oregon State 1969; MS Cornell 1970; MS Stanford 1975, PhD 1975

Butler, Judy Ann 1978 Res Asst Agricultural Chemistry. BS Oregon State 1969

Butts, Irene 1974 Instr Emeritus English

Buxton, Dwayne R. 1977 Superintendent Malheur Experiment Station, Prof Agronomy. BS Utah State 1964, MS 1966; PhD Iowa State 1969

Byrne, John Vincent 1960 Vice President for Research and Graduate Studies, Prof Oceanography. AB Hamilton C 1951; MA Columbia 1953;PhD Southern California 1957. On leave 1981

C

Cadart-Ricard, Odette 1965 Prof French. BA U of Paris 1943, LLB 1945; BA Dominican C 1947; MA Sacramento State C 1958; PhD Oregon 1970

Cain, Robert Farmer 1952 Prof Emeritus Food Science and Technology

Calder, Clarence Andrew 1978 Assoc Prof Mechanical Enginering. BSME Oregon State 1960; MS Brigham Young 1962; PhD California at Berkeley 1969

Calderer, McCarme T.C. 1981 Asst Prof Mathematics. BS U of Barcelona 1974; PhD Heriot-Watt U 1980

Caldwell, Douglas Ray 1968 Prof Oceanography. BA Chicago 1955, BS 1957 MS 1958, PhD 1963

Calhoun, Wheeler, Jr. 1948 Assoc Prof Agronomy. BS Oregon State 1946, MS 1953

Calkin, James D. 1981 Res Asst Entomology. BS Oregon State 1981, BS 1981

Calvert, Leonard J. 1961-65 1969 Extn Communication Specialist (Assoc Prof). BA Oregon 1955, MA 1976

Calvin, Lyle David 1953 Dean Graduate School, Prof Statistics; Director Survey Research Center. BS Chicago 1948; BS North Carolina State 1947, PhD 1953

Cameron, H. Ronald 1955 Prof Plant Pathology. BS California at Davis 1951; PhD Wisconsin at Madison 1955

Campbell, Allan III 1976 Area Extn Agent (Assoc Prof). BS Massachusetts 1958; MS Oregon State 1973

Campbell, Donald Eugene 1969 Prof Physical Education. LBA Augustana C 1950; MS Oregon 1956; EdD Colorado State C 1963

Campbell, JoAnne B. 1980 Res Assoc Agriculture Chemistry. BS Texas Woman's U 1973, PhD 1979

Campbell, John Carl 1948 Director of Safety; Assoc Prof Industrial and General Engineering. BS Kansas State 1947; MS Oregon State 1949; Professional Engineer; Certified Safety Professional

Campbell, Robert Kenneth 1969 Res Geneticist (Courtesy Assoc Prof) Forest Sciences Laboratory. BA Montana 1951; MS Washington 1954, PhD 1958

Campbell, Robert William 1975 Res Assoc Entomology (Courtesy). BS New York State College of Forestry 1953; MF Michigan 1959, PhD 1961

Campbell, Ronald Kenneth 1945 Prof Emeritus Organizational Behavior, School of Business

Campbell, William Alexander 1966 Prof Emeritus Music

Campbell, William Locke 1979 Res Asst Crop Science. BS Oregon State 1977

Canfield, Marilyn Loree 1979 Res Asst Botany. BA California State of Fullerton 1964, MA 1967

Cannon, Caroline Helena 1959-67 1972 Washington County Extn Agent (Assoc Prof). BA St. Olaf C 1959; MS Pacific Lutheran 1973

Cannon, Lynn Elton 1963 Coos County Extn Chairman (Prof). BS Oregon State 1958, MAgr 1965

Cantara, Gary M. 1980 Res Asst Forest Products. BS Massachusetts at Amherst 1978

Cantey, James Lee 1979 Res Asst Oceanography. BS Louisiana State 1959; BS Oregon State 1978

Cantrell, Michael Alan 1979 Res Assoc Nitrogen Fixation Laboratory. BS Illinois 1970; PhD Wisconsin at Madison 1977

Capizzi, Joseph 1955-63 1965 Extn Entomology Specialist (Prof). BS Indiana U of Pennsylvania 1949; MS Oregon State 1955

Caravatti, Giorgio 1981 Res Assoc Chemistry. BS ETH-Zurich 1977, PhD 1981

Carey, Andrew Galbraith, Jr. 1961 Assoc Prof Oceanography. AB Princeton 1955; PhD Yale 1962

Carey, Elizabeth Menges 1979 Res Asst Zoology (Courtesy). BA Smith C 1956

Carlin, Herbert Deyo 1951 Prof Emeritus History

Carlin, Marian Cushing 1954 Assoc Prof Emeritus Human Development and Family Studies

Carlson, Angela Ruth 1969 Senior Instr Music. BA Idaho 1964; MM Wisconsin at Madison 1965

Carlson, David Hilding 1963 Prof Mathematics. BA San Diego State 1957; MS Wisconsin at Madison 1959, PhD 1963

Carlson, Elaine Kathryn 1958 Assoc Prof Clothing, Textiles, and Related Arts; Asst Dean School of Home Economics. BA Northwest Nazarene C 1942, BMus 1947; MS Oregon State 1960

Carlson, Marlan 1969 Assoc Prof Music. BME Kansas 1959, BM 1959; MM Eastman School of Music 1961, DMA 1964

Carlson Roy Werner 1958 Assoc Prof English. BA U of Omaha 1952; MA Washington 1957; PhD New Mexico 1961

Carlson, Theodore Harold 1962 Assoc Prof Journalism. BS Oregon State 1950; MS Oregon 1967

Carlson, William Hugh 1945 Prof Emeritus (Director of Libraries)

Caron, Andre Louis 1969 Regional Manager, National Council for Air and Stream Improvement (Courtesy Asst Prof). BS Maine 1956, MS 1963

Carpenter, Charles E 1972 Prof Community College Education. BS Ft. Hays Kansas State C 1952; MA Colorado 1959; PhD Texas at Austin 1969

Carpenter, Hillary M., III 1978 Res Assoc Agricultural Chemistry. BS California State at Long Beach 1970, MA 1973; PhD Dartmouth C 1978

Carpenter, Judy K. 1979 Instr Physical Education. BS Arkansas State 1969, MS 1970

Carpenter, Paul 1920-27 1934 Prof Emeritus Agricultural Economics

Carpenter, Steven E. 1980 Res Assoc Botany and Plant Pathology (Courtesy). BS Oregon State 1973; MS Cornell 1975; PhD City U of New York 1980

Carr, Jay B. 1979 Area Extn Agent (Asst Prof). BS Missouri 1972, MS 1973

Carraway, Leslie NK 1980 Res Asst Fisheries and Wildlife. BS Texas at El Paso 1972, MS 1975

Carroll, Carleton Warren 1974 Assoc Prof French, Foreign Languages and Literatures. BA Ohio State 1961; MA Wisconsin at Madison 1965, PhD 1968

Carroll, Ross Stacy 1981 Instr English. BA California at Santa Cruz 1974; MA Eastern Washington 1981

Carson, George Barr, Jr. 1961 Prof Emeritus History

Carter, Cheri Jo 1973 Union County Extn Agent (Asst Prof). BS Oregon State 1971, MEd 1980

Carter, David Southard 1961 Prof Mathematics. BA Britsh Columbia 1946, MA 1948; PhD Princeton 1952

Carter, George Edward 1960 Asst Prof Agronomy, Superintendent, Klamath Experiment Station. BS Purdue 1956; MS Michigan State 1960

Carter, Ruth Harriett 1952 Senior Instr Emeritus English

Carter, W. Gibson 1980 Marine Extn Agent, (Asst Prof). BF Stephan F. Austin State 1953; MS George Washington U 1967; MS Rhode Island 1971

Casteel, John Lloyd 1979 Res Asst Food Science. BS Oregon State 1971; MS Oregon C of Education 1979

Cate, Rodney Michael 1979 Asst Prof Human Development and Family Studies. BS Texas at Austin 1965; MS Texas Tech 1975; PhD Pennsylvania State 1979

Cate, Rufus Henry, Jr. 1945 Prof Emeritus (Douglas County Extension)

Causley, Gary Clyde 1978 Res Assoc Biochemistry and Biophysics. BS Oregon 1968; PhD North Texas State 1978

Cawlfield, David E. 1980 Res Asst Computer Center. BS Oregon State 1969

Cerklewski, Florian Lee 1979 Asst Prof Foods and Nutrition. BS Pennsylvania State 1971; PhD Illinois at Urbana-Champaign 1976

Chacon, Ramon Acosta 1970 Director Upward Bound (Asst Prof). BS Texas A & I 1965; MEd Oregon State 1973

Chamberlain, David Jack 1980 Douglas County Extn Agent (Asst Prof). BS Idaho 1968, MS 1973

Chambers, Kenton Lee 1960 Prof Botany Curator of Herbarium. AB Whittier 1950; PhD Stanford 1956

Chan, Deborah L 1976 Extn Agent (Instr). BS Oregon State 1974. On leave 1981-82

Chang, Dong Suck 1981 Asst Prof Food Science and Technology. BS National Fisheries U of Busan (Korea) 1964, MS 1971, PhD 1976

Chaplin, Michael Hovey 1968 Prof Horticulture. BS Kentucky 1965, MS Rutgers 1966; PhD Michigan State 1968

Chapman, Thomas E. 1978 Assoc Prof Veterinary Medicine. BS California at Davis 1962, DVM 1964, PhD 1969

Chappell, Berkley Warner 1963 Prof Art, Department Chair. BFA Colorado 1956, MFA 1958

Charley, Helen Geneva 1944 Prof Emeritus Foods and Nutrition

Cheeke, Peter Robert 1969 Prof Animal Science. BSA British Columbia 1963, MSA 1965; PhD Oregon State 1969

Cheeseman, William E. 1981 Asst Prof Naval Science. BA Washington, BS 1977

Chen, Chen-Tung Arthur 1977 Assoc Prof Oceanography. BS National Taiwan U 1970; MS Miami 1974, PhD 1977

Chen, Paul M. 1978 Asst Prof Horticulture. MS North Dakota State 1971; MS Minnesota 1973, PhD 1976

Chen, Yiwen 1981 Res Asst Nuclear Engineering (Courtesy).

Cheney, Horace Bellatti 1952 Prof Emeritus Soil Science

Chick, Robert William 1962 Vice President for Student Services. Prof Education. BA Missouri at Columbia 1946, MEd 1950; EdD Denver 1960

Chikwem, Hohn Okwuchukwu 1981 Res Assoc Food Science. MS St Andrews U 1979; PhD Ohio 1981

Chilcote, David Owen 1953 Prof Crop Physiology. BS Oregon State 1953, MS 1957; PhD Purdue 1961

Chilcote, William Wesley 1950 Prof Botany. BS Iowa State 1943, PLhD 1950

Childs, Herbert Ellsworth 1935 Prof Emeritus English

Childs, Stuart Whiteley 1979 Asst Prof Soil Science. BS Stanford 1971; MS Utah State 1975; PhD Washington State 1980

Ching, Kim K. 1961 Prof Forest Genetics. BS Central U (China) 1942; MF Michigan State 1948, PhD 1954

Ching, Te May Tsou 1956 Prof Seed Physiology, Crop Science, BS Central U (China) 1944; MS Michigan State 1950, PhD 1954

Chiou, C. T. 1975 Assoc Prof (Senior Research) Agricultural Chemistry. BSE Cheng Kung U (Taiwan) 1965; MS Kent State 1970, PhD 1973

Chona, Harbans Singh 1966 Documents Librarian (Asst Prof). BA Punjab U 1954; MALS Peabody Library School, George Peabody C 1961

Christensen, Bert Einar 1931 Prof Emeritus Chemistry

Christensen, Dorothy Jean 1967 Marion County Extn Agent (Assoc Prof). BS Oregon State 1967, EdM 1972

Christensen, John Mark 1979 Asst Prof Pharmacy. BS Utah 1975, PhD 1980

Christensen, Leno Virgil 1957 Assoc Prof Emeritus Agricultural Education

Christensen, Neil Walter 1978 Asst Prof Soil Science. BS Nevada 1966; MS New Mexico State 1968; PhD Oregon State 1972

Christy, Barbara Craver 1979 Klamath County Extn Agent (Asst Prof). BA San Diego State 1972; MS California Polytechnic 1979

Church, Clarence Lewis 1943-44 1945 Asst Prof Emeritus Physics

Church, David Calvin 1956 Prof Emeritus Animal Science

Cicierska, Peggy 1981 Instr Health and Physical Education. BFA Guilliard School 1965

Cihak, Michael Raymond 1979 Counselor Financial Aid (Instr). BA U of San Diego 1966, MA 1973

Clark, Elsie K. 1960 Assoc Prof Emeritus (Polk County Extn Agent)

Clark, Glenn Edwin 1968 Prof Counselor Education. BS Nebraska 1941, MA 1948; EdD Wyoming 1964

Clark, Harry Edwin 1951 Prof Emeritus (Extn Community Development Specialist)

Clark, Jerry E. 1977 Instr Business. BS Iowa State 1971; MS Oregon State 1977

Clarke, Ronald Orville 1963 Prof Religious Studies. BS Oregon State 1950; BD Yale 1953; ThD Pacific School of Religion 1964

Clauson, Milo 1971 Res Asst Uncl, Oceanography. BA Eastern Oregon State C 1969

Claycomb, Alice E. 1979 Res Asst Veterinary Medicine. BA New Hampshire 1975; MS Rutgers 1977

Claypool, Donald Wedsel 1964 Asst Prof Animal Science. BS Berea C 1952; MS Kentucky 1959

Cleary, Brian Dennis 1973 Extn Reforestation Specialist (Assoc Prof). BS Oregon State 1965, MS 1966, PhD 1970

Cleaveland, Laura Mae 1946 Assoc Prof Emeritus Institution Management

Clement, Steven Douglas 1970 Extn Agent (Asst Prof). BS Southern Oregon State C 1970; MEd Oregon State 1977. On leave 1981-82

Clevenger, Scott Philip 1945 Asst Prof Emeritus (County Extn Agent-at-Large)

Cline, Steven P. 1978 Res Asst Forest Science. BS Illinois 1973; MS Oregon State 1977

Clinton, Richard Lee 1976 Assoc Dean College of Liberal Arts, Assoc Prof Political Science. BA Vanderbilt 1960, MA 1964; PhD North Carolina at Chapel Hill 1971

Coblentz, Bruce Evan 1975 Assoc Prof Wildlife Ecology. BS Fairleigh Dickinson U 1967; MWM Michigan 1969, PhD 1974

Cocker, Joshua D. 1979 Res Assoc Geology. BSc U of Tasmania 1971, PhD 1977

Coffin, Joyce. 1976 Instr Mathematics. BA Iowa State Teachers C 1950; BS Oregon State 1976

Cohen, Bruce A. 1977 Instr Business Administration. BS Purdue 1975; MS Oregon State 1977

Cohen, Philip R. 1981 Asst Prof Computer Science. BA Cornell 1972; MS U of Toronto 1974, PhD 1978

Colbert, Michael 1969-71 1972 Assoc Prof Education. BS Oregon 1955; MS Oregon C of Education 1958; EdD Oregon State 1971

Cole, Richard Lee 1977 Asst Prof Agricultural Education. BS Oregon State 1966, MEd 1973; PhD Iowa State 1977

Coleman, Ralph Orval 1919 Prof Emeritus Physical Education

Collingham, Richard Ellis 1971 Assoc Prof (Courtesy) Mechanical Engineering. BS Washington 1959,MS 1960; PhD Minnesota 1968

Collins Latisha Lynn 1979 Res Asst English Education Institute. BA Linfield 1976

Collins, Margaret D. 1980 Res Asst Horticulture. BS New Mexico State 1968; MS Oregon State 1977

Collins, Robert Herbert 1974 Asst Dean and Diretor Graduate Business Programs, Assoc Prof Business Administration. BS-WPE State U of New York 1963; BSF Syracuse 1963; MBA Wisconsin at Madison 1970, PhD 1973

Compton, Mary Tingley 1976 Prof (Courtesy) Horticulture. BS New Hampshire 1933, MS 1937; PhD Cornell 1941

Compton, Oliver Cecil 1948 Prof Emeritus Horticulture

Conard, Roberta Lee 1976 Res Asst Oceanography. BA Oregon State 1973, MS 1976

Conard, Susan G. 1980 Res Assoc Forest Science. BA Antioch 1971; MS California at Davis 1974, PhD 1980

Cone, Martha C. 1978 Res Assoc Microbioloby. BA Texas 1969, PhD 1972

Conkey, Harlan Don 1969 Prof Speech Communication. BS Kansas 1959, MS 1961; EdD Tulsa 1964

Conklin, Frank Sidney 1968 Prof Agricultural and Resource Economics. BS Oregon State 1954, MS 1959 PhD Iowa State 1968

Conklin, Melvin J. 1926-39 1950 Assoc Prof Emeritus Agricultural Ecomonics, Agricultural Experiment Station

Conner, Helen Dwelle 1963 Malheur County Extn Agent (Asst Prof). BS Montana 1963

Conrad, Diana Kay 1970 Assoc Director Admissions (Assoc Prof). BS Idaho 1959; MEd Western Washington 1970

Constantine, George Harmon, Jr. 1966 Asst Dean and Head Adviser Pharmacy, Prof Pharmocognosy. BS in Pharmacy Utah 1960, MS 1962; PhD Oregon State 1966

Conte, Frank Philip 1961 Prof Zoology. AB California at Berkeley 1950, PhD 1961

Converse, Richard Hugo 1967 Prof Plant Pathology (Courtesy), Research Plant Pathologist USDA. BS California at Berkeley 1947; MS California at Davis 1948, PhD 1951

Cook, Clive Winston 1944 Asst Prof Emeritus (Clackamas County Extn Agent).

Cook, Curtis Roger 1970 Assoc Prof Computer Science. BA Augustana C 1965; MS Iowa 1967, PhD 1970

Cook, Gordon Henry 1965 Union County Extn Agent (Assoc Prof). BS Oregon State 1964, MS 1974

Cook, Ronald Lawrence 1977 Extn Certification Asst Crop Science (Instr). BS Oregon State 1975, MS 1979

Cook, Thomas William 1977 Asst Prof Horticulture. BS Washington State 1972; MS Rhode Island 1975

Cook, William Ross 1978 Asst Women's Basketball Coach. BA Idaho 1969; MEd Oregon State 1981

Coolen, Michael Theodore 1978 Asst Prof Music. BA Seattle U 1969; MA Washington 1972, PhD 1979

Coolican, Patricia M. 1978 Assoc Dean School of Home Economics, Asst Director Extn (Prof). BS Cornell 1950; MS Michigan State 1960; PhD Syracuse 1973

Cooney, Wilbur Tarlton 1937 Dean Emeritus School of Agriculture, Prof Emeritus Poultry Science

Cooper, Alan S. 1979 Res Asst Crop Science. BS Oregon State 1979

Cooper, Thomas McNeil 1980 Res Asst Agricultural Engineering. BS C of Idaho 1973; MS Western Washington U 1979

Copek, Peter Joseph 1972 Director Humanities Development, Assoc Prof English. BS Loyola (Chicago) 1967; MA Northwestern 1969, PhD 1973

Copes, Donald Louis 1964 Asst Prof, Forest Science Laboratory (Courtesy). BS Purdue 1961; PhD Idaho 1967

Coppola, Alan J. 1981 Asst Prof Mathematics. BA Connecticut 1973;MA SUNY at Binghamton 1974, PhD 1980

Corden, Malcolm Ernest 1958 Prof Plant Pathology. BS Oregon State 1952, PhD 1955

Cordy, Clifford Bernard 1935 Prof Emeritus (Jackson County Extn Chairman)

Corey, Ann Elizabeth 1979 Res Asst Crop Science. BS Oregon State 1978

Corliss, John Burt 1970 Assoc Prof Oceanography. BS Arizona State 1958; PhD Scripps Institution of Oceanography 1970

Cormack, Charles William 1963 Prof Emeritus Anthropology

Cornelius, James Conley 1979 Asst Prof Agricultural and Resource Economics. BS California at Davis 1970; MS Wyoming 1972; PhD Washington State 1977

Corwin, Nancy A. 1978 Asst Prof Art. BA Oberlin 1956; MA Michigan 1958; PhD Washington 1976

Costa, Robert 1977 Morrow County Extn Agent (Asst Prof). BA California State at Fresno 1972; MS Oregon State 1977

Couch, Richard William 1966 Assoc Prof Geophysics. BS Michigan State 1958; MS Oregon State 1963, PhD 1969

Cousins, Joseph M. 1979 Asst Foreign Student Adviser International Education. BS Kansas State 1974, MS 1976

Courtney, E. Wayne 1972 Prof Agricultural Education. BSF Purdue 1953, BS 1957, MS 1958, PhD 1962

Covey, Belva Hight 1957 Assoc Prof Emeritus (Linn County Extn Agent)

Covey, Steven L. 1969 Res Asst, Sea Grant. BS Oregon LState 1960

Cowan, Hal Everett 1976 Asst Director Intercollegiate Athletics. BA Linfield 1964

Cowan, John Ritchie 1948 Prof Agronomy. BSA Toronto 1939; MS Minnesota 1942; PhD 1952. On indefinite leave

Cox, Joseph Alfred 1946 Prof Emeritus Physical Education

Cox, Joseph Rew 1945-50 1957 Prof Emeritus (Director Emeritus Extension Service)

Coyier, Duane Lee 1961 Research Plant Pathologist (Courtesy Assoc Prof). BS Wisconsin at Madison 1951, PhD 1961

Crabtree, Garvin Dudley 1958 Prof Horticulture. BS Oregon State 1951; MS Cornell 1955, PhD 1958

Craft, Irene Louise 1944 Assoc Prof Emeritus (Serials Librarian)

Craig, Albert Morrie 1976 Asst Prof Veterinary Medicine. BA Oregon State 1965, PhD 1970

Craig, Charles D. 1974 Res Asst Air Resources Center. BS Hawaii 1969

Craig, Richard P. 1974 Director Fiscal and Personnel Services School of Agriculture (Asst Prof). BBA Woodbury U 1960

Cramer, Richard Price 1957 Assoc Prof Physical Education. BS Oregon State 1957, MS 1961

Crane, Stephen D. 1971 Res Asst Chemical and Civil Enginerring. BS Oregon State 1970

Craven, Gene Francis 1958 Assoc Prof Science Education and Physical Science (General Science). BS Kansas State C at Pittsburg 1954; MS Oregon State 1958, PhD 1966

Crawford, David Lee 1964 Prof Food Science and Technology, Program Director, Seafoods Laboratory, Astoria. BS Oregon State 1958, MS 1961 PhD 1966

Crawford, John Arthur 1974 Assoc Prof Wildlife Ecology. BS Creighton 1968; MS Nebraska 1971; PhD Texas Tech 1974

Crawford, Lawrence 1975 Res Asst Civil Engineering. BS Oregon State 1975

Creech, Harold Clayton 1967 1971 Res Asst Oceanography. BS Oregon State 1965, MS 1967

Crews, Graydon Talmadge 1948 Prof Emeritus General Science

Crisman, Russell Owen 1979 Asst Prof Veterinary Medicine. DVM Purdue 1970; PhD Georgia 1979

Crisp Lloyd Earle 1972 Professor Speech Communication Department Chair. BA San Francisco State 1958, MA 1960; PhD Denver 1967

Crocker, Joseph Robert, Jr. 1962 Asst Prof Emeritus English

Croff, Howard Lester 1957 Prof Emeritus Industrial and General Engineering

Croft, Brian A. 1982 Prof Entomology. BS Brigham Young 1966, MS 1968; PhD California at Riverside 1970

Cromack, Kermit, Jr. 1974 Asst Prof Forest Science. BA Texas at Austin 1963, MA 1967; PhD Georgia 1973

Cronk, Richard V. 1974 Consultant Student Health Center (Assoc Prof). AB Pennsylvania 1960; MD Harvard 1965

Crooks, William Ramsden 1947 Prof Emeritus Psychology

Cropsey, Myron George 1946 Prof Emeritus Agricultural Engineering

Cross, Frank Richard 1969 Prof Education. BA Wyoming 1956, MEd 1962, EdD 1965

Crowell, Hamblin Howes 1946 Prof Emeritus Entomology

Crozier, William Kenneth, Jr. 1966 Prof Art. BFA Washington State 1954; MFA Washington 1959

Cruse, Donna Fay 1970 Assoc Prof Psychology. BS Colorado State 1965; MS Massachusetts 1967, PhD 1970

Cuenca, Richard H. 1978 Asst Prof Agricultural Engineering. BS California State Polytechnic 1971; MS California State at Sacramento 1975; PhD California at Davis 1978

Cuff, Michael Verge 1981 Asst Prof Military Science. BA Brigham Young 1974

Cull, Elaine Marie 1970 Asst to Dean Home Economics (Instr). BA Rosary C 1969; MS Oregon 1974

Cull, Paul 1970 Assoc Prof Computer Science. BS Providence C 1965; PhD Chicago 1970

Cummins, Kenneth William 1978 Prof Fisheries. AB Lawrence U 1955; MS Michigan 1957, PhD 1961

Curran, Donald Dorrance 1971 Instr Microbiology. BS Washington 1956; MS UCLA 1964

Currier, Raymond Alan 1961 Assoc Prof Forest Products. BS Massachusetts 1950; MS New York State C of Forestry 1952

Curtis, Lawrence R. 1980 Asst Prof (Senior Research) Fisheries. BS South Alabama 1974, MSc 1977; PhD Mississippi Medical Center 1980.

Custer, Peggy Benson 1978 Asst Director Career Planning and Placement (Instr). BS Oregon State 1974; MA Michigan State 1977

Cutler, Melvin 1963 Prof Physics. BS City C of New York 1943; AM Columbia 1947, PhD 1951

D

Dahlke, Otto Paul Herman 1973 Assoc Prof Mechanical Engineering (Courtesy). BS College Mittweida (Germany) 1924

Dahm, Clifford Neal 1980 Res Assoc Fisheries. BS Boise State 1972; MA Oregon State 1974, PhD 1980

Dailey, Charles Henry, Jr. 1947 Prof Physical Education. BS North Central C (Illinois) 1943; MA Michigan 1947; ScD Kasetsart 1979

Dale, Robert D. 1965 Assoc Prof Philosophy, Department Chair. BS Oregon State 1957; MA Chicago 1959; PhD California at Berkeley 1973

Dallons, Victor J. 1979 Instr Engineering, Research Engineer National Council for Air and Stream Improvement (Courtesy). BS Iowa State 1970, MS 1972

Dalton, Clifford Sherman 1971 Asst Prof Business Administration; Asst Dean School of Business; Director of Management Programs. BS Oregon State 1966, MBA 1969

Dane, Charles Wesley 1957 Prof Business Administration. BSFE Oregon State 1952, MS 1958; Registered Professional Engineer 1960; DBA Indiana 1968

Daniels, Kenton Ross 1981 Res Asst International Agriculture. BA Ohio State 1968

Daniels, Malcolm 1965 Prof Chemistry, Radiation Center. BSc (Honors in Chemistry) Kings C, U of Durham (England) 1951, PhD 1955

Daniels, Richard Jacob 1970 Assoc Prof English, BA Ohio State 1964; MA 1966, PhD 1972

Danielson, Harold Rodger 1968 Instr Crop Science. BA Montana State 1961; MS Oregon State 1973

Dankleff, Richard Elden 1963 Assoc Prof English. BS Columbia 1949; MA Nebraska 1954; PhD Chicago 1959

Darcy, Felix Joseph 1979 Asst Prof Health. BS C of Great Falls 1959; MEdS New Mexico 1964; MS Cincinnati 1970

Darnell, Thomas J. 1978 Umatilla County Extn Agent (Asst Prof). BS Kansas State 1967, MS 1969

Dasch, Ernest Julius, Jr. 1970 Assoc Prof Geology. BS Sul Ross State 1956; MA Texas at Austin 1959; MS Yale 1967, PhD 1969

Daterman, Gary Edward 1969 Res Entomologist and Project Leader, USFS, Forestry Sciences Laboratory; Assoc Prof Entomology (Courtesy). BA California at Davis 1962; MS Oregon State 1964, PhD 1969

Davidson, Thomas Parnell 1950 Asst Prof Emeritus Extn

Davie, James Ronald 1979 Res Assoc Biochemistry and Biophysics. BSc British Columbia 1975, PhD 1979

Davies, William Albert 1946 Prof Emeritus Forest Engineering

Davis, Joel 1963 Assoc Prof Mathematics. BA Princeton 1957; MS Wisconsin at Madison 1961, PhD 1965

Davis, John Rowland 1971 Assoc Dean School of Agriculture, Director Agricultural Experiment Station, Prof Agricultural Engineering. BS Minnesota 1949, MS 1951; PhD Michigan State 1959

Davis, Lorin Richard 1969 Prof of Mechanical Engineering. BA Brigham Young 1958, BESME 1959; MSME Purdue 1961; PhD Illinois 1964

Davis, Marilyn E. 1980 Instr Vocational Education. BA Idaho State 1969; MEd Oregon State 1976

Davis, Wilbur Arthur 1966 Prof Emeritus Anthropology. Curator of Anthropology

Dawson, Peter Sanford 1969 Prof Zoology. BS Washington State 1960; PhD California at Berkeley 1964

Dawson, Robert Harold 1968 Asst Prof Agricultural and Resource Economics (Courtesy) Economic Research Service, USDA. BA Washington 1957

Day, Paul Edward 1972 Lane County Extn Agent (Assoc Prof). BS Oregon State 1964, MS 1971

Deagen, John T. 1970 Res Asst Agricultural Chemistry. BS U of San Francisco 1969; MS Oregon State 1972

Dealy, Glen Caudill 1967 Prof Political Science. BA Washington 1957; MA George Washington U 1958; PhD California at Berkeley 1965

DeAngelis, Jack Douglas 1981 Res Asst Entomology. BA Miami U 1976; MS New Mexico State 1978; PhD Oregon State 1981

Deardorff, James W. 1978 Prof (Senior Research) Atmospheric Sciences. BS Stanford 1950; MA Washington 1956, PhD 1959

deCalesta, David Sherman 1975 Assoc Prof Wildlife Ecology, Extn Wildlife Specialist. AB Dartmouth 1964; MS Colorado State 1971, PhD 1973

Decius, John Courtney 1949 Prof Emeritus Chemistry

Decker, Fred William 1946 Assoc Prof Atmospheric Sciences. BS Oregon State 1940; MS New York U 1943; PhD Oregon State 1952

Decurtins, Silvio 1981 Res Asst Chemistry. Dr Chem U of Bern (Switzerland) 1981

De Deurwaerder, Charles A. 1967 Prof Landscape Architecture. BS Massachusetts 1953, MLA 1957

Deinzer, Max Ludwig 1973 Assoc Prof Agricultural Chemistry. BS Rutgers 1960; MS Arizona 1963; PhD Oregon 1969

De Kock, Carroll Wayne 1967 Prof Chemistry. BS Calvin C 1960; PhD Iowa State 1965

Demarest, Harold Hunt Jr. 1979 Asst Prof Geology. BA Reed C 1969; MA Columbia U 1971; PhD UCLA 1974

Denison, William Clark 1966 Assoc Prof Botany, Curator of Mycological Herbarium. AB Oberlin C 1950, AM 1952; PhD Cornell 1956

de Szoeke, Roland Andreas 1973 Assoc Prof Oceanography. MSc U of New South Wales 1970; PhD Nova U 1973

Deutsch, Allan 1969 International Agriculture Communications Specialist (Asst Prof) International Plant Protection Center. BS California at Davis 1957; MA Stanford 1967

Deveney, Wayne Edward 1978 Instr Clothing, Textiles and Related Arts. BFA Western Carolina U 1972; MS Tennessee 1974; MFA Wisconsin at Milwaukee 1976

DeYoe, David R. 1978 Asst Prof Forestry Science. BS Oregon State 1971, MS 1973; PhD Missouri 1977

Dickens, David Otto 1978 Chair Wallowa County Extn (Asst Prof). BS Oklahoma State 1956; MS Montana 1971

Dickinson, Ernest Milton 1927-36, 1938 Prof Emeritus Veterinary Medicine

Dickinson, R. Vern 1968 Assoc Prof Physical Education. BS UCLA 1961, MS 1962; PhD Southern California 1970

Dickinson, Virginia H. 1978 Asst Prof Family Resource Management. BS Washington 1955; MS Utah State 1975; EdD 1980

Diedesch, Marie 1945 Assoc Prof Emeritus Clothing, Textiles, and Related Arts

Dill, Wolfgang Otto 1970 Assoc Prof German, Foreign Languages and Literatures. BA California at Riverside 1968, PhD California at Davis 1972

Dillon, Thomas M. 1977 Asst Prof Oceanography. BA Sacramento State 1969; MA California at Davis 1971, PhD 1974

Dix, Russell Grover 1964 Assoc Registrar (Assoc Prof). BS Oregon State 1962; MF 1964

Dodd, Brian 1978 Asst Prof Nuclear Engineering. BS U of London 1969, PhD 1973

Dodd, Elizabeth Ellen 1978 Res Asst Food Science and Technology. AA American River C 1971; BS California at Davis 1973

Doerge, Robert F. 1960 Prof Emeritus Pharmaceutical Chemistry

Doerge, Thomas Andrew 1978 Res Asst Soil Science. BA Macalester C 1973; MS Oregon State 1979

Doerksen, Allan Harold 1964 Res Asst Forest Science. BS Oregon State 1962, MS 1964

Doler, Thurston Ermon 1949 Prof Speech Communication. BA Furman 1948; MS Purdue 1949; PhD Oregon 1968

Dolp, Franz 1977 Asst Prof Economics. BS Yale 1958; PhD Berkeley 1964

Domka, Walter F. 1981 Res Assoc Agriculture and Resource Economics. BS Fort Lewis C 1976; MS Oregon State 1981

Dooley, Harrison L. 1965 Asst Prof Botany and Plant Pathology (Courtesy). BS Oklahoma State 1954, MS 1961

Dorn, Harold Clarence 1965 Prof Journalism. BA Nebraska 1950, MA 1955

Dornfeld, Ernst John 1938 Prof Emeritus Zoology

Dorries, Terry K. 1980 Res Asst Biochemistry and Biophysics. BS Southern Oregon State C 1980, BS 1980

Dost, Frank Norman 1962 Extension Toxicologist and Chemist (Prof), Agricultural Chemistry and Veterinary Medicine (Courtsey). DVM Washington State 1951, BS 1953; MS Kansas State 1959

Dost, Jeanne 1965 Director Women Studies; Assoc Prof Economics. BA Washington State 1951; MA Harvard 1953; PhD 1959

Doudoroff, Eve-Mary 1960-61, 1963 Asst Prof French, Foreign Languages and Literatures. BA Incarnate Word C (San Antonio) 1957, MA 1959. On sabbatical 1979-80

Doudoroff, Peter 1953 Prof Emeritus Fisheries

Dougherty-Grigsby, Anne Margaret 1981 Res Asst Biochemistry and Biophysics. BS Texas Christian U 1981

Douglas, Clyde Lee, Jr. 1974 Instr Soil Science (Courtesy), Columbia Plateau Conservation Research Center, Pendleton. BS Southern Illinois 1962; MS Illinois 1966

Douglas, Jim Russel 1976 Hood River County Extn Agent (Asst Prof). BS Nevada at Reno 1970, MS 1974

Douglass, James Marlin 1968 Director of Bands, Prof Music. BME Denver 1960; MFA Ohio 1962

Dow, Randall Harold 1979 Res Asst Marine Geology. BS Idaho 1977

Dowell-Gravatt, Margaret 1973 Physician, Student Health Center (Prof). BS Minnesota 1943, MB 1944, MD 1945

Dowling, Barbara Tolley 1978 Instr English Language Institute International Education. BA Ohio 1971, MA 1973

Drake, Charles Whitney 1966 Prof Physics, Chairman of Department. BS Maine 1950; MA Wesleyan U (Connecticut) 1952; PhD Yale 1958. On sabbatical 1982

Drake, Ellen Tan 1976 Res Assoc Oceanography. BA Bryn Mawr 1949; MA Oregon State 1975, PhD 1981

Drlica, Karl Francis 1950 Assoc Prof Physical Education, Coordinator River Facilities. BS Oregon State 1941, MS 1952; EdD U of Mississippi, 1976

Drobnic, Karl S. 1974 Instr English Language Institute International Education. BA Ohio U 1965

Drost, Michael Evan 1977 Res Asst Computer Center. BS Oregon State 1969, BSEE 1975, MSEE 1977

Du, Shi-Hua 1980 Res Assoc Agricultural Chemistry. BS Nankai U 1962

Duarte, Elias Daniel 1979 Counselor Educational Opportunities Program (Instr). BA Idaho State 1974; MA Oregon State 1979

Duncan, James Andrew 1979 Asst Editor Experiment Station Communications (Instr). BA Central Arkansas 1969; MA Oregon 1975

Duncan, Robert Ames 1977 Asst Prof Oceanography. AB Princeton 1971; MS Stanford 1972; PhD Australian National U 1976

Dunn, James Wesley 1963 Director of Development (Assoc Prof). BS Oregon State 1951; MS New York U 1952

Dunn, John Maximillian 1975 Assoc Prof Physical Education, Department Chair. BS Northern Illinois U 1967, MS 1969; EdD Brigham Young 1972

Dunn, Paul Millard 1942 Prof Forestry (Courtesy), formerly Dean School of Forestry

Dunnington, Leslie Garner 1969 Asst Director Counseling Center (Assoc Prof). BME Central Missouri State 1958, MS 1961; PhD Wyoming 1966

Durham, Beverly Cochran 1969 Instr International Education. BA Hawaii 1965, MA 1970

Durham, Marvin Lyle 1970 Foreign Student Adviser, International Education (Assoc Prof). BS Washington 1952; MA Fletcher School of Law and Diplomacy 1953, PhD 1962

Duryea, Mary Louise 1981 Asst Prof Forest Science. BS California at Berkeley, MS 1974; PhD Oregon State 1981

Dutchuk, Michael Scott 1979 Res Asst Oceanography. BS Oregon State 1979

Dykes, Arnold Gene 1978 Instr Aerospace Studies, Technical Sergeant US Air Force

Dymond, Jack R. 1969 Prof Oceanography. BA Miami (Ohio) 1961; PhD California at San Diego 1966

E

East, Dorothy May 1961 Assoc Prof Foods and Nutrition. BS Montana State 1939; MS Oregon State 1961

Easterday, Harry Tyson 1960 Prof Physics. AB California at Berkeley 1947, PhD 1953

Easton, Edison Ellsworth 1951 Prof Business Administration, Department Chair Management. BS Southern California 1947; MBA California at Berkeley 1951; DBA Southern California 1967. CPA State of Oregon

Ebert, Arnold Christian 1936 Assoc Prof Emeritus (Extn Broadcast Communication Specialist)

Eckenrode, Frances M. 1981 Asst Prof Pharmacy. BS Virginia Commonwealth U 1975; PhD Iowa 1981

Ecklund, Earl F., Jr. 1977 Asst Prof Computer Science. BS Pacific Lutheran 1966; MA Western Washington State 1968; PhD Washington State 1972

Edaburn, Clara Williams 1939 Prof Emeritus Clothing, Textiles, and Related Arts

Eddleman, Lee Elbert 1981 Assoc Prof Rangeland Resources. BS Colorado State 1960, MS 1962, PhD 1967

Ede, Lisa S. 1980 Director Communication Skills Center, Coordinator Composition (Asst Prof) English. BS Ohio State 1969, PhD 1975; MA Wisconsin 1970

Edwards, John Allan 1961 Prof Agricultural and Resource Economics. BS Wisconsin at Madison 1950; MA Nebraska 1952; PhD Chicago 1963

Edwards, Louis Laird 1955 Assoc Prof Emeritus Business Administration (Director Emeritus Careers Planning and Placement)

Edwards, Margaret Ann 1951 Senior Instr Emeritus Foods and Nutrition

Egbert, Alice Marie 1981 Asst Prof Vocational and Technical Education. BS Augustana C 1969; MEd Colorado State 1979, PhD 1981

Ehrensing, Daryl 1981 Res Asst Crop Science. BS Oregon State 1976

Eichler, Walter R. 1979 Instr Vocational-Agricultural Education. BS Oregon State 1958, MEd 1966

Eide, Stuart Ames 1977 Res Asst Oceanogrphy. BS Oregon Stte 1962, PhD 1977

Eiseman, David 1968 Assoc Prof Music, Department Chair. AB California at Berkeley 1963; MM Illinois 1964, PhD 1972

Eisgruber, Ludwig Maria 1973 Assoc Dean of Agrculture, Director International Agriculture. Dipl Agr Technical U of Munich 1955; MS Purdue 1957, PhD 1959

Eisele, Thomas Anthony 1980 Res Assoc Food Science and Technology. BS Oregon State 1969, MS 1976; PhD Washington State 1980

Elam, Reid Pearson 1979 Fitness Director Intercollegiate Atheletics. BA Redlands 1974; MS Oregon 1979

Eldridge, Bruce Frederick 1978 Prof Entomology, Chairman of Department. AB San Jose State 1954; MS Washington State 1956; PhD Purdue 1965

Elia, Victor J. 1981 Asst Prof (Courtesy) Engineering. BS Portland State 1965; PhD Nebraska 1970

Elliker, Paul Reuben 1947 Prof Emeritus Microbiology

Ellis, John Kenneth 1964 Prof Health, Director Health Care Administration. BEd Southern Illinois 1943, BS 1944; MPH Michigan 1948, PhD 1963

Ellis, Russell Eugene 1949 Prof Architecture. BS Washington State 1949, BArchE 1952. Architect 1956

Elwood, Norman Eugene 1979 Extn Forest Management Specialist (Instr). BS Michigan State 1969; MS Minnesota 1978

Emmingham, William Heber 1980 Extn Silviculture Specialist (Asst Prof) Forest Science. BS Idaho 1961; MS Oregon State 1972, PhD 1974

Enborn, John A. 1973 Consultant Student Health Center (Assoc Prof). AB Whitman C 1962; MD Tulane Medical School 1966

Enfield, David Bruce 1977 Asst Prof (Senior Research) Oceanography. AB California at Berkeley 1965; MS Oregon State 1970, PhD 1973

Engel, Harold Nicholas 1979 Asst Prof Veterinary Medicine. BS Missouri 1969, DVM 1969; MS Auburn 1974; PhD Iowa State 1979

Engelbrecht, Rudolf S. 1977 Assoc Prof (Senior Research) Electrical and Computer Engineering. BSEE Georgia Institute of Technology 1951, MSEE 1953; PhD Oregon State 1979

Engelking, Henry Mark 1974 Res Asst Microbiology. BA California at San Diego 1971; MS Oregon State 1974

Engesser, Mary Miller 1946 1957 1963 Instr English. BA Western Maryland C 1943; EdM Oregon State 1963

Engesser, William Frederick 1941 Prof Emeritus Industrial and General Engineering

England, David Charles 1955 Prof Animal Science. BS Washington State 1949; MS Minnesota 1950, PhD 1952

Engle, John Franklin 1947 Prof Elecrtical and Computer Engineering. BS Oregon State 1947, MS 1951, EE 1958

English, Marshall Joseph 1978 Asst Prof Agricultural Engineering. BS San Jose State 1965; MS California 1974, PhD 1978

Enlows, Harold Eugene 1963 Prof Emeritus Geology

Enns, Judith Lynne 1981 Instr Speech Communication. BA Eastern Nazarene C 1964; MA Illinois State 1968; PhD Ohio State 1974

Enns, Robert E. 1981 Visiting Asst Prof Biochemistry and Biophysics. BS San Diego State 1965, MS 1967; PhD Oregon 1971

Erickson, Eldon Leroy 1971 Assoc Prof Health. BS Willamette 1957; MD U of Oregon Medical School 1960

Erickson, Linda P. Clackamas County Extn Agent (Asst Prof). BA Marshall U 1961, MEd Maryland 1971

Esbensen, Steven K. 1977 Asst Prof Atmospheric Sciences. BA UCLA 1968, MS 1972, PhD 1976

Escobar, German 1980 Agricultual Economist (Res Assoc) International Plant Protection Center. BS Santo Tomas U 1969; MS Cornell 1975; PhD Oregon State 1980

Euren, Florence Sarah 1946-49 1957 Senior Instr Emeritus (Asst Serials Librarian)

Evans, Evan L. 1980 Instr Speech Communication. BS Oregon College of Education 1969, MS 1969

Evans, Glenn Thomas 1977 Assoc Prof Chemistry. BS Seton Hall U 1968; PhD Brown 1973

Evans, Gwil Owen 1966 Director Agricultural Communications, Extn Communication Specialist (Prof), Prof Journalism. BS Oregon State 1961; AM Stanford 1962

Evans, Harold J. 1961 Director Laboratory for Nitrogen Fixation Research, Prof Plant Physiology. BS Kentucky 1946, MS 1948; PhD Rutgers 1950

Evans, J. Dennis 1975 Asst Prof English, Director English Education. BA Yale 1970; MA California at Berkeley 1974; PhD 1978

Evans, Thomas Morgan 1978 Res Assoc Microbiology. BS Montana State 1974, MS 1975; PhD New Hampshire 1978

Evans, Thomas Parker 1968 Prof Science Education, Chairman of Science and Mathematics Education. BA Transylvania C 1957; MA Kentucky 1962; PhD Ohio State 1968

Everest, Fred H. 1980 Assoc Prof Fisheries and Wildlife (Courtesy). BS Humboldt State 1964, MS 1965; PhD Idaho 1969

Ewalt, Harold Plympton 1932 Prof Emeritus (Extn Dairy Specialist)

Ewing, Richard Dennis 1971 Asst Prof Zoology (Courtesy). Research Project Leader, Oregon Department of Fish and Wildlife. BA Reed 1962; PhD Miami (Florida) 1968

F

Facteau, Timothy Joseph 1967 Assoc Prof Mid-Columbia Experiment Station. BS Rutgers 1963, MS 1965; PhD Florida 1967

Fagerness, Vicki Lynn 1981 Res Asst Oceanography. BA Colorado C 1977

Fairchild, Clifford Eugene 1962 Prof Physics. BA Fresno State 1956; PhD Washington 1962

Fairchild, Karan Anne 1980 Res Asst Fisheries and Wildlife. BS Oregon State 1979

Fairweather, Thomas David 1979 Res Asst Crop Science. BS Southern Illinois U 1975; MS Kansas State 1979

Fang, Sheng Chung 1948 Prof Emeritus Chemistry, Agricultural Chemistry

Farber, Paul Lawrence 1970 Assoc Prof History of Science. BS Pittsburgh 1965; MA Indiana 1968, PhD 1970

Farley, Carol E. 1978 Instr Business Administration. BS Wisconsin at Madison 1972; MS Oregon 1977

Farness, Donald H. K. 1963 Assoc Prof Economics. BA Reed 1957; PhD Washington 1968

Farrell, John Patrick 1968 Assoc Prof Economics. BS Wisconsin at Madison 1961, MS 1964, PhD 1973

Farrell, William King 1942 Prof Emeritus (Grant County Extn)

Faudskar, John David 1972 Tillamook County Extn Chairman (Asst Prof). BS Oregon State 1969, MS 1980

Faulkenberry, Gerald David 1965-69 1971 Prof Statistics, Acting Chairman of Department. BS Southeastern State C of Oklahoma 1959; Ms Oklahoma State 1963, PhD 1965

Fehler, Michael 1979 Asst Prof Geophysics. BA Reed C 1974; PhD MIT 1979

Fehringer, Anne Marie 1980 Instr Clothing Textiles and Related Arts. BS Nebraska at Lincoln 1976, MS 1978

Fein, Betty Lou 1972 Asst Prof Mathematics. BA UCLA 1961, MA 1963, PhD 1967

Fein, Burton Ira 1970 Prof Mathematics. BS Polytechnic Institute of Brooklyn 1961; MS Wisconsin at Madison 1962; PhD Oregon 1965

Fendall, Roger Kenneth 1968 Asst Dean, Head Adviser, School of Agriculture; Prof Agronomy. BS Oregon State 1960; PhD North Dakota State 1964

Feng, Ching-Hua David 1981 Res Asst Agricultural Chemistry. BS U of Chinese Culture 1974; BS Oregon State 1980

Ferguson, Douglas Edwin 1979 Asst Prof History. BA American U of Beirut 1960; MA UCLA 1965, PhD 1973

Ferguson, George Ray 1973 Prof Entomology (Courtesy). BS Oregon State 1936, MS 1939; PhD Ohio State 1941

Ferguson, Janet A. 1980 Program Coordinator International Education (Instr). BA UCLA 1964

Ferngren, Gary Burt 1970 Assoc Prof History. BA Western Washington State 1964; MA British Columbia 1967; PhD 1973

Ferran, Francisco Rene 1965 Asst Prof Spanish Emeritus Foreign Languages and Literatures.

Ferrell, William Kreiter 1956 Prof Emeritus Forest Management

Ferries, Jeremy V. 1975 Asst Prof Veterinary Medicine. BS Michigan State 1948, DVM 1951

Ferro, Adolph John 1978 Assoc Prof Microbioloby. BA Washington 1965; MS Western Washngton State 1970; PhD Washington State 1973

Feyereisen, Rene 1981 Asst Prof Entomology. MS U of Louis Pasteur, (France) 1974, Doct Univ 1976, Doct Etat 1979

Fichter, Eugene Frank 1977 Asst Prof Industrial and General Engineering. BME Rensselaer Polytechnic Institute 1967; MS U of New Brunswick 1973; PhD Monash U 1977

Field, Cyrus West 1963 Prof Geology. BA Dartmouth 1956; MS Yale 1957, PhD 1961

Fielder, William Rodney 1971 Prof Education. BA San Jose State 1952, MA 1956; EdD Stanford 1960

Filson, Lauren Kay 1980 Archivist (Instr) Office of Budgets. BS Willamette U 1979; MA U of Denver 1980

Finch, David V. 1977 Asst Prof Mathematics. BA Swarthmore C 1972; PhD MIT 1977

Fincke, Margaret Louise 1935 Prof Emeritus Foods and Nutrition

Fink, Gregory Burnell 1964 Prof Pharmacology. BS Montana 1950; PhD Utah 1960

Finlay, Barbara Agresti 1979 Asst Prof Sociology. BA Texas Tech 1969; MA Texas at El Paso 1971; PhD Florida 1976

Finnigan, David Francis 1957 Assoc Prof English. BA Colorado 1956, MA 1957; PhD Oregon 1970

Firey, William James 1961 Prof Mathematics. BS Washington 1948; MA Toronto 1949; PhD Stanford 1954

Firth, James Leslie 1973 Assoc Prof Education. AB San Diego State 1962; MS 1969; PhD Arizona State 1974

Fischer, Charles Merel 1947 Extn Poultry Specialist (Prof). BS South Dakota State 1943; MS Iowa State 1947

Fish, Carol Susanne 1979 Res Asst Food Science and Technology (Courtesy). BS Oregon State 1978

Fisher, Charles E. 1981 Director of Intramurals (Instr). BS Colorado State 1966, MEd 1969

Fisher, Ermina Jane 1952 Prof Emeritus (Marion County Extn Agent)

Fisher, Glenn Collins 1976 Extn Entomologist (Assoc Prof). BS California at Davis 1969, PhD 1977

Fisher, Herbert Henry 1971 Res Asst Crop Science, International Plant Protection Center. BS Ohio State 1962; MS 1971

Fisher, Loretta Gaylord 1938-42 1968 Instr Emeritus (Asst Reference Librarian)

Fitch, Luther Aaron 1960 Umatilla County Extn Agent(Prof). BS Idaho 1956; MS Michigan State 1960

Fitzgerald, Duane Stanley 1952 Asst Prof Emeritus (Building Manager Memorial Union)

Flaherty, Francis Joseph 1967 Prof Mathematics. BA Wisconsin at Madison 1956;MS Notre Dame 1959; PhD California at Berkeley 1965

Flath, Arnold William 1967 Prof Physical Education. BS Valley City State Teachers C 1951; MEd North Dakota 1958; PhD Michigan 1963

Fleischbein, Jane Helen 1982 Res Asst Oceanography. AA Clatsop Community C 1980, BA Western Washington 1981

Fletcher, Mary Genevieve 1959 Assoc Prof Emeritus (Douglas County Extn Agent)

Fletcher, Richard Allan 1979 Linn/Benton County Extn Agent Forestry (Asst Prof). BS Oregon State 1975, MBA 1977

Fletcher, Roger Leroy 1967 Polk County Extn Agent (Assoc Prof). BA Elon C 1964; MS Oregon State 1975

Flood, Elizabeth O'Brien 1954 Asst Prof Emeritus Mathematics

Floyd, Richard Leon 1970 Editor, Agricultural Experiment Station Communications (Assoc Prof). BA Indiana 1949; MS Oregon 1978

Fluent, Maud Purvine 1934 Assoc Prof Emeritus (Crook County Extn Agent)

Folse, Paul Joseph 1981 Coos County Extn Agent. BA Colorado 1969; MEd Oregon State 1978

Folts, James A. 1972 Asst Prof Journalism. AB Princeton 1966; BA, BA Oregon State 1972; MS Oregon 1980

Fontana, Peter Robert 1967 Prof Physics. MS Miami 1958; PhD Yale 1960

Foote, Wilson Hoover 1948 Prof Agronomy, Assoc Director Agricultural Experiment Station. BS Utah State 1942; MS Minnesota 1946, PhD 1948

Ford, Robert L. 1980 Asst Football Coach. BS Houston 1973; MS Western Illinois 1975

Foreman, Walter Cyril 1948 Prof Emeritus English

Fosque, Walton Bernard 1978 Asst Prof Art. BA California State at Long Beach 1971, MA 1973

Foster, Lee Russell 1947 Prof Emeritus (Hood River County Extn)

Foster, Roy Archilbald 1955 Prof Emeritus Health

Foster, William Abran, Jr. 1958 Assoc Prof Emeritus Sociology

Foulke, Ted E. 1955 Medical Consultant, Student Health Service (Prof). BS Case Institute of Technology 1944; MD Western Reserve 1951

Fox, Dorothy Bourke 1928 Assoc Prof Emeritus Art

Fox, Fred Wayne 1957 Prof Science Education. BSEd Miami U (Ohio) 1942; MA Ohio State 1949, PhD 1957

Frakes, Rodney Vance 1960 Assoc Dean of Research, Prof Plant Breeding, Crop Science. BS Oregon State 1956, MS 1957; PhD Purdue 1960

France, Thomas Traxler 1969 Asst Director of Publications (Asst Prof). BS Iowa State 1959

Frank, Albert Eugene 1977 Instr Atmospheric Sciences. BS Pennsylvania State 1971; MS Oregon State 1977

Frank, Robert Joseph 1969 Assoc Prof English, Department Chair, BA St. John's U (Minnesota) 1962; MA Minnesota 1968, PhD 1969

Franklin, Hugh Lockwood 1978 Engineering Librarian (Asst Prof). BS Oregon State 1952; MS Southern California 1960; MLS Washington 1973

Franklin, Jerry F. 1976 Prof Botany and Plant Pathology and Forest Science (Courtesy). BS Oregon State 1959, MS 1961; PhD Washington State 1966

Fraundorf, Kenneth Carl 1975 Asst Prof Economics. BA Oregon 1966; MA Cornell 1969, PhD 1971

Fraundorf, Martha Norby 1975 Asst Prof Economics. BA Carleton C 1968; MA Cornell 1971, PhD 1976

Frazier, Lloyd McDonald 1947 Manager of Instructional Shops, Industrial Engineering (Assoc Prof). BS Oregon State 1949; MS Brigham Young 1968

Frazier, William Allen 1949 Prof Emeritus Horticulture

Fredericks, William J. 1962 Prof Chemistry. BS San Diego State 1951; PhD Oregon State 1955

Freed, Michael Dale 1971 Asst Prof Resource Recreation Management. BA Carleton 1963; MS Michigan State 1969, PhD 1973

Freed, Virgil Haven 1943 Prof Chemistry, Head of Department of Agricultural Chemistry. BS Oregon State 1943, MS 1948; PhD Oregon 1959

Freeman, Monte Roy 1979 Counselor-Recruiter Educational Opportunities Program (Instr). AA Skagit Valley Community C 1964; BA Western Washington State; MA Pacific Lutheran 1974

Freeman, Peter Kent 1968 Prof Chemistry. BS California at Berkeley 1953; PhD Colorado 1958

Freiling, Michael J. 1978 Asst Prof Computer Science. BS San Francisco 1972; PhD MIT 1977

Frenkel, Robert Edgar 1965 Assoc Prof Geography. AB Kenyon C 1950; MS California at Berkeley 1954, PhD 1967

Freund, Harry 1947 Prof Emeritus Chemistry

Frey, Bruce Edward 1971 Asst Prof (Senior Research) Oceanography. BS Cornell 1967; MS Oregon State 1974, PhD 1977

Frichette, Steven Roger 1970 Assoc Director of Housing (Asst Prof). BS Washington State 1960; MA Syracuse 1968; PhD Oregon State 1976

Frick, Walter Eugen 1982 Res Asst Atomospheric Science. BA California at Riverside 1967; MS Oregon State 1976

Friedemann, Dale Herbert 1966 Chairman Clatsop County Extn (Assoc Prof). BS Nebraska 1959; MEd Colorado State 1966

Friedrichsen, Paul Stephen 1970 Harney County Extn Chairman (Assoc Prof). BS Chico State 1960; MS North Dakota State 1964

Frischknecht, Wilford Dean 1956 Extn Animal Scientist (Prof). BS Utah State 1942, MS 1943

Frishkoff, Patricia 1978 Assoc Prof Business Administration. BA St. Lawrence U 1966; DBA Kent State 1974

Frizzell, John Kitchener 1955 Prof Emeritus (Linn County Extn Agent)

Froehlich, Henry A. 1970 Prof Forest Engineering. BS Oregon State 1952; MF Yale 1966; PhD Colorado State 1969

Froehlich, Ronald Bernard 1981 Instr (Courtesy) Microbiology. BS Eastern Washington 1968; MST Portland State 1980

Frolander, Herbert Farley 1959 Prof Oceanography. EdB Rhode Island C of Education 1946; ScM Brown 1950, PhD 1955

Fross, Horton Lawrence 1963 Assoc Prof Emeritus (Director of Advising and Student Services, C of Liberal Arts)

Fryer, John Louis 1963 Prof Microbiology and Fisheries, Chairman Microbiology. BS Oregon State 1956, MS 1957, PhD 1964

Fuchigami, Leslie Hirao 1970 Prof Horticulture. BS Hawaii 1964; MS Minnesota 1966, PhD 1970

Fuhrer, David Allen 1973 Res Asst Computer Center. BS Oregon State 1971

Fullerton, Dwight Story 1976 Prof Pharmaceutical Chemistry. BS Oregon State 1967, BS 1967; PhD California at Berkeley 1971

Fulmer, Winnifred Keil 1938 Assoc Prof Emeritus Home Ecomonics

Funck, James W. 1979 Asst Prof Forest Products. BS Iowa State 1974, MS 1977, PhD 1979

Funk, Evelyn 1958 Prof Emeritus (Asst State Leader, Extn Home Economics)

Funk, Kenneth H, II 1980 Asst Prof Industrial and General Engineering. BA Taylor U 1975; MS Ohio State 1977, PhD 1980

Fuquay, Robert Frank 1953 Prof Political Science. BA Florida 1949, MA 1950, PhD 1953

G

Gabriel, Dean William 1981 Res Assoc Botany and Plant Pathology. BA Michigan State 1974, MS 1976, PhD 1981

Galperin, William Henry 1980 Instr English. AB Chicago 1971; AM Brown U 1975, PhD 1978

Gamble, Wilbert 1962 Prof Biochemistry. BS Wayne State 1955, PhD 1960

Gamroth, Michael Joseph 1973 Marion County Extn Agent (Asst Prof). BS Oregon State 1973, MAg 1980

Gardner, Ernest Hugh 1966 Extn Soil Scientist (Prof). BSA, British Columbia 1950; MS Oregon State 1959, PhD 1960

Gardner, John Arvy, Jr. 1973 Prof Physics. BA Rice 1961; MS Illinois 1963, PhD 1966

Garity, Dennis J. 1981 Asst Prof Mathematics. BS Wisconsin at Madison 1973, MA 1976, PhD 1980

Garland, John Joseph, Jr. 1973 Extn Timber Harvesting Specialist, Forest Engineering (Instr). BS Oregon State 1970; MS Minnesota 1972

Garman, John Clifton 1923 Assoc Prof Emeritus Physics

Garrard, James Lathrop 1957 Prof Emeritus Industrial and General Engineering

Garren Ralph, Jr. 1950 Prof Horticulture, Extension Specialist Small Fruits. BS Oregon State 1950, MS 1954; PhD Purdue 1961

Garrison, Chester Arthur 1954 Prof English. BA Dartmouth 1940; MA Columbia 1946, PhD 1964

Garrison, Evra Alta 1930 Asst Prof Emeritus Foods and Nutrition

Garrison, Louise Eileen 1957, 1967 Instr English. BEd Illinois State 1943; MA Columbia 1946

Garton, Ronald R. 1976 Assoc Prof Fisheries and Wildlife (Courtesy). BA Montana 1958, BS 1963; MS Michigan State 1967, PhD 1968

Gates, Dillard Herbert 1962 Director Yemen Program, Prof International Agriculture. BS Nebraska 1952, MS 1953; PhD Utah State 1956

Gates, Ruth Elizabeth 1969 Assoc Prof Clothing, Textiles, and Related Arts. BS Nebraska 1942; MS Kansas State 1948; PhD Pennsylvania State 1960

Gates, W. Lawrence 1976 Prof Atmospheric Sciences and Chairman of Department. Director Climatic Research Institute. SB MIT 1950, SM 1951, ScD 1951

Gathercoal, Forrest James 1969 Assoc Prof Education, Women's Golf Coach. B. Mus Oregon 1957, LLB 1966, JD 1971

Gavin, Charles Gerald 1955 Assoc Prof Emeritus (Wallowa County Extension)

Gawer, Herman A. 1961 Asst Prof Emeritus Health

Gemperle, Michael 1965 Instr Oceanography. BS California at Berkeley 1961

Gentle, Thomas H. 1980 Extn Communication Specialist (Asst Prof). AB Michigan 1962; MFA Oregon 1969

George, Richard Allen 1969 Asst Prof Speech Communication. Bs Illinois State 1965, MS 1967; MFA San Diego State 1980

George, Tommy Allen 1966 Asst Prof Agricultural Engineering (Courtesy); Agricultural Engineer, Soil Conservation Service, USDA, BS Nebraska 1960

Ghan, Steven John 1981 Res Asst Climatic Research Institute. BS Washington 1979; MS MIT 1981

Gibbs, Kenneth Charles 1964-69, 1976 Assoc Prof Resource Recreation Management. BS Colorado State 1964; MS Oregon State 1966, PhD 1969

Gibbs, Wallace Eugene 1958 Registrar and Director of Admissions (Prof). BS Oregon State 1950, EdM 1959

Giblin, Michael J. 1979 Asst Prof Industrial Education. BA San Diego State 1971; MA Ball State 1973; PhD Maryland 1979

Gilbert, William Earl 1967 Res Asst Oceanography. BS Oregon State 1965, MS 1967

Giles, Donald Edward 1968 Extn Marine Education Specialist (Assoc Prof). BA U of the Pacific 1953, MA 1956

Gilfillan, Francois Archibald 1918, 1922-25, 1927 Dean Emeritus College of Science, Prof Emeritus Chemistry

Gilkey, Gordon Waverly 1947 Dean Emeritus College of Liberal Arts; Prof Emeritus Art

Gillett, James Warren 1964 Res Assoc Agricultural Chemistry (Courtesy Assoc Prof). Research Environmental Scientist, USEPA. BS Kansas 1955; PhD California at Berkeley 1962

Gillis, John Simon 1976 Prof Psychology, Department Chair. BA Stanford 1959; MS Cornell 1961; PhD Colorado 1965

Gilmore, Bernard Howard, Jr. 1966 Assoc Prof Music, Conductor University Orchestras. BA UCLA 1959, MA 1961; DMA Stanford 1966

Gingrich, Gale Allen 1973 Marion County Extn Agent (Asst Prof). BS Oregon State 1972, MS 1979

Glass, Norman Ralph 1973 Assoc Prof Fisheries and Wildlife (Courtesy). BA California at Davis 1965, PhD 1968

Glass, William Ray 1956 Prof Architecture. BArch Oregon 1956, Architect 1963

Glassman, Carol Ann 1980 Res Asst Forestry. BS Eastern Michigan U 1974; BS Oregon State 1979

Gleicher, Mary Kay 1980 Instr Chemistry. BA Denison U 1956; MS Michigan 1962

Glenn, David Michael 1977 Asst Prof Crop Science. BS Fort Lewis C 1972; MS Colorado State 1977; PhD Oregon State 1981

Glenn, Susan White 1978 Res Asst Fisheries. BA Colorado 1972; MS Colorado State 1977

Gleeson, George Walter 1928 Dean Emeritus, School of Engineering; Prof Emeritus Chemical Engineering

Gleicher, Gerald Jay 1966 Prof Chemistry. BS Brooklyn C 1959; MS Chem Michigan 1961, PhD 1963

Godard, Russell Holcomb 1950 Asst Prof Emeritus Mathematics

Goddard, Earl 1967 Dean, School of Business; Prof Business Administration. BS Southern Illinois 1944; MBA Northwestern 1946; PhD Washington 1956

Goeger, Douglas E. 1979 Res Asst Agricultural Chemistry. BS Texas A & M 1973; MS Oregon State 1980

Goeger, Mary Pierson 1978 Res Asst Poultry Science. BS Oregon State 1975, MS 1978

Goesch, Tamara Dawn 1981 Instr Foreign Languages and Literatures. BA Stanford 1979; MAIS Oregon State 1981

Goetze, Norman Richard 1959 Extn Agronomist (Prof). BS Oregon State 1952, MS 1955; PhD Purdue 1960

Goheen, Harry Earl 1955 Prof Emeritus Mathematics and Computer Science

Goldman, Daniel A. 1980 Res Assoc Biochemistry and Biophysics. BA Yale 1975: MD Baylor 1979

Goldstein, Cindy S. 1981 Res Asst Botany and Plant Pathology. BS Oregon State 1981

Gollob, Lawrence 1977 Res Asst Forest Products. BS SUNY at Stony Brook 1974, MS Duke 1976

Gonor, Jefferson John 1964 Assoc Prof Oceanography and Zoology, Marine Science Center. BS Southwestern Louisiana 1953; PhD Washington 1964

Good, James Wunder 1980 Extn Oceanographer (Asst Prof). BA Susquehanna U 1966; MS Oregon State 1976

Goode, Delmer Morrison 1919 Prof Emeritus Higher Education

Gordon, John Charles 1977 Prof Forest Science, Head of Department. BS Iowa State 1961, PhD 1966

Gordon, Kenneth Llewellyn 1927 Prof Emeritus Zoology

Gordon, Louis Irwin 1969 Assoc Prof Oceanography. BS UCLA 1951; MS Scripps Institution of Oceanography 1953; PhD Oregon State 1973

Gough, John Earl 1980 Asst Football Coach. BA Occidental C 1970; MS Colorado 1972

Goul, Mike 1979 Instr Business Administration. BS Oregon State 1978, MBA 1979

Goulding, Robert Lee 1955 Prof Emeritus Entomology

Gourley, Jonna Carr 1968, 1978 Res Asst Forest Management. BA Alaska 1966

Grabe, Don Frederick 1968 Prof Agronomy, Crop Science. BS Iowa State 1950, MS 1955, PhD 1957

Gradin, Joseph Lloyd 1974 Res Asst Veterinary Medicine. BS Oregon State 1973, MS 1976

Grady, Agnes Martin 1970 Catalog Librarian (Assoc Prof). BA Washington 1969, MLS 1970; MA Oregon 1978

Graham, Crawford Henderson 1961 Assoc Prof Emeritus (Director Emeritus Alumni Relations)

Graham, Robert Douglas 1947 Prof Forest Products. BS Pennsylvania State 1941; MS Oregon State 1947

Grant, Phyllis Emogene 1949 Asst Prof Emeritus Clothing, Textiles, and Related Arts

Gravatt, Arthur Eugene 1962-64, 1973 Prof Human Development and Family Studies. BA Linfield 1949; MA Oregon 1951; PhD Oregon State 1963

Gray, Clifford Frederick 1961-2, 1965 Prof Business Administration. BS Millikin 1959; MBA Indiana 1961; DBA Oregon 1966

Gray, James Latimer 1949 Prof Emeritus Industrial and General Engineering.

Gray, Pearl Spears 1973 Instr Education, Director Affirmative Action Program, Assistant to the President. BA Wilberforce 1968; MAT Antioch 1970

Green, Anita Louise 1976 Instr Horticulture. BS Montana State 1964; MS Colorado State 1968

Green, Daniel Fred 1976 Clackamas County Extn Agent (Asst Prof). BS Oregon State 1969; MS Idaho 1977

Green, James L. 1975 Extn Specialist in Ornamental Horticulture (Asst Prof). Bs Colorado State 1965, MS 1967, PhD 1973

Greenlund, Mary Anne 1972 Wallowa County Extn Agent (Asst Prof). BS Oregon State 1955; MS Southern Oregon State 1981

Greenwalt, Richard N. 1979 Res Asst Columbia Basin Agricultural Research Center. BA Central Washington 1974; BS Oregon State 1978

Gregerson, Donna Marie 1974 Benton County Extn Agent (Asst Prof). BS Oregon State 1974, MS 1977

Gregg, Janice M. 1981 Jackson County Extn Agent (Asst Prof) Home Economics. BA Central Washington State 1972; MACE Washington State 1981

Gregory, Gerald Milne 1980 Women's Volleyball Coach (Instr) Women's Athletics. BA California at Santa Barbara 1976; MS Wright State U 1979

Gregory, Marie Hull 1926-35, 1942 Assoc Prof Emeritus (Catalog Librarian)

Gregory, Stanley V. 1977 Asst Prof (Senior Research) Fisheries. BS Tennessee at Knoxville 1971; MS Oregon State 1975, PhD 1980-

Greiner, Joyce A. 1976 Counselor, Instr Educational Opportunities Program. BA Oregon State 1969, EdM 1974

Griego, Viola M. 1980 Asst Professor Microbiology. BS New Mexico Highlands 1971, MS 1973; PhD Washington State 1978

Grieve, Mary Jane 1968 Assoc Prof Home Economics Education. BS North Dakota State 1943; MS Oregon State 1960

Griffin, Betty 1972 Director Foundations Program, Instr Education. BS Fisk 1965; EdM Oregon State 1976

Griffing, Lawrence Randolph 1980 Res Assoc Botany and Plant Pathology. BS Utah 1976; PhD Stanford 1981

Griffith, David Lee 1980 Asst Prof Food Science and Technology. BSA Arkansas 1976; PhD Georgia 1980

Griffith, Thomas K. 1980 Consultant Student Health Services (Coutesy Assoc Prof). Bs Iowa 1952, MD 1955

Griffiths, David J. 1967 Assoc Prof Physics. BA British Columbia 1959, MS 1960, PhD 1965

Griffiths, Robert P. 1972 Asst Prof (Senior Research) Microbiology. AB Oberlin C 1961; MA San Jose State 1968; PhD Oregon State 1972

Griggs, Lawrence F. 1974 Asst Director Educational Opportunities (Asst Prof). BA Pacific Lutheran 1970, MA 1972; PhD Oregon State 1978

Grigsby, Tom Elvin 1974 Assoc Prof Education Director Adult Education. BME Pacific 1959; EdD Oregon State 1974

Grimes, John Keith 1942-44, 1953 Asst Prof Emeritus (Clatsop County Extn Chairman)

Groder, Roland Herbert 1950 Prof Emeritus (Extn Fruit and Vegetable Marketing Specialist)

Groshong, James Willard 1946, 1950 Prof English. AB Stanford 1947, PhD 1957

Gross, Alvin Eugene 1935 Prof Emeritus Agronomy Klamath Experiment Station

Gross, Louis Henry 1943 Prof Emeritus (Yamhill County Extn Chairman)

Grothaus, Louis Charles 1978 Res Asst Crop Science. BA Oregon State 1973, MA 1975

Grumbein, Sondra Lee 1979 Asst Prof Veterinary Medicine. BS Kansas State 1969, DVM 1971, PhD 1977

Gudger, Charles M. 1970 Assoc Prof Business Administration. BS Kansas 1947, MS 1968, PhD 1970

Guenther, Ronald Bernard 1966 Prof Mathematics. BA Oregon State 1959, MA 1962; PhD Colorado 1964

Guin, Marilyn P. 1976 Librarian Marine Science Center (Asst Prof). BA Oklahoma City U 1966; MLS Oklahoma 1971; MS Oregon State 1978

Guinn, Jon Alvin 1980 Assoc Prof Aerospace Studies. BS Washington State 1967; MA Oklahoma 1978

Gum, Russell L. 1980 Prof Agricultural and Resource Economics (Courtesy), Economic Research Service BS California at Davis 1964, PhD 1970

Gunn, Paul James 1948 Prof Art. BS Edinboro State C 1947; MFA California C or Arts and Crafts 1948

Gunning, Cheryl Jeanne 1980 Res Asst Horticulture. BS California at Davis 1975

Gurton, John Reginald 1948 Assoc Prof Emeritus (Deschutes County Extn Agent)

Gustafson, Gregory C. 1976 Asst Prof Agricultural and Resource Economics (Courtesy). BS Washington State 1966, MA 1968; PhD California at Berkeley 1973

Gutbrod, Oscar Adam 1965 Extn Certification Asst (Asst Prof). BS Oregon State 1964

Guterman, Jeffery Carl 1979 Producer-Director Classroom TV (Res Asst). BS Oregon State 1976, MA 1981

Guthrie, Lou Ann 1980 Asst Prof Family Resource Management. BS Eastern Illinois 1974; MS Southern Illinois 1978; PhD Virginia Polytechnic 1980

Gutierrez, Mary Jo 1975 Res Asst Oceanography. BA Oregon State 1970

Gutierrez Robert 1972 Asst to the President (Asst Prof). BA Oregon State 1970; JD Willamette 1973

H

Haag, Joseph Roy 1927 Prof Emeritus Chemistry and Animal Nutrition, Agricultural Chemistry

Haasch, Daryl Alan 1981 Res Asst Columbia Basin Agricultural Research Center. BS Oregon State 1981

Hacker, Sally Lynn 1977 Assoc Prof Sociology. BA U of Chicago 1962, MA 1965, PhD 1969

Hackleman, Debra Marie Bond 1981 Cataloger Library (Instr). BA Oregon State 1975; MLS Oregon 1976

Hadden, Charlene M. 1981 Umatilla County Extn Agent (Instr). BA Idaho State 1972

Haferkamp, Marshall R. 1981 Asst Prof Eastern Oregon Agricultural Resource Center. BS Colorado State 1966, MS 1969; PhD Arizona 1975

Hagelstein, Fred 1951-53, 1958 Asst Director Extn Service (Prof). BS Oregon State 1951; MS Wisconsin at Madison 1967

Hagen, Ivan John 1969 Extn Certification Asst, Crop Science (Senior Instr). BS Oregon State 1969

Hagen, Thomas Lee 1979 Asst Prof Naval Science. BS Oregon State 1974

Hagg, Oscar Nathaniel 1950 Assoc Prof Emeritus (Extn Dairy Products Marketing Specialist)

Haith, Marvin Reynolds 1943-44, 1946 Assoc Prof Emeritus General Engineering

Hall, Frances Ann 1930-58, 1961 Assoc Prof Emeritus (Klamath County Extn Agent)

Hall, Helen Cecelia 1978 Asst Prof Home Economics Education. BS Indiana U of Pennsylvania; MEd Pennsylvania State 1972, PhD 1978

Hall, Jack Vernon 1954 Prof Emeritus Elementary Education. BA Central Washington 1944; MA Colorado State C 1947, EdD 1951

Hall, James Dane 1963 Assoc Prof Fisheries. AB California at Berkeley 1955; MS Michigan 1960; PhD 1963

Hall Kathryn B. 1981 Instr Mathematics. BA St Olaf C 1976; MA Oregon State 1981

Hall, Lynn Frank 1979 Umatilla County Extn Agent (Asst Prof). BS Utah State 1970, MS 1975

Hall, Madeline J. 1977 Res Asst Environmental Remote Sensing Applications Laboratory. BA Macalester C 1974; MS Oregon State 1976

Hall, Paige LeRoy 1954 Assoc Prof Emeritus (Lane County Extn Agent)

Hall, Robert Dale 1981 Instr Physics. BA Oregon State 1969; MSPH North Carolina at Chapel Hill 1972; MS Rice U 1976

Hall, Roberta Louise 1974 Assoc Prof Anthropology. BA Indiana 1963; MA Oregon 1969, PhD 1970

Hallgren, Elisabeth Lynn 1978 Res Assoc Computer Center. BA Goucher C 1958; MA Indiana 1961; PhD U or Toronto 1966; PhD Colorado 1977

Halliwell, George R., Jr. 1980 Res Asst Oceanography. BS Pennsylvania State 1971; MS Delaware 1979

Hamilton, Lee F. 1978 Marion County Extn Agent (Asst Prof). AA Inter-American U (Puerto Rico) 1972; BS Idaho 1974; MEd Oregon State 1978

Hamilton, Margaret Elizabeth 1957 Multnomah County Extension Agent (Prof). BS Oregon State 1944; MS Columbia 1966

Hamilton, Robert Roy 1968 Josephine County Extn Agent (Assoc Prof). BS Washington State 1966, MS 1971

Hamilton, Wendy Victoria 1978 Deschutes County Extn Agent/4-H and Youth (Asst Prof). BA Oregon State 1974, MS 1979

Hamm, Philip Barton 1975-77, 1980 Res Asst Botany and Plant Pathology. BS Oregon C of Education 1974; MS Oregon State 1981

Hampton, Richard Owen 1965 Prof Plant Pathology (Courtesy), Research Plant Pathologist USDA/ARS. BSA Arkansas 1951; MS Iowa State 1954, PhD 1957

Han, Young-June 1977 Asst Prof Atmospheric Sciences. BS Seoul National U 1964; MS UCLA 1970, PhD 1975

Hancock, Astrid Frolich 1963 Asst Prof Physical Education. AB Mount Holyoke 1956; MSc Wisconsin at Madison 1959

Hancock, Danil R. 1963 Asst Prof (Senior Research) Oceanography. BA California at Santa Barbara 1963; MS Oregon State 1969

Hane, Danny Clayton 1978 Res Asst Columbia Basin Agricultural Research Center. BS Washington State 1969; MS Colorado State 1973

Hann, David William 1978 Asst Prof Forest Management. BS Oregon State 1968, MS 1970; PhD Washington 1978

Hanna, Susan S. 1981 Res Assoc Agricultural and Resource Economics. BA Maine 1966, MS 1977; PhD Oregon State 1981

Hannaway, David B. 1979 Asst Prof Crop Science. BS Delaware 1973; MS Tennessee 1975; PhD Kentucky 1979

Hansen, Elmer 1935 Prof Emeritus Horticulture

Hansen, Everett Mathew 1972 Assoc Prof Botany and Plant Pathology. BS Oregon State 1968; MS Wisconsin at Madison 1971, PhD 1972

Hansen, Henry Paul 1939 Dean Emeritus Graduate School, Prof Emeritus Palynology

Hansen, Herbert Eugene 1974 Assoc Prof Agricultural Engineering. BS Iowa State 1952, MS 1970, PhD 1971

Hansen, Hugh Justin 1974 Prof Agricultural Engineering; Extn Energy Engineer BS North Dakota State 1951; MS Cornell 1952

Hansen, Neils John 1943 Prof Emeritus (Area Extn Agent, Water Resource Development)

Hanson, Dean B. 1972 Res Asst Soil Science. BS Oregon State 1966, MS 1968

Hanus, Frank Joseph 1970 Res Asst Laboratory for Nitrogen Fixation Research. BS Houston 1962, MS 1966

Hard, Robert Paul 1978 Asst Prof Zoology. BS Washington 1967, MS 1970; PhD SUNY at Albany 1975

Hardesty, David Powell 1968 Assoc Prof Art. BFA Miami (Ohio) 1966; MFA Cranbrook Academy of Art 1968

Hardin, Edward Eugene 1957 Assoc Prof Seed Technology, Crop Science. BS Washington State 1951

Hardin, Karin Ann Res Asst Foods and Nutrition. BS Oregon State 1979; BS Oregon Health Sciences Center 1980

Harding, G. Thomas 1966 Consultant Student Health Center (Assoc Prof). MD Washington 1958

Hardison, John Robert 1944 Prof (Senior Research) Plant Pathology. BS Washington State 1939; MS Michigan 1940, PhD 1942

Hare, Michael J. 1981 Physician Student Health Services (Assoc Prof). BS Michigan State 1970; MD Wayne State 1975

Harger, Virginia Frances 1967 Prof Emeritus Institution Management

Harmond, Jesse Edward 1945 Prof Emeritus Agricultural Engineering

Harp, Max William 1980 Assoc Prof Education. BS Oregon State 1964; MS Oregon 1969, EdD Oregon 1971

Harper, James Arthur 1942 Prof Poultry Science. BS Oregon State 1940; MS Pennsylvania State 1942

Harr, Robert Dennis 1971 Res Hydrologist, U.S. Forest Service (Courtesy Asst Prof Forest Hydrology). BS Washington State 1963; PhD Colorado State 1967

Harris, Frederick Philip 1967 Prof Emeritus Philosophy

Harris, Irwin Cecil 1945 Prof Emeritus Journalism (Director Emeritus Student Publications)

Harrison, William L. 1974 Assoc Prof Business Administration. BS Kansas State 1959; MBA Missouri at Kansas City 1965; PhD California at Berkeley 1973

Hart, Ralph Daniel 1969 Union County Extn Chairman (Assoc Prof). BS Idaho 1951, MA 1965

Hart Roger Alan 1971 Res Asst Uncl Oceanography. BS Tufts 1962; MSc Yale 1965

Harter, Charlotte T. 1960 Asst Prof Family Resource Management, Asst Prof Economics (Courtesy), Director of Center for Economic Education, Extn Economics Education Specialist, BA Wellesley 1948; MA Stanford 1958

Harter, Lafayette George, Jr. 1960 Prof Economics. BA Antioch 1941; MA Stanford 1948, PhD 1960

Hartmann, Marilyn June 1979 Instr English. BA California at Davis 1972; MFA Oregon 1975, MA 1979

Hartmann, Norbert Alfred, Jr. 1969 Asst Prof Statistics (Courtesy). BA Texas A&M 1964, MS 1967, PhD 1970

Harvey, Frances Madeleine 1946 Josephine County Extn Agent (Assoc Prof). BS Idaho 1943; MS Oklahoma State 1957

Harward, Moyle E. 1955 Prof Emeritus Soil Science

Haselton, Shirley S. 1968 Asst Prof Education. BA St Mary-of-the-Woods 1948; MEd Oregon State 1963, PhD 1974

Hathaway, Ronald Lee 1972 Klamath County Extn Agent (Assoc Prof). BS California Polytechnic 1968; MS Nevada at Reno 1972

Haugland, Richard Alan 1981 Res Assoc Lab for Nitrogen Fixation Research. BS Muskingum C 1973; PhD Ohio State 1979

Haun, James Franz 1964 Director of New Student Programs (Assoc Prof). BS Eastern Oregon State C 1954; MEd Oregon 1960; EdD Oregon State 1967

Haunold, Alfred 1965 Prof Agronomy (Courtesy); Research Geneticist, Crops Research Division, SEA, USDA Diplom Ingenieur, Agriculture U Vienna 1951, Dr Agric 1952, PhD Nebraska 1960

Hauser, Ernest Millard 1930 Assoc Prof Emeritus (Malheur County Extn Agent)

Haverson, Wayne W. 1978 Asst Prof Adult Education. BA Willamette U 1958; EdD Northern Colorado 1975

Hawkes, Stephen James 1968 Prof Chemistry. BSc London 1953; PhD 1963

Hawkins, Dawn Christina 1970 Umatilla County Extn Agent (Asst Prof). BS Oregon State 1970; MS Southern Oregon State 1977

Hawkins, Ruth P. 1976 Head Resident Student Housing (Instr). BS Delaware 1953; MA Columbia 1961

Hawthorne, Betty Eileen 1946 Dean School of Home Economics, Prof Foods and Nutrition. BS Washington 1941, MS 1944; PhD Michigan State 1954

Hay, James Warren 1977 Instr Horticulture, Greenhouse Manager. BS Oregon State 1975; MS Colorado State 1977

Haynes, Judith Lee 1975 Res Asst Education. BS Oregon C of Education 1964, MS 1970

Hazard, John William 1978 Assoc Prof Forest Management (Courtesy). BS Iowa State 1957; MS Oregon State 1962; PhD Iowa State 1969

Healey, Deborah Lynn 1979 Instr English Language Institute. BA Queens U 1974; MA Oregon 1976

Heath, George Ross 1968, 1978 Dean School of Oceanography, Prof Oceanography. BS U of Adelaide 1960, BS 1961; PhD Scripps Institute of Oceanography 1968

Heath, Kathleen Frances 1967 Asst Prof Physical Education. BA Marylhurst 1953; MS Illinois 1963

Heatherbell, David A. 1978 Asst Prof Food Science and Technology. BSc Canterbury U (New Zealand) 1965; PhD Oregon State 1970

Hedberg, Kenneth Wayne 1956 Prof Chemistry. BS Oregon State 1943; PhD California Institute of Technology 1948

Hedberg, Lise 1956 Res Assoc Chemistry. *Candidatus realium* U of Oslo 1952

Hedgpeth, Joel Walker 1965 Prof Emeritus Oceanography, Marine Science Center

Hedtke, James Lee 1973 Asst Prof Fisheries (Courtesy). BS Wisconsin at Oshkosh 1967; PhD Minnesota 1973

Heikkila, Paul Arthur 1969 Marine Extn Agent (Asst Prof). BS Washington 1968

Heintz, Diane Marcella 1979 Res Asst Food Science and Technology. BA Lewis and Clark C 1969

Heintzelman, Oliver Harry 1949 Prof Emeritus Geography

Helfer, Donald Harold 1963 Prof Veterinary Medicine. BS Washington State 1948; DVM 1949; MS Oregon State 1966

Helgerson, Ole T. 1981 Extn Silviculture Specialist (Asst Prof). BS Iowa State 1968, MS 1975; PhD Oregon State 1981

Heller, Duane L. 1980 Asst Prof Music. BM Denver, MA 1975

Hellickson, Martin Leon 1975 Assoc Prof Agricultural Engineering. BS North Dakota State 1968; MS South Dakota State 1972; PhD Minnesota 1975

Helsing, Guy Gustav 1974 Res Asst Forest Products. BS Oregon State 1974; MS 1981

Hemphill, Delbert D. 1976 Asst Prof Horticulture, North Willamette Experiment Station. BS Notre Dame 1966; PhD Michigan State 1971

Henderson, Marilyn Christine 1972 Res Asst Agricultural Chemistry. BA Central Washington State 1972

Henderson, Pamela 1975 Conference Asst Forestry (Res Asst). BA U of Edinburgh (Scotland) 1966

Henderson, Robert L. 1980 Crook County Extn Agent (Instr). BS California Polytechnic at San Luis Obispo 1967; BS California Polytechnic at Pomona 1977

Henderson, Robert Wesley 1938-41, 1946 Prof Emeritus Agronomic Crop Science

Hendricks, Jerry Dean 1975 Assoc Prof Food Science and Technology. BS Colrado State 1966, PhD 1971

Hennessey, John P. Jr. 1979 Res Asst Biochemistry and Biophysics. BS Oregon State 1978

Henny, Charles Joseph 1976 Assoc Prof Wildlife Ecology (Courtesy). BS Oregon State 1965, MS 1967, PhD 1970

Hensley, William E. 1981 Instr Speech Communication. BA Eastern Montana C 1968; MA Southern California 1972; PhD Oregon 1979

Hensleigh, Patrick F. 1980 Res Asst Crop Science Experiment Station. BS Montana State 1976

Henton, June M. 1979 Prof Human Development and Family Studies, Head of Department. BS Oklahoma State 1961; MS Nebraska 1963; PhD Minnesota 1970

Henton, Richard W. 1979 Prof Clothing, Textiles, and Related Arts. BS Oklahoma State 1960, MS 1961; PhD Minnesota 1968

Hermann, Freya Friederike 1962 Assoc Prof Pharmacy. BS U of Munich 1949; BS Oregon State 1959; MS Ohio State 1969

Hermann, Richard Karl 1961 Prof Forest Science. BS Ludwig-Maximilian U Munich 1951; MF Yale 1956; PhD Oregon State 1960; Dr forest h c Georg-August U Göttingen 1979

Herndon, Bob D. 1978 Asst Director Men's Athletics. BS Oklahoma 1955

Herrmann, Jacob Abraham 1959 Asst Prof Emeritus Mathematics

Herzog, James Herman 1967 Assoc Prof Electrical and Computer Engineering. BS Northwestern 1962; MS Michigan 1963, PhD 1967

Hewitt, Ray Storla 1953 Prof Emeritus English

Hewson, Edgar Wendell 1968 Prof Emeritus Atmospheric Sciences

Hickerson, Hugh James 1959 Linn County Extn Agent (Prof). BS Oregon State 1952, MAg 1974

Hicks, R. Gary 1975 Prof Civil Engineering. BS California at Berkeley 1963, MS 1965, PhD 1970

Highsmith, Richard Morgan, Jr. 1947 Prof Geography. BA Central Washington State 1941; MA Washington 1946, PhD 1950

Higley, Duane Lee 1974 Res Asst Oceanography. BS Oregon State 1961, MS 1963

Hildebrandt, Emery Vernon 1953 Prof Speech Communication. BS Oregon State 1950; MA Pennsylvania State 1956; PhD Oregon 1970

Hildebrandt, Helen Jean 1965 Instr Speech Communication. BA U of Akron 1950; MA Pennsylvania State 1951

Hilderbrand, Kenneth Stephen, Jr. 1969 Extension Seafood Processing Specialist (Assoc Prof). BS Oregon State 1962, MS 1964

Hill, Aki 1978 Women's Basketball Coach (Acting Instr)

Hill, Donald David 1927 Prof Emeritus Agronomy

Hill, Ronald Mitchel 1964 Res Asst Oceanography

Hillemann, Howard Herbert 1946 Prof Emeritus Zoology

Hilty, Ivy Elizabeth 1959 Ast Prof Emeritus (Jefferson County Extn Agent)

Hinman, Robert Charles 1078 Josephine County Extn Agent (Asst Prof). BS California State at Chico 1965; MS Cornell 1967

Hisaw, Frederick Lee, Jr. 1958 Assoc Prof Zoology. BS Missouri at Columbia 1950, MS 1952; PhD Harvard 1955

Hlebichuk, Joseph F. 1971 Assoc Prof Business and Distributive Education. BS Dickinson State 1961; MS Montana State 1968, EdD 1971

Ho, Philip Wen-Jen 1953 Catalog Librarian (Assoc Prof Emeritus)

Hoag, Michael L. 1981 Res Asst Forest Products. BS Colorado State 1974

Hobbs, Stephen D. 1978 Asst Prof Forest Ecology. BS New Hampshire 1969; PhD Idaho 1977

Hochhalter, Data Maxine 1959 Assoc Prof Emeritus (Jackson County Extn Agent)

Hodges, Eric Merritt 1980 Asst Prof Aerospace Studies. BS Utah State 1976; MS Webster C 1978

Hoecker, Frederick Dale 1946-58, 1963 Asst Prof Emeritus (Warm Springs Extn Agent)

Hoeye, Wyman Delos 1959 Assoc Prof Emeritus Industrial Education

Hoffman, Charles Chase 1978 Res Asst Animal Science. BA Stanford 1970; MBA Southern California 1974; MS Oregon State 1978

Hoffman, Elbert Neil 1942 Assoc Prof Emeritus Agronomy (Superintendent Malheur Experiment Station)

Hoffman, Kimberly D. 1981 Instr Art. BS Oregon State 1973; MFA Washington 1975

Hogan, Lewis Gregory 1970 Res Assoc Oceanography. BA, BS Oregon State 1959, MS 1968, PhD 1973

Hogg, Barbara B. 1980 Res Asst Communication Skills Center. BA Oregon State 1977

Hogg, Thomas Clark 1965 Prof Anthropology, Asst to Dean of Research. BS Oregon 1958, MA 1963, PhD 1965

Hohenboken, William Daniel 1970 Prof Animal Breeding and Genetics. BS Oklahoma State 1963; MS Colorado State 1968, PhD 1969

Holbo, Richard H. 1975 Asst Prof Forest Engineering. BA California at Davis 1960; MS Nevada at Reno 1964; PhD Oregon State 1972

Holcomb, Glenn Willis 1920 Prof Emeritus Civil Engineering

Holder, Thurman Gray, II 1980 Counselor Educational Opportunities Program (Instr). AA Long Beach City C. 1972; BS Northern Arizona 1975, MS 1976

Hollands, Harold Fuller 1948 Prof Emeritus Agricultural Economics

Holley, William Edwin 1975 Assoc Prof Mechanical Engineering. BS California State at Northridge 1967; MS Purdue 1968; PhD Stanford 1975

Holman, Robert Alan 1979 Asst Prof Marine Geology. BSc Royal Military C of Canada 1972; PhD Dalhousie U 1979

Holmes, Harvey Thomas 1976 Res Laboratory Animal Resources. BS California State at Long Beach 1971

Holmes, Zoe Ann 1965-69 1974 Assoc Prof Foods and Nutrition. BS Kansas State 1964, MS 1965; PhD Tennessee at Knoxville 1972

Holroyd, Michael Hayden 1978 Benton County Extn Agent/ 4-H and Youth (Asst Prof). BA San Fernando Valley State C 1971; MS California State at Northridge 1979

Holsberry, Will M. 1975 Director Recreational Sports (Assoc Prof). BA Eastern New Mexico 1962, MS 1965

Holst, David Lee 1977 Instr Agricultural and Resource Economics (Extn). BS Iowa State 1975;MS Oregon State 1978

Holt, John Douglas 1978 Res Assoc Computer Center. BS Western Australia 1961, BEd 1966; MS Oregon State 1975, PhD 1981

Holtan, Donald W. 1975 Asst Prof Animal Science. BS North Dakota State 1963; MS Washington State 1967, PhD 1973; Postgraduate Wisconsin at Madison 1975

Holthouse, Mary Margaret 1965 Asst Prof Emeritus Department of Information

Holton, Robert Lawrence 1971 Asst Prof (Senior Research) Oceanography. BA Montana 1950, ME 1958; MS Oregon State 1962; MS Minnesota 1965; PhD Oregon State 1968

Holyoak, Arlene 1981 Asst Prof Family Resource Management. BS Utah State 1961; MS Oregon State 1972; PhD Pennsylvania State 1981

Honey, William DeWayne, Jr. 1975 Res Assoc Anthropology. BS Oregon State 1973, MA 1975

Hopkins, Roswitha Gertrud 1971 Res Asst Botany and Plant Pathology. Chemotechniker, Chemistry Institute of Munich 1962

Hopkins, Ted Emo 1971 Res Assoc Computer Center. BSc Purdue 1952; PhD Illinois 1957

Hopkins, Walter Sawyer 1971 Prof Emeritus Forest Management

Horner, Chester Ellsworth 1951 Prof Botany and Plant Pathology (Courtesy). BA Walla Walla 1950; PhD Oregon State 1954

Hornyik, Karl 1970 Assoc Prof Nuclear Engineering. Dipl Ing Vienna 1960; MS Illinois 1961, PhD 1965

Horrell, Elvera Charlotte 1942 Asst Prof Emeritus (Extn Agricultural Economics Specialist)

Horton, Howard Franklin 1958 Extn Marine Advisory Program Leader, Prof Fisheries. BS California Polytechnic 1953; MS Oregon State 1955, PhD 1963

Horvath, Helen Scruggs 1965 Head, Catalog Department, Library (Assoc Prof) BA Washington U 1955; MA Illinois 1957, MS 1963

Hosoi, Yasuharu Timothy 1969 Asst Prof Religious Studies. Bth, Tokyo Bible Seminary 1954; BD Christian Theological Seminary (Indianapolis) 1964; MA Butler U; MA Chicago 1968, PhD 1974

Hou, Shih-Yue 1981 Res Assoc Chemistry. BS National Tsing Hua U 1974; MA Columbia 1977, PhD 1981

Hovland, Clarence Warren 1949 Prof Religious Studies, Department Chair. BA Lawrence C 1940; BD Yale 1943, PhD 1950

Howell, Christopher Lee 1981 Instr English. BS Oregon State 1968; MA Portland State 1971; MFA U of Massachusetts 1973

Howell, Herbert Badollet 1921 Prof Emeritus (Astor Experiment Station)

Howell, Michael Edward 1973-77, 1978 Extn Agent (Asst Prof). BS Idaho 1972, MS 1973

Howell, Philip John 1979 Instr English. AB Rockhurst C 1972; MA Missouri 1976

Hower, Mark Edward 1976 Res Asst Oceanography. BA Middlebury C 1975

Huber, James Russell 1947 Union County Extn Agent (Prof). BS Utah State 1946, MS 1947

Huber, Milon George 1945 Prof Emeritus (Extn Agricultural Engineering Specialist)

Huddleston, James Herbert 1976 Extn Soil Scientist, Prof Soil Science. BS Cornell 1963, MS 1965; PhD Iowa State 1969

Hudspeth, Robert Turner 1974 Assoc Prof Civil Engineering. BS U.S. Naval Academy 1963; MSCE Washington 1966; PhD Florida 1974

Hueth, Darrell C. 1980 Prof Agricultural and Resource Economics. BS Montana State 1959, MS 1969; PhD California at Berkeley 1973

Hughes, Arthur Douglas 1938 Prof Emeritus Mechanical Engineering

Hughes, Paul Eric 1980 Instr Veterinary Medicine (Courtesy). BS Humboldt State 1956; DVM California 1961

Hunsaker, Floyd R. 1975 Asst Prof Vocational Education. BS Utah State 1966, MEd 1967; EdD Oregon State 1975

Hunt, Gary Alan 1976 Res Asst Forest Science. BA California State at Fresno, 1969; MA California State at Hayward 1976

Huntley, Joni L. 1980 Asst Womens Track Coach Women's Athletics. BA California at Long Beach 1979

Hupprich, Florence Louise 1937 Assoc Prof Emeritus Physical Education

Husted, Elaine Virginia 1976 Grant County Extn Agent (Instr). BS Montana State 1973

Hutton, Norman E. 1977 Assoc Dean Veterinary Medicine (Prof). DVM Iowa State 1966, MS 1969

Huyer, Adriana 1973 Assoc Prof Oceanography. BSc Toronto 1967; MS Oregon State 1971, PhD 1974

I

Ice, George Gary 1978 Asst Prof Engineering (Courtesy), Research Forest Hydrologist. BA California at Berkeley 1972, MS 1973; PhD Oregon State 1978

Ilcewicz, Larry B. 1981 Res Asst Forest Products. BS Michigan Technical U 1977; MS Oregon State 1979

Ingle, James Davis, Jr. 1972 Assoc Prof Chemistry. BS Illinois 1968; PhD Michigan State 1971

Ingram, Patricia C. 1971 Asst Prof Physical Education. BA Western Washington State 1954; MS Oregon 1965

Inman, Roderick Daner 1971 Res Asst Agricultural Chemistry. BS Oregon State 1967

Inoue, Michael Shigeru 1964 Prof Industrial and General Engineering. BEE U of Dayton 1959, MS 1964; PhD Oregon State 1967

Inskeep, John Jerry 1926 Prof Emeritus (Clackamas County Extn Agent)

Iredale, Ruth Anne 1980 Res Asst Zoology. BS Oregon State 1980

Irvin, Paula K. 1981 Physician Student Health Center (Assoc Prof). MD Loyola U of Chicago 1975

Irvin, Richard Fredrick 1967 Assoc Prof Physical Education. BS Slippery Rock State C 1954; MS Illinois State 1959; EdD Oregon 1975

Isaacs, Frank Barrett 1979 Res Asst Fisheries and Wildlife. BS Michigan Technical U 1973, MS 1976

Isaacson, Dennis L. 1978 Res Asst Environmental Remote Sensing Applications Laboratory. BS Portland State 1969; MS Oregon State 1973, MAg 1975

Isenberg, Irvin 1965 Prof Biophysics. AB Temple 1944; PhD Pennsylvania 1950

Isley, Arleigh Gentry 1969 Grant County Extn (Assoc Prof). BS Oregon State 1969, MS 1977

J

Jacks, Clinton C. 1972 Jefferson County Warm Springs Extn Agent (Asst Prof). BA Sacramento State 1965; BS Oregon State 1970, MS 1972

Jackson, Philip L. 1978 Asst Prof Geography BA California State at Chico 1968; MA Arizona State 1970; PhD Kansas 1977

Jackson, Royal Gale 1970 Assoc Prof Resource Recreation Management. BA New Mexico 1960; MA Western New Mexico 1965; PhD New Mexico 1971

Jackson, Thomas Lloyd 1952 Prof Soil Science. BS Washington State 1943, MS 1948, PhD 1952

Jacobson, Randall Scott 1981 Asst Prof Oceanography. BA California at San Diego 1975, MS 1977, PhD 1980

Jacobson, Robert Warren 1967 Marine Extn Agent (Assoc Prof). BS Oregon State 1963

Jahn, Otto L. 1979 Assoc Prof Horticulture. BS Washington State 1952; MS Rutgers 1956; PhD Wisconsin 1961

Jameson, Demetrios George 1950 Prof Art. BFA Washington U 1949; MFA Illinois 1950

Jarvis, Robert Leo 1971 Assoc Prof Wildlife Ecology. BS Humboldt State 1963, MS 1965; PhD Southern Illinois 1969

Jaworsky, John M. 1981 Res Asst Forest Products. BS Swiss Federal Institute of Technology 1948; MS U of British Columbia 1959

Jeffers, Ronald Harrison 1974 Director of Choral Activities, Assoc Prof Music. BM Michigan 1966, MA 1968; MA Occidental C 1971

Jeffress, Dean Paget 1963 Asst Prof Emeritus English

Jeffrey, Hugh Frank, Jr. 1950 Director of Business Affairs (Prof). BS Oregon State 1947

Jemison, George Meredith 1969 Prof Emeritus Forestry

Jendrezejewski, Walter John 1938 Assoc Prof Emeritus (Klamath County Extn)

Jenkins, George Herrick1927 Prof Emeritus (Coos County Extn Agent)

Jenkins, Lyle Lee 1978 Director Elementary Education (Asst Prof). BA Point Loma C 1964; MA California State at San Jose 1969; PhD Claremont Graduate School 1978

Jenne, William Charles 1965 Assoc Prof Sociology. BS Illinois State 1953; AM Illinois 1958, PhD 1964

Jennings, Joe Cannon, Jr. 1981 Res Asst Oceanography. BS North Carolina 1972; MS Oregon State 1981

Jennings, Joseph Marshall 1975 Asst to Director Student Services (Asst Prof). BS Eastern Michigan 1972; MS Iowa State 1975

Jensen, Edward Charles 1976 Director Forestry Media Center (Instr). BS Illinois 1973; MS Washington 1976

Jensen, Harold James 1950 Prof Nematology, Botany and Plant Pathology. BS California at Berkeley 1947, PhD 1950

Jensen, James Herbert 1961 Prof Emeritus of Botany and Plant Pathology, President Emeritus of Oregon State University

Jensen, John Granville 1946 Prof Emeritus Geography

Jensen, Leland Christian 1955 Associate Prof Electrical and Computer Engineering. BS Oregon State 1954; MS Illinois 1963

Jensen, Louisa A. 1938 Prof Emeritus Agronomy

Jerome, Susie Harpole 1981 Counselor Financial Aid (Instr). BS Mississippi State 1978, MS 1979

Jespersen, Dennis Charles 1976 Asst Prof Mathematics. BS Michigan State 1971; PhD Michigan 1976.

Johnson, Arthur Guy 1966 Prof Radiation Health (General Science); Asst Director and Health Physicist, Radiation Center, Prof Nuclear Engineering. BS Missouri at Columbia 1956, MS 1958

Johnson, Bruce Lawrence 1979 Extn Eletronic Media Specialist (Asst Prof). BA Augustana C 1964; MA Iowa 1968

Johnson, Don B. 1976 Asst Director Student Activities Memorial Union (Instr). BS Southern Oregon 1971; MFA U of Puget Sound 1973

Johnson, Duane Paul 1959 Acting Asst Director 4-H and Youth (Prof). BS Iowa State 1959; MEd Colorado State U 1970

Johnson, Elizabeth Cox 1950-60, 1965 Assoc Prof Foods and Nutrition. BS Arizona 1940, MS 1942; PhD Oregon State 1950

Johnson, Eugene 1965 Res Asst Agricultural Chemistry. BS Oregon State 1966

Johnson, Jacquelin Jean 1980 Asst Womens Gymnastic Coach Women's Athletics. BS Oregon State 1979

Johnson, James Wendell 1961 Assoc Prof Forest Products. BS Idaho 1949; MS Oregon State 1950

Johnson, John Granville 1969 Prof Geology. BA UCLA 1957, MA 1959, PhD 1964

Johnson, Malcolm Julius 1948 Prof Emeritus Agronomy

Johnson, Richard 1981 Asst Prof Political Science. BA Yale 1969, PhD 1977

Johnson, Richard K. 1972 Assoc Prof Oceanography. BS Purdue 1968; PhD California at San Diego 1972. On LWOP 1982

Johnson, Robert Erik 1971 Assoc Prof Anthropology. AB Stanford 1967; PhD Washington State 1975

Johnson, Simon Sigvart 1971 Assoc Prof English. BA Colorado State 1962; MS Columbia 1963;MFA Iowa 1969, PhD 1972

Johnson, Stephen Hans 1971 Assoc Prof Oceanography. BA Carleton C 1962; MS Minnesota 1967; PhD Oregon State 1972. On LWOP 1981

Johnson, Susan Scheller 1975 Instr Art. BA Connecticut C 1960; EdM Oregon State 1978

Johnson, Victor Waldemar 1928 Prof Emeritus (Umatilla County Extn Agent)

Johnson, Wallace Earle 1956, 1970 Asst Director of Information (Assoc Prof). BS Oregon State 1951; MS Oregon 1959

Johnson, W. Curtis 1968 Prof Biochemistry and Biophysics. BA Yale 1961; PhD Washington 1966

Johnston, Alberta Buis 1963 Asst Director Extn, County Programs (Prof). BS Nebraska 1943; MS Kansas State 1957

Johnston, La Rea Dennis 1959 Senior Instr Botany, Asst Curator of Herbarium. BNA Willamette 1957; MA Oregon State 1959

Johnston, Richard Stanley 1966 Prof Agricultural and Resource Economics. BA Washington State 1960; MS Massachusetts 1963; PhD California at Berkeley 1970

Jolliff, Gary David 1976 Assoc Prof Crop Science. BS Ohio State 1956, MS 1966; PhD Colorado State 1969

Jones, Hilda Meius 1947 Director Management Communication Program, Assoc Prof Business Administration. BS Oregon State 1939; MS New York U 1940

Jones, Howard Robert 1974 Res Asst Oceanography. AA Moorpark C 1970; BS Western Washington State 1974

Jones, Jimmie Wendle 1980 Instr Naval Science

Jones, Robert 1962 Asst Prof English. AB Nebraska State Teachers C at Chadron 1953; MA Stanford 1959

Jordan, Cheryl W. 1976 Asst Prof Clothing, Textiles and Related Arts. BS Kansas State 1968, MS 1971

Jorgensen, Stephanie Everett 1968 Instr Mathematics. BA Pacific U 1964; MS Oregon State 1968

Jossy, Earle Fred 1943 Assoc Prof Emeritus (Jackson County Extn Chairman)

Jostes, Ralph F., Jr. 1981 Asst Prof General Science. BS Illinois State 1973, MS 1974; PhD Colorado State 1978

Judson, Cheryl Jean 1979 Asst Director Financial Aid (Asst Prof). BA Minnesota 1969;MA Michigan State 1973; PhD Oregon State 1981

Junge, David Campbell 1971 Director Energy Research and Development Institute, Assoc Prof (Senior Research) Mechanical Engineering. BS Stanford 1962; PhD Oregon State 1971. On leave 1981-82.

K

Kajikawa, Osamu 1981 Asst Prof (Courtesy) Veterinary Medicine. DVM Kitasato U, MS 1981

Kale, Dianna Leigh 1977 Program Director Art Education (Instr). BAE Wichita State 1972; MS Oregon 1977

Kalk, Peter Arthur 1968 Res Asst Oceanography. BS Michigan Tehnological U 1962

Kallander, Rudolph Martin 1961 Prof Emeritus Forestry

Kamm, James Albert 1967 Res Entomologist (Courtesy Assoc Prof) USDA-ARS.BS Wyoming 1962, MS 1963; PhD Oregon State 1967

Kaneps, Andris Janis 1981 Asst Prof Veterinary Medicine. BS Minnesota 1976, DVM 1978; MS Ohio State 1981

Kantor, Joseph Ralph 1965 Surgical Consultant, Student Health Service (Prof). BSc, MD Nebraska 1958

Kaplan, Edward Lynn 1961 Prof Emeritus Mathematics

Karchesy, Joseph J. 1979 Res Assoc Agricultural Chemistry. BS Washington 1968; MS Victoria 1970; PhD Oregon State 1974

Karpen, Donald John 1982 Prof Aerospace Studies. BA San Jose State 1957; MEd Mississippi State 1976

Kas, Arnold 1973 Prof Mathematics. BA Johns Hopkins 1962; PhD Stanford 1966

Kaser, John Robert 1971 Res Asst Instructional Resources and Materials. BS Oregon State 1969

Katen, Paul Charles 1977 Res Assoc Atmospheric Sciences. BS Lowell Technological Institute 1964; MS Trinity C 1969; PhD Colorado State 1977

Katz, Richard Whitmore 1979 Asst Prof (Research) Atmospheric Sciences. BA Virginia 1970; PhD Pennsylvania State 1974

Kaufman, Randy John 1980 Res Asst Microbiology. BS Oregon State 1977, BS 1977

Keeling, Kenneth Merlin 1969 Res Asst Oceanography. BS Oregon State 1969

Kellems, Richard Owen 1978 Asst Prof Animal Science. BS Brigham Young 1969; MS Oregon State 1975 PhD 1976

Keller, George Henrik 1975 Assoc Dean Oceanography, Prof Oceanography. BA Connecticut 1954; MS Utah 1956; PhD Illinois 1966

Kelley, John Paul 1966 Assoc Prof Radiological Physics, General Science, Radiation Safety Officer. BS Rensselaer Polytechnic Institute, 1947

Kelley, John Robert 1978 Foundation Seed Asst Crop Science (Instr). BS Texas A & M 1975; MS Oregon State 1980

Kelley, Suse S. 1976 Editor Western Rural Development Center (Res Asst Uncl). BA Texas at Austin 1974

Kellogg, Loren Dudley 1978 Instr Forest Engineering. BS Humboldt State 1974; MF Oregon State 1976

Kelly, Alfred Frank 1980 Asst Prof Speech Communications. BFA Texas 1970; MFA Ohio U 1973

Kelpsas, Bruce Robert 1980 Res Asst Forest Science. BS Southern Illinois 1974; MS Oregon State 1978

Kelsey, Mary Wallace 1958 Assoc Prof Foods and Nutrition. BS New York State U Plattsburgh 1955; MS Rhode Island 1957

Keltner John William 1963 Prof Speech Communication. BEd Illinois State Normal 1940; MA Northwestern 1943, PhD 1947

Kelts, Lora Ives 1944 Prof Emeritus (Agriculture-Forestry Librarian)

Kemp, Patrick Samuel 1974 Prof Business Administration, Chairman Accounting. BA Rice 1953; MPA Texas at Austin 1956; PhD Illinois 1959. CPA Texas and Illinois

Kennedy, Timothy Christopher 1976 Assoc Prof Mechanical Engineering. BS SUNY at Buffalo 1968; MS Stanford 1969, PhD 1972

Kenneke, Larry Jon 1970 Asst Dean of Educational Services; Prof Industrial Education. BS Northern Illinois 1961, MS 1965; EdD Oregon 1968

Kennick, Walter Herbert 1959 Assoc Prof Animal Science. BS Clemson 1948; MS Oregon State 1958, PhD 1959

Kerber, Delmar David 1976 Asst Baseball Coach Athletics. BA Oregon State 1964, MA 1967

Kerkvliet, Nancy Isaacson 1976 Asst Prof (Senior Research) Veterinary Medicine. BS Wisconsin State at Eau Claire 1970; MS Oregon State 1973, PhD 1976

Kerr, Frederick George 1978-80, 1981 Umatilla County Extn Agent (Asst Prof). BS California Polytechnic at San Luis Obispo 1973; MS Nevada at Reno 1977

Kerr, Harold Edward 1960 Wasco County Extn Chairman (Prof). BS Oregon State 1957; MEd Colorado State 1968

Kerr, Joan Namahana 1980 Instr Human Development and Family Studies. BA California at Santa Cruz 1972; MSW Washington 1978

Kerr, Kathleen Adele 1974 Assoc Prof Physical Education. BA Stanford 1968, MA 1974

Kezar, Hollis S., III 1981 Res Assoc Chemistry. BA Emory U 1975, PhD 1981

Kiekel, Robert Dene 1966 Assoc Prof Spanish and Linguistics. BA Willamette 1956; MA Washington 1962; PhD Oregon 1971

Kiemnec, Gary Lee 1976 Res Asst Soil Science. BA Indiana 1969; MS Purdue 1974

Kiesow, John A. 1957 Prof Emeritus (Asst to Director, Program Development) Extn

Kifer, Paul E. 1973 Professor Food Science and Technology, Head of Department. BS Michigan State 1950, MS 1953, PhD 1956

Kiigemagi, Ulo 1954 Senior Instr Agricultural Chemistry. BA Lewis and Clark 1953

Killingsworth, Kenneth Jay 1969 Wheeler County Extn Chairman (Assoc Prof). BA Washington State 1940; MAgr Oregon State 1970

Kim, Jeong-Woo 1976 Asst Prof Atmospheric Sciences. BS Yonsei U 1961; PhD UCLA 1973

Kimball, Margreta G. 1981 Instr English. BA New York U 1959; MA Michigan 1961

Kimeldorf, Donald Jerome 1967 Prof of Radiation Biology, General Science. BA Reed C 1942; MA Oregon 1944; PhD UCLA 1947

Kimerling, Arthur Jon 1976 Asst Prof Geography. BA Washington 1972; MS U of Wisconsin 1973, PhD 1976

Kinch, Michael Paul 1969 Agriculture and Forestry Librarian (Assoc Prof). BS Protland State 1968;l MLib Washington 1969; MS Oregon State 1974

King, Charles Everett 1977 Prof Zoology, Chairman of Department. AB Emory U 1958; MS Florida State 1960; PhD Washington 1965

King, David Arthur 1976 Asst Editor Agricultural Experiment Station Communications (Instr). BA California State at Chico 1972

King, David Burnett 1962 Prof History. BA Hamilton 1951; MA Rutgers 1955; PhD Cornell 1962

King, David Joseph 1977 Dean College of Liberal Arts, Prof Psychology. BA Boston 1951; MA Maine 1952; PhD Maryland 1958

King, John Phillip 1967 Assoc Director Continuing Education, Asst Prof Religious Studies. BA Hardin-Simmons U 1958; BD Southeastern Baptist Theological Seminary 1961; MA Emory U 1967, PhD 1977

King, Jonathan 1980 Asst Prof Business Administration. BA Antioch C 1965; MBA Washington 1975, PhD 1980

King, Keith Irl 1970 Senior Instr Biology (General Science). BS Montana State 1963; MS Oregon State 1970

King, Roger Edward 1954 Prof English. AB Northern Colorado 1950, MA 1954

Kingsley, Kenneth K. 1974 Extn Communication Specialist (Assoc Prof). BA Kansas State 1964, MS 1973

Kinney, John Rolland 1969 Asst Prof Mechanical Engineering (Courtesy). BSME Colorado 1959; MSME New Mexico State 1968, ScDME 1971

Kinsel, William Charles 1971 Asst Prof Mechanical Engineering (Courtesy). BS Nebraska 1958; MS Washington 1963; PhD Nebraska 1966

Kirby, David John 1981 Res Assoc Physics. BSc U of Warwick (England) 1977, PhD 1981

Kirk, Dale Earl 1942 Prof Agricultural Engineering. BS Oregon State 1942; MS Michigan State 1954

Kirkendall, Lester Allen 1949 Prof Emeritus Human Development and Family Studies

Kistner, Theodore Patrick 1972 Assoc Prof (Senior Research) Wildlife Ecology. DVM Ohio State 1955; MS Georgia 1969

Kitchen, James C. 1975 Res Asst Oceanography. BA Bloomsburg State C 1973; MS Oregon State 1978

Klein, Glenn Arthur 1952 Program Director Extn Education (Prof). BS Oregon State 1951; MA Maryland 1962; EdD Arizona State 1976

Klemke, Lloyd Walter 1970 Assoc Prof Sociology. BA UCLA 1963; MA California State U at Northridge 1965; PhD Oregon 1969

Klepper, Elizabeth L. 1977 Plant Physiologist Botany and Plant Pathology (Courtesy Assoc Prof). BA Vanderbilt 1958; MA Duke 1963, PhD 1966

Kling, Gerald Fairchild 1974 Asst Prof Soil Science. BS Purdue 1968; MS Cornell 1973, PhD 1974

Klingeman, Peter Clayton 1966 Prof Civil Engineering, Director Water Resources Research Institute. BS Northwestern 1957, MS 1959; PhD California at Berkeley 1965

Knapp, James Gilbert 1960 Assoc Prof Music. BS Bradley 1952; MM Lewis and Clark C 1961; DEd Oregon 1976

Knight, Kelton Wallace 1977 Asst Prof French, Foreign Languages and Literatures. BA Weber State C 1967, MA Utah 1973, PhD 1975

Knothe, Carol Alicia 1972 Malheur County Extn Agent (Assoc Prof). BS Nebraska 1962; MHEc Oregon State 1971

Knudsen, James George 1949-52 1953 Prof Chemical Engineering. BS Alberta 1943, MS 1944; PhD Michigan 1949

Knutson, Donald Maurice 1971 Asst Prof Plant Pathology (Courtesy), Plant Pathologist U.S. Forest Service. BS Minnesota 1957, PhD 1968

Kocher, Carl Alvin 1973 Assoc Prof Physics. AB California at Berkeley 1963, PhD 1967

Kock, Jo Anne 1976 Extn Program Asst (Instr).

Koerper, Greg 1980 Res Asst Forest Science. BS Michigan 1973, MS 1977

Koepsell, Paul Arthur 1969 Extn Plant Pathologist, Assoc Prof Botany and Plant Pathology. BS California at Davis 1962, PhD 1968

Koester, Ardis Williams 1974 Extn Textiles and Clothing Specialist (Assoc Prof). BS Oregon State 1961; MSHE North Carolina at Greensboro 1971, PhD 1974

Kolbe, Edward Robert 1974 Assoc Prof Agricultural Engineering. BME Rensselaer Polytechnic Institute 1964; MSE Case Western Reserve 1966; PhD New Hampshire 1975. On sabbatical 1982

Kolding, Mathias F. 1967 Senior Instr Columbia Basin Agricultural Research Center, Pendleton, BS Oregon State 1967

Koler, Kevin DeBaun 1979 Instr Animal Science. BS Washington State 1976

Kolodziej, J. Wojciech 1980 Asst Prof Electrical Engineering. MS Technical U of Warsaw 1974; PhD Oregon State 1980

Kolshorn, Agnes 1929 Prof Emeritus (Extn Nutrition Specialist)

Komar, Paul Douglas 1970 Prof Oceanography. BA Michigan 1962, MS (Math) 1963, MS (Geol) 1966; PhD California at San Diego 1969

Konuk, Ahmet Aydin 1981 Asst Prof Chemical Engineering. BS Robert C 1971; MS California at Santa Barbara 1973, PhD 1975

Kopperman, Paul Edward 1978 Asst Prof History. BA Queens C 1966, MA 1969; PhD Illinois 1972

Koski, William Arthur 1950 Prof Health, Asst Dean for Student Services, Head Adviser Health and Physical Education. BS Oregon State 1949; MS Michigan 1950; EdD Oregon State 1954; MPH California at Berkeley 1959

Kozlik, Charles James 1961 Assoc Prof Forest Products. BA Doane C 1952; MF Duke 1957

Kraft, Walter Carl 1950 Prof Emeritus Foreign Languages and Literatures.

Krahmer, Robert Lee 1962 Prof Forest Products. BS Oregon State 1958, MS 1960; PhD State U of New York at Syracuse 1962

Krane, Kenneth Saul 1974 Assoc Prof Physics. BS Arizona 1965; MS Purdue 1967, PhD 1970.

Krantz, Gerald William 1955 Prof Entomology. BS Pittsburgh 1951; PhD Cornell 1955

Krauss, John C. 1970 Consultant Student Health Center (Assoc Prof). AB Hope C 1959; MD Wayne State 1963

Kraynick, Roger G. 1975 Res Assoc Western Rural Development Center. BS Colorado School of Mines 1966; PhD Colorado 1976

Kreid, Dennis Karl 1975 Assoc Prof Mechanical Engineering (Courtesy). BS Minnesota 1964, MS 1966, PhD 1970

Krishnan, Palaniappa 1980 Res Assoc Agricultural Engineering. BS IIT-Kharagpur (India) 1975; MS Hawaii 1976; PhD Illinois 1979

Kronstad, Warren Ervind 1959 Prof Plant Breeding, Crop Science. BS Washington State 1957, MS 1959; PhD Oregon State 1963

Kruchoski, Brian Louis 1979 Instr Civil Engineering. BS Illinois Institute of Technology 1975, MS 1977

Krueger, Eugene Rex 1975 Prof Computer Science; Vice Chancellor for Educational Systems, OSSHE. BS Rensselaer Polytechnic Institute 1957, MS 1960, PhD 1962

Krueger, Hugo Martin 1948 Prof Emeritus Zoology and Fisheries and Wildlife

Krueger, James Harry 1961 Prof Chemistry. BS Wisconsin at Madison 1958; PhD California at Berkeley 1961

Krueger, Judith Crookham 1966 Senior Instr Music. BA Idaho 1957; MA Oregon State 1965

Krueger, Thomas Anthony 1981 Counselor Educational Opportunities Program (Instr). BA Western Washington 1972, MS Oregon 1976

Krueger, William Clement 1971-80, 1981 Department Head and Prof Rangeland Resources. BS St Mary's C 1964; MS Humboldt State 1967; PhD Utah State 1970

Krumperman, Paul Henry 1966 Assoc Prof Food Science and Technology. BS Brigham Young 1949; MS Utah State 1950; PhD California at Davis 1964

Krygier, Bernard Bruce 1980 Res Asst Botany and Plant Pathology. BS Portland State 1968; MS Oregon State 1980

Krygier, James Theodore 1954 Coordinator, Forestry Extn Prof Forestry. BS Utah State 1952, MS 1955; PhD Colorado State 1971

Kuhn, Lee Wallace 1946 Prof Emeritus Wildlife Ecology.

Kuipers, Judith Lee 1979 Prof Family Life, Dean of Undergraduate Studies. BS Michigan State 1959; MS Central Michigan 1966; PhD Michigan State 1969

Kuklok, Dennis Lloyd 1977 Asst Prof Architecture and Landscape Architecture. BA Oregon 1973

Kulm, LaVerne Duane 1964 Prof Oceanography. BA Monmouth C 1959; PhD Oregon State 1965

Kuntz, Berry Ted 1973 Instr Agricultural and Resource Economics (Courtesy), Economic Research Service. BS Oklahoma State 1962, MS 1964

Kurth, Ervin Frederick 1945 Prof Emeritus Chemistry

L

LaBaun, George Bradford 1958 Assoc Prof Civil Engineering. BS Oregon State 1958, MS 1960

LaFleur, Lawrence E. 1977 Research Chemist Engineering Experiment Station, NCASI (Courtesy Instr). BS U of Puget Sound 1975; MS Oregon 1977

Lagerstedt, Harry Bert 1957 Asoc Prof Horticulture (Courtsey), Research Horticulturist, USDA. BS Oregon State 1954, MS 1957; PhD Texas A & M 1965

Lais, Lyman T. 1977 Asst Prof Pharmacology. BS California 1971; MS Iowa 1973, PhD 1976

Lam, Kai Cheong 1981 Res Assoc Agricultural Chemistry. BS National Defense Medical Center (Taiwan) 1976; PhD Iowa 1981

Lambert, Charlotte LaVerne 1966 Prof Physical Education. BA Evansville 1944; MA Iowa 1949, PhD 1959

Landau, Rubin Harold 1974 Assoc Prof Physics. BS Cornell 1965; MS Illinois 1966, PhD 1970

Landers, John Herbert, Jr. 1950 Prof Emeritus (Extn Animal Scientist)

Landforce, Andrew S. 1946 Assoc Prof Emeritus (Extn Specialist, Wildlife Management and 4-H Youth Development)

Landgren, Chal Gordon 1979 Columbia/Cowlitz County Extn Agent (Asst Prof). BS California at Berkeley 1975; MS Utah State 1977

Landgren, Susan Gangler 1975 Columbia County Extn Agent (Instr). BS Oregon State 1975

Langford, Charles Clinton 1970 Assoc Prof Sociology. BA Kansas State 1963, MA 1965; PhD Oregon 1971

Langmo, R. Donald 1948 Assoc Prof Agricultural and Resource Economics (Industrial Engineer). BS Oregon State 1943, BS 1950; MS UCLA 1959

Lanka, Kenneth Edward 1981 Asst Prof Animal Science. BS Nebraska 1971, MS 1977; PhD Texas A&M 1980

Lannan, Arthur Theodore 1979 Asst Director Upward Bound (Instr). BA Claremont Men's C 1973

Lannan, James Edmund, Jr. 1969 Assoc Prof (Senior Research) Fisheries. BA California at Santa Barbara 1967, MA 1969; PhD Oregon State 1972

LaPiana, Kathleen 1978 Instr English Language Institute, International Education. BA Bryn Mawr 1972; MS Georgetown 1974

Larison, James Roger 1978 Director Sea Grant Communications (Asst Prof). BS Cornell 1970; MS Wisconsin 1972

Larse, Lloyd Quenderbilt 1940 Prof Emeritus Business Education and Office Administration.

Larsen, Knud Sonderhede 1969 Prof Psychology. BA California State at Los Angeles 1964, MA 1966; PhD Brigham Young 1969

Larson, Ann Lindsay 1980 Instr English Language Institute. BA Scripps C 1975; MA Utah 1976

Larson, Beverly Jean 1981 Instr Speech Communication. BS Oregon State 1968

Larson, Erik 1980 Asst Prof Business Administration. BA Claremont Men's C 1974; PhD SUNY at Buffalo 1981

Larson, Milton Byrd 1952 Prof Mechanical Engineering. BS Oregon State 1950; MEngr, Yale 1951; MS Oregon State 1955; PhD Stanford 1961

Larson, Robert Elof 1965 Prof Pharmacology and Toxicology. BS Washington State 1957, MS 1962; PhD Iowa 1964

Lassen, E. Duane 1980 Assoc Prof Veterinary Medicine. DVM Iowa State 1972, PhD 1976

Lasser, Gerald W. 1977 Res Assoc Biochemistry and Biophysics. BA Humboldt State 1972, MA 1975

Lattin, John Daniel 1955 Prof Entomology. BS Iowa State 1950; MA Kansas 1951; PhD California at Berkeley 1964

Laursen, Harold Ivan 1963 Prof Civil Engineering. BS Oregon State 1958, MS 1960; PhD California at Berkeley 1964

Lauw, Hian 1978 Asst Prof Electrical and Computer Engineering. BSEE Delft U (Holland) 1966, MSEE 1968, PhD 1977

Lavender, Denis Peter 1961 Prof Forest Physiology, Forest Science. BS Washington 1949; MS Oregon State 1958, PhD 1962

Laver, Murray Lane 1969 Assoc Prof Forest Products Chemistry. BSA Toronto 1955; PhD Ohio State 1959

Law, Duncan Kenneth 1944 Prof Food Science and Technology, Seafoods Laboratory, Astoria. BS Oregon State 1944

Lawrence, Francis Joseph 1965 Assoc Prof Horticulture (Courtesy),Horticulturist USDA. BS Maryland 1951, MS 1958, PhD 1965

Lawrence, Margaret Lucille 1945 Asst Prof Emeritus English

Lawrence, Robert Dale 1970 Assoc Prof Geology. BA Earlham C 1965; PhD Stanford 1968

Lawrence, Robert Elwood 1974 Head Science-Technology Librarian (Assoc Prof).BS Michigan State 1955, MS 1957; AMLS Michigan 1964

Lawson, David Cadden 1969 Assoc Prof Health. BS West Virginia 1963, MS 1966, EdD 1969

Lawton, Stephen J. 1980 Instr Business Administration. BA Southern Methodist U 1973; MBA K.U.L. (Belgium) 1975; MBA Cornell 1975

Layton, Robert Davis 1972 Assoc Prof Civil Engineering. BSCE Colorado State 1959; MSCE Kansas State 1965; PhD California at Berkeley 1970

Lea, Bryan G. 1978 Asst Gymnastics Coach Women's Athletics

Leach, Charles Morley 1950 Prof Plant Pathology. BS Queens U (Belfast, Ireland), 1949, BAgri 1950; PhD Oregon State 1956

Lear, Gene Maurice 1939 Prof Emeritus (Director, Extn Service)

Leasher, Evelyn Marie 1976 Social Science and Humanities Librarian (Asst Prof). BA Central Michigan U 1965; MLS Pratt Institute 1967

Leatham, Rae Deane 1974 Res Asst Oceanography. BA California at Davis 1969; MS Long Island U 1974

Ledbetter, N Marie 1946 Assoc Prof Emeritus Clothing, Textiles, and Related Arts

LeDoux, Chris Bob 1978 Instr Forest Engineering. BS Idaho 1973; MS Oregon State 1975

Lee, Eugene Carlton 1962 Senior Instr Emeritus Pharmacognosy

Lee, John Preston 1979 Instr Mathematics. BS Iowa 1977; MS Oregon 1979

Lee, John Walter 1969 Prof Mathematics. BS Stanford 1964, MS 1966, PhD 1969

Lee, Jong Sun 1963 Prof Food Science and Technology. AB California at Berkeley 1958; MS Oregon State 1962, PhD 1963

Lee, Sylvia 1952 Prof Emeritus (Curry County Extn Agent)

Lee, Sylvia Lucile 1968 Prof Home Economics Education, Head of Department. BS Oregon State 1947; MA Teachers C, Columbia 1959, EdD 1966

Lee, William Orvid 1956 Prof Agronomy (Courtesy); Research Agronomist, USDA. BS Utah State 1950, MS 1954; PhD Oregon State 1965

Leeland, Albert Lewis 1954 Professor Emeritus Elementary Education

Leeland, Lucille Rees 1955 Prof Emeritus Elementary Education

Lees, Kevin Michael 1980 Asst Prof Naval Science. BSME Purdue 1976

Leffel, John Alvan 1962 Washington County Extn Agent (Prof).BS AgEd Oregon State 1955, MS AgEd 1967

Leibowitz, Flora Lynn 977 Asst Prof Philosophy. BA SUNY at Stony Brook 1969; MA Johns Hopkins 1975, PhD 1979

Leisinger, Sherrie Hawkins 1981 Instr Clothing, Textiles, and Related Arts. BS Oregon State 1969, MS 1981

Leisy, Douglas J. 1980 Res Asst Agricultural Chemistry. BS Oregon 1976; MS Iowa 1980

Leklem, James Erling 1975 Assoc Prof Foods and Nutrition. BS Wisconsin at Madison 1964, MS 1966, PhD 1973

Leman, Craig Billings 1971 Professor, University Honors Progran (Courtesy). BA Chicago 1946; MD Harvard 1952

Leman, Nancy Farwell 1971 Instr English. PhB Chicago 1944; BA Tulane 1946; MA Chicago 1948

Le Master, Jerome Lloyd 1928 Prof Emeritus Business Law

LeMay, Morris Lee 1964 Associate Dean of Students for Medical Services, Director Counseling and Testing Center, Prof Education. BS McMurry C 1956; MA Colorado 1961; DEd Oregon 1966

Lemon, Berlan 1959 Assoc Prof Emeritus Education

Lenssen, John P. 1981 Academic Coordinator Educational Opportunities Program (Instr). BA Claremont Men's C 1971; MTS Harvard 1973

Leonard, John William 1979 Prof Civil Engineering. BS Tufts 1962; MS Illinois 1963, PhD 1966

Leong, Jo-Ann Ching 1975 Assoc Prof Microbioloby. BA California at Berkeley 1964; PhD California at San Francisco

Le Sueur, Mary-Louise (Billie) 1965 Klamath County Extn Agent (Assoc Prof). BS Montana State 1942; MS Oregon 1977

Levenspiel, Octave 1968 Prof Chemical Engineering. BS California at Berkeley 1947;MS Oregon State 1949, PhD 1952

Levi, Shaul 1977 Assoc Prof Geophysics, Oceanography. BA U of San Francisco 1964; MA California at Davis 1966; PhD Washington 1974

Levine, Gloria A. 1960 Assoc Prof of Spanish, Foreign Languages and Literatures. BA Queen's C, City U of New York 1945; MA New Mexico 1946

Levine, Murray David 1978 Asst Prof (Senior Research) Oceanography. BA California at Irvine 1972; PhD Washington 1979

Levine, Shepard 1954 Prof Art. BA New Mexico 1950, MA 1951

Lewin, Donald Ralph 1979 Manager Software Systems Computer Center (Res Asst). BS North Dakota State 1959; MBA Golden Gate U 1972

Lewis, Anthony James 1979 Res Assoc Environmental Remote Sensing Applications Lab. BS West Chester State C 1962; MS Oregon State 1968; PhD Kansas 1971

Lewis, Mary Josephine 1974 Zoology-Oceanography Librarian (Asst Prof). BA Northland C 1967; MLib Washington 1968

Lewis, Theodore G. 1976 Assoc Prof Computer Science. BS Oregon State 1966; MS Washington State 1970, PhD 1971

Li, Hiram Waye 1979 Assoc Prof Fisheries (Courtsey). AB California at Berkeley 1966; MS Colorado State 1969; PhD California at Davis 1973

Libbey, Leonard Morton 1961 Prof Food Science and Technology. BVA Massachusetts 1953; MS Wisconsin at Madison 1954; PhD Washington State 1961

Libertini, Louis James 1978 Res Assoc Biochemistry and Biophysics. BS Arizona 1967; PhD Oregon 1971

Lichatowich, James August 1980 Program Manager Oregon Department of Fish and Wildlife, Assoc Prof (Courtesy) Fisheries and Wildlife. BS Oregon State 1969, MS 1970

Liggett, Helen 1981 Asst Prof Political Science. BA Catholic U of America 1968; MA Hawaii 1972, PhD 1979

Ligon, John Frank, Jr. 1946 Prof Emeritus English, Director Emeritus Summer Term

Likens, Sam Talbert 1951 Prof Chemistry (Courtesy), Agricultual Chemistry. Chemist, USDA. BS Oregon State 1950

Lillevik, Sigurd L. 1981 Asst Prof Electrical Engineering. BS Michigan State 1973, MS 1974, PhD 1978

Lilley, Marvin 1974 Res Asst Oceanography. BS Stephen Austin State 1965; MS Arkansas 1970

Lillig, Everett Houston 1970 Director Emeritus Physical Plant

Limehouse, John B. 1975 Instr University Honors Program (Courtesy). BS Ohio State 1962, DVM 1966

Lin, Dan-fu 1981 Res Assoc (Courtesy) Nuclear Engineering

Linderman, Robert Grant 1973 Prof Botany and Plant Pathology (Courtesy). BA Fresno State 1960; PhD California at Berkeley 1967

Lindsey, Steven Lee 1976 Instr Architecture and Landscape Architecture. BS Oregon 1970; BS Oregon State 1974

Lindstrom, Fredrick Thomas 1965 Assoc Prof (Senior Research) Statistics and Mathematics. BS Oregon State 1963, MS 1965, PhD 1969

Liss, William John 1977 Asst Prof Fisheries. BS Pennsylvania State 1969; MS Oregon State 1974, PhD 1977

List, Peter Charles 1967 Assoc Prof Philosophy. BA Michigan State 1961, MA 1964, PhD 1969

Little, Stanley Ray 1975 Instr Aerospace Studies, Technical Sergeant U.S. Air Force

Livingston, Harold Maurice 1946 Prof Emeritus Speech Communcation; Director Emeritus of Classroom TV

Lockwood, James D. 1980 Asst Prof (Courtesy) Interinstitutional Library Council. BA California at Santa Cruz 1970; BA California State at Los Angeles 1971; MA Michigan 1973, MALS 1976

Logan, Albert Victor 1946 Prof Emeritus Chemistry

Logan, Robert Steven 1973 Douglas County Extn Agent (Assoc Prof). BA Wheaton C 1967; MS Oregon State 1973

Loker, Eric Samuel 1979 Instr Zoology. BA Cornell 1972; MS Michigan 1974; PhD Iowa State 1979

Lombard, Porter Bronson 1963 Prof Horticulture, Superintendent, Southern Oregon Experiment Station. BA Pomona 1952; MS Washington State 1955; PhD Michigan State 1958

Lomonte, Rose Marie 1969 Head Serials Librarian (Assoc Prof). BS Houston 1948; MS Illinois 1952

Long, David Robert 1947 Prof Agricultural Engineering. BS Oregon State 1947, MS 1951, BS 1959

Long, James John 1981 Res Asst Microbiology. BS Oregon State 1981

Long, James Waldo 1966 Prof Emeritus Physcial Education, Dean Emeritus Health and Physical Education

Long, Jay Bass 1940 Prof Emeritus Wildlife Ecology

Lonseth, Arvid Turner 1948 Prof Emeritus Mathematics

Loomis, Walter David 1953 Prof Biochemistry. BS Iowa State 1948; PhD California at Berkeley 1953

Looney, James Chester 1957 Assoc Prof Electrical and Computer Engineering. BS Oregon State 1954, MS 1960, EE 1963

Loper, Bobby Ray 1961 Res Asst (Courtesy), Chemistry, Agricultural Chemistry. BS Oregon State 1966

Lopez, Carlos 1972 Res Asst Oceanography. BS The Cooper Union 1959; MS Oregon State 1977

Lorence, Walter V. 1976 Instr Vocational-Technical Education. BS Portland State 1963; MEd Oregon State 1971

Lorusso, David James 1979 Res Assoc Agricultural Chemistry. BA Colorado 1966; PhD Wisconsin 1971

Lorz, Harriet VanArsdale 1962-69 1972 Res Asst Oceanography. BS Oregon State 1964, MS 1967

Loveland, Patricia M. Rice 1975 Res Asst Food Science and Technology. BS Washington 1963

Loveland, Walter David 1967 Prof Chemistry, Radiation Center. SB MIT 1961; PhD Washington 1966

Lovell, Ronald Paul 1971 Assoc Prof Journalism. BA UCLA 1959, MS 1961.

Lovell, William Stuart 1981 Patent Manager Research Office (Asst Prof). BS, BA Portland State 1959; MA Princeton 1962, PhD 1963; JD Willamette U 1971

Lowrie, Miriam Carlson 1971 Polk County Extn Agent (Assoc Prof). BS North Dakota State 1968, MS 1971

Lowry, Robert Ronald 1962 Res Asst Chemistry, Agricultural Chemisty. BA Chico State 1953

Luba, Thomas Herbert 1980 Media Production Specialist (Instr) Forestry. BS Oregon State 1978

Lubchenco, Jane 1976 Asst Prof Zoology. BA Colorado C 1969; MS Washington 1971; PhD Harvard 1975

Ludwig (Niesslein), Judith M. 1977 Women's Sports Information Director (Instr). BSJ West Virgina 1975

Ludwig, Martin James 1949 Asst Prof English. BA Northeastern (Massachusetts) 1947; MA Boston 1949

Ludwig, Miriam Daniels 1949-51 1970 Res Asst Oceanography. BA Oberlin 1946

Ludwig, Ronald Lynn 1975 Gymnastic Coach, Women's Athletics (Instr). BS Pittsburgh 1971; MS West Virginia 1975

Luebke, James Paul 1980 Res Asst Food Science. BS Edgewood C 1974

Luke, Alan Dewayne 1977 Res Asst Malheur Experiment Station. BS Arizona 1977

Luke, H. Alan 1976 Extn Economist Agricultural and Resource Economics (Prof). BS Utah State 1941; MS Cornell 1943, PhD 1948

Lumpkin, Margaret Catherine 1948 Prof Education. BS U of North Carolina 1944; MS Wellesley 1945; EdD Oregon State 1957

Lund, Steve 1975 Prof Agronomy, Superintendent Columbia Basin Agricultural Research Center, Pendleton. BS Clemson 1949; MS Wisconsin at Madison 1951, PhD 1953

Lundbom, Dorothy B 1966 Asst Prof Emeritus (Baker County Extn Agent)

Lunner, Marilyn Jeanne 1968 Clackamas County Extn Agent (Assoc Prof). BS Nebraska 1961; MA Portland State 1979

Luoma, Teresa Kim 1980 Res Asst Microbiology. BS Oregon State 1980

Lusetti, Walter I. 1967 Assoc Prof Spanish, Italian, and Foreign Language Education. BA Pittsburgh 1949, MLitt 1950; PhD Oregon 1967

Lyford, John Higgins, Jr. 1966 Assoc Prof Biology (General Science). BA Carleton C 1950; MS Oergon State 1962, PhD 1966

Lyle, Mitchell Wayne 1979 Res Assoc Oceanography. BS Michigan 1973; PhD Oregon State 1978

Lyons, Joseph Kevin 1981 Res Asst Forest Engineering. BS Colorado State 1979

Lyons, William N. 1978 Res Asst Affirmative Action. BA California at Santa Barbara 1971; MA California State at Fresno 1977

Lysne, David Holtan 1980 Asst Prof (Courtesy) Forest Engineering. BS Iowa State 1968; MS Oregon State 1980

M

MacBride, Diane Elizabeth 1980 Res Asst Food Science and Technology. BS Central Michigan 1973; BS Oregon State 1980

MacDonald, Donald Laurie 1962 Prof Biochemistry and Biophysics. BA Toronto 1944, MA 1946, PhD 1948

MacDonald, Elizabeth 1969 Res Asst Microbiology and Agricultural Chemistry. BA Toronto 1944, MA 1945

MacDonald, Margaret Russell 1979 Res Asst Microbiology. BA Oregon State 1979

Mack, Harry John 1955 Prof Horticulture. BS Texas A&M 1950, MS 1952; PhD Oregon State 1955

Mackey, Andrea C. 1938 Prof Emeritus Food and Nutrition

Mackey, Robert Bruce 1981 Assoc Prof (Courtesy) Agricultural and Resource Economics. BA Lewis and Clark C 1967; MS Washington State 1970, PhD 1973

Maclean, Doris Glasser 1963 Asst Prof French, Foreign Languages and Literatures. BA Miami (Ohio) 1947; MA Wisconsin at Madison 1950

Macnab, Alexander W. 1979 Extn Agent (Instr). BS Oregon State 1975

MacSwan, Iain C. 1955 Extn Plant Pathology Specialist, Prof Botany and Plant Pathology. BSA British Columbia 1942, MSA 1961

MacVicar, Robert William 1970 President Oregon State University; Prof Chemistry, Departments of Agricultural Chemistry, Biochemistry and Biophysics, and Chemistry. BA Wyoming 1939; MS Oklahoma State 1940; PhD Wisconsin at Madison 1946

Madden, Edith Holmes 1973 Asst Director and Instr English Language Institute, International Education. BA U of Omaha 1946; MA Minnesota 1950

Madden, Theodore Martin 1959 Assoc Prof Psychology. BA Western Washington C 1946; MA Columbia 1947; PhD Arizona 1959

Maddox, Russell Webber, Jr. 1950 Prof Political Science. BA Marshall C 1946; MPA Wayne State 1948; PhD Illinois 1953

Maddy, William Charles 1974 Baker County Extn Agent (Asst Prof). BS Oregon State 1973; MACE Washington State 1980

Madsen, Victor Arviel 1963 Prof Physics. BS Washington 1953, PhD 1961

Magnusson, Philip Cooper 1946 Prof Electrical and Computer Engineering. BS Washington 1937; MS California at Berkeley 1938; ScD MIT 1941; EE Washington 1947

Mahrt, Larry J. Assoc Prof Atmospheric Sciences. BS Wisconsin at Madison 1967, MS 1969, PhD 1972

Maksud, Michael George 1980 Dean Health and Physical Education (Prof). BS Illinois 1955; MA Syracuse 1957; PhD Michigan State 1965

Maksymiuk, Bohdan 1965 Principal Entomologist, Forestry Sciences Laboratory and Assoc Prof Entomology (Courtesy). BSF Michigan 1953, MF 1955; PhD Maryland 1965

Malatesha, Rattihalli N. 1978 Asst Prof Education. MEd Karnatak U (India) 1967; MA Indiana State 1971; PhD South Carolina 1976

Malencik, Dean Anthony 1980 Res Assoc Biochemistry. BS Notre Dame 1965; MS Cal Tech 1968; PhD Oregon State 1972

Mallalieu, Jessalee Ahrens 1948 Assoc Prof Emeritus (Extn Recreation Specialist)

Malueg, Sara Ellen 1966 Prof French, Foreign Languages and Literatures; Department Chair. BA Muskingum C 1954; MA Wisconsin at Madison 1957, PhD 1965

Mandel, David Edward 1977 Res Asst Oceanography. BS Portland State 1971; MA Montana 1973

Manfredo, Michael James 1979 Asst Prof Resource Recreation Management. BA Pensylvania State 1973, MS 1976; PhD Colorado State 1979

Mansour, N. S. 1970 Extn Vegetable Crop Specialist (Assoc Prof). BS Wisconsin at Stevens Point 1956; MS Wisconsin at Madison 1961; PhD Michigan State 1966

Manuto, Ronald Joseph 1973 Instr Speech Communication. BA California at Berkeley 1965; MA California State at San Franscisco 1972

Marcum, Ronald G. 1976 Consultant Student Health Center (Assoc Prof). BS Oregon State 1965; MS U of Oregon Medical School 1969, MD 1969

Maresh, Susan Ellyn 1977 Res Asst Statistics. BS Kent State 1973; MS Oregon State 1978

Maresh, Thomas Joseph 1967 Department Chairman and Assoc Prof Geography. BA Washington State 1962; PhD Illinois 1968

Margolis, Ellen Sharon 1980 Softball Coach (Instr) Women's Athletics. BS North Carolina at Greensboro 1973, MS 1976

Marin, Anna Belle 1979 Res Asst Entomology. BS Oregon State 1973

Marino, Deborah A. 1978 Instr English Language Institute, International Education. BA Ohio 1971; MEd Oregon State 1977

Marker, Dennis K. 1980 Instr Chemical Engineering. BS Wisconsin 1962; MS Illinois 1970

Markgraf, Peter Marion 1967 Baker County Extn Chairman (Assoc Prof). BS Oregon State 1963, MS 1970

Marks, Stephen Chester 1956 Assoc Prof Emeritus Agricultural Econonmics

Marriott, William Robert Victor 1968 Physician, Student Health Center (Prof Emeritus).

Marsh, Robert Kendall 1956 Asst Prof Emeritus (Clatsop County Extn Agent)

Martel, Donald Joseph 1947 Prof Emeritus Landscape Architecture

Martignoni, Mauro Emilio 1965 Chief Microbiologist, Forestry Sciences Laboratory and Prof Entomology (Courtesy). Dipl Ing Swiss Federal Institute of Technology--Zurich 1950, Dr rer nat 1956

Martin, Carol Ellen 1978 Foreign Study Advisor Office of International Education (Instr). BA Iowa State 1974; MA American U 1977

Martin, Don Bruce 1966 Assoc Prof Physical Education, BS Oregon 1949, MS 1950

Martin, George Robert 1967 Assoc Prof Business Administration. BBA Washington 1960; PhD California at Berkeley 1967. CPA Washington 1960, Oregon 1968, Certified Management Accountant 1975

Martin, John Holmes 1970 Prof Crop Science (Courtesy). BS Oregon State 1914; MS Maryland 1921; PhD Minnesota 1926

Martin, Lloyd Wayne 1967 Superintendent North Willamette Experiment Station, Prof Horticulture. BS Oklahoma State 1958, MS 1961; PhD Michigan State 1967

Martin, Michael V. 1977 Asst Prof Agricultural and Resource Economics. BS Mankato State C 1969, MA 1971; PhD Minnesota 1977

Martin, Robert R. 1980 Res Assoc Botany and Plant Pathology (Courtesy). BS Wisconsin at Madison 1975, PhD 1979

Martinez, Pete, Jr. 1976 Asst Prof Industrial Education. BS Colorado State 1964, MEd 1967; PhD Maryland 1970

Martinson, Norman Harry 1958 Assoc Prof Physical Education. BS Oregon State 1948, MS 1949

Marvell, Elliot Nelson 1948 Prof Chemistry. BS Brown 1943; PhD Illinois 1948

Masilionis, Genevieve Jeannette Ann 1960 Assoc Prof Physical Education. BS Ohio 1944, MS 1945

Mason, Richard Randolph 1967 Principal Insect Ecologist, Forest Sciences Laboratory; Asst Prof Forestry (Courtesy). BSF Michigan 1952, MF 1956, PhD 1966

Mason, Robert George 1953 Prof Sociology, Survey Research Center. BS Oregon State 1951; MS Wisconsin at Madison 1952; PhD Stanford 1962

Massie, John William 1956 Tillamook County Extn Agent (Assoc Prof). BS Agr Ohio State 1951; MAgEd Arizona 1968

Mate, Bruce Reed 1972 Asst Prof Oceanography. Extn Marine Biologist. BS Oregon 1968, PhD 1973

Mathany, Allan Riley 1975 Director Office of Budgets (Asst Prof). BS Oregon State 1963, MBA 1971

Mathews, Catherine Z. 1978 Res Asst Biochemistry and Biophysics. BA California at Berkeley 1958

Mathews, Christopher K. 1978 Prof and Chairman of Biochemistry and Biophysics. BA Reed 1958; PhD Washington 1962

Matson, Walter Edward 1965 Extn Agricultural Engineer; Prof Agricultural Engineering. BS Washington State 1947, MS 1953, BSEE 1957

Matsumoto, Masakazu 1975 Assoc Prof Veterinary Medicine. DVM Hokkaido (Japan) 1964; MS Hawaii 1966; PhD California at Davis 1972

Mattson, Donald Eugene 1965 Assoc Prof Veterinary Medicine. BS California at Davis 1957, DVM 1959; PhD Washington State 1966

Matzke, Gordon Edwin 1977 Asst Prof Geography. BA Valparaiso U 1966; MS Oklahoma State 1971; PhD Syracuse 1975

Maughan, Laurel Smith 1972 Library Bibliographic Instruction Coordinator (Assoc Prof). BA Utah State 1968; MLS Pittsburgh 1972;MA 1973; MA Oregon 1980

Maule, Peter A. 1978 Res Asst Atmospheric Sciences. BA San Francisco State 1971; MS Oregon State 1979

Maxwell, Darrell Clifford 1952-60 1963 Umatilla County Extn Chairman (Prof). BS Oregon State 1952; MEd California at Davis 1970

Mayer, Jean Avis 1969 Instr English Language Institute, International Education. BA Oregon 1947

McAllister, Randall Evan 1978 Wasco County Extn Agent (Instr). BS Oregon State 1974

McBride, Marjorie Grace 1966 Assoc Director Career Planning and Placement Center, Assoc Prof Education. BA Linfield 1948; MA Syracuse 1953; EdD Oregon State 1973

McCain, Robert Francis 1969 Assoc Prof Emeritus Business Administration

McCarl, Bruce A. 1981 Prof Agricultural and Resource Economics. BS Colorado 1970; PhD Pennsylvania State 1973

McCarthy, Michael John 1976 Yamhill County Extn Agent (Asst Prof). BS Oregon State 1973, MS 1976

McCarty, Raymond Gerald 1953 Assoc Prof Emeritus (Clackamas County Extn Agent)

McClanahan, Frank E. 1981 Instr English. BA Colorado 1969; MA Claremont 1977; MAT Reed C 1978

McClellan, Thomas John 1945-46, 1948 Prof Emeritus Civil Engineering

McClenaghan, William Andrew 1949 Prof Political Science. BA Washington 1948

McClintock, Thomas Coshow 1959 Prof History, Department Chair. BA Stanford 1949; MA Columbia 1950; PhD Washington 1959

McClurken-Lilley, Becky Lee 1979 Res Asst Fisheries. BS Oregon State 1978

McCowen, David William 1980 Energy Extn Agent (Asst Prof). BME General Motors Institute 1974; MME Cornell 1974

McCreary, Douglas Dewitt 1975 Res Asst Forest Science. BA California at Riverside 1967; MS Oregon State 1976

McCreight, Keith Russell 1971 Assoc Director Financial Aid (Asst Prof). BS Nebraska 1965, MA 1967; PhD Oregon State 1981

McCuistion, Willis Lloyd 1975 Assoc Prof Crop Science. BS Colorado State 1959; PhD Oklahoma State 1967

McCulloch, Michael J. 1979 Assoc Prof Veterinary Medicine (Courtesy). BS Iowa 1966, MD 1969

McDonald, Marguerita 1962 Assoc Prof Emeritus (Engineering Librarian)

McDougal, Marianne 1978 Instr English Language Institute. BA California State at Chico 1976; MA California State at Fresno 1979

McDougal, William G. 1981 Asst Prof Civil Engineering. BS Humboldt State U 1976; MCE Delaware 1977; PhD Oregon State 1981

McDowell, Edward David 1974 Assoc Prof Industrial and General Engineering. BS Ohio State 1965; MS Ohio U 1970; PhD Ohio State 1974

McDowell, Marjorie Ellen 1981 Instr Speech Communication. BA Oregon State 1979, MA 1981

McEvoy, Peter Bens 1976 Asst Prof Entomology. BA Amherst 1971; PhD Cornell 1977

McFarland, Floyd Brant 1963 Assoc Prof Economics. BA Texas at Austin 1957, MA 1959, PhD 1964

McFarlane, Dale Donald 1965 Prof Business Administration. BA Washington 1960, MBA 1961; DBA Indiana 1966

McGee, Keane Bentley, Jr. 1979 Instr Mathematics. BS C of Idaho 1965; PhD Oregon State 1978

McGill, Lois Ann 1945-48, 1952 Prof Food Science and Technology. BS Oregon State 1945

McGrath, Edward Gorham 1965 Prof Emeritus Political Science

McGuire, William Saxon 1956 Prof Agronomy. BS Arkansas 1947; MS U of New Zealand 1951; PhD Washington State 1952

McIlvenna, Don Edward 1965 Assoc Prof History. AB Sacramento State 1952; MA California at Berkeley 1956; PhD Stanford 1966

McIntire, Charles David 1964 Prof Botany. BBA Southern Methodist 1954; BS Oregon State 1958, MS 1960, PhD 1964

McKalip, William Ward 1937-42, 1953 Assoc Prof Emeritus Physical Education

McKee, Walter Arthur 1973 Instr Forest Science. BS Vermont 1967

McKenzie,Frederick Francis 1944 Prof Emeritus Animal Science

McKie, William Robert 1978 Res Asst Climatic Research Institute. BS Western Illinois 1973, MS 1975

McKimmy, Milford D. 1953 Prof Forest Products. BS Michigan State 1949; MS Oregon State 1951; PhD New York State C of Forestry 1955

McKinney, Patricia S. 1981 Instr English. BA Oregon 1950; MAT Portland State 1967

McLaren, Earle Kenneth 1963 Asst Prof Emeritus Forest Engineering

McMahon, Robert Ormond 1966 Assoc Prof Forest Products Economics. BS Idaho 1951, MF 1953; PhD California at Berkeley 1962

McMorran, Jeffery Paul 1980 Res Asst Botany and Plant Pathology. BS California at Davis 1978

McMullen, Starr B. 1980 Asst Prof Economics. BA S.U.N.Y. at Stony Brook 1973; MA California at Berkeley 1976, PhD 1979

McNabb, David Howard 1978 Instr Forest Engineering. BSF Missouri 1970, MS 1972

McNamee, William A. 1975 Res Asst Agricultural and Resource Economics. BS Caifornia Polytechnic at Pomona 1973; MS Oregon State 1977

McNees, Ralph Edward 1979 Director of Publications Forestry (Asst Prof). BA Arkansas State 1962

McNeil, Charles 1965 Asst Prof Physical Education. BA San Jose State 1959; MEd Oregon State 1965

McNeil, William J. 1980 Assoc Prof Fisheries (Courtsey). BS Oregon State 1952, MS 1956; PhD Washington 1962

McNeilan, Ray Arthur 1958-71, 1977 Extn Agent (Assoc Prof). BS New Mexico State 1957; MS Oregon State 1958

McQuesten, Isabella Franklin 1948 Prof Emeritus Education

McWhorter, Frank Paden 1930 Prof Emeritus Plant Pathology

Meehan, Margaret Elizabeth 1970 Senior Instr History, Director University Honors Program. AB Rutgers 1948, MA 1950

Meehan, Thomas Richard 1962 Prof History. AB Rutgers 1949, MA 1951; PhD Wisconsin at Madison 1960

Meeks, Anna Ruth 1965 Prof Emeritus Education

Megale, Donald Manuell 1958 Assoc Prof Physical Education. BS Oregon State 1952, MEd 1958; PhD Utah 1970

Mehlig, Joseph Parke 1920 Prof Emeritus Chemistry

Mellen, Elaine H. 1979 Instr Home Economics Education. BS Idaho 1956; MHEc Oregon State 1968

Mellenthin, Walter M. 1950 Prof Horticulture, Superintendent, Mid-Columbia Experiment Station. BS Oregon State 1950, MS 1952

Menge, Bruce Allan 1976 Assoc Prof Zoology. BA Minnesota 1965; PhD Washington 1970

Menzies, David William 1974 Res Asst Oceanography. BS Washington 1967; MS Oregon State 1972

Meredith, Charlotte, 1973 Res Asst Oceanography. BA Lawrence U 1967; MS Stanford 1971; BFA Oregon State 1976

Meredith, Michael John 1979 Res Assoc Biochemistry and Biophysics. BA Kansas 1972; MS Western Kentucky 1974; PhD Virginia Polytechnic Institute 1977

Meredith. Robert Eugene 1959 Assoc Prof Chemical Engineering. BS California at Berkeley 1956, PhD 1959

Mesecar, Roderick Smit 1963 Assoc Prof Oceanography, Oceanography Technical Planning and Development. BS Oregon State 1956, MS 1958, EE 1964, PhD 1967

Meslow, Edwin Charles 1971 Assoc Prof Wildlife Ecology (Courtesy); Leader Oregon Cooperative Wildlife Research Unit, U.S. Fish and Wildlife Service. BS Minnesota 1959, MS 1966; PhD Wisconsin at Madison 1970

Messersmith, Ann M. 1978 Assoc Prof and Head Institution Management. BS Muskingum C 1959; MS Michigan State 1970; PhD Missouri at Columbia 1975

Metzger, Robert J. 1954 Prof Cytogenetics (Courtesy); Wheat Geneticist, USDA. BS Illinois 1948, MS 1949, PhD 1953

Metzger, Stuart Miles 1962 Assoc Prof Architecture and Landscape Architecture, Assoc Director Facilities Planning. BArch Washington 1961

Meyers, Theodore Richard 1980 Res Assoc Food Science and Technology. AAS Paul Smiths C 1970; BS Utah State 1972; MS Oregon State 1974; PhD Cornell 1980

Michael, Robert Emerson 1968 Assoc Prof Physical Education. BS North Central C 1962; MS Northern Illinois 1966; EdD Oregon 1972

Michael, Robert Ray 1947 Assoc Prof Emeritus Electrical and Computer Engineering

Michaels, Kathryn I. 1975 Instr English Language Institute, International Education. BA Westmont C 1971; MA Oregon 1975

Michalson, Nancy 1980 Head Coach Crew Athletics. BA Washington 1975

Michel, Frank Clifford 11970 Counselor, Counseling Center (Asst Prof). BS Washington State 1961;MEd Arkansas 1967; EdD Washington State 1974

Mikesell, Oscar Edwin 1934 Prof Emeritus (Linn County Extn)

Miles, Stanley Donovan 1966 Extn Economist (Assoc Prof). BS North Dakota State 1965; MS Oregon State 1971

Miller, Charles Benedict 1970 Prof Oceanography. BA Carleton C 1963; PhD California at San Diego 1969.

Miller, Donald Bruce 1974 Res Assoc Civil Engineering. BA Manchester C 1952; MS Ohio State 1955; PhD 1957; MS Oregon State 1975

Miller, Donald James 1961 Asst Prof Forest Products. BS Connecticut 1951; MF Yale 1954

Miller, Edward Lee 1969 Res Asst Forest Engineering. BA California at Berkeley 1966; MA San Diego State 1969

Miller, Elaine 1979 E.P.A. Technical Information Specialist Library (Instr). BA Fort Hays Kansas State 1966; BS Kansas State 1977; MA Denver 1967

Miller, James Carlton 1958 Prof Emeritus Animal Science

Miller, Jeffery Clark 1979 Asst Prof Entomology. BS California at Davis 1973, PhD 1977

Miller, Joan Marie 1980 Instr Mathematics. BS Nebraska 1973; MS Oregon State 1979

Miller, Kathleen Alice 1978 Res Asst Forest Science. BS Oregon State 1975

Miller, Larry John 1980 Res Assoc Zoology. BS S.U.N.Y. at Stony Brook 1973; MS Wisconsin at Milwaukee 1976; PhD Louisiana State 1979

Miller, Lorraine Theresa 1966 Assoc Prof Foods and Nutrition. BS Wisconsin at Madison 1953, MS 1958, PhD 1967

Miller, Ralph Howard 1970 Head Basketball Coach (Prof), Intercollegiate Athletics. BS Kansas 1942

Miller, Richard Frank 1977 Asst Prof Rangeland Resources, BS California State at Humboldt 1971; MS Oregon State 1974; PhD New Mexico State at Las Cruces 1977

Miller, Scott F. 1981 Physician Student Health Center (Assoc Prof). MD Creighton U 1974

Miller, Stanley Frank 1973 Director International Plant Protection Center, Assoc Prof Agricultural and Resource Economics. BS Brigham Young 1960; MS Utah State 1962; PhD Oregon State 1965

Miller, Terry L. 1970 Assoc Prof (Senior Research) Agricultural Chemistry. BA San Diego State 1964, MS 1965; PhD Oregon State 1969

Milleville, Howard P. 1969 Assoc Prof Emeritus (Extn Food Technology Specialist, Processing)

Milliken, Margaret 1947 Assoc Prof Resource Recreation Management. BS Oregon State 1942, MS 1947

Mills, Dallice I. 1976 Assoc Prof Botany and Plant Pathology. BS Wisconsin State C 1961; MS Syracuse 1964; PhD Michigan State 1969

Mills, William Willis 1954 Prof Emeritus Psychology

Miner, Betty Emery 1972 Instr Food and Nutriton. BS Kansas State 1959, MS 1960

Miner, John Ronald 1972 Prof Agricultural Enginerring. Head of Department. BS Kansas 1959; MSE Michigan 1960; PhD Kansas State 1967

Mingle, John Glenn 1960 Prof Mechanical Engineering. BSME Purdue 1942; MS Oregon State 1949

Minnick, Kenneth Clayton 1944 Assoc Prof Emeritus (Benton County Extn Agent)

Minnick, Miriam Sharp 1957 Prof Emeritus Library

Minore, Don 1966 Principal Plant Ecologist Forestry Sciences Laboratory, U.S. Forest Service; Asst Prof Forestry (Courtesy). BS Minnesota 1953;PhD California at Berkeley 1966

Miranga, Cristobal L. 1977 Res Assoc Agricultural Chemistry and Environmental Health Sciences Center. DVM U of the Philippines 1959; MS Virginia Polytechnical Institute 1971, PhD 1974

Mitchell, Gregg F. 1979 Clackamas County Extn Agent (Asst Prof). BS Arizona 1969, MS 1979

Mitchell, Maurice E. 1979 Extn Agent (Asst Prof). BSF Northern Arizona 1970, MSF 1972

Mitchell, Richard G., Jr. 1980 Asst Prof Resource Recreation Management. BA California State at Los Angeles 1970; MA Southern California 1974, PhD 1980

Mitchell, Velma Roberta 1958 Lane County Extn Agent (Assoc Prof). BS Oregon State 1945

Mix, Michael Cary 1970 Assoc Prof Biology General Science. BS Washington State 1963; PhD Washington 1970

Mobley, Robert Leon 1976 Res Asst Climatic Research Institute. BS Northeast Missouri State 1961

Mobley, Ronald T. 1968 Jefferson County Extn Chairman (Asst Prof). BS Oregon State 1967, MEd 1975

Moe, Harold William 1935-42 1949 Assoc Prof Emeritus Physical Education

Mohler, Ronald Rutt 1972 Prof Eletrical and Computer Engineering. BS Pennsylvania State 1956; MS Southern California 1958; PhD Michigan 1965

Mok, David W. S. 1975 Assoc Prof Horticulture, BSc National Taiwan U 1967; MSc Guelph 1970; PhD Wisconsin at Madison 1975

Mok, Machteld C. 1975 Assoc Prof (Senior Research) Horticulture. BS U of Wageningen (The Netherlands) 1969;MS Wisconsin at Madison 1973, PhD 1975

Moldenke, Alison Feerick 1980 Res Assoc Entomology. BA Wellesley C 1964; MA Wesleyan U 1966; PhD Stanford 1973

Moldowan, Mervin John 1976 Assoc Prof Pharmacology and Toxicology. BSP U of Saskatchewan 1963; MSc U of British Columbia 1968, PhD 1972

Moltmann, Karl Herman 1956 Assoc Prof Emeritus Music

Monaco, Philip Anthony 1980 Res Asst Nutrition Research Institute. BS Oregon State 1978

Monroe,Cal Graham 1942 Prof Emeritus (Asst State 4-H and Youth Leader)

Montgomery, Marvin Leonard 1954 Senior Instr Agricultural Chemistry. BA Linfield 1954

Montgomery, Morris W. 1961 Prof Food Science and Technology. BS North Dakota State 1951, MS 1957; PhD Washington State 1961

Moon, Barbara Gwenn 1981 Res Asst Health and Physical Education. BS Oregon State 1981

Moor, Helen Sterling 1926-28, 1954-1966 Dean Emeritus of Women (Prof Emeritus)

Moore, Ben Adams 1972 Res Asst Oceanography. BS Oregon State 1972; AA Linn-Benton CC 1978

Moore, Bernard Jerry 1970 Senior Instr Emeritus Plant Pathology

Moore, Daniel Louis 1979 Res Asst Botay and Plant Pathology. BA Indiana State at Evansville 1976; MS Purdue 1979

Moore, Duane Grey 1965 Research Soil Scientist (Courtesy Assoc Prof) U.S. Forest Service. BS Wisconsin at Madison 1953, MS 1955, PhD 1960

Moore, Frank Ludwig 1975 Asst Prof Biology (Zoology). BA C of Wooster 1967; MA Colorado 1974, PhD 1974

Moore, Harvey Lee 1976 Res Asst Sea Grant, Coordinator Consortium for International Fisheries and Aquaculture Development. BS Oregon State 1948; MS Hawaii 1950

Moore, James A. 1979 Extn Agricultural Engineer (Assoc Prof). BS California Polytechnic 1962; MS Arizona 1964; PhD Minnesota 1975

Moore, Kathleen Dean 1975 Asst Prof Philosophy. BA C of Wooster 1969; MA Colorado 1971, PhD 1977

Moore, Larry Wallace 1969 Assoc Prof Plant Pathology. BS Idaho 1962, MS 1964; PhD California at Berkeley 1970

Moore, Margaret Louise 1980 Asst Prof Education. BS Oregon State 1965, MS 1966, PhD 1981

Moore, Sandy 1973 Res Asst Oceanography. BS Michigan 1968; MS Florida State 1972

Moore, Sylvia Lee 1966 Director Women's Intercollegiate Athletics, Assoc Prof Physical Education. BS Washington 1963; MS Oregon 1966, PhD 1980

Moore, Thomas Carrol 1963 Prof Botany and Chairman of Department. BA North Texas State 1956; MA Colrado 1958, PhD 1961

Moran, Douglas B. 1980 Asst Prof Computer Science. SB M.I.T. 1973; MS Michigan 1975, PhD 1980

Moran, James E. 1981 Instr Computer Science. BS Montana State 1960; MS Utah State 1966

Morehouse, Jim W., Jr. 1980 Instr Physical Education. BS Washington State 1966; MS Portland State 1973

Morgan, John Blagdon 1974 Res Asst Oceanography. BA Linfield C 1970; MS Portland State 1974

Morgan, Max Eugene 1970 Prof Emeritus Food Science and Technology

Morita, Richard Yukio 1962 Prof Microbiology and Oceanography. BS Nebraska 1947; MS Southern California 1949; PhD Scripps Institution of Oceanography 1954

Mork, Colleen 1977 Res Asst Crop Science. BS Montana State 1976

Morray, Marjorie Kuh 1968 Asst Prof International Education English Language Institute. AB Chicago 1940; MA California at Berkeley 1964; PhD Oregon State 1978

Morris, Frank E. 1979 Track Coach (Instr). MS Oregon 1971

Morris, James Madison 1928 Prof Emeritus (Division of Continuing Education)

Morris, John Edward 1968 Assoc Prof Zoology. BA Stanford 1958; MS Hawaii 1960; PhD UCLA 1966

Morris, John William 1980 Res Asst Forest Science. BS Michigan State 1976; MS Oregon State 1979

Morris, Robert James, Jr. 1965 Assoc Prof History of Science General Science. BS U.S. Military Academy 1954; MGE (Geological) Oklahoma 1961; PhD 1965

Morris, Roy Owen 1961 Prof Chemistry, Agricultural Chemistry. BSc London 1955, PhD 1959

Morrow, Alice Mills 1980 Extn Family Economics Specialist (Assoc Prof). BS Massachusetts 1962; MA Michigan State 1965; JD Louisville 1973

Moser, John Christian 1979 Res Asst Oceanography. BS Dickinson C 1971; MS Oregon State 1979

Moser, Ruth Annetta 1946 Assoc Prof Emeritus Clothing, Textiles, and Related Arts

Mosby, Dale Earl 1976 Res Asst Oceanography. BS Oregon State 1976

Mosher, Wayne Delbert 1948 Prof Emeritus Douglas County Extn

Mosley, Alvin Ray 1978 Assoc Prof Crop Science Agronomist. BA Kentucky 1965, MS 1968; PhD Oregon Stte 1972

Moss, Dale Nelson 1977 Prof Crop Science, Head of Department. BS Ricks C 1956; MS Cornell 1956, PhD 1959

Motamedi, Kurt K. 1974 Assoc Prof Business Administration. BSEE San Jose State 1966; MSEE California at Santa Barbara 1969; MBA UCLA 1971, PhD 1974

Mrazek, Robert Vernon 1960 Prof Chemical Engineering. BS Purdue 1957; PhD Rensselaer Polytechnic Institute 1960

Muckleston, Keith Way 1964 Assoc Prof Geography. BA Washington 1970; MA 1963; PhD 1970. On sabbatical 1982-83

Mukatis, W. Alfred 1980 Asst Prof Business Administration. BS Northwestern U 1960; PhD Cal Tech 1964; JD Illinois 1976

Mumford, Dwight Curtis 1938 Prof Emeritus Agricultural and Resource Economics

Mumford, Ira Daniel 1976 Multnomah County Extn Agent (Instr). AA Portland Community C 1966

Mundy, Bruce Carl 1980 Res Asst Oceanography. BS Long Island U 1972

Munford, James Kenneth 1939-46, 1948 Prof Emeritus Education (Director Emeritus Publications and OSU Press)

Munro, Alan Alexander 1962 Prof Art BA George Peabody C 1952; MFA Wichita State 1956

Munroe, Clifford E. 1979 Weed Control Specialist, Res Asst Crop Science, International Plant Protection Center. BS Loma Linda U 1973; MS Hawaii 1976

Murdzek, Benjamin Peter 1967 Prof History. BA American U 1950, PhD 1960

Murphy, Allan H. 1979 Prof (Senior Research) Atmospheric Sciences. BS MIT 1954; MA Michigan 1963, PhD 1974

Murphy, Lea Frances 1980 Asst Prof Mathematics. BA Temple U 1976; PhD Carnegie-Mellon 1980

Murphy, Thomas A. 1963-66, 1968 Director Human Services Program, Assoc Prof Psychology. BA Michigan State 1959, MA 1961

Murray, RJay 1966 Res Assoc Computer Center. BS Utah 1957; MS Auburn 1966

Murry, Donald A. Jr. 1979 Asst Football Coach. BSE Arkansas A & M 1966

Musser, Gary Loren 1972 Assoc Prof Mathematics. BS Michigan 1961, MS 1963; PhD Miami (Florida) 1970

Muth, Otto Herbert 1929 Prof Emeritus Veterinary Medicine

Myers, H. Joe 1948 Prof Emeritus (Asst Director Extn Service)

Myers, William N. 1981 Asst Prof Naval Science. BS Oregon State 1970; MBA National U 1981

Myhrum, David Ray 1978 Asst Prof Architecture and Landscape Architecture. BS Oregon State 1970; MLA Illinois 1972

Myrin, Steven P. 1981 Instr (Courtesy) Veterinary Medicine. MVZ New Mexico 1981

N

Naffziger, Ken C. 1971 Counselor, Counseling Center (Asst Prof). BA Carthage 1958; MA Moorhead State 1964; PhD Oregon 1971

Nagy, Rebecca A. 1979 Res Asst Crop Science. BS Idaho 1975, MS 1977

Nakaguma, Spencer T. 1980 Asst Prof Naval Science. BS US Naval Academy 1976

Nakaue, Harry Sadao 1975 Assoc Prof Poultry Science. BS California State Polytechnic U 1959; MS Arizona 1963, PhD 1966

Narasimhan, Mysore Narasimhaiyengar Lakshmi 1966 Prof Mathematics. BS U of Mysore, MS 1951; PhD Indian Institute of Technology (Kharagpur) 1958.

Nason, Debora Ann 1981 Res Asst Columbia Basin Agricultural Experiment Station. BA Chadron State C 1977; MS Colorado State 1981

Nath, John Henry 1970 Prof Civil and Mechanical Engineering; Director, OSU Fluid Dynamics Laboratory. BS Colorado 1952, MS 1960; PhD MIT 1967

Neal, Victor Thomas 1964, 1966 Asst Dean and Assoc Prof Oceanography. BS Notre Dame 1948; MEd North Dakota 1954; PhD Oregon State 1965. On sabbatical 1981-82

Nelson, A. Gene 1969 Acting Department Head and Prof Agricultural and Resource Economics. BS Western Illinois 1964; MS Purdue 1967, PhD 1969

Nelson, David M. 1977 Assoc Prof Oceanography. AB Dartmouth 1969; PhD Alaska 1975

Nelson, Donna Christine 1974 Asst Prof Human Development and Family Studies. BS Central Washington State 1968; MS Iowa State 1971

Nelson, Earl Edward 1963 Assoc Prof Plant Pathology (Courtesy); Plant Pathologist, Forestry Sciences Laboratory. BS Oregon State 1957, PhD 1962

Nelson, Esther Hillila 1979 Res Asst North Willamette Experiment Station. BA California Lutheran C 1966; MA Northwestern 1967; BS Connecticut 1976; MS 1977

Nelson, Herbert Benjamin 1927 Prof Emeritus English

Nelson, Julius Loren 1975 Research Agronomist Central Oregon Experiment Station (Asst Prof). BS Wyoming 1959, MS 1963; PhD Wisconsin at Madison 1968

Nelson, Paul Burgert 1959 Assoc Prof English. BA Wesmar C 1951; MA Colorado 1955, PhD 1966

Nelson, Peter Oliver 1975 Assoc Prof Civil Engineering. BS Cornell 1968, MS 1972, PhD 1975

Neshyba, Stephen Joseph 1965 Prof Oceanography. BS Texas at Austin 1949, MS 1954; PhD Texas A&M 1965

Ness, Bradford A. 1979 Instr Art. BFA Oregon State 1979

Ness, Gordon Everett 1969 Res Assoc Oceanography. BS California State at Hayward 1969; MS Oregon State 1972

Neugart, Zelma R. 1955-63, 1977 Assoc Prof Emeritus (Gilliam County Extn).

Nevue, Patricia Ann 1978 Women's Tennis Coach (Instr). BS Oregon State 1974; MS U of Puget Sound 1978

Newberger, Priscilla Anne 1981 Res Assoc Oceanography. BS MIT 1964;PhD Oregon State 1981

Newberger, Stuart Marshall 1969 Assoc Prof Mathematics. BEE City C of New York 1960; PhD MIT 1964.

Newburgh, Robert Warren 1953 Prof Emeritus Biochemistry

Newcomb, Gene B. 1976 Res Assoc Botany and Plant Pathology. BA California at Berkeley 1952, PhD 1962

Newell, Ben Allen 1944 Prof Emeritus (Marion County Extn)

Newman, James C. 1971 Consultant Student Health Center (Assoc Prof). BS Oregon 1954;MD U of Oregon Medical School 1958

Newton, Byron Louis 1947-48, 1949 Prof Emeritus Business Administration

Newton, Michael 1960 Prof Forest Science. BS Vermont 1954; BS Oregon State 1959, MS 1960, PhD 1964

Neyhart, Charles Amos, Jr. 1973 Assoc Prof Business Administration. BS Pennsylvania State 1968, MBA 1969, PhD 1973

Nibler, Joseph William 1967 Prof Chemistry. BS Oregon State 1963;PhD California at Berkeley 1966

Nibler, William Gerald 1940 Prof Emeritus (Asst Director, Extension Service)

Nice, Karl Jacob 1969 Asst Prof Science Education. BS Indiana State 1958, MS 1965; PhD Iowa 1969

Nichols, Mitchell R. 1979 Instr Industrial and General Engineering. BA California State at Chico 1977; MS Oregon State 1979

Nicodemus, David Bowman 1950 Prof Physics, Dean of Faculty. AB DePauw 1937; PhD Stanford 1946

Nielsen, James Frederick 1974 Assoc Prof Business Administration. BME General Motors Institute 1967; MBA Colorado 1969, DBA 1972

Niem, Alan Randolph 1970 Assoc Prof Geology. BS Antioch 1966; MS Wisconsin at Madison 1969, PhD 1971

Niiler, Pearn Peter 1974 Prof Oceanography. BSc Lehigh 1960; PhD Brown 1964.

Nixon, Joseph Eugene 1968 Prof (Senior Research) Food Science and Technology. BS Illinois 1961, PhD 1965

Nolan, Mary Lee 1973 Assoc Prof Geography. BA Louisiana State 1957; MA Sam Houston State 1963; MA Texas at Austin 1967; PhD Texas A&M 1972

Nooteboom, Anne-Sabine 1980 Res Asst Microbiology. BS, BS Oregon State 1980

Nordheim, John Prescott 1978 Morrow County Extn Agent (Asst Prof). BS Washington State 1975, MS 1981

Norgren, Marthanne Burow 1980 Instr Education. BS Maine 1956; MLS Oregon 1978

Norris, Faith Grigsby 1947 Prof Emeritus English

Norris, Logan A. 1961 Assoc Prof Agricultural Chemistry and Prof Forest Science (Courtesy); Chief Research Chemist, Project Leader, USDA. BS Oregon State 1961, MS 1964; PhD 1970

Norris, Thomas Hughes 1947 Prof Emeritus Chemistry

Northam, Ray Mervyn 1966 Prof Geography. BS Oregon State 1953, MS 1954; PhD Northwestern 1960

Northcraft, Martin Ellis 1955 Assoc Prof Civil Engineering. BS Oregon State 1955

Notwehr, Alan John 1981 Res Asst Botany and Plant Pathology. AA Iowa Western Community C 1977; BS Iowa State 1980

Novotny, Raymond E. 1952 Prof Emeritus Malheur County Extn

O

Oades, John D. 1973 Program Director Agriculture Education (Asst Prof)). BS Oregon State 1968, EdM 1972; PhD Colorado State 1976

Oberhettinger, Fritz 1958 Prof Emeritus Mathematics

Obermiller, Frederick W. 1974 Extn Economist. Assoc Prof Agricultural and Resource Economics. AB Missouri at Columbia, PhD 1969

Obermire, Robert Francis 1968 Instr Botany. BS Portland State 1963

O'Brien, Dennis T. 1980 Agricultural Economist International Plant Protection Center (Asst Prof). BS Sydney 1970; MS Manitoba 1975; PhD Oregon State 1980

O'Connor, Carl William 1975 Extn Marketing Economist, Assoc Prof Agricultural and Resource Economics. BS California State Polytechnic U (Pomona) 1968; MS Massachusetts 1972; PhD Oregon State 1974

O'Connor, J. Jerry 1970 Asst Prof Social Science; Director, Advising and Student Services, Director of Liberal Studies, College of Liberal Arts. BA Loras C 1958; MA Mt St Marys 1963; EdD U of the Pacific 1970

O'Connor, John Alan 1949 Prof Emeritus Music and Music Education

Oester, Louis Milton 1955 Staff Development Leader, Extension Service (Prof). BS Oregon State 1949, EdM 1952; EdD North Carolina State 1973

Oester, Paul Thomas 1980 Extn Agent Forestry (Asst Prof). BS Oregon State 1972, MS 1977

Oh, Suk Y. 1980 Director Nutrition Research Institute (Asst Prof). BS Kon Kuk U 1965; MS U of Guelph 1971; PhD Colorado State 1974

O'Hara, Richard Knight 1981 Res Assoc Zoology. BS Michigan State 1972, MS 1974; PhD Oregon State 1981

Ohvall, Richard Arthur 1976 Dean and Prof of Pharmacy. BS U of Wisconsin 1953, MBA 1959, PhD 1962

Oldfield, James Edmund 1949 Prof Animal Nutrition, Head of Department of Animal Science. BSA British Columbia 1941, MSA 1949; PhD Oregon State 1951

O'Leary, John Elmer 1949 Prof Forest Engineering. BSF Michigan 1942; MF Oregon State 1947

Oles, Keith Floyd 1961 Prof Geology. BS Washington 1943, MS 1952, PhD 1956

Oliveira, Ronald Anthony 1976 Assoc Prof Agricultural and Resource Economics (Courtesy). BS California at Berkeley 1968; MS California at Davis 1969, PhD 1973

Olleman, Roger Dean 1959 Prof Metallurgical Engineering (Courtesy). BS (Mech Engr), Washington 1948; MS (MetE) Carnegie Institute of Technology 1950; PhD Pittsburgh 1955

Olsen, Eldon Dale 1976 Assoc Prof Forest Engineering. BS Utah 1966; MS Montana State 1969; PhD Oregon State 1979

Olson, Geraldine I. 1975 Assoc Prof Family Resource Management, Head of Department. BS Wisconsin at Madison 1961; MS Cornell 1965; PhD Ohio State 1975

Olson, Robert Eldon 1968 Assoc Prof (Senior Research) Fisheries. BA Concordia C (Moorhead, Minnesota) 1962; MS Montana State 1964, PhD 1968

Oman, Paul Wilson 1967 Prof Emeritus Entomology

Oman, Paul Wilson, Jr. 1979 Res Asst Computer Science. BS Oregon State 1975, MS 1979. On leave 1981-82

O'Neill, John Philip 1966 Prof Human Development and Family Studies. BS Oregon State 1959, MS 1961; PhD Florida State 1963

O'Neill, Kevin 1980 Athletic Trainer, BS Pittsburgh 1976; MS Arizona 1977

O'Neill, Paul V. 1980 Res Asst Oceanography. BA California at San Diego 1981

Onstad, Preston Eugene 1956 Asst Prof Emeritus English

Oorthuys, Hendrik Jacob 1941-44, 1957 Assoc Prof Emeritus Electrical and Computer Engineering

Oriard, Michael Vincent 1976 Assoc Prof English. BA Notre Dame 1970; PhD Stanford 1976

Orzech, Miriam W. 1965 Director Educational Opportunities (Assoc Prof). BA California at Berkeley 1953; MA Oregon State 1969, PhD 1974

Orzech, Ze'ev B. 1957 Assoc Prof Economics. BS California at Berkeley 1950, MS 1977

Osborn Katherine Hughes 1929 Prof Emeritus (Science-Technology Librarian)

Osborne, Owen Dale 1971 Program Leader Energy Extn, Asoc Prof Electrical and Computer Engineering. BS Missouri at Columbia 1966; MS Oklahoma State 1967, PhD 1972

O'Shea, John Patrick 1962 Prof Physical Education. BA Michigan State 1960, MA 1962; EdD Utah 1970

Osis, Vicki Jean 1971 Extn Marine Education Specialist (Asst Prof). BS Southwest Missouri State 1965;MA Missouri at Columbia 1968

Osterman, Dean Newell 1973 Director Instructional and Faculty Development (Assoc Prof). BS Oregon C of Eduation 1966, MS 1972; MS Oregon 1968, PhD 1975

Otley, Fred Isadore 1978 Extn Agent (Instr). BS Oregon State 1977

Ottaway, George Hollis 1941 Assoc Prof Emeritus, Marion County Extn Agent

Overholser, Donald Lee 1965 Asst Prof (Courtesy) Microbiology. BS Oregon State 1961, MS 1968

Overholser, Jean Satterlee 1955 Asst Prof Emeritus Mathematics

Overton, Walter Scott 1965 Prof Statistics. BS Virginia Polytechnic Institute 1948, MS 1950; PhD North Carolina State 1964

Oviatt, Sharon L. 1981 Asst Prof Human Development and Family Studies. BA Oberlin C 1972;MA U of Toronto 1974, PhD 1979

Ovitz, Janet M. 1981 Asst Prof Anthropology. MA New Mexico 1969; MA Colorado 1972, PhD 1978

Ovregaard, Arthur L. 1979 Consultant Student Health Center (Assoc Prof). BA C of Idaho 1944;MD U of Oregon Medical School 1948

Owczarzak, Alfred 1955 Assoc Prof Zoology. BS Cornell 1944; PhD Wisconsin at Madison 1953

Owen, Sydney John Thomas 1975 Prof Electrical and Computer Engineering. Head of Department. BSc Nottingham (England) 1957,PhD 1961

Owston, Constance Jean 1981 Res Asst Food Science and Technology. BS Michigan 1963

Owston, Peyton Wood 1969 Plant Physiologist, Assoc Prof (Courtesy). Forestry Sciences Laboratory, U.S. Forest Service. BS Michigan 1960, MF 1962, PhD 1966

P

Paasche, Olaf Gustav 1946 Prof Emeritus Metallurgical Engineering

Packard, Earl Leroy 1932 Prof Emeritus Geology

Padfield, Harland Irvine 1972 Prof Anthropology. BA San Diego State 1950;MA Arizona State 1952; PhD Arizona 1964

Page, Glen Ellis 1949 Assoc Prof Emeritus Agricultural Engineering

Pahl, Janet Maurene 1976 Clatsop County Extn Agent (Instr). BS Kearney State C 1968

Pahre, Richard Eugene 1956 Director of Financial Aid (Prof). BSC Iowa 1950, MA 1954

Paine, David Philip 1962 Assoc Prof Forest Management. BS Oregon State 1953, MS 1958; PhD Washington 1965

Pak,Hasong 1969 Assoc Prof (Senior Research)Oceanography. BS Republic of Korea Naval Academy 1956;MS U.S. Naval Post Graduate School 1961; PhD Oregon State 1970

Palfrey, Kennard Miller, Jr. 1981 Instr Oceanography. BS US Coast Guard Academy 1956;MS Washington 1967

Palmer, Constance Mardee 1968 Senior Istr Business Education. BS, Kansas State Teachers C (Emporia) 1959; MS Southern California 1963

Pan, Hua-Lu 1980 Asst Prof Atmospheric Sciences. BS Taiwan 1970; MA Temple 1973; MS Florida State 1975, PhD 1979

Paolo, Dorris June 1981 Instr English. BA Arizona 1959; MA Southeast Missouri State 1973, MA 1977; MA Wahington U 1980

Park, Joseph Kenneth 1963 Assoc Prof Agricultural Engineering (Courtesy); Agricultural Engineer USDA. BS Missouri at Columbia 1937; MS Minnesota 1940

Parker, Douglas Stuart 1981 Res Asst Environmental Remote Sensing Applications Laboratory. BA California at Santa Barbara; MS Oregon State 1981

Parker, James Roland 1926 Assoc Prof Emeritus (Douglas County Extn Agent)

Parker, Jesse Elmer 1946 Prof Emeritus Poultry Science

Parks, Frank Lovern 1949 Prof Emeritus Sociology

Parks, Harold Raymond 1977 Asst Prof Mathematics. AB Dartmouth 1971; PhD Princeton 1974

Parks, Leo W. 1958 Prof Microbiology. BS Illinois 1952; AM Indiana 1953; PhD Washington 1956

Parrott, Keith Adrian 1976 Asst Prof Pharmacy. BS Idaho State 1970; Pharm D Kentucky 1976

Parsons, Jacque E. 1965 Clackamas County Extn Agent (Prof). BS West Virginia 1957; MS Maryland 1962

Parsons, Theran Duane 1955 Prof Chemistry; Acting Vice President for Administration. BS Washington 1949;PhD 1953

Paschke, Paul Edward 1969 Assoc Prof Business Administration. SB Chicago 1962, MBA 1964; DBA Indiana 1970

Passon, David Edward 1960 Douglas County Extn Agent (Assoc Prof). BS Oregon State 1959;MS Michigan State 1969

Pastorek,Christine 1980 Instr Chemistry. BS San Francisco 1974;PhD Oregon State 1980

Patt, John Anthony, Jr.1977 Res Assoc Fisheries. BS U of Dayton 1966; MS West Virginia 1968; PhD Pennsylvania State 1972

Patterson, Joan 1936 Prof Emeritus Clothing, Textiles, and Related Arts.

Patterson, Joyce Elaine 1959 Extn Communication Specialist (Asst Prof). BA South Dakota 1954;MA Oregon State 1973

Patterson,Kenneth Denton 1958 Prof Economics, Department Chair. BS Iowa State 1951;MA Nebraska 1956, PhD 1961

Patton, Nephi Monroe 1972 Director, Laboratory Animal Resources. Prof Veterinary Medicine. BS Utah Sate 1958; DVM California at Davis 1962; PhD Missouri at Columbia 1972

Paul, William Howard 1926 Prof Emeritus Mechanical Engineering

Paulsen, Lenore Maxine 1969 Douglas County Extn Agent (Asst Prof). BS South Dakota State 1956; MS Oregon 1977

Paulson, Clayton Arvid 1971 Prof Oceanography. BA Augsburg C 1960;PhD Washington 1967

Paumier, James Orrin 1981 Res Asst Atmospheric Sciences. BA California State at Fullerton;MS Oregon State 1981

Pawlowski, Norman Edward 1968 Assoc Prof (Senior Research) Food Science and Technology. BS Southern Oregon State 1961;PhD Oregon State 1965

Pearcy, William Gordon 1960 Prof Oceanography. BS Iowa State 1951, MS 1952; PhD Yale 1950

Pearson, Erwin Gale 1981 Assoc Prof Veterinary Medicine. BS Oregon State 1954, MS 1979; DVM Cornell 1958

Pearson, George Denton 1971 Assoc Prof Biochemistry and Biophysics. BS Stanford 1964, PhD 1969

Pearson, Margot Noall 1971 Res Assoc Agricultural Chemistry. BS Oregon 1963; PhD Stanford 1970

Pease, James Robert 1973 Assoc Prof Geography; Extn Land Resource Management Specialist. BA Massachusetts 1960,MS 1970, PhD 1972

Peck, Mariol Ruth 1968 Social Sciences and Humanities Librarian (Assoc Prof). BA Linfield 1967; MLS California at Berkeley 1968; MA Oregon 1980

Peckham, Charles Wesley 1965 Director of Printing (Asst Prof). BS California State Polytechnic U at San Luis Obispo 1958

Peddicord, Kenneth Lee 1975 Assoc Prof Nuclear Engineering. BSME Notre Dame 1965;MS Illinois 1967, PhD 1972

Pelofske, Peter Joseph 1980 Res Asst North Willamette Experiment Station. BA Winona State 1969;MAR Evangelical Theological Seminary 1973; MS Oregon State 1977

Penn, John Roger 1972 Director, Special Programs; Asst to the Vice President for Student Services; Asst to the President for Academics Relations; Assoc Prof Education. BA Colorado State 1967, MS 1968;PhD Oregon State 1972

Peper, Joanne 1981 Res Asst Oceanography. BS Fort Lewis C 1978

Perkins, Harley Almon, Jr. 1966 Assoc Prof Electrical and Computer Engineering (Courtesy). BS Pittsburgh 1950,MSEE 1958

Perrigan, Shelton C. 1979 Res Asst Crop Science. BS Oregon C of Education 1975

Perry, David Anthony 1977 Asst Prof Forest Science. MS Florida 1966; MS Montana State 1971,PhD 1974

Perry, Joanne Marion 1979 Map Librarian (Instr). BA Arizona 1971;MSLS Kentucky 1972; MA Arizona 1976

Perry, William McGuire 1945 Asst Prof Emeritus (Yamhill County Extn Agent)

Persson, P. Ola G. 1980 Res Asst Atmospherical Sciences. BA Pennsylvania State 1977; MS Washington 1980

Peters, Gary Lee 1970 Res Asst Entomology. BA LaVerne C 1963

Peters, Jean McLeod 1958 Assoc Prof Foods and Nutrition. BHE British Columbia, 1950;MS Oregon State 1964

Petersen, Bent Edward 1968 Prof Mathematics. BS British Columbia 1964;PhD MIT 1968

Petersen, Charlie F. 1980 Prof Poultry Science (Courtesy). BS Idaho 1940, MS 1946

Petersen, Ray Olaf 1953 Prof Emeritus (Klamath County Extn Agent)

Petersen, Robert Gene 1955, 1965 Prof Statistics. BS Iowa State 1949,MS 1950;PhD North Carolina State 1954

Peterson,Ernest Walter 1969 Assoc Prof (Senior Research) Atmospheric Sciences. BS UCLA 1962; PhD Pennsylvania State 1969

Peterson, Gary L. 1980 Res Asoc Biochemistry and Biophysics. BA California at Irvine 1967;MS Hawaii 1969; PhD Oregon State 1975

Peterson, Jack O. 1979 PMC Manager Crop Science Experimental Station (Courtesy Asst Prof). BS Brigham Young 1958

Peterson, John 1964 Assoc Prof Civil Engineering. BS South Dakota State 1951; MS Illinois 1959; PhD Wisconsin at Madison 1964

Peterson, Kermit Joseph 1959 Prof Emeritus Veterinary Medicine

Petridis, Dimitris 1981 Res Assoc Chemistry. BS U of Athens 1962; MS Georgetown U 1966; PhD Notre Dame 1968

Petzel, Florence Eloise 1954-61, 1967 Prof Emeritus Clothing, Textiles, and Related Arts

Pfanner, John Adams, Jr. 1946 Prof Emeritus Business Administration

Pfeil, John Frederick 1979 Asst Prof English. BA Amherst C 1971; AM Stanford 1973

Phelps, David Walton 1965 Prof Health, Department Chair. BS Oregon C of Education 1956; MS Oregon 1959; MPH California at Berkeley 1962, EdD 1964

Phelps, Robert Elton 1968 Assoc Prof Civil Engineering. BS Alaska 1957; MS Stanford 1958

Philipp, Kurt David 1963 Assoc Prof History. BA UCLA 1956; MA Colorado 1958; PhD Kansas 1969

Phillips, Maryann Katherine 1967 Counselor, Counseling Center (Asst Prof). BA Miami (Ohio) 1952;MEd Oregon State 1967

Phillips, Mary Ellen 1973 Asst Prof Business Administration. BA Washington 1956; MBA Oregon State 1973

Phillips, Robert Lee 1957 Prof Journalism. AB Miami (Ohio) 1952;MS Illinois 1954; PhD Oregon 1966

Phinney, Harry Kenyon 1947 Prof Botany. BA Cincinnati 1941; MA Albion 1943; PhD Northwestern 1945

Phipps, Wanda Lee 1951-52, 54-56, 1971 Multnomah County Extn Agent (Asst Prof). BS Linfield 1949; MS Portland State 1979

Piepmeier, Edward Harman 1966 Prof Chemistry. BS Northwestern 1960; PhD Illinois 1966

Pierce, Donald Alan 1966 Prof Statistics. BS Oklahoma State 1961, MS 1962, PhD 1965

Pilcher, K. Stephen 1951 Prof Emeritus Microbiology

Pillsbury, Ronald Dale 1967 Assoc Prof (Senior Research) Oceanography. BA Chico State 1961; MA California at Davis 1964; PhD Oregon State 1972

Pirelli, Gene Jack 1979 Polk County Extn Agent (Asst Prof). BS Oregon State 1977, MS 1979

Pisias,Nichlas G. 1981 Asst Prof Oceanography. BA San Francisco State 1970; MS Oregon State 1974;PhD Rhode Island 1978

Pitman, Gary Boyd 1976 Assoc Prof Forest Science. BS California at Davis 1960; MS Oregon State 1962, PhD 1964

Pittock, Henry L. 1974 Res Asst Oceanography. BS Oregon State 1963, MS 1968

Pitts, G. Stephen 1979 Res Asst Geophysics. BS California State C at Stanislaus 1973;MS Oregon State 1979

Plambeck, Hans Heinrich 1946 Prof Emeritus Sociology

Plant, Thomas Kent 1978 Asst Prof Electrical and Computer Engineering. BS Kansas State 1968; MS Iowa State 1969; PhD Illinois 1975

Plants, Constance Patricia 1960-66, 1967 Coordinator of Home Economics Learning Resource Center (Senior Instr). BS Oregon State 1947

Plonk, Martha Amanda 1952 Prof Emeritus Family Resource Management

Polensek, Anton 1965 Assoc Prof Forest Products (Structural Engineer). Dipl in Civil Engineering,U or Ljubljana, Yugoslavia 1962; MS Oregon State 1969; PhD 1972

Polensek, Helen M. 1968 Instr English Language Institute, International Education. BA Houghton C 1960; MA Michigan 1963

Poling, Dan Williams 1937 Dean Emeritus of Men (Prof Emeritus)

Poling, Dow Peter 1963 Assoc Prof Physical Education.BS Oregon State 1956, EdM 1963; PhD Illinois 1972

Poling, Helen Virginia 1956 Senior Instr Emeritus Physical Education

Pollard, David 1980 Res Assoc Climatic Research Institute. BA Christ's C, Cambridge 1973, MA 1973; MS Cal Tech 1974, PhD 1978

Poocharoen, Duangduen 1979 Res Ast Food Science and Technology. BSc Chulalongkorn U (Thailand) 1968; MST Portland State 1973

Poole, Albert Roberts 1946 Prof Emeritus Mathematics

Poole, Arthur Parker 1975 Coos County Extn Agent (Assoc Prof). BA Northeastern 1965; BS Oregon State 1969, MAgr 1971

Poole, Robert Howe 1981 Assoc Prof Military Science. BA California at Berkeley 1960; JD Hastings C of Law 1963

Popovich, Milosh 1947 Prof Emeritus Mechanical Engineering, Vice President Emeritus for Administration

Porter, Paul E. 1981 Res Assoc Agricultural Chemistry,. BA San Diego State 1941; PhD Iowa State 1951

Porter, Stan Albert 1980 Coordinator Youth Traffic Safety Project (Instr). BS Oregon C of Education 1974; MS Oregon State 1978

Post, Wilmer H. 1966 Asst to the President, Assoc Prof Business Administration. BS Oregon State 1960; MBA California at Berkeley 1961

Postman, Joseph D. 1979 Res Asst Horticulture. BS Maryland 1976

Potter, John Richard 1976 Plant Physiologist USDA/SEA (Courtesy Assoc Prof). BS Virginia Polytechnic 1961; MS Arizona 1964, PhD 1970

Potter, Sandra J. W. 1977 Res Assoc Zoology. BA Minnesota 1960; MAT C of St. Thomas 1963; MS Arizona 1967, PhD 1970

Potts, Willard Charles 1959 Prof English. BA Washington 1952, MA 1956, PhD 1969

Powelson, Mary Lois 1972 Asst Prof Botany and Plant Pathology. BS Bloomsburg State C 1963;MS Michigan State 1965; PhD Oregon State 1972. On leave 1982-83

Powelson, Robert Loran 1956 Prof Plant Pathology. BS Utah State 1951, MS 1956; PhD Oregon State 1959. On sabbatical 1982-83

Powers, V. Michael 1977 Assoc Prof Electrical and Computer Engineering. BSE Michigan 1963, MSEE 1964, PhD 1970

Pratt, Clara Collette 1978 Director Program on Gerontology. Asst Prof Human Development and Family Studies. BA Gonzaga 1970; MS Oregon 1972, PhD 1974

Price, Catherine Hallene 1955 Asst Prof Emeritus (Union County Extn Agent)

Pritchard, Austin Wyatt 1953 Prof Zoology. AB Stanford 1948, MA 1949; PhD Hawaii 1953

Pritchett, Harold Duane 1957 Prof Civil Engineering. BS Oregon State 1957,MS 1961; DE Stanford 1965

Proebsting, William Martin 1980 Asst Prof Horticulture. BS Washington 1973; PhD Cornell 1978

Perotasel, Greg John 1977 Asst Prof Political Science. BA Redlands 1969; MA Michigan 1970, PhD 1977

Pumphrey, Floyd Vance 1957 Prof Agronomy, Columbia Basin Agricultural Research Center, Pendleton. BS Nebraska 1943, MS 1948

Purvis, Benjamin Percy 1964 Director, Instructional Resources and Material Center (Assoc Prof). BS Oregon State 1960; MS 1966; PhD Syracuse 1969

Pye-Petersen, Lois 1960 Assoc Prof Physical Education. Diploma in Education (Physical Education),Whitelands C London 1949; BS Oregon State 1966, MEd 1968. On sabbatical 1979-80

Pyles, Marvin R. 1974-75, 1981 Asst Prof Forest Enginering. BS Oregon State 1973, MS 1975; PhD California at Berkeley 1981

Pytkowicz, Ricardo Marcos 1963 Prof Oceanography. BS Louisiana State 1953; PhD California at Berkeley 1957

Q

Quatrano, Ralph Stephen 1968 Prof Botany. AB Colgate 1962; MS Ohio 1964; PhD Yale 1968

Quinn, William Hewes 1967 Assoc Prof Emeritus (Senior Research)Oceanography

R

Raab, Carolyn Ann 1975 Extn Food and Nutrition Specialist (Asst Prof). BS California at Berkeley 1970; MS California at Davis 1972

Rackham, Robert L. 1971 Benton County Extn Agent (Assoc Prof). BS Wyoming 1956, MS 1958

Radder, Marianne 1981 Instr Mathematics. BS SUNY at Albany 1968; MS Oregon 1972

Rader, Mark Warren 1979 Asst Prof Aerospace Studies, Captain USAF. BS Air Force Academy 1974; MBA Missouri 1978

Ragulsky, Frank A. 1981 Manager Student Communications Media (Asst Prof). BS Southern Colorado 1968; MA Adams State C 1969; EdD Oklahoma State 1979

Rainey, Jack Charles 1970 Administrative Asst (Assoc Prof), Academic Coordinator, Intercollegiate Athletics. BS Idaho 1950,MS 1954

Raleigh, Robert Joseph 1960 Prof Animal Nutrition Superintendent, Eastern Oregon Agricultural Research Center, Squaw Butte Station. BS Montana State 1952; MS Utah State 1954, PhD 1959

Ralston, Allen Thurman 1960 Prof Emeritus Animal Science

Ramage,Kenneth 1977 Res Assoc National Council for Air and Stream Inprovement (Courtesy). BS Beloit KC 1969

Ramanathan, Brinda 1980 Res Assoc Biochemistry and Biophysics. BSc Madras 1972, MSc 1974; PhD Missouri 1980

Ramig, Robert E. 1961 Assoc Prof Soils, Research Soil Scientist-ARS, Columbia Plateau Conservation Research Center, Pendleton (Courtesy). BS Nebraska 1943; MS Washington State 1948; PhD Nebraska 1960

Rampton, Henry Hardy 1936 Assoc Prof Emeritus Agronomy

Ramsey, Fred Lawrence 1966 Assoc Prof Statistics. BA Oregon 1961;MS Iowa State 1963, PhD 1964

Rankka, Kristine M. 1981 Philosophy/Religion Librarian (Instr). BA Washington 1977, MLS 1978

Rao, Nagaraja Chitaldrug Rama 1977 Assoc Prof (Senior Research) Atmospheric Sciences. BS U of Mysore 1955, MS 1956; MS UCLA 1962, PhD 1965

Rasmussen, Donald Lewis 1946 Prof Emeritus (Marion County Extn Agent)

Rasmussen, Paul Eugene 1977 Asst Prof Soil Science (Courtesy), Soil Scientist USDA; Columbia Plateau Conservation Research Center. BS Nebraska 1964; MS Colorado State 1971

Rathja, Roy C. 1977 Asst Prof Electrical and Computer Engineering. BS California At Davis 1969; MS Oregon State 1973, PhD 1980

Rauen, Paul Meredith 1959 Yamhill County Extn Agent (Assoc Prof). BS South Dakota State 1958; MS Portland State 1969

Read, Paul Daniel 1954 Asst Prof Architecture. BSArch Cincinnati 1953; Architect 1957

Redmond, Richard George 1964 Senior Instr Emeritus Oceanography

Reed, Barbara Mary 1979 Asst Prof Botany. BS Nebraska 1971; MS Oklahoma State 1974, PhD 1977

Reed, Donald James 1962 Prof Biochemistry. BS C of Idaho 1953; MS Oregon State 1955, PhD 1957

Reed, Ralph L. 1978 Res Assoc Agricultural Chemistry. BS Peru State C (Nebraska) 1971; PhD Oklahoma State 1976

Reese, Hamit Darwin 1947 Prof Emeritus Chemistry

Reeve, Barrett A. 1981 Instr General Science. BA Humboldt State 1965; MS Oregon State 1970

Reger, Charles Calhoun 1964 Prof Emeritus Student Health Center

Rehfuss, Paul Stephen 1981 Instr Mathematics. BS Reed C 1975; MA Oregon 1980

Reiley, Ralph Hunt, Jr. 1976 Asst Registrar (Asst Prof). AB Muhlenberg C 1953; JD Rutgers 1957

Reinert, David Edward 1979 Res Asst Oceanography. BS Oregon State 1972

Reistad, Gordon M. 1970 Prof Mechanical Engineering. BS Montana State 1966; MS Wisconsin at Madison 1967, PhD 1970

Resch, Helmuth 1970 Prof Forest Products, Head of Department. Dipl Engineer, Universitat für Bodenkultur, Vienna 1951;MS Utah State 1958; Doctorate UFB Vienna 1960

Rettig, Jack Louis 1961 Prof Business Administration. BS Evansvile C 1949; MA San Diego State 1956; PhD UCLA 1962

Rettig, Raymond Bruce 1968 Assoc Prof Agricultural and Resource Economics. BA Montana 1962; MA Northwestern 1964; PhD Washington 1969

Reynolds, Guy Elmer 1966 Prof Emeritus Veterinary Medicine

Rice-Sayre, Laura Prindle 1979 Asst Prof English. BA Ohio State 1968; MA Kent State 1971; PhD Washington 1976

Richardson, Daryl Garnet 1973 Assoc Prof Horticulture. BS Minnesota 1969, MS 1971, PhD 1973

Richardson, George Arthur 1974 Prof Emeritus Food Science and Technology and Dairy Chemistry

Richman, James G. 1978 Asst Prof Oceanography. BSc Harvey Mudd C 1971; PhD MIT/Woods Hole Oceanographic Institution 1977

Rickman, Ronald Wayne 1970 Assoc Prof Soil Science (Courtesy), Research Soil Scientist-ARS, Columbia Plateau Conservation Research Center, Pendleton. BS Washington State 1963; PhD California at Riverside 1966

Rickson, Fred Richard 1971 Prof Botany and Plant Pathology. BA California State U at Northridge 1961; MA Miami (Ohio) 1963; PhD California at Berkeley 1966

Ridlington, James W. 1971 Res Assoc Agricultural Chemistry. BS Washington State 1966; PhD Purdue 1971

Ridlington,. Sandra S. 1973 Res Asst Sea Grant Communications. BA Washington State 1966; MA Purdue 1969, PhD 1979

Riebold, Thomas William 1981 Asst Prof Veterinary Medicine. BS Illinois 1970, DVM 1972

Riedel, Georgia Susanne 1974 Res Asst Biochemistry and Biophysics. BA Humboldt State 1974; MS Oregon State 1980

Riggert, Craig Edwin 1976 Washington County Extn Agent (Asst Prof). BS Colorado State 1974, MS 1976

Riggs, Dale I. 1981 Res Asst Horticulture. BS Utah State 1980

Riggs, James Lear 1958 Prof and Head of Department Industrial and General Engineering, Director Oregon Productivity Center. BS Oregon State 1951; MS 1958, PhD 1963

Riggs, Keith Douglas 1978 Instr Speech Communication. Broadcast Media Coordinator Department of Information. BA Idaho State 1977

Riley, Jack Etter 1972 Head Baseball Coach,Intercollegiate Athletics (Asst Prof). BA Linfield 1960; MA Oregon State 1971

Rinehold, John William 1977 Res Asst Extn Entomology. BS Oregon State 1974

Ringle, John Clayton 1966 Assoc Dean Graduate School, Assoc Prof Nuclear Engineering. BS Case Institute of Technology 1957, MS 1959; PhD California at Berkeley 1964

Robbins, James Milton 1981 Res Asst Oceanography. BS Southern Oregon 1970; BS Oregon State 1975; MS U of British Columbia 1978

Robbins, Patricia A. 1981 Res Asst Horticulture. BS Oregon State 1977

Robbins, Paul Carey 1980 Instr English. BA Colorado 1971, MA 1976

Robbins, Scott H. 1979 Res Asst Horticulture. BS Oregon State 1975

Robbins, William Grover 1971 Assoc Prof History. BS Western Connecticut State 1962; MA Oregon 1965, PhD 1969

Roberts, Alfred Nathan 1940 Prof Emeritus Horticulture

Roberts, Linda Marion 1974 Res Asst Fisheries and Wildlife and Entomology. BS Calgary 1970; BS Washington 1972, BS 1973

Roberts, Paul Alfred 1966 Prof Zoology. BS Illinois 1953, MD 1957; PhD Chicago 1962

Roberts, Warren Wayne 1950-52, 1954 Yamhill County Extn Chairman (Prof). BS Oregon State 1950, MAgr 1970

Robertson, Herbert Lee 1980 Instr Naval Science

Robertson, William James 1965 Assoc Prof Speech Communication. BFA School of Drama Art Institute of Chicago 1949, MFA 1951; PhD Wisconsin at Madison 1963

Robinson, Alan Hadley 1966 Prof Nuclear Engineering. BS Swarthmore C 1956; MS Stanford 1961, PhD 1965

Robinson, Anja Marjatta 1970 Res Asst Fisheries. BS Turku (Finland) 1963, MS 1965

Robinson, Dan D. 1944 Prof Emeritus Forest Management

Robinson, David Miller 1976 Assoc Prof English,Director American Studies Program. BA Texas at Austin, 1970 MTS Harvard Divinity School 1972; MA Wisconsin at Madison 1973, PhD 1976

Rocha, Elisabet Perez 1979 Res Assoc Biochemistry and Biophysics (Courtesy). BSc Barcelona (Spain) 1974, PhD 1979

Rock, John Henry 1958 Prof Art. BSEd Oregon State 1951; MFA California C of Arts and Crafts 1957

Rodgers, Jefferson Belton 1946 Prof Emeritus Agricultural Engineering

Rogers, Scott Orland 1981 Res Asst Botany and Plant Pathology. BS Oregon 1976, MS 1980

Rogers, William Reinhold 1980 Lincoln County Extn Agent (Asst Prof). BA Virginia 1967; MA Stanford 1968, MA 1969; BS Oregon State 1978, MS 1980

Rogge, David F. 1982 Asst Prof Civil Engineering. BS Nebraska 1970, MS 1971; PhD Texas 1981

Rohde, Charles Raymond 1952 Prof Agronomy, Columbia Basin Agricultural Research Center, Pendleton. BS Montana State 1947; PhD Minnesota 1953

Rohde, Kermit Julius 1956 Prof Psychology. BS Iowa State 1943; MA Nebraska 1949; PhD Northwestern 1951. Licensed Psychologist 1973

Rohovec, John S. 1977 Asst Prof (Senior Research) Microbiology. BS New Mexico 1967: PhD Oregon State 1975

Rohrman, George F. 1976 Asst Prof (Senior Research) Agricultural Chemistry. BA Washington 1965, PhD 1970

Root, Jon Richard 1969 Director Classroom TV (Assoc Prof). BA Kansas State 1966. MS Oregon 1972, PhD 1978

Rose, Sharon L. 1980 Res Assoc Forest Science. BS California State at Long Beach 1970; MA Humboldt State 1976; PhD Oregon State 1980

Rosenfeld, Charles Louis 1974 Assoc Prof Geography. BA Pittsburgh 1968, MA 1971, PhD 1973

Rosenstiel, Robert George 1946 Assoc Prof Emeritus Entomology

Rosler, Curtis Whitehurst 1979 Prof Military Science, Colonel US Army. BA Washington 1959; MS Troy State 1974

Ross, Charles Robert 1946 Assoc Prof Emeritus (Extn Forestry Specialist)

Ross, Erric Virgil 1980 Linn County Extn Agent (Asst Prof). BS Oregon State 1964, MS 1969, BS 1970

Ross, Jackson 1951 Prof Emeritus (Ast Director, Extn Service)

Ross, Richard Everett 1970 Assoc Prof Anthropology. BA Colorado 1959; MA Oregon 1963; PhD Washington State 1971

Rossbacher, Peter Georg 1968 Prof Russian, Foreign Languages and Literatures. PhD U of Kiel 1959

Roth, Charles Walter 1973 Asst Prof Microbiology. BS Purdue 1964; MS Illinois 1966, PhD 1969

Roth, Frances Izzo 1981 Instr English. BA Trinity C 1968; MA Alaska at Fairbanks 1970

Roth, Lewis Franklin 1940 Prof Emeritus Botany

Rowe, Kenneth Eugene 1964 Prof Statistics. BS Colorado State 1957; MS North Carolina State 1960; PhD Iowa State 1966

Rowley, Marvin Lavern 1973 Forest Properties Manager, Forest Engineering (Senior Instr). BS Oregon State 1950

Roy, Doris Mary 1952 Assoc Prof Emeritus (Clatsop County Extn Agent)

Ruben, John Alex 1975 Asst Prof Zoology. BS Humboldt State 1968; MA California at Berkeley, PhD 1975

Rudd, James Harold 1974 Asst Athletic Director (Asst Prof). BA Northern Iowa 1970, MA 1971

Rudd, Oris Clark 1955 Prof Emeritus (Malheur County Extn)

Rudinsky, Norma Leigh 1965 Instr English. AB Stanford 1950, AM 1953

Rudolph, Jacquelyn T. 1977 Assistant to the Vice President for Administration (Instr). BS Oregon State 1975, MBA 1980

Ruff, Robert Eugene 1971 Res Asst Oceanography. BS Washington 1971

Rugh, William Daniel 1979 Res Asst Oceanography. BS Oregon State 1979

Rumsey, Dora L. 1972 Curry County Extn Agent (Asst Prof). BS Kansas State 1968; MS Southern Oregon State 1979

Runciman, Alexander 1981 Instr English. BA Santa Clara 1973; MFA Montana 1977; PhD Utah 1981

Russell, Sterling Arthur 1963 Senior Instr Laboratory for Nitrogen Fixation Research. BS Utah State 1960, MS 1962

Rutland, Paul M. 1952 Instr Animal Science (retired)

Ryan, Roger Baker 1961 Assoc Prof Entomology (Courtesy); Principal Entomologist, U.S. Forest Service. BS New York State College of Forestry 1953; MS Oregon State 1959, PhD 1961

Rydrych, Donald J. 1965 Assoc Prof Agronomy, Columbia Basin Agricultural Research Center, Pendleton. BS Idaho 1953, MS 1958

Ryker, Lee Chester 1975 Res Assoc Entomology. BA Franklin C of Indiana 1963; MS Michigan 1965; MS Oregon 1971; PhD Oregon State 1975

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Sabourin, Josanne Rizzo 1981 Res Asst Botany and Plant Pathology. BS Michigan 1974; MS Louisiana State 1981

Sabourin, Thomas Donald 1981 Res Assoc (Courtesy) Pharmacy. BA Michigan 1973: MA California State at Hayward 1977; PhD Louisiana State 1981

Sadler, Albert Johnston, Jr. 1981 Res Asst Botany and Plant Pathology. BS Colorado State 1978, MS 1981

Sager, Azalea Linfield 1932 Prof Emeritus (Home Economics Extn)

Sager, Robert William 1961 Prof Emeritus Pharmacy

Sager, Roberta Ann 1979 Instr Communication Skills Center. BS Oregon State 1979

Saleeby, Becky Margaret 1981 Instr Anthropology. BA California at Santa Barbara 1971; MS Oregon 1977

Saletore, Murli 1978 Asst Prof Mechanical Engineering. BE Osmania U 1962; MS Illinois Institute of Technology 1966; PhD Washington 1978

Salisbury, Ralph William 1949 Prof Emeritus (Extn Publications Specialist)

Samuels, Linda Marie 1975 Pharmacist Student Health Center (Instr). BS Oregon State 1972

Sanchez, Eve Chambers 1978 Instr English Language Institute. BA SUNY 1966; MA Middlebury C 1969

Sander, Gary Herman 1955 Asst Prof Emeritus (Extn Forestry Specialist)

Sanders, James Edward 1978 Asst Prof Microbiology (Courtesy). BA San Jose State 1964; MS Oregon State 1968, PhD 1979

Sanders, Raymond S. 1967 Chief Clinical Psychologist Student Health Center (Prof). AB Chico State 1960; MA Michigan State 1965, PhD 1967

Sanders, Thomas H 1978 Director University Publications and OSU Press (Asst Prof). AA Fullerton C 1964; BA California State at Fullerton 1966, MA 1971

Sanderson, Donald R. 1968 Director of Student Activities (Assoc Prof). BS Ohio Northern 1958; MEd Bowling Green State 1965; MA Toledo 1966; EdD Oregon State 1971

Sandgren, Ernest Nelson 1948 Prof Art. BA Oregon 1943, MFA 1948

Sandine, William Ewald 1958 Prof Microbiology. BS Iowa State 1950; MS North Carolina State 1955; PhD Oregon State 1958

Santantonio, Dan 1976 Res Asst Forest Science. BA California 1972; MS Oregon State 1974

Santantonio, Elaine M. 1979 Res Asst Horticulture Science. BS New Mexico State 1977, MS 1978

Sanz, Daniel 1979 Instr Speech Communication. BA Florida 1967; MA Oregon State 1981

Sarasohn, Louise Tunick 1978 Asst Prof History. BA New York 1971; MA UCLA 1973, PhD 1979

Sargent, Edward C. III 1977 Physician Student Health Center (Assoc Prof). BS Oregon 1973; MD Case Western Reserve 1976

Sartwell, Charles Jr. 1969 Res Assoc Entomology (Courtesy), Forest Sciences Laboratory, U.S. Forest Service. BS California at Berkeley 1961; MS Idaho 1966

Saslow, Carol Ann 1969 Assoc Prof Psychology. BA California at Berkeley 1964; PhD Washington 1969

Saugen, John Louis 1964 Assoc Prof Electrical and Computer Engineering. BSEE Washington 1955, MSEE 1958, PhD 1964

Saul, Molly Sylvester 1962 Prof Emeritus (Umatilla County Extn Agent)

Saunders, Court A. 1978 Res Assoc Biochemistry and Biophysics. BA Kansas 1973; PhD Brandeis 1978

Saunders, E. W. 1966 Res Asst Agricultural Chemistry. BA Mount Holyoke 1965

Saunders, Roy Bly 1946 Assoc Prof Emeritus Mathematics

Sawer, Barbara J. 1974 Extn Specialist, 4-H and Youth (Assoc Prof). BS Kansas State 1962; MS Montana State 1967; EdD British Columbia 1972

Sawyer, William Arthur 1934 Prof Emeritus Range Science

Sayre, Henry Marshall 1980 Asst Prof English (Courtesy). BA Stanford 1971; PhD Washington 1976

Scales, Murle 1947 Prof Emeritus (Asst State Leader, Home Economics Extn)

Scanlan, Michael J. 1981 Asst Prof Philosophy. BA Goddard C 1973; MA Emory U 1981

Scanlan, Richard Anthony 1964 Prof Food Sciences and Technology. BS Cornell 1960, MS 1962; PhD Oregon State 1968

Schaaf, Karen Frances 1979 Res Asst Botany and Plant Pathology. BS Oregon State 1978

Schacht, David Waldron 1967 Science-Tech Librarian (Assoc Prof). BA Carleton C 1940: MS Oklahoma 1947; MA Denver 1964

Schaffer, Randy Lee 1978 Res Asst General Science. BS Oregon State 1978

Schallau, Con H. 1977 Prof Forest Management (Courtesy). BS Iowa State 1954; MS Michigan State 1958, PhD 1961

Schallig, Willem Hendrik Christiaan 1955 Asst Prof Emeritus Range Ecology

Schary, Philip B. 1966 Assoc Prof Business Administration. BS St. Louis U 1951; MBA California at Berkeley 1955: PhD UCLA 1966

Schasteen, Charles Steven 1980 Res Assoc Biochemistry and Biophysics. BA Kansas, PhD 1980

Schauber, Ann C. 1978 Marion County Extn Agent/4-H and Youth (Asst Prof). BS Delaware 1972; MS Michigan State 1977

Schaumburg, Frank David 1967 Prof Civil Engineering, Head of Department. BSCE Arizona State 1961; MSCE Purdue 1964, PhD 1966

Schaup, Henry W. 1973 Assoc Prof Biochemistry. BA C of Steubenville 1964; PhD Colorado State 1969

Schecter, Larry 1955 Prof Physics. AB California at Berkeley 1948, MA 1951, PhD 1953

Scheel, Jean Willard 1946 Prof Emeritus (Extn Service)

Scheffer, Theodore Comstock 1969 Res Assoc Forest Products. BS Washington 1926, MS 1929; PhD Wisconsin at Madison 1935

Scheffler, Wilbert Albert 1974 Assoc Prof Mechanical Engineering (Courtesy). BS Tulane 1961, MS 1965; PhD Minnesota 1971

Scheidegger, Kenneth F. 1979 Assoc Prof Oceanography. BA California at Berkeley 1967, PhD Oregon State 1972

Schimerlik, Michael Ira 1978 Asst Prof Biochemistry and Biophysics. BS Pennsylvania State 1971; PhD Wisconsin 1975

Schink, William Paul 1981 Asst Director Bands, Asst Prof Music. BA Washington State 1958, MA 1960; DA Northern Colorado 1981

Schlegel, James Michael 1979 Extern/Vocational Inservice Coordinator Vocational Education (Instr). BSE Emporia State 1970, MS 1972

Schlesinger, Michael Earl 1976 Asst Prof Atmospheric Sciences. BS UCLA 1965, MS 1970, PhD 1976

Schmall, Vicki Louise 1975 Asst Prof Family Life, Extn Gerontology Specialist. BS Montana State 1969; PhD Oregon State 1977

Schmedding, David William 1970 Res Asst Agricultural Chemistry. BA California State at Hayward 1969

Schmidt, Charles 1981 Res Asst Crop Science. BS Kansas State 1980

Schmisseur, Wilson Edward 1971 Assoc Prof Agricultural and Resource Economics. BS Illinois 1964; MS Purdue 1966, PhD 1973

Schmitt, Roman A. 1966 Prof Chemistry. MS Chicago 1950, PhD 1953

Schmitz, John Albert 1972 Director Veterinary Diagnostic Laboratory, Prof Veterinary Medicine. DVM Colorado State 1964; PhD Missouri at Columbia 1971

Schneider, Gary Lee 1964 Malheur County Extn Agent (Assoc Prof). BS Oregon State 1962, MAg 1971

Schoning, Robert Whitney 1978 Visiting Prof Fisheries. BS Washington 1944

Schori, Richard Miles 1978 Prof Mathematics and Chairman of Department. BS Kenyon C 1960; MS Iowa 1962, PhD 1964

Schowalter, Timothy Duane 1981 Asst Prof Entomology. BA Wichita State 1974;MS New Mexico State 1976; PhD Georgia 1979

Schrader, Hans-Joachim Bruno 1976 Prof Oceanography. Dr. rer.nat. U of Tübingen 1968

Schreck, Carl Bernhard 1975 Assoc Prof Fisheries (Courtesy), Leader Oregon Cooperative Fishery Research Unit. AB California at Berkeley 1966;MS Colorado State 1969, PhD 1972

Schroeder, Elver August 1946 Prof Emeritus English

Schroeder, Jane Foster 1952-59, 1960 Assoc Prof Emeritus (Deschutes County Extn)

Schroeder, Paul 1979 Res Asst Forest Science. BA Beloit C 1972; MF Oregon State 1980

Schroeder, Walter Greiff 1949 Curry County Extn Chairman (Prof). BS Oregon State 1949; MS Wisconsin at Madison 1957

Schroeder, Warren Lee 1967 Prof Civil Engineering, Asst Dean of Engineering. BSCE Washington State 1962, MSCE 1963; PhD Colorado 1967

Schrumpf, Barry James 1972 Director Environmental Remote Sensing Applications Laboratory (Assoc Prof-Senior Research). BA Willamette 1966; MS Oregon State 1968, PhD 1975

Schultz, Harold William 1953 Prof Emeritus Food Science and Technology

Schultz, Harry Wayne 1959 Assoc Prof Pharmaceutical Chemistry. BS Iowa 1952, MS 1957, PhD 1959

Schultz, Robert James 1962 Prof Civil Engineering. BSCE Worcester Polytechnic Institute 1955, MSCE 1960; Professional Engineer, Massachusetts 1959, Oregon 1963, Professional Land Surveyor Oregon 1974

Schupp, Jim S. 1979 Asst Director Conference Services (Instr). BS Oregon State 1978, MBA 1979

Schuyler,Michael W. 1981 Assoc Prof Chemistry. BS California at Berkeley 1966; PhD Indiana 1970

Schwartz, Robert B. 1978 Asst Prof English. BA Tulane 1972; PhD Virginia 1978

Schwartz, Thomas Grant 1981 Instr Aerospace Studies

Scott, Allen Brewster 1941 Prof Emeritus Chemistry

Scott, David Andrew 1975 Instr Architecture and Landscape Architecture

Scott, Nan Herring 1973 Instr Crop Science. BA Furman 1969

Scott, Paul H. 1975 Res Asst Oceanography. BS Humboldt State 1975

Seat,Velma Maxwell 1959 Prof Emeritus Agricultural and Resource Economics (Extn Food Marketing Specialist)

Sedell, James R. 1979 Assoc Prof Fisheries and Wildlife (Courtesy). BA Willamette 1966; PhD Pittsburgh 1971

Seely, Justus Frandsen 1969 Prof Statistics. BS Utah State 1963, MS 1965; PhD Iowa State 1969

Seidler, Ramon John 1970 Prof Microbiology. BS California State at Northridge 1964; PhD California at Davis 1968

Seifert, Edward A. 1971 Res Asst Oceanography. BS Oregon State 1971

Seim, Wayne Kenneth 1971 Senior Instr Fisheries. BS Oregon State 1967, MS 1970

Selivonchick,Daniel Paul 1976 Assoc Prof Food Science and Technology. BS Eastern Illinois 1965; PhD Illinois 1973

Sellers, Allen L. 1977 Instr English Language Institute, International Education. BA Antioch 1967; MA Oregon 1976

Senatra, Phillip 1977 Asst Prof Business Administration. BBA Iowa 1964, MA 1969, PhD 1976

Senechal, Ronald George 1973 Res Asoc Geology. BS Rensselaer Polytechnic Institute 1961

Severeide, Jean Caryl 1957 Prof Education. BA Grinnell 1948; MEd Oregon 1956

Sexton, Gary Joe 1975 Res Assoc Statistics (Courtesy). BA California State at Long Beach 1965; MS Oregon State 1972, PhD 1975

Seyer, Susan 1981 Res Asst Entomology. BA Blackburn C 1974; MS Oregon State 1980

Shanahan, Sean Leo 1979 Res Asst Geophysics. PE Colorado School of Mines 1965;MEd Oregon 1973

Shane, Barry 1971 Assoc Prof Business Administration. BS Northeastern 1965, MBA 1967; PhD Massachusetts 1973

Shannon, Edfred Loren 1945 Assoc Prof Emeritus (Portland City Extn Agent)

Sharrow, Steven Harold 1976 Assoc Prof Rangeland Rsources. BS California at Davis 1971; MS Texas Tech 1973, PhD 1975

Shaughnessy John Michael 1976 Assoc Prof Mathematics, BA LeMoyne C 1968; MA Indiana 1970; PhD Michigan State 1976

Shaw, Clayton Albert 1950-53, 1966 Asst Prof Emeritus (Asst Registrar)

Shaw, Francis Harding 1955 Prof History. BA Reed 1948; MA California at Berkeley 1951; PhD Harvard 1957

Shaw,James Niven 1919-21, 1926 Prof Emeritus Veterinary Medicine

Shaw, Marcia 1977 Asst Prof Speech Communication. BA Michigan State 1968; MA Wisconsin 1971; PhD Pennsylvania State 1977

Shearer, Marvin Nobel 1950 Extn Irrigation Specialist. Prof Agricultural Engineering. BS Oregon State 1948; MS Michigan State 1961

Sheely, Milton Cornwell 1939 Prof Emeritus Mechanical Engineering

Sheets, Willis Arden 1959 Washington County Extn Agent (Assoc Prof). BS Kanasas State 1952; MS Oregon State 1967

Sheggeby, Gene G. 1978 Res Asst Veterinary Medicine. BA California Western U 1966; MS Oregon State 1974; MT (ASCP) LAC/USC Medical Center 1975

Shelby, Bo 1976 Asst Prof Resource Recreation Management. BA Colorado 1970; MS Wisconsin 1973; PhD Colorado 1976

Shelton, Dennis W. 1980 Res Asst Food Science and Technology. BS Southern California 1974; MS Oregon State 1979

Shelton, Fred Ames 1980 Asst Prof Business Administration. BA Colorado 1957, MA 1960; MSBA Denver 1968; PhD Iowa 1968

Shelton, Mark Douglas 1981 Res Asst Entomology. AA Modesto Junior C 1975; BS Idaho 1977; MS Purdue 1980

Shen, Zhenhua 1981 Res Assoc (Courtesy) Agricultural Engineering

Shenk, Myron Daniel 1969 Res Asst Crop Science. International Plant Protection Center. BS Oregon State 1966, MS 1968

Shepard, W. Bruce 1972 Assoc Prof Political Science. AB California at Riverside 1969, MA 1970, PhD 1972

Sher, Steven J. 1981 Instr English. BA City C of New York 1970; MA Iowa 1973; MFA Brooklyn C 1978

Sherburne, James Wilson 1938 Prof Emeritus Community Education

Shibley, Gilbert Almon 1976 Multnomah County Extn Agent (Asst Prof). BA Lewis and Clark C 1960; MA Oregon 1962, PhD 1964

Shibley, Gloria Olson 1965 Linn County Extn Agent (Assoc Prof). BS North Dakota State 1957; MS Oregon C of Education 1974

Shideler, Fred Merle 1929 Prof Emeritus Journalism (Asst to the President, Director University Relations)

Shirazi, Mostafa Ayat 1975 Assoc Prof Mechanical Engineering (Courtesy).EPA. BS California Polytechnic 1959; MS Washington 1961; PhD Illinois 1967

Shires, George Michael Hume 1977 Director Veterinary Teaching Hospital, Prof Veterinary Medicine. BVSc U of Pretoria 1956; MRCVS England 1970; MS Auburn 1972

Shirk, Paul David 1981 Asst Prof Zoology. BA Northern Iowa 1970; MS Texas A&M 1975, PhD 1978

Shirley, Robert Edwin 1967 Assoc Prof Business Administration. BA Iowa 1943; MBA Harvard 1948; PhD Utah 1965. CPA State of Oregon 1968

Shively, Jon H. 1981 Assoc Prof Mechanical Engineering. BS Lehigh U 1958; MS John Carroll U 1963; PhD Case Western Reserve U 1967

Shively, Stanley Edward 1968 Assoc Prof Sociology. BA Colorado 1955, MA 1957; PhD Pittsburgh 1966

Shoemaker, Clara Brink 1970 Assoc Prof (Senior Research) Chemistry. PhD Leiden U (Netherlands) 1950

Shoemaker, David Powell 1970 Prof Chemistry. BA Reed 1942; PhD California Institute of Technology 1947

Short, Robert Allen 1966 Prof Electrical Engineering. BS Oregon State 1949, BA 1952; MS Stevens Institute of Technology 1956; PhD Stanford 1961

Shou,Stephens Tefen 1952 Prof Emeritus Library

Shoup, Thomas D. Res Asst Agricultural Chemistry. BS California at Riverside 1975

Shumway, Sallyann M. 1963 Baker County Extn Agent (Asst Prof). BS Oregon State 1963

Sidor, Theodore Henry 1952 Prof Emeritus (Asst Director Extn)

Siebenaller, Joseph F. 1981 Asst Prof Oceanography. BS Wisconsin at Madison 1972; PhD Scripps Institution of Oceanography 1978

Siebler, Jane Ross 1979 Head Adviser and Asst Dean (Instr) Business Administration. BA Oregon State 1975, MBA 1979

Silen, Roy Ragnar 1954 Prof Forest Genetics (Courtesy), Forestry Sciences Laboratory, U.S. Forest Service. BS Oregon State 1943; MSF Yale 1948; PhD Oregon State 1960

Silverthorn, William E. Asst Prof Chemistry (Courtesy). BS California at Berkeley 1964; PhD Arizona 1967

Simerville, Clara L. 1950 Assoc Prof Emeritus International Education

Simko, Ben Christopher 1978 Extn Pest Management Specialist (Res Asst). BS California at Davis 1974, MS 1977

Simmons,Dale David 1959-1963, 1966 Assoc Prof Psychology. BA Puget Sound 1954; MA Oregon 1958, PhD 1961

Simoneit,Bernd Rolf Tatsuo 1981 BS Rhode Island 1960; PhD U of Bristol (England) 1976

Simons, William Haddock 1966 Prof Mathematics. BA British Columbia 1935, MA 1937; PhD California at Berkeley 1947

Simonson, Gerald H. 1961 Prof Soil Science. BS Minnesota 1951, MS 1953; PhD Iowa State 1960

Simonson, William 1974 Assoc Prof Pharmacy. BS Rhode Island 1970; PharmD Michigan 1974

Simpkins, John III 1976 Res Asst Oceanography. BS Worcester Polytechnic Institute 1972

Sims, David Edward 1981 Asst Prof Veterinary Medicine. BA U of Western Ontario 1972, MEng 1974; PhD Kansas State 1981

Sinnard Harriet King 1034-36, 1940-42, 1963 Asst Prof Emeritus Family Resource Management

Sinnard,Herbert Reeves 1929-32, 1934 Prof Emeritus Agricultural Engineering, Architecture and Landscape Architecture

Sinnhuber, Russell Otto 1939 Prof Emeritus Food Science and Technology

Sisson, Harriet Eleanor 1946 Assoc Prof Pharmacy. BS Minnesota 1937, MS 1939; PhD Oregon 1978

Sisson, James R. 1978 Instr Business Administration. BA Ohio Wesleyan U 1963; MBA Pennsylvania 1968

Sitton, Gordon Russell 1955 Prof Emeritus Agricultural and Resource Economics

Sjogren, Christine Oertel 1960 Prof German, Foreign Languages and Literatures. BA Mills 1945; PhD Johns Hopkins 1950

Skilling,Douglas Edward 1981 Res Asst Veterinary Medicine. BS California State Polytechnic at San Luis Obispo 1970

Skinner, Francis Asbury 1946 Assoc Prof Emeritus (Klamath County Extn Agent)

Slagle, Rodney L. 1980 Res Asst Forestry. BS San Diego State 1977; MS Oregon State 1979

Slegel, Louis 1945 Prof Emeritus Mechanical Engineering

Slezak, Edward John 1961 Prof Emeritus Resource Recreation Management

Slotta, Larry Stewart 1962 Prof Civil Engineering. BS Wyoming 1956, MS 1959; PhD Wisconsin at Madison 1962

Small, Carol Ivy 1974, 1979 Res Asst Computer Center. BA Oregon 1969

Small, Enoch Wallace 1971 Asst Prof (Senior Research) Biochemistry and Biophysics. BS Cornell 1967; PhD Oregon 1971

Small, Lawrence Frederick 1961 Prof Oceanography. AB Missouri at Columbia 1955; MS Iowa State 1959, PhD 1961

Smith, Alvin Winfred 1980 Director of Research and Assoc Prof Veterinary Medicine. BA Washington State 1955, DVM 1957; MS Texas A&M 1967; PhD California at Berkeley 1975

Smith, Charles Edward 1961 Prof Mechanical Engineering. BS ME Oregon State 1955; MS ME Rensselaer Polytechnic Institute, 1958; PhD Stanford 1962

Smith, Clifford Lovejoy 1931-34, 1941 Prof Emeritus (Extn Training Leader)

Smith, Courtland L. 1969 Prof Anthropology, Department Chair. BME Rennselaer Polytechnic Institute 1961; PhD Arizona 1968

Smith, Dorothy Marguerite 1973 Asst Prof Mathematics. BA Mount St. Mary's (Los Angeles) 1953;MS Notre Dame 1963; PhD Oregon State 1972

Smith, Earl Eugene 1957 Prof Industrial Education. BS Oregon State 1950; MA Northern Colorado 1951; EdD Oregon 1965

Smith,Edward Doyle 1946, 1947 Prof Emeritus English

Smith, Frank Herschel 1936 Prof Emeritus Botany

Smith, Frederick John 1964 Extn Marine Economist; Prof Agricultural and Resource Economics. BS Cornell 1958; MS Oklahoma State 1962; PhD North Carolina State 1964

Smith, Howard George 1935 Prof Emeritus (Tillamook County Extn)

Smith, John R. 1979 Asst Prof (Senior Research) Pharmacy, Marine Science Center. BS Loyola 1970; MS Oregon State 1974, PhD 1975

Smith, John Wolfgang 1964 Prof Mathematics. BA Cornell 1948; MS Purdue 1950; PhD Columbia 1957

Smith, Kathryn Haskin 1951-52, 1955 Assoc Prof Emeritus (Director of Teacher Placement)

Smith, Kennan Tayler 1968 Prof Mathematics, BA Bowling Green State 1947; MA Harvard 1948; PhD Wisconsin at Madison 1951

Smith, Margaret Mary 1977 Asst Prof Health. BA Marylhurst C 1963;l MS Portland State 1969, EdD 1981

Smith, Orrin E. 1980 Associate Dean and Director of Resident Instruction (Prof) Horticulture. BS Oregon State 1957; PhD California at Davis 1962

Smith, Robert John 1978 Res Asst Agricultural Chmistry. BS Minnesota 1975; MS Oregon 1979

Smith, Robert Lester 1956-1972, 1979 Chairman Multnomah County Extn (Assoc Prof). BS Oklahoma State 1949; MS California at Davis 1964

Smith, Robert Lloyd 1962 Prof Oceanography. BA Reed 1957; MA Oregon 1959; PhD Oregon State 1964

Smith, Robert Wayne 1943 Prof Emeritus History

Smith, Susan M. 1981 Res Asst Forest Products. BS U of Massachusetts 1978; MS Oregon State 1981

Smith, Wesley Warren 1947-48, 1956 Prof Emeritus Mechanical Engineering

Smith, William Charles 1951 Prof Emeritus (Extn Communications Specialist)

Smotherman, Maureen LaVallee 1978 Instr Psychology. BA Northern Illinois 1972; MA San Francisco State 1977

Smotherman, William Peter 1977 Assoc Prof Psychology. BA Elmhurst 1970; MA Northern Illinois 1972, PhD 1974

Snead, Joseph M. 1981 Res Asst Horticulture. BS Oregon State 1976

Sneva, Forrest Arlo 1952 Asst Prof Range Management (Courtesy). Range Scientist, USDA Eastern Oregon Agricultural Research Center, Squaw Butte Station. BS Utah State 1952

Snider, B. Alan 1974 Extn Specialist 4-H and Youth (Assoc Prof). BS Ohio State 1958, MA 1963; PhD Michigan State 1974

Snider, Martha Ann 1980 Instr Family Resource Management. BS Ohio State 1959; MS Michigan State 1975

Snow, Charles Dale 1966 Asst Prof Fisheries (Courtesy), Project Leader for Shellfish Investigations, Oregon Department Fish and Wildlife. BA Linfield 1951; MS Wyoming 1952

Snyder, Joe Wesley 1981 Asst Director Computer Center (Res Asst Uncl). BS Houston 1969, MS 1971

Soeldner, Alfred Henry 1968 Instr Botany and Plant Pathology. AAS State University of New York at Farmingdale 1964; BS Oregon State 1967

Solberg, Ingvald Ben 1947 Assoc Prof Emeritus Landscape Architecture

Soleau, Carol Jean 1977 Asst Prof Physical Education. BA Stanford 1972, MA 1974

Sollins, Phillip 1977 Res Assoc Forest Science. BA Swarthmore 1966; MA North Carolina 1970; PhD Tennessee 1972

Sollitt, Charles Kevin 1972 Assoc Prof Civil Engineering.BSCE Washington 1966, MSCE 1968; PhD MIT 1972

Solmon, Donald Clyde 1977 Assoc Prof Mathematics. BS Southeastern Massachusetts 1967; MS Oregon State 1973, PhD 1974

Sorensen, Frank Curtis 1964 Plant Geneticist, Forestry Sciences Laboratory, U.S. Forest Service; Asst Prof Forestry (Courtesy). BS Montana 1958; MS Florida 1960; PhD Oregon State 1964

Sorenson, Gary Warren 1968 Assoc Prof Economics.BA Fresno State 1961; MA Claremont Graduate School 1966, PhD 1968

Soule, B. Linn 1967 Assoc Prof Business Administration, Director, Hotel and Restaurant Management Program. BS EE Michigan 1951; MBA Ohio State 1963; PhD Michigan State 1967

Sower, Lonne Lee 1976 Res Assoc Entomology (Courtesy). BS Ft Lewis C 1965; MS Colorado State 1967; PhD California at Riverside 1970

Spark, Patricia Helen 1976 Asst Prof Art. BA Western Washington State 1970; MFA Washington 1975

Sparrow, Margaret Anne 1981 Res Asst Oceanography. BS California at Davis 1978

Spencer, James Brookes 1963 Assoc Prof History of Science. (General Science). BS Lawrence C 1948; MS Wisconsin at Madison 1956, PhD 1964. On sabbatical 1981-82

Sperling, Bertrand Thomas 1965 Asst Prof, Media Consultant IRAM Center. BS St. Lawrence U 1948; BS U.S. Navy Post Graduate School at Monterey 1962; MS Oregon C of Education 1974

Spiesschaert, Lyle Joseph 1970 Washington County Extn Agent (Asst Prof). BS Oregon State 1970; MA Arizona 1981

Spikes, Kristine E. 1974 Asst to Director International Education (Instr). BA Oregon State 1973

Spinrad, Bernard Israel 1972 Prof Nuclear Engineering. BS Yale 1942, MS 1944, PhD 1945

Spoonenburgh, Mark Ritter 1961 Prof Art. Diploma Cranbrook Academy 1940;Diploma, Ecole des Beaux Arts (Paris) 1946; AM Cairo 1953; MA London 1957; DFA (hon.), National C of Arts 1970

Spotts, Robert Allen 1978 Assoc Prof Botany and Plant Pathology. Mid-Columbia Experiment Station. BS Colorado State 1967, MS 1969; PhD Pennsylvania State 1974

Sprinker, John Michael 1975 Assoc Prof English. BA Northwestern 1972; MA Princeton 1974, PhD 1975

Sprowls, John Fremont 1952 Prof Emeritus (Multnomah County Extn Agent)

Srinivasa,Ramanujan 1979 Res Assoc Chemistry. BSc Mysore (India) 1961, MSc 1966; PhD Montana State 1979

Stacy, Benjamin David 1978 Instr Mathematics. BS California Polytechnical State U 1971, MA 1975

Stadsvold,Cynara R. 1975 Pharmacist Student Health Center (Instr). BS North Dakota State 1955

Stadsvold, Cyril Velde 1963 Assoc Prof Architecture.BArch North Dakota State 1953. Architect 1963

Stafford, Susan Gail 1979 Consulting Statistician Forest Science (Asst Prof). BS Syracuse 1974; MS SUNY 1975, PhD 1979

Staker, Kirk John 1980 Res Asst Forest Science. BA Eastern Oregon State C 1978

Stalley, Robert Delmer 1956 Prof Mathematics. BS Oregon State 1946,MA 1948; PhD Oregon 1953

Stamps, Charles A. 1976 Asst Dean Schoolof Education, Assoc Prof Education. BA Colorado State 1955; MBA Denver U 1960; PhD Northern Colorado 1974

Stamps, Margaret F. 1977 Asst Prof Education. BA Western State C 1956; MA Adams State C 1971; PhD Oregon State 1979

Stander, Jeffrey M. 1974 Asst Prof Anthropology. BS California State at Hayward 1966; MS Oregon State 1969

Standley, Carol L. 1976 Res Asst Horticulture. BS Oregon State 1969

Standley, David R. 1972 Res Asst Civil Engineering. BS Oregon State 1978

Stang, Jack Rudolf 1976 Assoc Prof Horticulture. BS Clemson U 1968, MS 1970; PhD Oregon State 1976

Stanger, Charles Earl, Jr. 1973 Assoc Prof Agronomy, Malheur Experiment Station. BS Utah State 1961; MS Oregon State 1971, PhD 1972

Stark, Meritt W. 1977 Instr English Language Institute, International Education. BA Washington U 1972; MS Georgetown 1974

Starkey, Edward Evan 1975 Assoc Prof Resource Recreation Management (Courtesy). BS Bemidji State 1964; MS St. Cloud State 1969; PhD Washington State 1972

Starnes, Charles Edwin 1976 Assoc Prof Sociology. AB Indiana 1961, MS 1964, PhD 1973

Starr, Karen Joyce 1977 Gifts and Exchange Librarian (Instr). BA Oregon State 1974; MLS Texas Woman's U 1975

Staton, Maryanne 1949-51, 1958-69, 1972 Prof Human Development and Family Studies. BA, BS Oregon State 1949; MS 1950

Staton, Warren Spencer 1958 Asoc Prof Civil Engineering. BA, BS Oregon State 1950, MS 1951

Staver, Frederick Lee 1957 Assoc Prof Emeritus English

Stebbins,Robert Lloyd 1962 Extn Horticulture Specialist (Prof). BS Colorado State 1955; MS California at Davis 1959; PhD Michigan State 1970

Steele, Mary Ann 1979 Asst Intramurals Director (Instr). BSE Emporia State 1971; MSE Kansas State 1976

Stehman, Stephen V. 1981 Instr Mathematics. BS Pennsylvania State 1979;MS Oregon State 1981

Stehr, Christian Peter 1974 Assoc Prof German and Linguistics and Head German Section, Foreign Languages and Literatures. Dip Philos Wurzburg U (West Germany) 1967; MA Oregon 1971, PhD 1975

Stein, David Leslie 1969 Res Assoc Oceanography. BA Humboldt State 1969; MS Oregon State 1976, PhD 1981

Stein, William I. 1973 Principal Plant Ecologist Forestry Sciences Laboratory. BS Pacific C 1943; BF Oregon State 1948; MS Yale 1952, PhD 1963

Steinbach, Gary Milton 1981 Asst Prof Industrial Education. BS Wisconsin at Platteville 1968, MS 1974; PhD Minnesota 1979

Stennett, Douglass John 1974 Assoc Prof Pharmacy. PharmD, California at San Francisco 1970

Stephan, William Pershing 1968 Prof Emeritus Student Health Center

Stephen, David Bruce 1976 Asst Director Housing/Residence Program (Instr). AA Los Angeles Valley College 1970; BS Northern Arizona 1974;MA U of Redlands 1975; EdM Oregon State 1979

Stephens, Edward Brice 1981 Res Assoc Microbiology. BS Seton Hall U 1976; MS Maryland 1979, PhD 1981

Stephen, William Procuronoff 1953 Prof Entomology. BSA Manitoba 1948; PhD Kansas 1952

Stephens, John L. 1977 Asst Director Physical Plant, Asst Prof (Courtesy) Civil Engineering. BS Washington State 1951, MS 1976

Stephens, Will 1977 Women's Cross Country, Track and Field Coach, Instr Women's Intercollegiate Athletics. BA Lewis and Clark 1953; MA San Francisco 1979

Steppan, Linda Gayle 1976 Res Asst Veterinary Medicine. BS Oregon State 1967

Sterling, Robert Howard 1940-42, 1956 Prof Emeritus (Baker County Extn)

Stern, Sam 1981 Asst Prof Industrial Education. BS Eastern Kentucky 1972; MS Temple U 1976, EdD 1980

Stetz, Albert William 1976 Assoc Prof Physics. BS Pennsylvania State 1962; PhD California at Berkeley 1968

Stevely, Robert Hugh 1954 Asst Prof Emeritus (Columbia County Extn Agent)

Stevens, Billie K. 1976 Crook County Extn Agent (Instr). BS Idaho 1973

Stevens, George F. 1973 Assoc Dean of Students for Student Activities (Prof).; Director, Memorial Union. BA Iowa 1950; EdM Oregon State 1968

Stevens, Joe Bruce 1966 Prof Agricultural and Resource Economics. BS Colorado State 1958; MS Purdue 1963; PhD Oregon State 1965

Stevenson, Elmer Clark 1967 Prof Emeritus Horticulture; Assoc Dean Emeritus and Director Emeritus of Resident Instruction, Agriculture

Stewart, John R. 1971 Asst Prof Architecture and Landscape Architecture, Department Chair. BS Oregon State 1969

Stewart, Martha Ayers 1979 Instr Speech Communication. BA Western Michigan U 1968, MA 1970

Stewart, Mary Dilworth 1976 Multnomah County Exn Agent (Instr). BS Oregon State 1976

Stiehl, Ruth E. 1972 Assoc Prof Education. Program Director Educational Media. AB Northwest Nazarene 1966; MEd Eastern Washington State 1969; EdD Idaho 1972

Still, Robert Edward 1971 Res Asst Oceanography. BS Oregon State 1962, MS 1970

Stockton, Paul H. 1978 Res Asst Atmospheric Sciences.

Stoltenberg, Carl Henry 1966 Dean School of Forestry, Director Forest Research Laboratory, Prof Forestry. BS California at Berkeley 1948, MF 1949; PhD Minnesota 1952

Stolz, Michael Allan 1979 Extn Agent (Asst Prof). BS Montana State 1962; MS Oregon State 1975

Stone, Louis Nelson 1947 Prof Emeritus Electrical and Computer Engineering. BS Oregon State 1939

Stone, Solon Allen 1956 Asst Dean of Engineering, Prof of Electrical Engineering. BS Oregon State 1952; Professional Engineer 1960

Stonehill, Arthur Ira 1966 Prof Business Administration. BA Yale 1953; MBA Harvard 1957; PhD California at Berkeley 1965

Storm, Robert Macleod 1948 Prof Zoology. BE Northern Illinois 1939; MS Oregon State 1941, PhD 1948

Stormshak, Fredrick 1968 Prof Animal Science. BS Washington State 1959, MS 1960; PhD Wisconsin at Madison 1965

Stovick, Clara A. 1945 Prof Emeritus Foods and Nutrition

Straatman, Marcelle Dorothea 1974 Extn Human Development Specialist (Assoc Prof). BS Wisconsin-Stout 1943; MEd Central Washington State 1972

Strandberg, Lee R. 1975 Assoc Prof Pharmacy. BS North Dakota State 1968, MS 1970; PhD Colorado 1975

Strawn, Bernice 1959 Prof Emeritus (Extn Home Management Specialist)

Streit, Irva Kay 1980 Instr Business Administration. BS Kansas State 1969, MS 1973

Streit, Les D. 1980 Asst Prof Education. BS Kansas State 1970, MS 1973, PhD 1979

Strickler, Lester Braden 1954 Prof Business Administration. BA Pennsylvania State 1948, MA 1949; DBA Indiana 1954

Strobel, Gregory O. 1981 Asst Wrestling Coach Athletics. MEd Oregon State 1977

Strode, Monine Miller 1970 Yamhill County Extn Agent (Asst Prof). BA Central Washington State 1968; MA Oregon State 1977

Strohmeyer, Elizabeth Ann 1979 Coordinator of Recreational Sports (Instr). BS Illinois at Urbana 1975, MS 1976

Strong, Elizabeth 1960 Asst Prof Emeritus Oceanography

Stroud, Frances Carolyn 1975 Res Asst Biochemistry and Biophysics. BS Oregon State 1967

Strowbridge, Edwin David, Jr. 1964 Assoc Prof Education. BS Oregon State 1950; MEd Lewis and Clark 1956, D.Ed Oregon 1967

Stults, Harold M. 1981 Prof (Courtesy). Agricultural and Resource Economics. BS Colorado State 1961; MS Arizona 1964, PhD 1967

Sturgeon, Kareen Barbara 1980 Res Assoc Forest Science. BS UCLA 1965; MA California State at Hayward 1976; PhD Colorado 1980

Subert, John Robert 1979 Res Asst Univeristy Publications. BS Oregon State 1974

Suess, Erwin 1976 Prof Oceanography. MS Kansas State 1966; PhD Lehigh U 1968; Dr.rer. nat. habil. U of Kiel (Germany) 1976

Suess, Robert Kirk 1981 Asst Prof Military Science. BA Eastern Washington 1969

Sugar, David 1978 Res Asst Southern Oregon Agricultural Experiment Station. BA Michigan 1971; BS Washington 1975; MS California at Davis 1977

Sugawara, Alan Iwao 1970 Assoc Prof Human Development and Family Studies. BA Hawaii 1961; MDiv Chicago Theological Seminary 1965; MA Michigan State 1967; PhD Oregon State 1971

Sugihara, Thomas T. 1981 Dean College of Science (Prof). BA Kalamazoo C 1945; MS U of Chicago 1951, PhD 1952

Sullivan, David 1981 Asst Prof Business. BBA Oregon 1974; MS Carnegie-Mellon U 1980, PhD 1981

Summy, Charles L. 1974 Senior Instr Pharmacy. AB San Jose State 1939; BS Oregon State 1949

Sun, Laiyan 1981 Res Assoc (Courtesy). Nuclear Engineering

Sutherland, Charles Fearn, Jr. 1959 Assoc Prof Forest Management. BS Idaho 1948, MF 1954; PhD Michigan 1961

Suttie, Sandra Jean 1969 Curriculum Coordinator, Asst to the President. Acting Assoc Dean Graduate School, Assoc Prof Physical Education. BS Colorado 1960; MS Oregon 1962; PhD Southern California 1970

Suzuki, Warren Noboru 1974 Assoc Prof Vocational-Technical Education. BS Illinois 1963, MEd 1964, EdD 1968

Swan, Grant Alexander 1926 Assoc Prof Emeritus Physical Education

Swanson Frederick John 1975 Adjunct Prof Geology and Asst Prof Forest Engineering (Courtesy). Forestry Sciences Laboratory. BS Pennsylvania State 1966; PhD Oregon 1972

Swanson, Lloyd Vernon 1971 Assoc Prof Dairy Phsiology. BS Minnesota 1960, MS 1967; PhD Michigan State 1970

Swanson, Richard Keith 1978 Instr Vocational and Technical Education. BA Central Washington State C 1968, MS 1970

Swanson, Stanley Stewart 1962 Head of Bibliographic Selection and Evaluation, Library (Assoc Prof). BA Colorado 1949, MEd 1953; MALS Michigan 1956

Swanston, Douglas Neil 1971 Res Geologist U.S. Forest Service; Asst Prof Forestry (Courtesy). BS Michigan 1960; MA Bowling Green State 1963; PhD Michigan State 1967

Swartz, Richard Carlyle 1976 Asst Prof Oceanography (Courtesy). BA Johns Hopkins 1964; PhD William and Mary 1972

Sweeney, Glen R. 1974 Instr Business Administration. BS Oregon State 1973, MBA 1975

Swenson, Eric David 1974 Res Asst International Agriculture. BA Temple 1965; MA Washington 1971; PhC 1971

Swenson, Leonard Wayne 1968 Prof Physics. BS MIT 1954, PhD 1960

Syhre, Danny Ray 1981 Asst Prof Military Science. BS South Dakota State 1975

T

Tank, Gertrude 1953 Assoc Prof Emeritus Nutrition Research

Tanselli, Gene Natale 1962 Assoc Prof Physical Education. BS Oregon State 1951, MEd 1960

Tappeiner, John Cummings, II 1980 Assoc Prof Forest Management. BS California at Berkeley 1957, MS 1961, PhD 1967

Tarrant, Robert Frank 1979 Prof Forest Science (Visiting). BS Oregon State 1941

Taskerud, Esther Adelia 1947 Prof Emeritus (Extn Service)

Taubeneck, William Harris 1951 Prof Geology. BS Oregon State 1949, MS 1950; PhD Columbia 1955

Taubman, Lisa Waite 1956 Asst Prof Psychology. BA Washington 1948; MEd Mills 1952

Taylor, Anne Robinson 1975 Assoc Prof English. BA Stanford 1967; MA California at Berkeley 1970, PhD 1975

Taylor, Edward Morgan 1966 Assoc Prof Geology. BS Oregon State 1957, MS 1960; PhD Washington State 1967

Taylor, Norton Oscar 1946-48, 1949 Assoc Prof Emeritus (Umatilla County Extn Agent)

Taysom, Wayne Pendleton 1953 Prof Art. BFA Utah 1948; MA Columbia 1950

Tedder, Philip Lance 1977 Assoc Prof Forest Management. BS Oklahoma State 1969, MS 1973, PhD 1976

Ten Pas, Henry Arnold 1948 Prof Emeritus Education

Tentchoff, Dorice M. 1977 Asst Prof Anthropology. BA Case Western Reserve 1968, MA 1970, PhD 1977

Terriere, Leon C. 1950 Prof Emeritus Biochemistry and Insect Toxicology, Agricultural Chemistry and Entomology

Tesch, Steven D. 1981 Asst Prof Forest Science. BS Montana 1973, MS 1975, PhD 1981

Thetford, Gloria Ann 1976 Instr Health and Physical Education. AA Lane Community C 1968; BS Oregon State 1971, MEd 1975

Thienes, John Ralph 1952 Prof Emeritus (Wasco County Extn)

Thies, Richard William 1968 Assoc Prof Chemistry. BS Michigan 1963; PhD Wisconsin at Madison 1967

Thomas, Claire 1978 Instr Business Administration. BS Oregon State 1974; BA Oregon 1977

Thomas, Constance C. 1980 Res Asst Education. BA Detroit 1956; MA California State at Long Beach 1978

Thomas, Dale Oren 1956 Prof Physical Education, Wrestling Coach. BA Cornell C 1947; MPE Purdue 1948; PhD Iowa 1956

Thomas David Reginald 1967 Prof Statistics. BS Oregon State 1960, MS 1962, PhD Iowa State 1965

Thomas, Howard R. 1967 Agricultural Economist, USDA (Courtesy Asst Prof). BS Utah State 1966, MS 1968; PhD Oregon State 1974

Thomas, Jack Ward 1976 Assoc Prof Wildlife Ecology (Courtesy). BS Texas A&M 1957; MS West Virginia U 1969; PhD Massachusetts 1973

Thomas, Larry 1981 Asst Prof Chemistry. BA Washington 1970, PhD 1975

Thomas, Marion Daws 1937-45, 1947 Prof Emeritus (Extn Specialist, Tax Policy Education)

Thomas, Shirley J. 1981 Res Asst Food Science and Technology. BS Oregon State 1959

Thomas, Stuart Park 1980 Instr Mathematics, BA California State at Long Beach 1965; MS California at Berkeley 1967

Thomas, Thomas Darrah 1971 Department Chairman and Prof Chemistry. BS Haverford 1954; PhD California at Berkeley 1957

Thompson, Benjamin Garrison 1924 Prof Emeritus Entomology

Thompson, Betty Lynd 1927 Assoc Prof Emeritus Physical Education

Thompson, Georgine Emmilly 1969 Psychiatric Social Worker, Student Health Service (Asst Prof). BS Michigan State 1964; MSW, Illinois 1969, ACSW 1972, RCSW 1978

Thompson John Gray 1948 Clackamas County Extn Agent (Assoc Prof). BS Oregon State 1948; MS Michigan State 1967

Thompson, Maxine Marie 1964 Prof Horticulture. BS California at Davis 1948, MS 1951, PhD 1960

Thompson, Thomas William 1949 Prof Emeritus (Umatilla County Extn)

Thomson, Bruce Edward 1975 Res Asst General Science. BS Wagner C 1970; MS Oregon State 1975

Thomson, Patricia Alice 1966 Res Asst Agricultural Chemistry. BS Oregon State 1964

Thornburgh, George Earl 1952 Prof Mechanical Engineering. BS Nebraska 1944; MS Iowa State 1950

Thresher, Robert Wallace 1970 Prof Mechanical Engineering. BS Michigan Technological U 1962, MS 1967; PhD Colorado State 1970

Tian, Zhaosheng 1981 Res Assoc (Courtesy) Nuclear Engineering

Ticknor, Robert Lewis 1959 Prof Horticulture, North Willamette Experiment Station. BS Oregon State 1950; MS Michigan State 1951, PhD 1953

Tiedeman, Gary Howard 1970 Assoc Prof Sociology. Department Chair, BA Colorado 1961; MA Stanford, 1963; PhD North Carolina 1968

Tiger, George Wayne 1966 Jackson-Josephine County Area Extn Agent (Asst Prof). BS Oregon State 1966; MS Oregon 1977

Tilles, E. Doris 1968 Inter-Library Loan Librarian (Assoc Prof). AB California at Berkeley 1956, MLS 1957; MA Stanford 1976

Tillman, Thomas Norman 1969 Asst Prof Physical Education. BS Michigan 1951; MA Michigan State 1964, PhD 1972

Tillson, Gregory Davis 1970 Coordinator Extn Family Community Leadership Project (Asst Prof). BS Oregon State 1970, MS 1977

Tingelstad, Gertrude Bernice 1964 Catalog Librarian (Asst Prof). AB Luther C. 1941; ABLS Michigan 1942; MA Minnesota 1959

Tingey, David Thomas 1973 Assoc Prof Plant Physiology (Courtesy). BA Utah 1966, MA 1968; PhD North Carolina State 1972

Tinsley, Ian James 1957 Prof Chemistry, Agricultural Chemistry. BSc Sydney U (Australia) 1950; MS Oregon State 1955, PhD 1958

Tison, David L. 1980 Res Assoc Microbiology. BS U of Puget Sound 1974; MS Idaho 1976; PhD Rensselear Polytechnic 1980

Todd, Rodney Morris 1974 Klamath County Extn Agent (Assoc Prof). BS California at Davis 1968; MS Colorado State 1970

Tolan, Tim Douglas 1978 Assoc Director Alumni Relations (Instr). BS Oregon State 1973; JD Gonzaga School of Law 1976

Tomine, Satsuki 1980 Asst Prof Human Development and Family Studies. BA California at Berkeley 1966; EdM Oregon State 1970, PhD 1979

Tompkins, Faye Anne 1980 Instr Business Administration. BA Oregon 1970; MBA Oregon State 1980

Tonge, Fred M. 1980 Chairman and Prof Computer Science. BS Carnegie Institute of Technology 1954, MS 1954; PhD 1960

Tonkyn, Russell 1981 Res Asst Agricultural Chemistry. BA Reed C 1978

Topielec, Richard Robert 1980 Jackson County Energy Extension Agent (Asst Prof). BS Southern Illinois 1971; MA Governors State 1974

Torbeck, Frances Watts 1958 Coos County Extn Agent (Asst Prof). BS Minnesota 1949

Torgersen, Torolf Robert 1975 Res Assoc Entomology (Courtesy). BS New York State College of Forestry 1960; MS Wisconsin 1962, PhD 1964

Torpey, James Edward 1971 Assoc Prof Physical Education. BS Springfield C 1952, MS 1953; EdD Oregon 1965. On sabbatical winter 1979

Torvend, Palmer Stanley 1939 Prof Emeritus (Extn)

Tower, Terrill Kay 1980 Area Coordinator Student Housing (Instr). BA Oregon State 1969, MEd 1980

Towey, Richard Edward 1962 Prof Economics. BS U of San Francisco 1954; MA California at Berkeley 1957; PhD 1967.

Trammell, Anne Marilyn 1976 Interlibrary Loan and Reference Librarian (Instr). BSc U of Wales at Bangor (U.K.) 1953, Dip Ed 1954; MLS Oregon 1973

Trappe, James Martin 1965 Prof Botany and Forest Science (Courtesy) Forestry Sciences Laboratory, Principal Mycologist, U.S. Forest Service. BS Washington 1953; MF State U of New York at Syracuse 1955; PhD Washington 1962

Trautman, Jamie 1979 Res Asst Oceanography. BA Evergreen State C 1978

Tressler, Bessie Gwyneth 1946 Assoc Prof Emeritus (Acquisitions Librarian)

Trione, Edward John 1959 Prof Botany and Plant Pathology (Courtesy). Biochemist USDA. BA Chico State 1950; PhD Oregon State 1957

Tripathi, Vijai Kumar 1974 Assoc Prof Electrical and Computer Engineering. BSc Agra U 1958; MSc Tech Allahabad U 1961; MSEE Michigan 1964, PhD 1968

Troseth, Steven C. 1979 Res Asst Oceanography. BS Oregon State 1972, MS 1979

Trow, Clifford Wayne 1965 Assoc Prof History. AB Kansas Wesleyan U 1951; MA Colorado 1958; PhD 1966

Trow, Jo Anne J. 1965 Assoc Dean of Students, Prof Education, Director of College Student Services Administration in Education. BA Denison U 1953; MA Indiana 1956; PhD Michigan State 1965

Tubb, Richard Arnold 1975 Prof Fisheries, Department Head Fisheries and Wildlife. BS Oklahoma State 1958, MS 1960, PhD 1963

Tucker, Sylvia Boltz 1975 Prof Education. BA U of Northern Iowa 1942; EdD UCLA 1964

Tuor, Brian Lewis 1981 Instr Forest Engineering. BS Oregon State 1972

Turner, Harley Allen 1974 Assoc Prof Animal Science. Eastern Oregon Agricultural Research Center, Squaw Butte Station. BS Oregon State 1964, MS 1965; PhD Missouri at Columbia 1974

Turrell, Teresa Hogue 1974 Harney County Extn Agent (Instr). BS Oregon State 1972

Tyler, Albert Vincent 1974 Prof Fisheries. BA Pennsylvania 1960; MS Toronto 1964, PhD 1968

Tyree, Teresa M. 1980 Instr English. BA Portland State 1978; MA SUNY at Albany 1980

U

Ullrich, Nancy Ann 1979 Instr Veterinary Medicine. BS Washington State 1974, DVM 1977

Ulrich, Pamela Vadman 1980 Instr Clothing, Textiles, and Related Arts. BS Oregon State 1971; MS Auburn 1980

Unger, Donald Ben 1972 Physical Sciences Librarian (Assoc Prof). BA William Jewell C 1956; MLS Oklahoma 1972; MA Kansas 1975

Ungerer, Carl A. 1977 Res Asst Oceanography. BS California Polytechnic 1973; MS Oregon State 1981

Ungier, Leon 1979 Res Asst Chemistry. MS U of Wroclaw (Poland) 1970

Uzgalis, William L. 1981 Asst Prof Philosophy. BA California at Irvine 1972; MA California State at Long Beach 1976; PhD Stanford 1981

V

Vadi, Helena Vaike 1980 Res Assoc Biochemistry and Biophysics. PhD Stockholm 1977

Valencia, David B. 1972 Yamhill County Extn Agent (Asst Prof). BS Oregon C of Education 1972; MEd Oregon State 1976

Valenti, Paul Bartholomew 1949 Assoc Director Intercollegiate Athletics (Assoc Prof). BS Oregon State 1947, MS 1957

Valentine, Milton Albert 1964 Prof Speech Communication. AB Stanford 1945, MA 1950, PhD 1957. On sabbatical 1978-79

Vandehey, Norbet Joseph 1959 Lane County Extn Agent (Prof). BS Oregon State 1949; MEd Linfield 1955

Van de Water, John 1976 Director International Education (Assoc Prof). BA St. Lawrence U 1961; MA Syracuse 1967, PhD 1970

Vanderpool, Nancy M. 1979 Asst Dean of Students (Instr). BA Oregon 1958; MA Syracuse 1960

Van Dyke, Henry 1963 Prof Biology General Science. BS Western Reserve 1947; MA Michigan 1949, PhD 1955

Van Eman, Janis B. 1980 Instr Speech Communications. AB Wichita State 1963; MA Arkansas 1975

Van Eman, Lanny E. 1980 Asst Basketball Coach Athletics. AB Wichita State 1962, MEd 1965; EdS Western Kentucky 1978

Van Holde, Kensal Edward 1967 Prof Biophysics. BS Wisconsin at Madison 1949, PhD 1952

Van Horn, Edna Marjorie 1939 Prof Emeritus Home Administration

Van Vliet, Antone Cornelis 1955 Prof Forest Products; Director Career Planning and Placement Center. BS Oregon State 1952, MS 1958; PhD Michigan State 1970

Vars, R. Charles, Jr. 1966 Prof Economics. BS Denver 1958, MBA 1960; MA California at Berkeley 1965, PhD 1969

Varseveld, George Wallace 1963 Asst Prof Food Science and Technology. BS Alberta 1947; MS Oregon State 1953

Vaughan, Edward Kemp 1947 Prof Emeritus Plant Pathology

Vavra, Martin 1971 Assoc Prof Animal Science and Rangeland Resources, Asst Superintendent Eastern Oregon Agricultural Research Center at Union. BS Arizona 1966, MS 1969; PhD Wyoming 1972

Vejil, Emilio 1974 Assistant to Director Financial Aid (Asst Prof). AS Treasure Valley Community C 1970; BS Oregon State 1973, MEd 1979

Vergun, Judith R. 1981 Res Asst Zoology. BS Utah 1961; AA Santa Monica C 1972

Verhoeven, Mary Boulger 1973 Instr Crop Science. BA Skidmore C 1968; BS Oregon State 1972; MS 1980

Verhoeven, Thomas A. 1980 Res Asst Forest Science. BS Oregon State 1976

Vertrees, Junius Damiel 1949-53, 1957 Assoc Prof Emeritus (Douglas County Extn Agent)

Verts, B. J. 1965 Prof Wildlife Ecology. BS Missouri at Columbia 1954; MS Southern Illinois 1956, PhD 1965

Verts, Lita Jeanne 1974 Instr Educational Opportunity Program, Special Services Project. BA Oregon State 1973; MA Oregon 1974

Verzasconi, Ray A. 1967 Assoc Prof Spanish, Foreign Languages and Literatures. BA California at Berkeley 1960; MA Washington 1962, PhD 1965

Vesterby, Marlow 1967 Asst Prof Agricultural and Resource Economics (Courtesy); Agricultural Economist, Economic Research Service USDA. BS Montana State 1961, MS 1965

Vinson, Ted Stephen 1976 Assoc Prof Civil Engineering. BS California at Berkeley 1966, MS 1967, PhD 1970

Vinyard, Harold Roth 1938 Assoc Prof Emeritus Physics

Volk, Veril Van 1966 Prof Soil Science. BSc Ohio State 1960, MS 1961; PhD Wisconsin at Madison 1965

Vollmer, Gregory S. 1980 Manager Foundation Seed (Instr) Extn Crop Science. BBA Oregon 1971

Vomocil, James Arthur 1967 Extn Soil Scientist (Prof). BS Arizona 1950; MS Michigan State 1951; PhD Rutgers 1956

Von Borstel, Frank, Jr. 1948 Prof Emeritus (Marion County Extn)

Vorce-West, Thomas E. 1979 Asst Prof Pharmacy. BS Purdue 1971, MS 1972

W

Wade, John Edward 1977 Res Asst Atmospheric Sciences. BS Oregon State 1974; MS Washington 1977

Wadsworth, Henry A. 1976 Director Extn Service, Assoc Dean of School of Agriculture, Prof Agricultural and Resource Economics. BS Cornell 1956, MS 1958, PhD 1962

Wagener, Joseph Mark 1969 Assoc Prof, Clinical Psychologist, Student Health Center. AB Ohio 1962; MA Kent State 1964; PhD Purdue 1969

Wagner, James Daniel 1977 Res Asst Oceanography. BA Oregon State 1963, MS 1965; PhD Colorado State 1972

Wagner, Robert Gordon 1981 Res Asst Forest Science. BS Utah State 1977; MS Washington 1980

Wagner, Sheldon L. 1966 Prof Agricultural Chemistry and Environmental Health Science. BS Wisconsin at Madison 1954; MD 1957

Wakefield, Willard Waldo 1981 Res Asst Oceanography. BS Pennsylvania State 1973

Waldron, Rodney King 1954 Director of Libraries (Prof). BA Denver 1950, MA 1950

Waldvogel, James Brian 1979 Curry County Marine Extn Agent. BS Humboldt State 1968, MS 1977

Wales, Joseph Howe 1959 Assoc Prof Emeritus Food Science and Technology

Walker, Pamela K. 1977 Coordinator of Services to the Handicapped, Counseling Center (Res Asst). BA U of Denver 1972

Wall, Mary Jane 1973 Assoc Prof Education, Guidance and Counseling. BS Nebraska, 1946; MS Drake 1955; EdD Oregon State 1973

Wallace, Alexander S. 1965 Assoc Prof Speech Communication. BA Kansas State Teachers C 1960; MA Kent State 1961

Wallace, Betty M. 1975 Linn County Extn Agent (Instr). BS Sterling C 1956

Wallace, Sharon A. 1975 Assoc Prof Home Economics Education, Coordinator Vocational-Technical Education. BS Ohio 1967, MS 1970; PhD Pennsylvania State 1974

Walls, Robert Boen 1947 Prof Emeritus Music

Walrod, Don Coin 1948 Assoc Prof Emeritus (Columbia County Extn)

Walsh, Marilyn Lundblad 1978 Res Asst Agricultural Chemistry. BS Pacific Lutheran U 1963;MS Oregon State 1968

Walstad, John Daniel 1980 Assoc Prof Forest Science. BS William and Mary C 1966; MF Duke 1968; PhD Cornell 1971

Walter, Austin Frederic 1950 Prof Political Science, Department Chair.BA Carleton 1940; MA Fletcher School of Law and Diplomacy 1942; PhD Michigan 1954

Wang, Chih 1950 Prof Chemistry, Director Radiation Center and Institute of Nuclear Science and Engineering. Head of Department of Nuclear Engineering. BS U of Shantung (China) 1937; MS Oregon State 1947, PhD 1950

Wang, Jun-Lan 1970 Res Assoc Agricultral Chemistry. BS Normal U (Taiwan) 1960; BA North Carolina at Greensboro 1970; PhD Oregon State 1977

Wang, Yun-liang 1981 Res Assoc (Courtesy) Nuclear Engineering

Wanke, Lee Arthur 1974 Assoc Prof Pharmacy, Associate Director for Operations, Oregon Poison Control and Drug Information Center. BPharm Washington State 1971; MS Ohio State 1973

Ware, Margaret Christian 1945 Asst Prof Emeritus Foods and Nutrition

Waring, Richard Harvey 1963 Prof Forest Science. BS Minnesota 1957, MS 1959; PhD California at Berkeley 1963

Warkentin, Benno P. 1977 Prof Soil Science, Head of Department. BSA U of British Columbia 1951;MSc Washington State 1953; PhD Cornell 1956

Warnath, Charles Frederick 1961 Prof Psychology. AB Princeton 1949; MA Teacher's College Columbia 1951; PhD Columbia 1954

Warren, Charles Edward 1953 Prof Fisheries. BS Oregon State 1949, MS 1951; PhD California at Berkeley 1961

Warren, Rex 1934-45, 1947 Prof Emeritus (Extn Farm Crops Specialist)

Washburn, James L. 1968 Res Asst Civil Engineering. BS Oregon State 1968

Wasserman, Allen Lowell 1965 Assoc Prof Physics. BS Carnegie Institute of Technology 1956; PhD Iowa State 1963

Wasson, Josephine 1943 Assoc Prof Emeritus Art and Architecture

Watkins, David John Res Asst Computer Center. BS Oregon State 1975

Watkinson, Lois Ardell 1962 Polk County Extn Chairman (Prof). BS Oregon State 1945, MS 1970

Watrous, Barbara Jean 1981 Asst Prof Veterinary Medicine. BS California at Davis 1972, DVM 1974

Watson, Barney T. Jr. 1976 Res Asst Food Science and Technology. BA California at Berkeley 1971; MS California at Davis 1975

Watson, John Lowe 1947 Controller Emeritus (Prof Emeritus), Oregon State Board of Higher Education

Wax, Darold Duane 1962 Prof History. BA Washington State 1956; MA Washington 1959, PhD 1962

Way, Carl M. 1981 Res Asst Zoology. BA Miami U 1976; MS U of Dayton 1978

Way, Frederick Lewis 1981 Linn County Extn Agent (Asst Prof). BS California at Davis 1974, MS 1976

Weaver, Roger Keys 1962 Prof English. BA Oregon 1957; MA Washington 1962; MFA Oregon 1967

Webber, Nancy Ruth 1971 Asst Prof Emeritus Library

Weber, Bruce Alan 1974 Assoc Prof Agricultural and Resource Economics. BA Seattle U 1965; MS Wisconsin at Madison 1972, PhD 1973

Weber, Dale William 1977 Asst Prof Animal Science. BS Iowa State 1952, MS 1970, PhD 1974

Weber, John Charles 1980 Res Asst Forest Science. BA Gonzaga 1971; MS Washington 1980

Weber, Lavern John 1969 Director Marine Science Center; Prof Pharmacology and Fisheries. BA Pacific Lutheran 1958; MS Washington 1962, PhD 1964

Weber, Leonard Joseph 1954 Prof Electrical and Computer Engineering. BS Oregon State 1952; MS Washington 1962

Webster, Emma Louise 1953 Assoc Prof Emeritus (Multnomah County Extn Agent)

Wedman, E. Edward 1971 Dean School of Veterinary Medicine (Prof). DVM Kansas State 1945;MPH Minnesota 1954, PhD 1964

Weiler, Jerome Conrad 1969 Assoc Prof Business Administration. BBA Michigan 1948;MBA Air Force Institute of Tehnology 1959. Certified Public Accountant, Colorado 1951

Weinman, Richard Jay 1967 Prof Speech Communication. AB Indiana 1955; MA Columbia 1956; PhD Indiana 1965

Weinzierl, Richard Alan 1979 Extn Pest Management Specialist (Res Asst). BA Concordia C 1975; MS North Dakota State 1979

Weir, Erma Marion 1945 Prof Emeritus Physical Education

Weiser, Conrad John 1973 Prof Horticulture, Head of Department. BS North Dakota State 1957; PhD Oregon State 1960

Weiss, Christine Kay 1979 Res Asst Botany and Plant Pathology. BA Wisconsin at Madison 1976

Weller, Dwight Donan 1978 Asst Prof Chemistry. BS Lafayette C 1972; PhD California at Berkeley 1976

Wells, Howard Allison, Jr. 1981 Director Physical Plant, Assoc Prof Civil Engineering. BS US Naval Academy 1959; BS Rensselear Polytechnic 1962; MSE UCLA 1969

Wells, Patricia Ann 1974 Prof Business Administration; Director, Administrative Management Program. BS C of Great Falls 1966; MS North Dakota 1967, PhD 1971

Wells, Vera Lucile 1948 Asst Prof Emeritus Clothing, Textiles, and Related Arts

Welsh, Katherine Chafin 1980 Asst Director Admissions (Instr). BA Weber State C 1976

Welty, James Richard 1958 Prof Mechanical Engineering, Head of Department. BSME Oregon State 1954, MSME 1959, PhD 1962

Wernz, James George 1981 Res Asst Horticulture. BS Capital U 1961; MS Oregon State 1966, PhD 1972

Werth, Harold Eldon 1949-51, 1956 Assoc Prof Emeritus (Benton County Extn)

Wess, Robert Victor 1978 Asst Prof English. BA Chicago 1963, MA 1966, PhD 1970

West, Carol W. 1981 Instr Communication Skills Center. BS North Dakota 1963; MEd Oregon State 1980

West, H. Milton 1980 Instr Educational Opportunities Program. BA Oregon State 1980

West, Thomas Moore 1976 Assoc Prof Industrial and General Engineering. BS Tennessee at Knoxville 1963, MS 1965; PhD Oregon State 1976

West, William Irvin 1946 Prof Emeritus Forest Products

Westall, John C. 1980 Asst Prof Chemistry. BS North Carolina at Chapel Hill 1971; PhD MIT 1977

Westigard, Peter Hughes 1962 Prof Entomology, Southern Oregon Experiment Station. BA San Jose State 1957, PhD California at Berkeley 1962

Westwood, Melvin Neil 1960 Prof Horticulture. BS Utah State 1952; PhD Washington State 1956

Weswig, Paul Henry 1941 Prof Emeritus Chemistry, Agricultural Chemistry

Whanger, Philip Daniel 1966 Prof Agricultural Chemistry. BS Berry C 1959; MS West Virginia 1961; PhD North Carolina State 1965

Wheeler, George MacGregor 1980 Extn Energy Specialist (Asst Prof). BS MIT 1967;MS California at Berkeley 1970, PhD 1972

Wheeler, Patricia A. 1981 Assoc Prof Oceanography. BA California at Irvine 1971,MS 1974, PhD 1976

Wheeler, William Perry 1949 Prof Emeritus Forest Management

White, Diane Elise 1979 Res Asst Forest Research Laboratory. BS Nevada at Las Vegas 1973;MS California at Davis 1979

White, James David 1971 Prof Chemistry. BA Cambridge 1959; MSc British Columbia 1961;PhD MIT 1965

White, Marjorie Joann 1963 Assoc Prof Education. BEd San Jose State 1952; MEd Oregon 1957; EdD Wayne State 1963

White, Pearl Hagen 1969 Senior Instr Music. BA Minot State Teachers C 1942

Whitlow, Leo 1970 Multnomah County Extn Agent (Asst Prof). BA Langston U 1949; MA Oklahoma 1956.

Whitney, Donald E. 1980 Academic Counselor (Asst Prof) Athletics. BS Oregon State 1971;MS School of Theology at Claremont 1976

Whittle, Alan John 1981 Res Assoc Chemistry. BSc Imperial C (England) 1978, PhD 1981

Wick, William Quentin 1960 Director Sea Grant College Program, Prof Extension, Prof Wildlife Ecology. BS Oregon State 1950, MS 1952

Wickman, Boyd Ellis 1967 Supervisory Research Entomologist, Forestry Sciences Laboratory; Assoc Prof Entomology (Courtesy). BS California at Berkeley 1958, MS 1966

Wickman, H. H. 1971 Prof Chemistry. AB Nebraska at Omaha 1959; PhD California at Berkeley 1964

Wickramanayake, Palitha 1981 Res Assoc Agricultural Chemistry. BSc U of Sri Lanka 1974; PhD Dalhousie U (Canada) 1980

Wicks, Charles Edward 1954 Prof Chemical Engineering, Head of Department. BS Oregon State 1950; MS Carnegie Institute of Technology 1952, PhD 1954

Widicus, Wilbur Wilson 1964 Prof Business Administration. BS Southern Illinois 1958; MBA Indiana 1959; PhD Columbia 1964

Wigle, Kathryn Loretta 1979 Broadcast Media Manager Memorial Union and Student Activities (Instr). BS Oregon C of Education 1966

Wilcox, Bert Guy 1962 Klamath County Extn Chairman (Prof). BS Utah State 1957; MS Oregon State 1961

Wilcox, Janet Steere 1980 Res Asst Food Science and Technology. AB Oberlin C 1967

Wilkins, Billy Hughel 1961 Prof Economics. BBA Texas A&I University 1956, MS 1957; PhD Texas 1962

Wilkins, Dale 1979 Asst Prof Agricultural Engineering (Courtesy). Engineer Columbia Plateau Conservation Research Center. BS Purdue 1961; MS Maryland 1966; PhD Iowa State 1973

Willard, Joel 1980 Res Asst Biochemistry and Biophysics. BS New Mexico Inst Mining and Technology 1971

Willett, Michael James 1979 Jackson County Extn Agent (Asst Prof). BS Michigan State 1977; MS Washington State 1980

Willey, Dale Herbert 1959 Asst Prof English. BA Linfield 1950; MA Washington State 1952

William Raymond D. 1979 Extn Horticulture Weed Specialist (Assoc Prof). BS Washington State 1968; MS Purdue 1971, PhD 1974

Williams, Cal Robertson 1973 Multnomah County Extn Agent (Instr). BS Alcorn State U 1973

Williams, James Garfield III 1979 Prof Naval Science. BS California Maritime Academy 1952; BS George Washington U 1973; MA Central Michigan U 1975

Williams, Janet Lynn 1966 Res Asst Food Science and Technology. BS Washington State 1965; MS Oregon State 1971

Williams, John L. 1981 Asst Prof Mechanical Engineering. BSME California at Davis 1977; MSME Stanford 1978

Williams, Max Bullock 1941 Prof Emeritus Chemistry

Williams, William Appleman 1968 Prof History. BS U.S. Naval Academy 1944; MA Wisconsin at Madison 1948, PhD 1950

Williamson, Kenneth Jay 1973 Assoc Prof Civil Engineering. BS Oregon State 1968, MS 1970; PhD Stanford 1973

Williamson, Stanley Ellsworth 1946 Dean Emeritus, School of Education; Prof Emeritus Science Education

Willis, David Lee 1962 Prof Biology. General Science; Chairman of Department. BTh Biola C 1949, BA 1951; BS Wheaton C 1952; MA Long Beach State 1954; PhD Oregon State 1963

Willis, Glen E. 1978 Assoc Prof (Senior Research) Atmospheric Sciences. BA Oklahoma City U 1958, BA 1960; MS Washington 1962

Willis,John Marcus 1979 Res Asst Oceanography. BS Colorado State 1977; MS Oregon State 1980

Willrich, Ted Leroy 1971 Prof Emeritus Agricultural Engineering Extn

Wills,Clayton Stanley 1959 Clackamas County Extn Chairman (Prof). BS Oregon State 1950, M.Ed. 1957

Wilson, Charles Owens 1959 Dean Emeritus of Pharmacy, Prof Emeritus Pharmaceutical Chemistry

Wilson, Glenn R. 1978 Res Asst Agricultural Chemistry. BA Southern Oregon State 1977

Wilson, Howard LeRoy 1964 Prof Mathematics and Science Education. BA Willamette 1954; MS Illinois 1960, PhD 1966

Wilson, James Brian 1973 Assoc Prof Forest Products. BS State U of New York at Syracuse 1964, PhD 1971

Wilson, Jeremy 1980 Res Asst Computer Center. BA California at San Diego 1974;MS Utah State 1977

Wilson, Laurilee B. 1974 Marion County Extn Agent (Instr). BS Colorado State 1973.

Wilson, Norman William 1947 Assoc Prof Emeritus English

Wilson, Odelia Jungers 1958 Assoc Prof Emeritus Music

Wilson, Robert Claude 1949 Asst Prof Emeritus Industrial Education

Wilson, Robert Elliot 1957 Prof Mechanical Engineering. BS Oregon State 1955; MS Illinois 1956; PhD Oregon State 1963

Wilson, Robert Lee 1952 Assoc Prof Emeritus Forest Engineering

Winger, Fred Everett 1947 Prof Emeritus Business Education and Office Administration

Winkler, William, Jr. 1957 Assoc Prof Physical Education. BS (Ed) Michigan 1955, MS (Ed) 1960

Winters, Eugene Philip 1954 Prof Emeritus (Douglas County Extn)

Winton, James R. 1980 Res Asst Microbiology. BA Colorado 1967; PhD Oregon State 1981

Wiprud, Theodore Franklin 1964 Prof Art. BA Washington 1958; ME Central Washington State 1962; MFA Claremont Graduate School 1964

Wirth, Donald Shelby 1971 Director Alumni Relations (Asst Prof). BS Oregon State 1961

Witmer, Paul D. II 1979 Instr Naval Science

Witt, James McAuley 1966 Extn Chemist and Environmental Toxicologist (Prof), Agricultural Chemistry. BS California at Berkeley 1947, PhD 1965

Witters, Robert E. 1977 Assoc Director Agricultural Experiment Station, Assoc Prof Crop Science. BSEd Eastern Illinois 1962; MS Michigan State 1967, PhD 1970

Wittrup, Rich J. 1979 Res Asst Atmospheric Sciences. BS Ohio 1973; MA Ball State 1977

Wolberg, Floyd Byron 1945 Assoc Prof Emeritus Animal Science

Wolf, Marvin Abraham 1977 Assoc Prof (Senior Research) Atmospheric Sciences.BS New Mexico Institute of Mining and Technology 1951;MS Washington 1962

Wolfe, John William 1947 Prof Emeritus Agricultural Engineering

Wolff, Scott Earl 1977 Seed Certification Asst (Res Asst Uncl). BS Oregon State 1977

Wolfson, Murray 1963 Prof Economics. BS City of New York 1948; MS Wisconsin at Madison 1951, PhD 1964

Wong, Allen Quan 1967 Prof Art. BA Oregon 1943

Wong, James 1964 Res Asst Botany. BS Oregon State 1962

Wong, Sally 1973 Counselor, Counseling Center (Asst Prof). BFA Texas at Austin 1963; MSW Portland State 1969, ACSW 1971

Wood, Carvel W. 1968 Prof Education. BS Utah State 1950; MA Stanford 1956, EdD 1967

Wood,Gregory Burton 1951 Prof Emeritus Agricultural Economics, Director Emeritus Agricultural Experiment Station

Wood, Jack Henry 1948 Assoc Prof Emeritus (Linn County Extn)

Wood, Scott Denison 1981 Res Asst Microbiology. BS Oregon State 1981

Woodard, Ernest Steve 1963-68, 1974 Lane County Extn Agent (Assoc Prof). BS Oregon State 1963, MS 1966

Woodburn, Margy Jeanette 1969 Assoc Dean Home Economics Research, Prof and Department Head. BS Illinois 1950; MS Wisconsin at Madison 1956, PhD 1959

Woods, LaVerne 1976 Counselor and Recruiter Educational Opportunities. AA St. Mary's 1971

Woods, W. Kelly 1978 Prof Nuclear Engineering. BA Stanford 1934; MS MIT 1936, PhD 1940

Woodworth, Bruce M. 1968 Assoc Prof Business Administration. BS Oregon State 1958; MBA Colorado 1965, DBA 1968

Workinger, Clytie May 1910 Asst Prof Emeritus of Education

Workman, Grace Irene 1957 Asst Prof Emeritus (Portland City Extn Agent)

Worrest, Robert Charles 1975 Assoc Prof (Senior Research) Biology, General Science. BA Williams C 1957; MA Wesleyan U (Conn.) 1964; PhD Oregon State 1975

Wright, David W. 1975 Physician Student Health Center (Assoc Prof). BS Seattle Pacific C 1968; MD California at Davis 1972

Wright, Hollis Gary 1974 Physician,Student Health Center (Prof). BA Yale 1965, MD 1970

Wright, Janet Kathleen 1972-74, 1980 Social Sciences and Humanities Librarian (Asst Prof). BA Portland State 1964; MLS Oregon 1968;MFA Idaho State 1979

Wright, LeRoy Clinton 1929 Assoc Prof Emeritus (Baker County Extn Agent)

Wrolstad, Ronald Earl 1965 Prof Food Science and Technology. BS Oregon State 1960; PhD California at Davis 1964

Wu, Arthur Szu-Hsiao 1952 Prof Animal Reproduction. BS National Central (China), 1941; MS Oregon State 1949, PhD 1952

Wubben, Hubert Hollensteiner 1963 Prof History. BA Cornell C 1950, MA Iowa 1958, PhD 1963

Wyatt, Carolyn Jane 1977 Assoc Prof Food Science and Technology. BS Arizona 1959; MS Oregon State 1960, PhD 1966

Wyckoff, Jean Bratton 1971 Extn Economist, Public Policy; Prof Agricultural and Resource Economics. BS Oregon State 1953, MS 1957; PhD Washington State 1963

Wyckoff, Winnefred Lee 1971 Assoc Prof Physical Education. BS Oregon State 1955; MS Washington State 1959; EdD Massachusetts 1971. On leave 1982

X

Xu, Bujin 1979 Res Assoc Nuclear Engineering (Courtesy)

Y

Yamate, Robert T. 1978 Head Swim Coach (Instr). BS California Polytechnic 1972; MAT U of La Verne 1978

Yamauchi, Carol Ann K. 1981 Res Asst Foods and Nutrition. BS Purdue 1976; MS Colorado State 1980

Yaneng, Cai 1981 Res Assoc (Courtesy) Zoology

Yang, Hoya Y. 1943 Prof Emeritus Food Science and Technology

Yates, Thomas Leyba 1962 Director Computer Center (Prof). BA Willamette 1950; MS Oregon State 1967

Yearick, Elisabeth Stelle 1966 Prof Emeritus Foods and Nutrition

Yeats, Robert S. Prof Geology, Chairman of Department. AB Florida 1952; MS Washington 1956, PhD 1958

Yerian, Charles Theodore 1937 Prof Emeritus Business Education and Office Administration

Yoke, John Thomas 1964 Prof Chemistry. BS Yale 1948; MS Michigan 1950, PhD 1954

Yonker, Nicholas J. 1962 Prof Religious Studies. BA Hope C 1950; MA Columbia 1956, PhD 1961

Yoshimura, Ralph Jitsuo 1980 Instr Vocational Education. BA California State C 1958; MEd Oregon 1968

Yost, Melvin Lowell 1967 Art Director, Instructional Resources and Materials Center (Asst Prof). BS Lewis and Clark 1962

Yost, Raymond Allen 1973 Tillamook County Extn Agent (Asst Prof). BS Mt Angel C 1968; MS Oregon C of Education 1973

Youmans, Russell Clark 1966 Director Western Rural Development Center, Program Leader Extension Community Development, Prof Agricultural and Resource Economics. BS Illinois 1958; MS Purdue 1962, PhD 1966

Young, J. Lowell 1957 Prof Soil Science (Courtsey); Chemist ARS/USDA. BS Brigham Young 1953; PhD Ohio State 1956

Young, John Aubrey 1972 Assoc Prof Anthropology. BA Macalester C 1963; MA Hawaii 1965; MA Stanford 1967, PhD 1971

Young, Marvin Miles 1958 Deschutes County Extn Chairman (Prof). BS Oregon State 1954; ME Colorado State 1962

Young, Peter Maclagan 1980 Res Asst Forest Science. BA Washington 1970, BS 1977; MS Washington State 1980

Young, William Clyde III 1978 Res Asst Crop Science. BS Western Illinois U 1973; MS Oregon State 1980

Youngberg, Chester Theodore 1952 Prof Emeritus Forest Soils

Youngberg, Harold Wayne 1960 Extn Agronomist, Prof Crop Science. BS Oregon State 1951, MS 1966; PhD Purdue 1970

Yu, San-qian 1980 Res Assoc Botany and Plant Pathology (Courtsey). BS Fudan U (China) 1961, MS 1964

Yu, Te Chang 1961 Res Asst Agricultural Chemistry. BS Taiwan Teacher's College 1950

Yu, Teh Chu 1951 Assoc Prof Emeritus Food Science and Technology

Yui, Mary A. 1981 Res Asst Zoology. BA California at Santa Barbara 1977

Yungen, John Alfred 1950 Assoc Prof Agronomy. Superintendent Southern Oregon Experiment Station. BS Oregon State 1950, MS 1959

Yunker, Edwin Arthur 1925 Prof Emeritus Physics

Z

Zaerr, Joe Benjamin 1965 Prof Forest Science. BS California at Berkeley 1954, PhD 1964

Zaneveld, Jacques Ronald Victor 1971 Assoc Prof Oceanography. BS Old Dominion U 1964; SM, MIT 1966; PhD Oregon State 1971

Zaworski, Robert Joseph 1958 Prof Mechanical Engineering. BSME MIT 1947, SMME 1958, PhD 1966

Zehfus, Betty Regina 1979 Res Asst Microbiology. BS Carroll C (Wisconsin) 1977

Zhang, Zhiyong 1980 Res Assoc Botany and Plant Pathology (Courtesy). BS U of Nanking (China) 1951

Zimmerman, Gary Lee 1977 Asst Prof Veterinary Medicine. BS Kansas State 1967, MS 1970, PhD 1973, DVM 1977

Zimmerman, Martin Joseph 1960 Jefferson County Extn Agent (Assoc Prof). BS Oregon State 1953, MS 1969

Zinn, Thomas G. 1962 Extn Area Supervisor (Prof). BS Oregon State 1956,MS 1978

Zobel, Donald Bruce 1968 Assoc Prof Botany. BS North Carolina State 1964; AM Duke 1966, PhD 1968

Zopf, David Oscar 1970 Res Asst Oceanography. Asst to Director Marine Science Center. BS Stanford 1950, MS 1951, EE 1952

Zundel, Afton 1934-44, 1957 Prof Emeritus (Clackamas County Extn Agent)

Zuzel, John F. 1979 Instr Agricultural Engineering (Courtesy). Engineer Columbia Plateau Conservation Research Center. BS Montana State 1964; MS Washington 1977

Zwahlen, Fred Casper, Jr. 1950 Prof Journalism, Department Chair. BA Oregon State 1949; AM Stanford 1952

Zwick, Robert Ward 1964 Assoc Prof Entomology, Mid-Columbia Experiment Station. BS Washington 1947;MS Washington State 1951, PhD 1962

Summary of Enrollment

Enrollment by Curriculum and Class, Regular Session, 1980-81

Curriculum	Freshman year	Sophomore year	Junior year	Senior year	Graduate	Special	Sub-total	Total
Liberal Arts and Sciences								
College of Liberal Arts	707	523	517	511	26	107	2,391	
College of Science	823	614	567	578	775	40	3,397	
TOTAL, Liberal Arts and Sciences (excluding duplicates)	1,530	1,137	1,084	1,089	801	147	5,788	
Professional Curricula								
School of Agriculture	235	253	324	398	533	27	1,770	
School of Business	1,035	777	753	691	160	56	3,472	
School of Education	142	194	206	228	560	18	1,348	
School of Engineering	907	741	685	824	476	13	3,646	
School of Forestry	166	146	168	271	175	9	935	
School of Health and Physical Education	92	99	141	170	13	6	521	
School of Home Economics	194	184	176	267	112	18	951	
School of Oceanography					111		111	
School of Pharmacy	46	41	67	210	63	3	430	
School of Veterinary Medicine					41		41	
University Exploratory Studies Program	189	77	3			0	269	
Unclassified					768		768	
TOTAL, Professional Schools	3,006	2,512	2,523	3,059	3,012	150	14,262	
TOTAL (excluding duplicates)	4,536	3,649	3,607	4,148	3,813	297		
TOTAL STUDENTS, Regular Session								20,050

Summary of Degrees Conferred 1980-81

Advanced Degrees

Doctor of Philosophy	143
Doctor of Education	7
Master of Arts	4
Master of Arts (Interdisciplinary Studies)	25
Master of Science	419
Master of Agriculture	10
Master of Business	41
Master of Education	135
Master of Forestry	10
Master of Home Economics	6
Master of Ocean Engineering	2
Master of Materials Science	1
TOTAL ADVANCED DEGREES	803

Bachelor's Degrees

BACHELOR OF FINE ARTS	16
BACHELOR OF ARTS	
College of Liberal Arts	102
College of Science	7
Business	3
Education	13
Home Economics	7
BACHELOR OF SCIENCE	
College of Liberal Arts	271
College of Science	355
Agriculture	279
Business	556
Education	164
Engineering	456
Forestry	147
Health and Physical Education	89
Home Economics	185
Pharmacy	66
TOTAL BACHELOR'S DEGREES	2,716
TOTAL DEGREES CONFERRED 1980-81	3,519

Enrollment by Sex, All Sessions, 1980-81

Session	Men	Women	Total
Summer Term, 1980	2,436	3,166	5,602
Fall Term, 1980-81	10,537	7,152	17,689
Winter Term, 1980-81	10,382	6,996	17,378
Spring Term, 1980-81	9,695	6,648	16,343
NET TOTAL, REGULAR SESSIONS	11,863	8,187	20,050
NET TOTAL, ALL SESSIONS	14,299	11,353	25,652

Enrollment in Summer Term, 1980

	Men	Women	Total
Summer Term, 1980	2,436	3,166	5,602
4-H Club Short Course, 1980	218	549	767
TOTALS	2,654	3,715	6,369

Directory of Offices, Schools, and Departments

Position and Officer	*Building and Room*	*Campus Tel.*
President, R. W. MacVicar,	AdS 622	2565
Acting Vice-President for Administration, T. D. Parsons,	AdS A 622	2447
Acting Dean of Research, G. H. Keller,	AdS 312	3437
Dean of Graduate School, L. D. Calvin,	AdS A 300	4881
Vice-President for Student Services, R. W. Chick,	AdS A 220	3626
Dean of Faculty, D. B. Nicodemus,	AdS A 600	2111
Dean of Undergraduate Studies, J. L. Kuipers,	AdS A 608B	3733
Admissions, W. E. Gibbs, dir,	AdS B 104	4411
Affirmative Action, P. S. Gray, dir,	AdS A 600	3556
Alumni Relations, D. S. Wirth, dir,	MU 103	2351
Archives, L. Filson, dir,	AdS B 94	2165
Budgets, A. Mathany, dir,	AdS A 510	4121
Business Affairs, H. F. Jeffrey, Jr., dir,	AdS B 100	3031
Campus Security		4473
Classroom TV Center, J. R. Root, dir,	Kidd 113T	4905
Computer Center, T. L. Yates, dir,	MCC 217	2494
Continuing Education, R. D. Andrews, dir,	CCC	2679
Counseling and Test Cntr, M. L. LeMay, dir,	AdS A 322	2131
Curriculum Coord, S. J. Suttie, dir,	AdS A 600F	3711
Development Office, J. W. Dunn, dir,	AdS A 524	4218
Educ Opportun, M. W. Orzech, dir,	Wald 377	3628
Extension Serv, H. A. Wadsworth, dir,	Ext 101	2711
Faculty Senate, R. R. Becker, pres,	SS 107	4344
Financial Aid, R. E. Pahre, dir,	AdS A 218	2241
Honors Program, M. E. Meehan, dir,	Bexl 209	4459
Horner Museum, L. Skjelstad, dir,	Gill 1	2951
Housing, M. E. Bryan, dir,	AdS B 204	4771
Information Department, S. H. Bailey, dir,	AdS A 416	4611
Instruct Develop, D. N. Osterman, dir,	WSC 20B	4335
Instruct Resour and Materials, B. P. Purvis, dir,	Kidd 109	2121
International Ed, J. G. Van de Water, dir,	AdS A 100	3006
Lab Animal Resour, N. M. Patton,	LARC	2263
Libraries, R. K. Waldron, dir,	KLib 320	3411
Memorial Union, G. F. Stevens, dir,	MU	3137
Men's Intercollegiate Athletics, D. G. Andros,	Gill 103	2611
Motor Pool, C. B. Barnett, dir,	MoPl	4141
New Student Programs, J. F. Haun, dir,	AdS A 110	2626
OSU Foundation Center, R. D. Andrews, dir,	CCC	2402
OSU Press, T. H. Sanders, dir,	Wald 101	3166
Personnel Services, G. Todd, dir,	AdS B 122	3103
Physical Plant, H. A. Wells, Jr.,	PP	4921
Placement Office, A. C. Van Vliet, dir,	AdS B 008	4085
Planning and Institut Research, D. A. Bucy, dir,	AdS A 500	2001
Printing and Mailing, C. W. Peckham, dir,	IndB	4941
Purchasing, K. Potter, mgr,	Gill	4261
Radiation Center, C. H. Wang, dir,	RC	2341
Registrar, W. E. Gibbs,	AdS B 102	4331
Sea Grant College Prog, W. Q. Wick, dir,	AdS A 320	2714
Student Activ Cntr, D. R. Sanderson, dir,	MUE	2101
Student Assist and Information Cntr,	AdS A 200	3625
Student Health Center, D. S. Boots, dir,	PInF	2721
Student Publications, F. Ragulsky, dir,	MUE 118	3374
Student Services, J. J. Trow, assoc dean,	AdS A 200	3661
Summer, Evening Classes, R. D. Andrews, dir,	CCC	2052
University Explor Studies Prog, M. L. LeMay, coord,	AdS 322	2131
University Publications, T. H. Sanders, dir,	Wald 101	3166
Upward Bound, R. Chacon, dir,	Wald 343	4681
Women's Intercolleg Athlet, S. Moore, dir,	WB 129	3015

Colleges, Schools, and Departments

Graduate School, L. D. Calvin, Dean,	AdS A 300	4881
College of Liberal Arts, D. J. King, Dean,	SS 205	2511
Anthropology, C. L. Smith,	Wald 234	4515
Architecture-Landsc Arch, J. R. Stewart,	Ag 409	2606
Art, B. W. Chappell,	Fair 106	4745
Economics, K. D. Patterson,	Bexl 201	2321
English, R. Frank,	More 240C	3244
Foreign Languages and Literatures, S. E. Maleug,	Kidd 212	2146
Geography, T. J. Maresh,	Wlkn 202	3141
History, T. C. McClintock,	Milm 306B	3421
Journalism, F. C. Zwahlen,	Ag 229	3108
Music, D. Eiseman,	Bent 103	4061
Philosophy, R. Dale,	SS 213G	2955
Political Science, A. F. Walter,	SS 312	2811
Psychology, J. S. Gillis,	More 204B	2311
Religious Studies, C. W. Hovland,	SS 200	2921
Sociology, G. H. Tiedeman,	Fair 307	2641
Speech Communication, L. E. Crisp,	Shep 107	2461
College of Science, T. T. Sugihara, Dean,	Kidd 128	4811
Atmospheric Sciences, W. L. Gates,	Ag 326B	4557
Biochemistry and Biophys, C. K. Mathews,	Wngr 535	4511
Biology, R. R. Becker,	Cord 1030	2993
Botany and Plant Path, T. C. Moore,	Cord 2082	3451
Chemistry, T. D. Thomas,	Gilb 153A	2081
Computer Science, F. M. Tonge,	Kidd 294C	3273
Entomology, B. F. Eldridge,	Cord 2046	4733
General Science, D. L. Willis,	Wngr 355	4151
Geography, T. J. Maresh,	Wlkn 202	3141
Geology, R. S. Yeats,	Wlkn 102	2484
Mathematics, R. M. Schori,	Kidd 368C	4686
Microbiology, J. L. Fryer,	Nash 220	4441
Physics, C. W. Drake,	Wngr 301	4631
Science and Math Ed, T. P. Evans,	Wngr 253	4031
Statistics, L. D. Calvin,	Kidd 46	3366
Zoology, C. E. King,	Cord 3029	5002
School of Agriculture, E. J. Briskey, Dean,	Ag 126	2331
Agricultural and Resource Economics, A. G. Nelson,	Ext 217	2942
Agricultural Chemistry, V. H. Freed,	Wngr 339	3791
Agricultural Education, J. Oades,	Bat 202	3681
Agricultural Engineering, J. R. Miner,	Gilm 100	2041
Animal Science, J. E. Oldfield,	With 106	3431
Crop Science, D. N. Moss,	Crps 109B	2821
Extension Education, G. A. Klein,	Ext 125	2661
Fisheries and Wildlife, R. A. Tubb,	Nash 104	4531
Food Sci and Technology, P. E. Kifer,	Wgnd 100	3131
Horticulture, C. J. Weiser,	Cord 2042	3695
Poultry Science, G. H. Arscott,	Dryd 208	2301
Rangeland Resources, W. C. Krueger,	With 200	3341
Soil Science, B. P. Warkentin,	Ag 202	2441
School of Business, E. E. Goddard, Dean,	Bexl 200	2551
Accounting, P. S. Kemp,	Bexl 206	4276
Admin Mgt, P. A. Wells,	Bexl 208	3520
Management, E. E. Easton,	Bexl 428	3689
Mgt Sci, A. E. Abrassart,	Bexl 408	3171
Mkrtng, Fin, and Prod, W. G. Browne,	Bexl 407	4116
School of Education, Robert D. Barr, Dean,	Educ 215	3739
Communication Ed		4661
Counseling and Guidance		4661
Elementary Ed		4661
Educational Foundations		4661
Postsecondary Ed		4661
Sci, Social Sci, and Math Ed		4661
Vocational and Tech Ed		4661
School of Engineering, F. J. Burgess, Dean,	Covl 201	4525
Agricultural Engineering, J. R. Miner,	Gilm 100	2041
Chemical Engineering, C. E. Wicks,	ChE 101	4791
Civil Engineering, F. D. Schaumburg,	App 206	4934

Elec and Computer Engr, J. Owen, Dear 303 3617
Industrial and General Engr, J. L. Riggs, Covl 210 4645
Mechanical Engr, J. R. Welty, Rog 206 3441
Nuclear Engineering, C. H. Wang, RC C100 2343

School of Forestry, C. H. Stoltenberg, Dean, Pvy 150D 2221
Forest Engineering, G. W. Brown, Pvy 213 4952
Forest Management, J. H. Boyle, Pvy 213 4951
Forest Products, H. Resch, Pvy 119 2017
Forest Science, J. C. Gordon, FRL 111 198–0
Resource Recreation Mgmt, P. J. Brown, Pvy 108 2043

School of Health and Phys Ed, M. G. Maksud, Dean, WB 124 3220
Health, D. Phelps, Wald 321 2686
Phys Ed, J. Dunn, Lang 214 2643

School of Home Ec, B. E. Hawthorne, Dean, Mlm 112 .. 3551
Clothing, Text, Rel Arts, R. E. Gates, Mlm 228 3796
Family Resource Mgt, G. Olson, Mlm 323B 4992
Foods and Nutrition, M. J. Woodburn, Mlm 110 3561
Home Economics Education, H. Hall, Mlm 20 3101
Hum Devel and Fam St, J. M. Henton, Mlm 322 4765
Institution Management, A. M. Messersmith, Mlm 14 3101

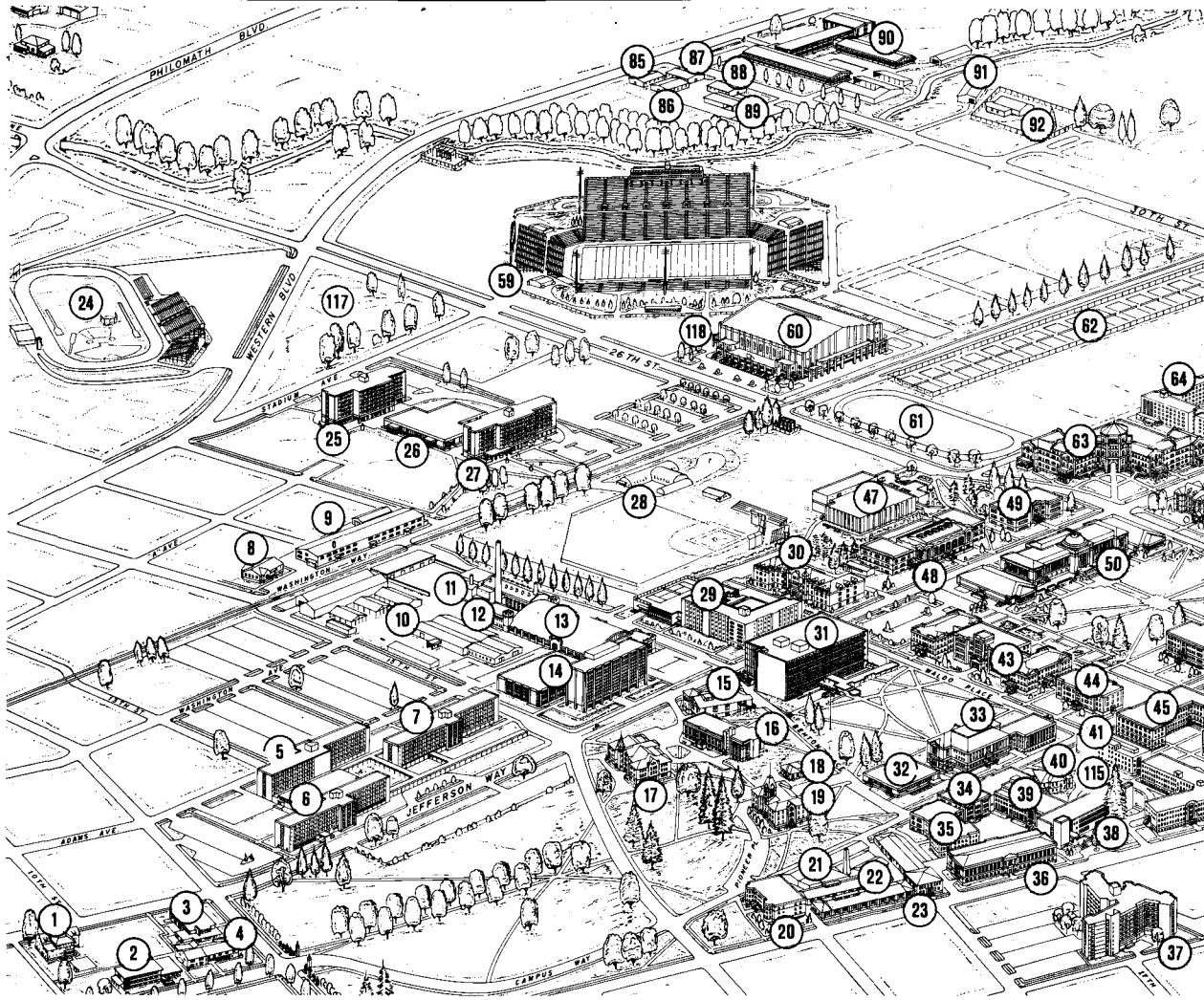
School of Oceanography, G. R. Heath, Dean, Ocn I-414 3504

School of Pharmacy, R. A. Ohvall, Dean, Phar 203 3725

School of Veterinary Medicine, E. E. Wedman, Dean, Magr 200B 2098

Interdisciplinary Degree Programs
Health Care Admin, J. K. Ellis, Wald 303 4373
Hotel and Rest Mgt, L. B. Soule, Bexl 204C 4034

Reserve Officers Training Corps
Aerospace Stud, J. K. McPherson, McAF 308 3291
Military Science, C. W. Rosler, McAF 200 3511
Naval Science, J. G. Williams, III, Navy 2605



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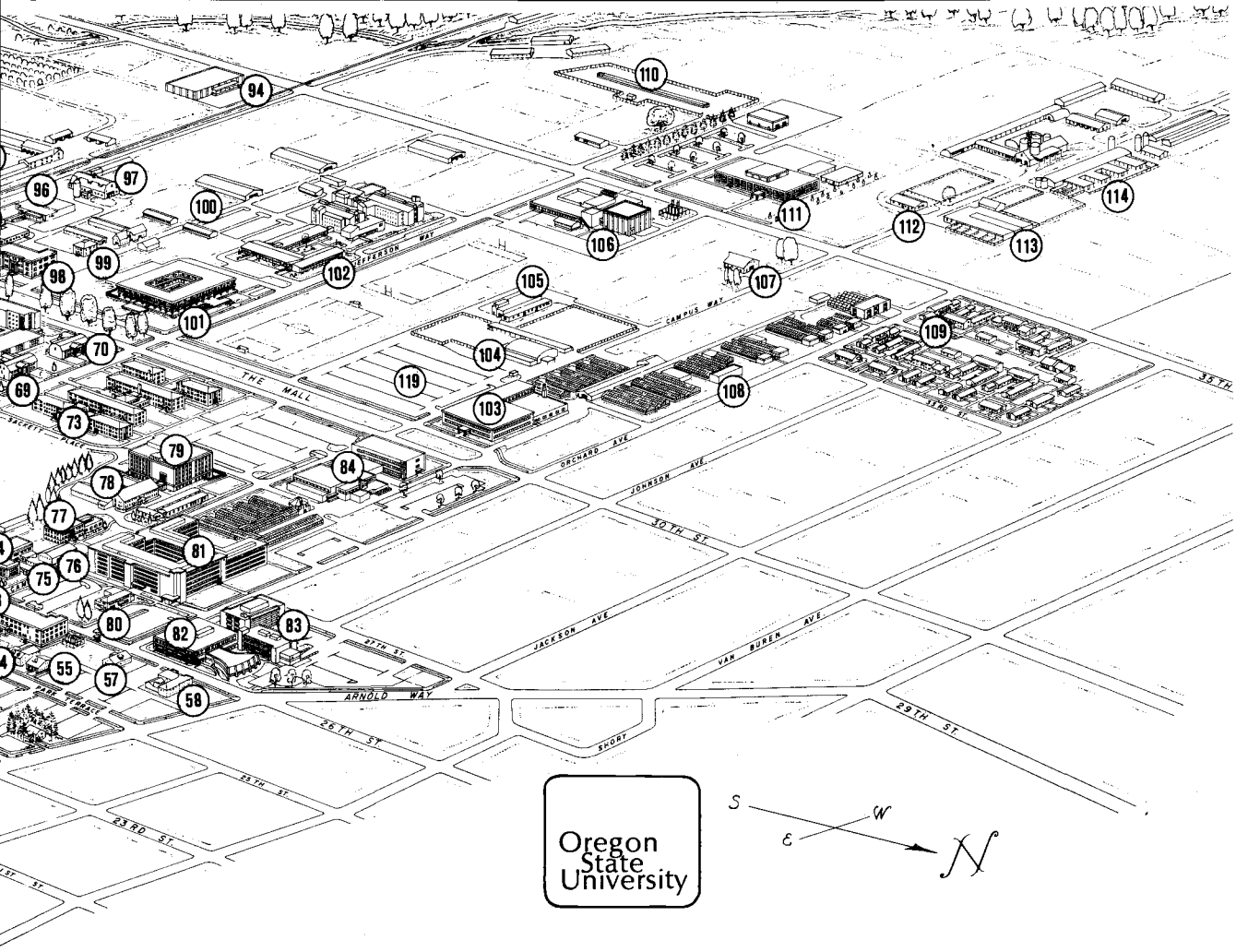

NUMERICAL LISTING

1 ..... Oxford House
2 ..... Avery Lodge
3 ..... Dixon Lodge
4 ..... Azalea House
5 ..... Wilson Hall
6 ..... McNary Hall and Dining Hall
7 ..... Callahan Hall
8 ..... Physical Plant Office Building
9 ..... Industrial Building
10 ..... Physical Plant Shops and Stores
11 ..... Heating Plant
12 ..... Indoor Target Range
13 ..... McAlexander Fieldhouse
14 ..... Administrative Services Building
15 ..... Mitchell Playhouse
16 ..... Pharmacy Building
17 ..... Education Hall
18 ..... Women's Center (Instr. Dev.)
19 ..... Benton Hall
20 ..... Apperson Hall
21 ..... Instructional Shops
22 ..... Merryfield Hall Annex
23 ..... Merryfield Hall
24 ..... Wayne Valley Field
25 ..... Bloss Hall
26 ..... Arnold Dining Hall
27 ..... Finley Hall
28 ..... Naval Armory
29 ..... Memorial Union East (Snell Hall)
30 ..... Waldo Hall
31 ..... Kerr Library
32 ..... Milne Computer Center
33 ..... Kidder Hall
34 ..... Batcheller Hall
35 ..... Covell Hall
36 ..... Graf Hall
37 ..... College Inn
38 ..... Rogers Hall
39 ..... Dearborn Hall
40 ..... Shepherd Hall
41 ..... Chemical Engineering Building
42 ..... Gilbert Hall
43 ..... Agriculture Hall
44 ..... Social Science Hall
45 ..... Bexell Hall
46 ..... Weniger Hall
47 ..... Dixon Recreation Center
48 ..... Langton Hall
49 ..... Moreland Hall
50 ..... Memorial Union Building
51 ..... Milam Hall (Home Ec.)
52 .... Milam Auditorium (Home Ec Aud.)
53 ..... Extension Hall
54 ..... Extension Hall Annex
55 ..... Park Terrace Child Dev. Center
56 ..... Plageman Hall (Student Health Center)
57 ..... Kent House
58 ..... Coed Cottage
59 ..... Parker Stadium
60 ..... Gill Coliseum
61 ..... Intramural Field
62 ..... Tennis Courts
63 .... Weatherford Hall and Dining Hall
64 ..... Poling Hall
65 ..... Cauthorn Hall
66 ..... Buxton Hall
67 ..... Hawwley Hall
68 ..... West Hall and Dining Hall
69 ..... Heckart Lodge
70 ..... Reed Lodge
71 ..... Fairbanks Hall
72 ..... Women's Building
73 ..... Sackett Hall
74 ..... Gilmore Hall
75 ..... Gilmore Annex
76 ..... Farm Crops Annex (Seed Lab)
77 .... Farm Crops Building (Comp. Sci.)
78 ..... Agriculture Utilities
79 ..... Nash Hall
80 ..... Orchard St. Child Dev. Center
81 ..... Cordley Hall
82 ..... Wilkinson Hall
83 ..... Oceanography
84 ..... Withycombe Hall
85 ..... (Physical) Oceanography Lab
86 ..... Oceanography Warehouse
87 .. Oceanography Geophysics Building
88 ..... Oceanography Core Lab
89 ..... Oceanography Shop Building
90 ..... Forest Research Lab
91 ..... Aero Engineering Lab
92 ..... Oceanography Staging Building
93 ..... Vet. Sheep Barn
94 ..... Dormitory Service Building
95 .... Vet. Diagnostic Lab (Res. Facil.)
96 ..... Lab Animal Resources Center
97 ..... Vet. Dairy Barn
98 ..... Dryden Hall
99 ..... Poultry Feed Building
100 ..... Poultry Research Facilities
101 ..... Peavy Hall
102 ..... Forestry Sciences Lab (USDA)
103 ..... Wiegand Hall
104 ..... Motor Pool
105 ..... Clark Laboratory
106 ..... Radiation Center
107 ..... Farrier School
108 ..... Forest Entomology Lab
109 ..... Orchard Court Apartments
110 ..... Wave Tank Facility
111 .... Corvallis Environmental Res. Lab (E.P.A.)
112. ..... Stock Judging Pavilion
113 ..... Sheep Barn
114 ..... Beef Barn
115 ..... Gilbert Hall Addition
116 ..... Magruder Hall
117 ..... OSU Foundation Center
118 ..... Horner Museum
119 ..... Crop Science Building

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