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Director, Div. of Phys. Education
Men's Gym 214

CATALOG ISSUE

1963-64

Oregon State

University

BULLETIN

CORVALLIS • OREGON



OREGON STATE SYSTEM
OF HIGHER EDUCATION

Explanation of Code Numbers

Course Numbering System

- 1- 49 Noncredit courses or credit courses of a terminal or semiprofessional nature.
- 50- 99 Credit courses of a basic, preparatory, subfreshman level.
- 100-299 Courses for freshmen and sophomores.
- 300-499 Courses for juniors and seniors.
- 400-499 With (g) or (G) undergraduate courses that may be taken for graduate credit.
- 500-599 Graduate courses.

Class Meetings per Week

The symbols that accompany each course description in this Catalog refer to the number and duration of the class periods each week. For example, 3 ① means that the class meets three times a week for one hour. 2 ③ means that the class has two three-hour meetings each week.

See pages 26 and 27 for other definitions, more details of the numbering system, and an explanation of the grading system.

OREGON STATE UNIVERSITY BULLETIN

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Oregon State University
CATALOG

1963-64



CORVALLIS, OREGON

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Oregon State University Calendar

Summer Session 1963

June 17, <i>Monday</i>	Registration
June 18, <i>Tuesday</i>	Classes begin
July 4, <i>Thursday</i>	Independence Day—holiday
August 8-9, <i>Thursday-Friday</i>	Final examinations
August 9, <i>Friday</i>	End of summer session

Fall Term 1963

September 18, <i>Wednesday</i>	Faculty Day
September 18-29, <i>Wednesday-Sunday</i>	New Student Program
September 26-27, <i>Thursday-Friday to 3 p.m.</i>	Registration
September 30, <i>Monday</i>	Classes begin
October 11, <i>Friday</i>	Latest day for registering or adding courses
October 18, <i>Friday</i>	Latest day to drop a course—returning students
October 26, <i>Saturday</i>	End of fourth week (reports of unsatisfactory progress)
November 8, <i>Friday</i>	Latest day to drop a course—first-term freshmen
November 16, <i>Saturday</i>	End of seventh week
November 23, <i>Saturday</i>	Latest day to withdraw from college without responsibility for grades
November 28-December 1, <i>Thursday-Sunday</i>	Thanksgiving vacation
December 16-21, <i>Monday-Saturday</i>	Final examinations
December 21, <i>Saturday</i>	End of fall term

Winter Term 1964

January 6-7, <i>Monday a.m. and p.m., Tuesday to 12 noon</i>	Registration
January 7, <i>Tuesday, 1 p.m.</i>	Classes begin
January 20, <i>Monday</i>	Latest day for registering or adding courses
January 27, <i>Monday</i>	Latest day to drop a course—returning students
February 3, <i>Monday</i>	End of fourth week (reports of unsatisfactory progress)

June 1963							July 1963							August 1963							September 1963						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
.....	.....	.....	.....	.....	.....	1	.....	1	2	3	4	5	6	.....	.....	.....	.....	1	2	3	1	2	3	4	5	6	7
2	3	4	5	6	7	8	7	8	9	10	11	12	13	4	5	6	7	8	9	10	8	9	10	11	12	13	14
9	10	11	12	13	14	15	14	15	16	17	18	19	20	11	12	13	14	15	16	17	15	16	17	18	19	20	21
16	17	18	19	20	21	22	21	22	23	24	25	26	27	18	19	20	21	22	23	24	22	23	24	25	26	27	28
23	24	25	26	27	28	29	28	29	30	31	.....	.....	25	26	27	28	29	30	31	29	30	.....	.....	.....	.....	.....
30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

October 1963							November 1963							December 1963							January 1964						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
.....	.....	1	2	3	4	5	.....	.....	.....	.....	1	2	1	2	3	4	5	6	7	.....	.....	.....	1	2	3	4	
6	7	8	9	10	11	12	3	4	5	6	7	8	9	8	9	10	11	12	13	14	5	6	7	8	9	10	11
13	14	15	16	17	18	19	10	11	12	13	14	15	16	15	16	17	18	19	20	21	12	13	14	15	16	17	18
20	21	22	23	24	25	26	17	18	19	20	21	22	23	22	23	24	25	26	27	28	19	20	21	22	23	24	25
27	28	29	30	31	.....	.....	24	25	26	27	28	29	30	29	30	31	.....	.....	.....	26	27	28	29	30	.....	.....

February 17, *Monday*.....Latest day to drop a course—first-term freshmen
 February 22, *Saturday*.....Latest day to withdraw from college without
 responsibility for grades
 February 24, *Monday*.....End of seventh week
 March 16-21, *Monday-Saturday*.....Final examinations
 March 21, *Saturday*.....End of winter term

Spring Term 1964

March 30-31, *Monday a.m. and p.m., Tuesday to 12 noon*.....Registration
 March 31, *Tuesday, 1 p.m.*.....Classes begin
 April 13, *Monday*.....Latest day for registering or adding courses
 April 20, *Monday*.....Latest day to drop a course—returning students
 April 27, *Monday*.....End of fourth week (reports of unsatisfactory progress)
 May 11, *Monday*.....Latest day to drop a course—first-term freshmen
 May 16, *Saturday*.....Latest day to withdraw from college
 without responsibility for grades
 May 18, *Monday*.....End of seventh week
 May 29, *Friday*.....Close of work for graduating students; grades due
 May 30, *Saturday*.....Memorial Day—holiday
 June 7, *Sunday*.....Commencement
 June 8-13, *Monday-Saturday*.....Final examinations
 June 13, *Saturday*.....End of spring term

Summer Session 1964

June 22, *Monday*.....Registration
 June 23, *Tuesday*.....Classes begin
 July 4, *Saturday*.....Independence Day—holiday
 August 13-14, *Thursday-Friday*.....Final examinations
 August 14, *Friday*.....End of summer session

Fall Term 1964

September 16-27, *Wednesday-Sunday*.....New Student Program
 September 28, *Monday*.....Classes begin

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

February 1964

M	T	W	T	F	S
.....	.....	.....	.....	1	
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			

March 1964

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 1964

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 1964

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 1964

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

July 1964

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 1964

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	.....	.....	.....	.....	.....

September 1964

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	.....	.....	.....

Oregon State System of Higher Education

THE OREGON STATE SYSTEM of Higher Education, as organized in 1932 by the State Board of Higher Education following a survey of higher education in Oregon by the U. S. Office of Education, includes all the state-supported institutions of higher education. The several institutions are elements of an articulated system, parts of an integrated whole. The educational program is so organized as to distribute as widely as possible throughout the State the opportunities for general education and to center on a particular campus specialized, technical, and professional curricula closely related to one another.

The institutions of the State System of Higher Education are Oregon State University at Corvallis, University of Oregon at Eugene, Portland State College at Portland, Oregon College of Education at Monmouth, Southern Oregon College at Ashland, Eastern Oregon College at La Grande, and Oregon Technical Institute at Klamath Falls. University of Oregon Medical School and University of Oregon Dental School are located in Portland. General Extension Division, representing all the institutions, has headquarters in Portland and offices in Ashland, Corvallis, Eugene, La Grande, Monmouth, and Salem.

At Oregon College of Education, Southern Oregon College, and Eastern Oregon College, students may complete major work in teacher education or general studies or enroll in a preprofessional program. A major program in business is offered at Southern Oregon College.

Portland State College offers major work in general studies and selected liberal arts and professional fields as well as certain preprofessional programs.

At University of Oregon and Oregon State University, major curricula, both liberal and professional, are grouped on either campus in accordance with the distinctive functions of the respective institutions in the unified State System of Higher Education.

Oregon Technical Institute offers technology curricula leading to associate degrees in technical and semiprofessional areas.

An interinstitutional booklet, *Your Education*, which outlines the curricula of the several institutions and contains other information is available from the Division of Information, Board of Higher Education, P.O. Box 5175, Eugene, Oregon.

Six summer sessions are offered by the institutions of the Oregon State System of Higher Education. For a brochure describing the sessions, write P.O. Box 1491, Portland 7, Oregon.

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* Board members are appointed to six-year terms by the Governor of Oregon with confirmation by the State Senate.

Oregon State System of Higher Education

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Oregon State University

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Charter of Oregon State University

FEDERAL LAND-GRANT ACT (FIRST MORRILL ACT), JULY 2, 1862

... Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there be granted to the several States, for the purposes hereinafter mentioned, an amount of public land, to be apportioned to each State . . . And be it further enacted, That all moneys derived from the sale of lands aforesaid, by the States . . . shall constitute a perpetual fund . . . the interest of which shall be inviolably appropriated by each State . . . to the endowment, support and maintenance of at least one college, where 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 such manner as the Legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life . . . No State shall be entitled to the benefit of this act unless it shall express its acceptance within two years. . . .

MORRILL ACT PROVISIONS IRREVOCABLY ACCEPTED BY OREGON LEGISLATURE, OCTOBER 9, 1862

... each and all of the propositions in said act of Congress offered to the State of Oregon are hereby irrevocably adopted, with all the conditions and obligations therein contained. . . .

CORVALLIS COLLEGE INCORPORATED AUGUST 22, 1868

The name . . . Corvallis College . . . is not limited in duration . . . The object of this incorporation is to . . . endow, build up, and maintain an institution for educational purposes and to confer all such honors, distinctions, and degrees usual in colleges . . . provided such college shall be strictly a literary institution.

CORVALLIS COLLEGE (OREGON STATE UNIVERSITY) DESIGNATED THE LAND-GRANT INSTITUTION OF OREGON, OCTOBER 27, 1868

J. F. Miller, J. H. Douthit and Joseph C. Avery are hereby constituted a board of commissioners . . . To locate all the lands to which the state is entitled by act of congress for the purpose of establishing an agricultural college . . . Until other provision can be made, the Corvallis college is hereby designated and adopted as the agricultural college, in which all students sent under the provisions of this title shall be instructed in all the arts, sciences, and other studies, in accordance with the requirements of the acts of congress making such donation . . .

OCTOBER 27, 1868 ACTION MADE PERMANENT, OCTOBER 1870

Corvallis College, in Benton County, is hereby designated and permanently adopted as the Agricultural College of the State of Oregon, in which all students sent under the provisions of law shall be instructed in accordance with the requirements of the Act of Congress. . . .

DESIGNATED OREGON STATE UNIVERSITY, MARCH 6, 1961

ORS 352.230 is amended to read: Any reference to Oregon State College in the laws of Oregon is intended to be and shall be deemed to be a reference to Oregon State University.

Organization and Facilities

History

THE CORVALLIS COMMUNITY started 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.

Oregon had made an earlier attempt—before statehood—to establish a public university. In 1851 the legislature of Oregon Territory, comprising the vast area from California to Canada and from the Rocky Mountains to the Pacific Ocean, designated Corvallis (then called Marysville) as the site of the territorial university. Building materials were assembled on the selected site (where Extension Hall now stands), but before construction began, the legislature of 1855 changed the location of the university to Jacksonville and ordered the building materials sold.

Oregon as a state began its support of higher education on October 27, 1868, when it designated Corvallis College "the agricultural college of the State of Oregon" and began making appropriations to maintain the institution. In taking this action the legislature 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. The 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 to 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—provided further for the teaching function of the institutions and also for programs of research and extension.

Corvallis College originally occupied a site at Fifth Street near Madison. 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 1889.

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 School was held in 1908. Extension work had its beginnings in 1889 when farmers' institutes were held at four places in the State.

In organizing the State System of Higher Education in 1932, the State Board of Higher Education established freshman and sophomore work in liberal arts and sciences on a parallel basis at Oregon State College and the University of Oregon. Beyond the lower division years and in professional fields, the two institutions were differentiated. At Corvallis the School of Science was established offering undergraduate and graduate work in the biological and physical sciences and mathematics. Other departments of the School of Basic Arts and Sciences were incorporated into the Lower Division. The School of Health and Physical Education became the Division of Physical Education. Mining courses were incorporated into the School of Engineering. The School of Commerce was discontinued. The School of Business and Technology was established (first as a "Division") in 1943, the School of Humanities and Social Sciences in 1959.

The first advanced degree (AM) was awarded in 1876. The first Ph.D. degrees were conferred in 1935. A committee on advanced degrees appointed in 1910 was the precursor of the Graduate School.

General research is centered in the Graduate School. Other research divisions have been established as follows: Agricultural Experiment Station, 1888; Engineering Experiment Station, 1927; Science Research Institute, 1952; Forest Experiment Station, 1954 (consolidated with Agricultural Experiment Station, 1957). The Oregon Forest Products Laboratory, established in 1941, was expanded into the Oregon Forest Research Center adjacent to the campus in 1957, and became the Oregon State University Forest Research Laboratory in 1961.

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 (acting), 1941-42; August Leroy Strand, 1942-61; James Herbert Jensen, from 1961.

Accreditation

Oregon State University is accredited by the Northwest Association of Secondary and Higher Schools. The departments of Chemistry and Chemical Engineering are approved by the American Chemical Society. The School of Business and Technology received full accreditation by the American Association of Collegiate Schools of Business in 1960. Also in 1960, the School of Education was granted full accreditation of its program for preparation of elementary teachers, secondary teachers, and school service personnel (guidance counselors) with a doctor's degree as the highest degree approved. Six curricula in the School of Engineering are approved by the Engineers' Council for Professional Development. The School of Forestry is one of the 27 schools accredited by the Society of American Foresters. The School of Pharmacy has been accredited since 1929 and is rated as a class A school by the American Council on Pharmaceutical Education.

Income

The state law creating the Board of Higher Education specified that this body was to "control the use, distribution, and disbursement of all funds, appropriations and taxes, now or hereafter in possession, levied and collected, received or appropriated for the use, benefit, support and maintenance of institutions of higher education." By virtue of this act, and beginning July 1, 1931, the Board has administered all funds for state-supported higher educational activities, including Oregon State University, on the basis of a unified budget.

Funds for the support of higher education in Oregon are derived primarily from the following sources: State appropriations for the operations of the institutions; specified sums from the National Government assigned for definite purposes by Congressional acts; income from student tuition and fees; and other sources such as gifts, grants, sales, service charges, etc.

Forest and Farm Lands

For research and instruction in agriculture, the State owns and leases lands including the main campus and adjoining areas consisting of approximately 4,000 acres. The Agricultural Experiment Station, including the thirteen branch stations, utilizes approximately 24,000 acres, much of which is owned by the counties or the Federal Government.

The School of Forestry owns and administers a total of about 14,300 acres of forest land included in Peavy Arboretum, McDonald Forest, and the Adair, Blodgett, and Spaulding tracts. Peavy Arboretum and McDonald Forest are located seven miles north of the campus and provide easily accessible areas for instruction and research. Laboratory classes in many forest management and forest engineering courses are held on these adjacent forest lands. Research studies are also in progress on these areas.

Library

The William Jasper Kerr Library, now containing 420,000 volumes, will begin the 1963-64 year in a new building providing space for 590,000 books and 1,600 readers. Books will, with a limited number of exceptions, be on open shelves directly available to faculty and students.

The books will be grouped into four major areas. On the first floor will be the music-fine arts-education books, a music listening room, a map room, a general reading room, and the reserve book room. The second (main) floor will house humanities books, the central reference services, the public catalog, and control and checkout desks.

The third floor will be occupied by administrative offices and books in business and social sciences. The fourth floor will contain books in science, agriculture-forestry, pharmacy, and engineering. Study carrels and conference rooms will be provided on all floors. All the book collections will be under the direction of subject specialists.

Collections. The books in the Library, and the 20,000 or more volumes added annually, are closely coordinated with teaching and research. The collections are therefore primarily technical and scientific, but sufficient books in the humanities and the social sciences are owned to give the Library a good cultural and literary balance. Subjects in which special strength has been

developed are textiles, costume design, nutrition, mathematics, and the history of horticulture. Collections of some distinction are also being built up in biology, food technology, chemistry, plant pathology, mycology, and entomology. Over 3,600 periodicals are received currently and a large portion of the Library's holdings are consequently bound journal volumes.

The Library is a designated depository for publications of the United States Government, Carnegie Institute of Washington, U. S. Atomic Energy Commission, Atomic Energy Research Establishment of Great Britain, Rand Corporation of Santa Monica, California, and official publications of the State of Oregon. It is also a depository for U. S. Army maps and has a total map collection of over 65,000 items. The picture collection includes 79,000 pieces. Newspapers received currently, some of which are on microfilm, total 122.

Books may be taken for home use by anyone connected with Oregon State and by others with permission. Students may keep books for two weeks, with privilege of renewal. Faculty members may borrow for more extended periods.

All books, numbering 1,550,000 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 a Director of Libraries. The director is also librarian of Oregon State University at Corvallis, where central offices of the library system are located.

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. A combined author list of all books and periodicals in the State System is maintained in the central office in Corvallis to facilitate a better distribution of the book stock and to eliminate unnecessary duplication of material.

Museums and Collections

Special exhibits and loan collections are displayed frequently in the Memorial Union, Kidder Hall, Kerr Library, Home Economics Building, and Horner Museum. Permanent museums and collections include the following:

The Horner Museum (LULA MARY STEPHENSON, curator) contains valuable collections of historic, scientific, and artistic interest. Located on the ground floor of the Coliseum, the displays include, for example, the famous Hank Monk stagecoach and many weapons and tools of pioneer Oregon, displays of antique glass and china, objects of art from foreign countries, Indian artifacts, mineral collections, mounted birds and animals, a replica of the U. S. Capitol, and many other types of exhibits, approximately 13,000 articles in all. Visitors to the Museum exceed 50,000 each year.

The William Henry Price Memorial Collection of Paintings includes 53 paintings, chiefly western landscapes and marines, by the late William Henry Price. All but two of these distinctive paintings are on permanent display within the Memorial Union.

The Entomological Collection (JOHN D. LATTIN, curator) contains approximately 430,000 specimens of insects (including 5,700 microscope slides), chiefly from the Pacific Northwest. The collection is particularly strong in Hymenoptera, Coleoptera, Heteroptera, and Diptera. Five hundred Riker mounts of economically important insects are included in the collection. A special collection of Acarina, or mites, under the direction of G. W. Krantz, contains approximately 8,000 slides and 1,000 vials of specimens. All collections are housed in Cordley Hall.

The Geological Collection, housed in Education Hall, includes minerals, ores, rocks, invertebrate fossils, some vertebrate fossils, and a large number of fossil plants. More than 2,400 mineral specimens are arranged according to the Dana classification. This collection is now broken up for use in classes. A paleontological collection in the Paleontology Laboratory supplements the other collections.

The Herbarium (KENTON CHAMBERS, curator) housed on the fourth floor of Cordley Hall, contains about 165,000 named specimens of seed plants, ferns, mosses, and fungi. Among the special items contributing to the usefulness of the herbarium are a seed collection of 2,800 numbers, and 250 photographs of type specimens of Northwest vascular plants.

The Natural History Collection (ROBERT M. STORM, in charge) includes nearly 34,000 specimens of terrestrial vertebrates and nearly 800 mounts of birds and mammals. Housed in the Natural History Building, the collection includes the Braly Ornithological Collection, the Currier Bird Egg and Nest Collection, the Alex Walker Waterfowl Collection, the Oregon State Game Commission Collection, and the Grace McCormac French collection of ornithological notes and literature.

Publications

Official Publications of Oregon State University, published through the Office of Publications and printed by the Department of Printing include:

OREGON STATE UNIVERSITY BULLETIN (Catalogs, Newsletters, and other announcements—seven issues a year)

BULLETINS and CIRCULARS of the Engineering Experiment Station.

BULLETINS, TECHNICAL BULLETINS, and CIRCULARS of the Agricultural Experiment Station.

OREGON'S AGRICULTURAL PROGRESS (quarterly)

BULLETINS, CIRCULARS, OUTLOOK CIRCULARS, and 4-H Club publications of the Federal Cooperative Extension Service.

CIRCULARS and other publications of the School of Forestry.

Miscellaneous programs, folders, and pamphlets.

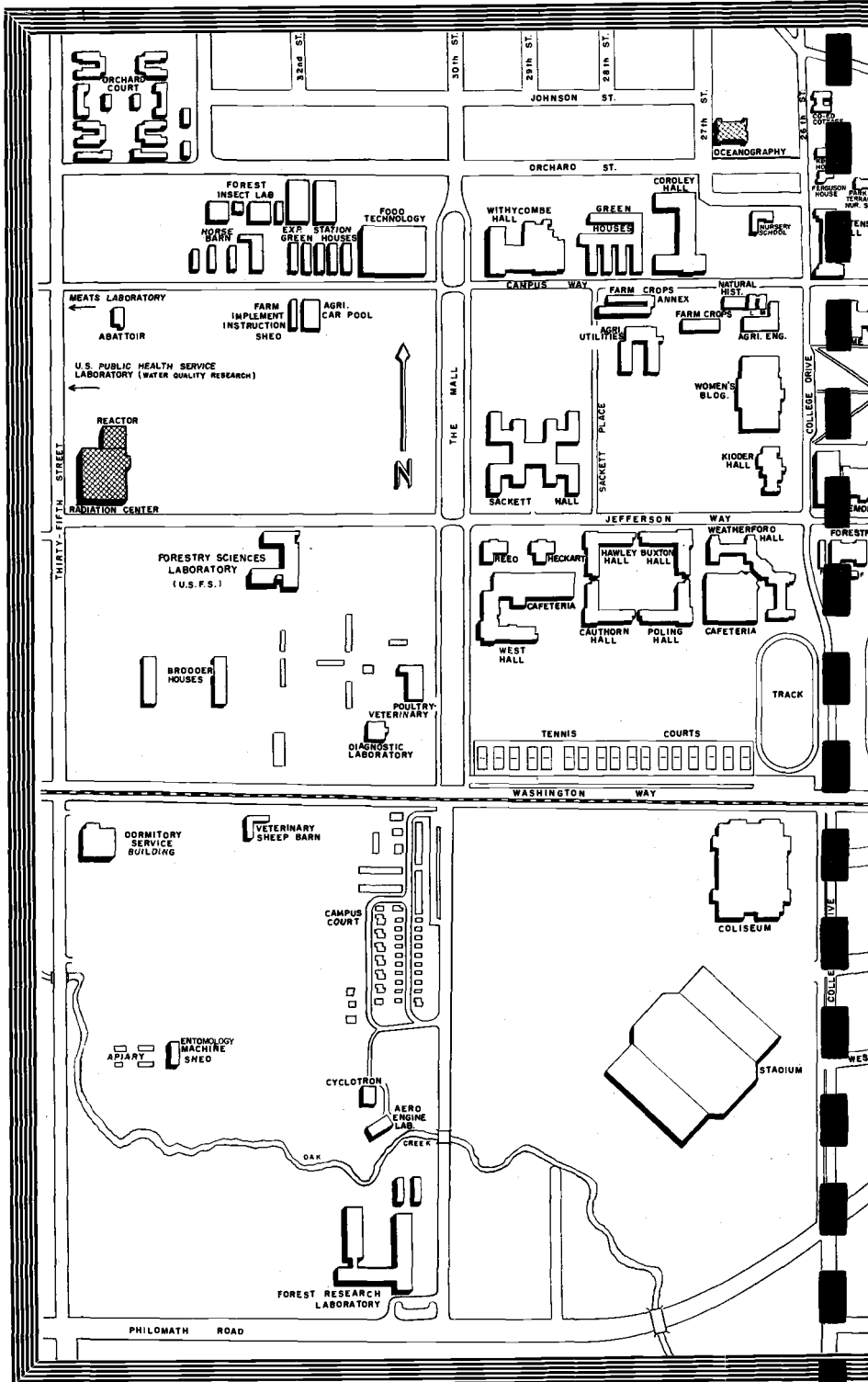
The **Oregon State University Press** is the publishing and sales agency for the following:

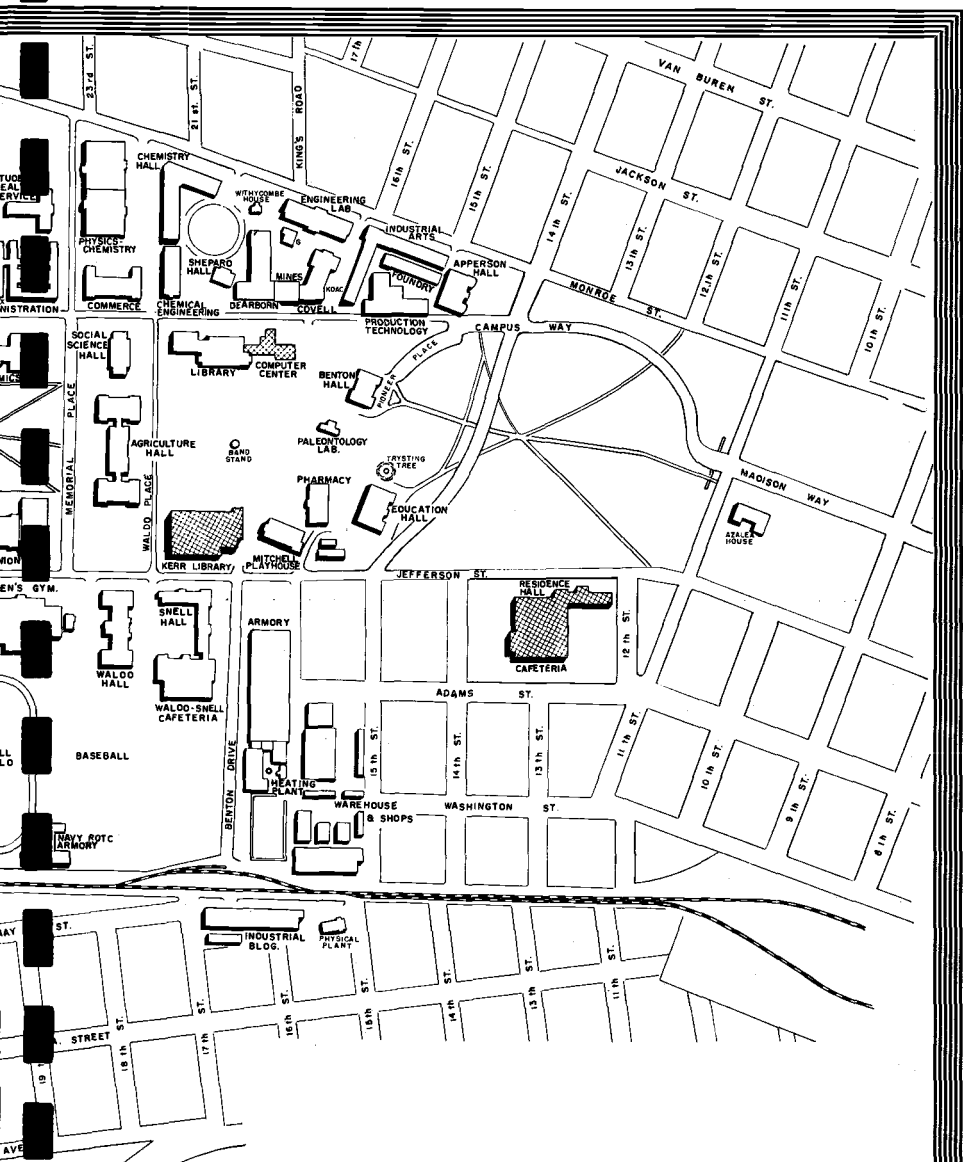
MONOGRAPHS, including series in bacteriology, botany, economics, education and guidance, entomology, geology, history, literature and languages, mathematics and statistics, political science, and zoology.

BIOLOGY COLLOQUIUM PROCEEDINGS (annually)

IMPROVING COLLEGE AND UNIVERSITY TEACHING (quarterly)

Miscellaneous books and other publications as approved by the Board of Governors of the Oregon State University Press.





Campus Map
Oregon State University
 CORVALLIS, OREGON

Under Construction

Campus

See map on pages 16-17

Corvallis (population 25,663) is situated in the heart of the Willamette Valley between the Cascade Mountains and the Coast Range, 80 miles south of Portland and 60 miles from the Pacific Ocean. The climate is equable with an average annual temperature of about 82° F. The humidity is never very high so the usual summer temperature which ranges from 70° to 90° is very comfortable. Rainfall, occurring mostly during the winter months, averages about 39 inches annually.

Development of the 397-acre main campus has been in accordance with a plan prepared by John C. Olmsted and A. D. Taylor. Buildings are arranged first as colleges or schools, and further are grouped in quadrangles so planned that expansion can take place without injury to established buildings and campus areas. Each quadrangle is planted with ornamental trees and shrubs which serve as living laboratory material for students engaged in landscape and horticultural studies.

The campus plan is presently under review by Louis A. De Monte and revisions are being made in line with the recent substantial and continuing expansion of the institution. Present buildings, with dates of original erection and later additions or remodeling are given below. For temporary buildings the dates indicate either date of erection or date acquired by Oregon State.

Abattoir (date unknown)	Heckart Lodge (1954)
Administration (1947)	Home Economics (1914, 1920, 1952)
Administration Annex (1948)	Industrial Building (1947, 1958)
Aero Engine Laboratory (1953)	Kent House (1924)
Agricultural Car Pool (1954)	Kerr Library (1918, 1941)
Agricultural Engineering (1912, 1939)	Kidder Hall (1892, 1936)
Agricultural Utilities (1909)	Married Student Housing Units (1961)
Agriculture Hall (1909, 1911, 1913)	Memorial Union (1928, 1960)
Apperson Hall (1898, 1920, 1950)	Men's Gymnasium (1915, 1921, 1953)
Apiary (1947)	Mines (1913)
Armory (1910, 1911)	Mitchell Playhouse (1899, 1950)
Azalea House (1953)	Natural History (1948)
Beef Barn (1948)	Naval ROTC Armory (1946, 1954, 1959)
Benton Hall (1889)	Orchard Street Nursery School (1939)
Buxton Hall (1961)	Paleontology Laboratory (1899)
Cafeteria (1957)	Park Terrace Nursery School (1918)
Cauthorn Hall (1957)	Pharmacy (1924)
Chemical Engineering Building (1955)	Physical Plant Warehouse (1948, 1952)
Chemistry Hall (1939)	Physical Plant Office (1961)
Coliseum (1950)	Physics-Chemistry (1959, 1961)
Commerce Hall (1922, 1958)	Poling Hall (1957)
Cordley Hall (1957)	Poultry-Veterinary (1927)
Covell Hall (1928, 1960)	Production Technology (1908, 1949)
Cyclotron (1952)	Reed Lodge (1954)
Dearborn Hall (1949)	Sackett Hall (1947)
Dormitory Service Building (1961)	Shepard Hall (1908)
Education Hall (1902, 1940)	Snell Hall (1959)
Engineering Laboratory (1920)	Social Science Hall (1912, 1951)
Engineering Service (1947)	Stadium (1953)
Extension Hall (1921, 1951)	Student Health Service (1936, 1961)
Farm Crops (1919, 1924, 1951)	Veterinary Diagnostic Laboratory (1952, 1961)
Filter Plant (1955)	Waldo Hall (1907, 1959)
Food Technology (1951)	Waldo-Snell Dining Hall (1959)
Forest Entomology Laboratory (1957)	Weatherford Hall (1928)
Forest Research Laboratory (1961)	West Hall (1960)
Forestry (1917)	West Dining Hall (1960)
Foundry (1899)	Withycombe Hall (1952)
Greenhouse (1928, 1951, 1954, 1957)	Withycombe House (1918)
Hawley Hall (1959)	Women's Building (1926)
Heating Plant (1923, 1949, 1953, 1960)	

Procedures and Requirements

Admissions Information

OREGON STATE UNIVERSITY welcomes all students of good moral character who provide evidence of suitable preparation for work at the college level.

Admission to Freshman Standing

- A. Early Confirmation of Acceptance:** A high school senior may apply for fall term admission at any time following completion of the first half of his final year. (See **ADMISSION PROCEDURE**, page 22.) Resident applicants with a grade average of 2.50 or better or with a combined score of 950 or higher for the verbal and mathematical sections of the Scholastic Aptitude Test (SAT) of the College Entrance Examination Board are notified immediately of acceptance for fall term. (A 3.00 average or SAT scores of 1,000 plus minimum high school GPA of 2.50 is necessary for nonresident applicants.)
- B. Oregon residents being admitted as freshmen:**
1. Must graduate from a standard high school and have:
 - (a) A "C" average or above in all high school subjects taken toward graduation,* or
 - (b) A combined score of 880 or higher for the verbal and mathematical sections of the Scholastic Aptitude Test of the College Entrance Examination Board,† or
 - (c) A minimum grade-point average of 2.00 (C) on 12 term hours of college-level course work, or on 9 term hours in a prescribed program in a regular collegiate summer session.
- C. Nonresidents being admitted as freshmen:**
1. Must have graduated from an accredited high school.
 2. Must qualify for admission under the following standards:
 - (a) A freshman having a high school grade-point average of 2.75 is eligible for admission without specific test score requirements. The minimum standard for acceptance as a freshman is a high school GPA of 2.25. An applicant whose high school GPA is between 2.25 and 2.75 may be admitted on the basis of his predicted success in college as determined by a combination of his high school GPA and College Entrance Examination Board test scores.

* Admission is granted on the basis of the high school (including the ninth grade) record. The required testing program is for placement rather than entrance purposes, and is discussed under **PLACEMENT EXAMINATIONS**, page 22.

† Information concerning scheduled examination dates and examination centers may be obtained from the College Entrance Examination Board, P.O. Box 27896, Los Angeles 27, California, or P.O. Box 592, Princeton, New Jersey. Official scores are forwarded to Oregon State by Educational Testing Service upon student request.

- (b) An alternative for the student who does not qualify as outlined in (a) above is attendance at summer school at the institution he desires to attend and the earning of a minimum of 2.25 for 12 term hours of college-level work.

D. Entering freshmen with superior records: Entering freshmen who demonstrate unusual competence in scholastic pursuits are provided 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.
2. *Credit by Examination:* Students with special competence in specific academic areas may apply on campus for a departmental examination which may qualify them for advanced placement or credit in that department.
3. *Honors Sections:* 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 honors courses are offered through the departments of English, Chemistry, Physics, Mathematics, and Biological Sciences.

Admission of Transfer Students. Transfers from other colleges are required to present (1) evidence of high school graduation, (2) evidence of eligibility to return to any college or university previously attended, and (3) a satisfactory grade-point average. Residents may transfer with a 2.00 (C) or better grade average while nonresidents must present a minimum of 2.25. A student transferring fewer than 12 term hours must satisfy the entrance requirements for both transfers and entering freshmen. Transfers should review **ADMISSION PROCEDURE**, and **PLACEMENT EXAMINATIONS**, pages 22, 23. Foreign students entering as undergraduates should review the section on **ADMISSION OF FOREIGN STUDENTS**.

Upon arrival on campus, each transfer is assigned an adviser with whom the academic program is planned. Reports showing credit and class standing received from Admissions will often differ from departmental evaluation. Admissions determines college entrance eligibility only, while departments determine specific departmental degree requirements.

Transfer students are required to file complete official records of all school work beyond the eighth grade. College records must be certified by the Registrar of the institution where the work was undertaken. If the high school record is adequately shown on the college transcripts, the student need not obtain another record direct from his high school.

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 ap-

proved 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 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, and a scholastic record and background and other evidence that indicate he is capable of doing satisfactory graduate work. See GRADUATE SCHOOL for further information.

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 his own university and (2) must have achieved a superior scholastic record on the basis of his own grading system, and (3) must have certified English proficiency. 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 admission as an undergraduate but may not enter 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 Session. The only requirement for admission to the Summer Session is ability to do the work. Those persons who expect to attend regular sessions or who desire to receive credit toward a degree at Oregon State must, however, satisfy regular admission requirements.

Admission as a Special Student. The Admissions Committee may consider for entrance as a special student:

- (1) A person qualified but not planning to earn a degree at Oregon State.
- (2) A mature person who does not qualify for admission for degree work but who could benefit from limited study.
- (3) A high school senior with a B or better grade-point average who is recommended by his principal.

A special student signs a statement indicating that he is not a degree student and that recorded credit will be applied to a degree only if he qualifies according to Academic Regulation 18 *Schedule of Classes* as a regular student and satisfies regular admissions procedures and regulations.

Admission from Unaccredited Institutions. Admission from an unaccredited 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. Upon completion of 45 term hours of satisfactory work, undergraduate transfers from nonaccredited colleges may petition for acceptance of credit desired for transfer. A total of 15 term hours of satisfactory work is required of graduate students prior to petition for recognition of credit. Validation examinations may be required.

Credit for Military Experience. Veterans are granted physical education and/or ROTC credit but do not receive college credit for service schooling or USAFI tests or courses. Application should be made to the Registrar during the first term of attendance at Oregon State University.

Admission Procedure

Applications for admission and questions regarding admission should be addressed to:

OFFICE OF ADMISSIONS
Administration Building
Oregon State University
Corvallis, Oregon

Application Blanks, Form A, are available from the Office of Admissions. The special Oregon high school application form is available at all Oregon high schools. The applicant requests the high school principal and/or the Registrar of each college attended to forward certified transcripts of all academic records directly to the Office of Admissions for evaluation purposes. All records submitted become the property of Oregon State. Transcripts for transfer students must include all schoolwork beyond the eighth grade and, for graduate students, must include all undergraduate and graduate records.

Applications should be initiated at least thirty days in advance of desired entrance date to permit processing. A \$10 fee is charged for any fall term application made after August 31. If currently in college elsewhere, the applicant should apply during his final term or semester.

The deadline for a nonresident undergraduate to apply for fall term admission is September 1.*

Placement Examinations

High school seniors planning to enter Oregon State should take the Scholastic Aptitude Test and the English Composition and Intermediate Mathematics Achievement Tests of the College Entrance Examination Board. See footnote on page 19.

These three tests, together with the high school and other records, provide the academic adviser with valuable information about the student's educational development, abilities, and aptitudes.

Use of the College Boards for placement examination purposes allows the student to be examined in a more normal situation than is possible during the opening of a college year. Completion of such tests in spring will permit more individualized course planning prior to the opening of school. Entering freshmen who have not completed the tests in advance may take them on campus at the opening of the term although delays in registration may result.

Transfer students are exempt from the placement testing program unless they are majoring in home economics or forestry. Home economics students may be required to take the Intermediate Mathematics Achievement Test.

The **aptitude test** gives an indication of ability to do college work. Since the results are used in planning the student's educational and vocational programs, it is required of all undergraduate students.

The **English examination** covers the fundamental principles of grammar, and tests the student's ability to apply these principles in writing. Students who make the best scores in this examination are enrolled in honors sections (Wr 111-H, 112-H, and 113-H).

* This date is subject to change as circumstances demand.

Students whose test scores indicate a need for further preparation in English before enrolling in Wr 111 may enroll in Wr 49, a noncredit remedial course offered in evening classes by the General Extension Division. An additional fee is charged for this course.

The **mathematics examination** covers the fundamentals of elementary algebra. Students who score 550 or higher in the Intermediate Mathematics Test qualify to take the Advanced Mathematics Test to determine possible advanced placement.

Other placement examinations may be required in certain majors. Engineering students whose placement test scores indicate a deficiency in mathematics will be classified as "preengineering" and registered in mathematics courses compatible with the test results. Forestry students may receive similar special consideration.

The **medical examination** required of all students entering Oregon State University for the first time includes tuberculin test, vaccination against smallpox, and other tests. It provides a scientific basis for adjustment of the student's physical education to his individual needs. It also provides a safeguard both to the student and to the institution. For the student, it may result in the discovery and correction of defects which, if allowed to continue, might seriously impair his health; for the institution it may result in the prevention of epidemics which might develop from undiagnosed cases of contagious disease. See also STUDENT HEALTH SERVICE, page 35.

New Student Program

Undergraduate students who enroll fall term are required to participate in a program of orientation before officially registering in the University. By means of general assemblies, individual conferences, and placement examinations, every new student is assisted in getting the best possible start at Oregon State. During the orientation program, students visit with their academic deans and faculty members, become acquainted with the expectations of the University and the professional schools of their choice, and meet leaders of the student body. Detailed information concerning the new student program and registration is sent early to students accepted for admission.

Degrees and Certificates

Oregon State University offers curricula leading to junior standing upon completion of two years' work, and to the following baccalaureate and graduate degrees:

- Humanities and Social Sciences, *B.A., B.S.*
- Science, *B.A., B.S., M.A., M.S., Ph.D.*
- Agriculture, *B.S., B.Agr., M.Agr., M.S., Ph.D.*
- Business and Technology, *B.A., B.S.*
- Education, *B.A., B.S., M.A., M.S., Ed.M., Ed.D., Ph.D.*
- Engineering, *B.A., B.S., M.A., M.S., A.E., Ch.E., C.E., E.E., I.E., M.E., Min.E., Ph.D.*
- Forestry, *B.S., B.F., M.S., M.F., Ph.D.*
- Home Economics, *B.A., B.S., M.A., M.S., M.H.Ec., Ph.D.*

Naval Science, *B.A., B.S.*

Pharmacy, *B.A., B.S., M.A., M.S., M.Pharm., Ph.D.*

Physical Education (through School of Education), *B.A., B.S.*

Air Science, Military Science, or Naval Science may be taken by men as a comajor in any school.

Work leading to the degree of *Master of Arts (General Studies)* is offered under the direction of the Graduate School.

Lower division work leading to certificates (see page 25) is offered in liberal arts and sciences, in the professional and technical fields listed above, and in architecture and allied arts, journalism, and music. Approved preparation is offered also for the degree curricula in medicine, dentistry, and nursing at University of Oregon Medical School and University of Oregon Dental School in Portland.

Requirements for Bachelor's Degree

To earn the Bachelor of Arts degree (B.A.) or Bachelor of Science degree (B.S.), a student must complete three sets of requirements: (1) general institutional requirements, (2) institutional graduation requirements, and (3) requirements of the department and school. Curricular and departmental requirements are listed elsewhere in this Catalog. Institutional requirements follow:

General Requirements (Institutional)

A student is expected to fulfill the following requirements during his first six terms:

- a. English composition: 9 term hours. (Exclusive of Wr 49.)
- b. Physical education: five terms in activity courses. Students over 30 years of age are not required to take physical education activity courses. Normally hygiene and physical education classes should not be taken at the same time. No more than one activity course may be taken at one time but it is permissible for hygiene and an activity class to be taken concurrently if there is sufficient reason why the normal pattern cannot be followed.
- c. General Hygiene: one term.

Graduation Requirements (Institutional)

- a. Term hours: minimum, 192 (in Engineering and Forestry, 204; in Pharmacy [five-year curriculum], 240). The minimum must include:
 - (1) Hours in upper division courses: minimum, 45, exclusive of upper division physical education activity courses.
 - (2) Hours in major: minimum, 36, including at least 24 in upper division courses.
 - (3) Hours after receipt of senior standing: minimum, 45, including credits reserved.
- b. Distribution of hours for baccalaureate degrees:
 - (1) Bachelor of Arts: 36 hours in general humanities (foreign language, philosophy, writing [except Wr 49, 111, 112, 113], literature, speech, humanities) including proficiency in foreign language equivalent to that attained at the end of two years (normally 21 term hours) of college study of 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 (Ed.B., B.F., B.Agr.): fulfillment of all school requirements.
- c. Grade-point average: minimum of 2.00 on all of the following:
- (1) All college work.
 - (2) All work taken in residence at this institution (exclusive of General Extension Division courses).
 - (3) Last 45 hours for which registered.
 - (4) In at least two of the last three terms.
- d. Residence: minimum, 45 term hours (normally the last 45). Classroom work taken through the General Extension Division is considered as resident work. A student qualifying for his degree by study through the General Extension Division must satisfactorily complete a minimum of 12 term hours while registered as a full-time Oregon State University student.
- e. Dean's certification of fulfillment of all requirements of major school. (For details see school advisers or deans.)
- f. Restrictions:
- (1) Correspondence study: maximum, 60 term hours.
 - (2) Law or medicine: maximum, 48 term hours.
 - (3) Music (applied music): maximum, 12 term hours.
- g. Application for degree: To become a candidate for a degree a student must have achieved senior standing¹ and must make formal application for the degree. The student must file his application with the Registrar during the first week of the term preceding the term in which he expects to complete requirements for a degree.

Concurrent Degrees

A student may receive two or more baccalaureate degrees (for example, B.A. or B.S. with same or different majors) at the same or subsequent graduation exercises provided that (1) he meets the requirements of the curricula represented by the degrees; (2) he completes for each additional degree a minimum of 32 term hours more than the 192 term hours or 204 term hours required by the first degree (the additional term hours may be taken concurrently with 192 or 204 term hours); (3) he is registered during last three terms before his graduation at least one term in each appropriate school or department.

Requirements for Certificates

These certificates may be granted on completion of approved programs:

Junior Certificate, granted on application and completion of requirements for junior standing and with dean's approval.

Certificate in Agriculture, granted on application and completion of two-year curriculum and with approval of dean.

Certificate in Engineering, granted on application and completion of two-year curriculum and with approval of dean.

¹ Before senior standing may be achieved, a student must complete 135 term hours (147 term hours for engineering and forestry) including 9 term hours of English composition, five terms of physical education activity, and one term of hygiene with a minimum grade-point average of 2.00.

Requirements for Advanced Degrees

For advanced degree requirements see 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 by petition. See "Reserving Credits" under GRADUATE SCHOOL.

Definitions

Academic Year: three terms of approximately 12 weeks each.

Summer Session: an eight-week session from late June to mid-August.

Intersession: a four-week session from mid-August to early September.

Course: a subject, or an instructional subdivision of a subject, offered through a single term.

Sequence: closely articulated courses extending through more than one term.

Prerequisite: the background necessary for successful performance in a course. In addition to stated requirements, or acceptable substitute, consent of instructor is implied for admission to class.

Curriculum: an organized program of study arranged to provide integrated cultural or professional education.

Term Hour: the unit of credit, representing 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. The number of meetings per week for any course may be found in the course description in this catalog or in the separately published *Schedule of Classes*.

To convert semester hours to term hours, multiply by $1\frac{1}{2}$ (every 10 semester hours count as 15 term hours).

Period: a class meeting for discussion, lecture, laboratory, etc., and may be for one or more hours.

The number of class meetings per week for each course in this catalog is indicated by use of symbols indicating length of periods. ① indicates a one-hour period, ② a two-hour period, ③ a three-hour period, etc. For example: 2 ① 1 ③ indicates *two one-hour periods and one three-hour period*.

Grading System

Grades. The grading system consists of four passing grades, *A, B, C, D*, and of others listed below. *A* denotes exceptional work accomplished; *B*, superior; *C*, average; *D*, inferior.

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*. For failure in a course, the grade of *F* is given. When the quality of the work is satisfactory, but some minor essential 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. Students may withdraw from a course by filing the proper blanks at the Registrar's Office in accordance with OSU regulations; in such cases a report of *W* is made. A student who discontinues attendance in a

course without official withdrawal receives a grade of *F* in the course. *R* indicates thesis in progress, and *P* denotes thesis successfully completed.

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 *I*, *W*, *E*, *R*, and *P* are disregarded in the computation of points. The grade-point average (GPA) is the quotient of total points divided by total term hours in which *A*, *B*, *C*, *D*, and *F* are received.

Course Numbering System

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

- 1-49. Noncredit courses or credit courses of a terminal or semiprofessional nature not applicable toward degree requirements.
- 50-99. Credit courses applicable toward degree requirements but of a basic, preparatory, subfreshman level, such as the first year of a foreign language or fundamental mathematics courses.
- 100-299. Courses on the lower division level.
- 300-499. Courses on the upper division level.
400-499, with designation (G) or (g). Upper division courses which 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.

Reserved Numbers.

- 100-110, 200-210. Survey or foundation courses at the freshman and sophomore levels.
- 400-410, 500-510. Reserved numbers. 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 the following:
 - 301, 401, 501. Research
 - 303, 403, 503. Thesis
 - 305, 405, 505. Reading and Conference. (Individual reading reported orally to instructor.)
 - 306, 406, 506. Projects
 - 307, 407, 507. Seminar
 - 308, 408, 508. Workshop

Scholarship Regulations

The faculty Committee on Academic Deficiencies has discretionary authority to suspend or place on probation any student not achieving satisfactory progress toward graduation (a minimum grade-point average of 2.00 or "C" for both the term and cumulative records). Application of this rule results in the following practices:

PROBATION. Any student achieving a grade-point average below 2.00, either for the term or cumulative, will be placed or continued on probation (unless subject to suspension).

SUSPENSION. A student is subject to suspension whenever he is in danger of accumulating a grade deficiency great enough to make his future graduation difficult if not impossible. Most suspensions occur when a student is 12 or more grade points deficient (formula used is hours taken times 2 with grade points earned subtracted). If other factors indicate it is advisable, a student may be suspended with fewer than 12 points deficiency. Also, a student 12 or more points deficient during his most recent course work may be suspended even though he has a cumulative average above 2.00, if other factors so indicate. (This applies to both resident and transfer students of sophomore, junior, or senior standing.)

RELEASE FROM PROBATION. Any student on probation may return to good standing by earning both term and cumulative 2.00. This statement applies to resident plus transfer credit as well as to resident credit alone.

Fees and Deposits

Students at Oregon State, Portland State, and the University of Oregon pay the same tuition, fees, and deposits. The State Board of Higher Education reserves the right to make changes in rates quoted without notice.

Regular Tuition Fees

Undergraduate students pay regular fees of \$90 per term—\$270 a year. Payment of these fees entitles a student to all services maintained by Oregon State for the benefit of students. These services include: use of the Library; use of laboratory and course equipment and materials; medical attention and advice at the Student Health Service; use of gymnasium equipment, including gymnasium suits and laundry service; a subscription to 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 desire to use some of these privileges.

Nonresident Fee

Undergraduate students who are not residents of Oregon pay regular fees and in addition pay a nonresident fee of \$140 per term, or \$420 per year—a total of \$690 per year for fees and tuition.

Under the regulations of the Oregon State Board of Higher Education, a minor student whose parents are bona fide residents of Oregon qualifies for enrollment under the resident fee; a student whose domicile is independent of his father qualifies for enrollment under the resident fee if he presents convincing evidence that he established his domicile in Oregon three months prior to his first registration and that he has not been a student at a collegiate institution during this period.

All other students are required to pay the nonresident fee, with the following exceptions:

a. A student who holds a degree from an accredited college or university. (However, a nonresident student with a bachelor's degree enrolled in a curriculum at the University of Oregon Medical or Dental Schools leading to the degree of Doctor of Medicine or Doctor of Dental Medicine is required to pay the nonresident fee.)

b. A student attending a summer session.

c. A student paying part-time fees.

d. An entering freshman from Alaska or Hawaii. The nonresident fee requirement for an entering freshman from Alaska and Hawaii will be waived for the freshman year. In order to retain this waiver for the following years, the student must maintain a 2.50 grade average.

A student who has been classified as a nonresident may be reclassified as a resident:

a. In the case of a minor, if his nonresident parents have moved to Oregon and have established a bona fide residence in the state, or

b. In the case of a student whose domicile is independent of that of his father, if the student presents convincing evidence that he has established his domicile in Oregon and that he has resided in the state for at least twelve consecutive months immediately prior to the term for which reclassification is sought.

A student whose official record shows a domicile outside of Oregon is *prima facie* a nonresident and the burden is upon the student to prove that he is a resident of Oregon. If his scholastic record shows attendance at a school outside of Oregon, he may be required to furnish further proof of Oregon domicile.

If any applicant has questions concerning the rules governing the administration of these policies, he should consult the Office of Admissions.

Graduate Fees

Graduate students (including fellows) registered for 8 term hours of work or more pay tuition and fees of \$90 a term. Graduate students do not pay nonresident fee. Teaching or research assistants pay \$34 per term. Graduate students (including fellows) registered for 7 hours of work or less pay the regular part-time fee. Payment entitles the student to all services maintained by Oregon State for the benefit of students.

Deposits

Persons who enroll for academic credit (except staff members) must make a deposit of \$15, 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, military uniforms, library books, locker keys, or residence hall equipment. If at any time charges against this deposit become excessive, the student may be called upon to reestablish the original amount.

Refund. The deposit, less any deductions, is refunded about one month after close of the academic year. Students who discontinue work before the end of the year may receive refunds upon petition to the Business Office.

Special Fees

Special fees are paid by students under the conditions indicated:

Part-Time and Auditor's Fees.....per term hour, \$11.00

Undergraduate and graduate students enrolled for 7 term hours or less pay, instead of the regular fees, a part-time fee in accordance with the following scale: 1-2 term hours, \$22; 3 term hours, \$33; 4 term hours, \$44; 5 term hours, \$55; 6 term hours, \$66; 7 term hours, \$77. Nonresident fee does not apply. Payment of fee entitles students to all usual services and use of facilities of Oregon State. An auditor, a person who has obtained permission to attend classes without receiving credit, pays the auditor's fee at time of registration. He is entitled to attend classes but has no other institutional privileges. Regularly enrolled students may be granted auditor's privileges without payment of auditor's fee. Maximum for auditors is \$90.

Staff Fee (except staff auditors).....per term hour, \$3.00

Staff members may register for courses at a \$3-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.

Late-Registration Fee.....first day \$5.00, additional days each \$1.00

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. Part-time students pay \$1 a week. Auditors are not required to pay late-registration fees.

Return-of-Check Feeper day, \$1.00

If institutional charges are met by a check which is returned because of any irregularity for which student is responsible, a fine of \$1 per business day will be charged. Maximum penalty: \$5.

Change-of-Course Fee.....	per course, \$1.00
The student pays this fee for each course change in his official program after the scheduled last day of mass registration.	
Reinstatement Fee	\$2.00
If for any reason a student has his registration canceled during a term for failure to comply with the regulations of the institution, but is later allowed to continue his work, he must pay the reinstatement fee.	
Special-Examination Fee	per term hour, \$1.00
A student pays a fee of \$1 per term hour for the privilege of taking an examination for advanced credit, or other special examinations.	
Registration-in-Absentia Fee	per term hour, \$11.00
Minimum fee \$22.	
Transcript Fee.....	\$0.50 and \$1.00
Charge for first copy at any one time is \$1; charge for each additional copy furnished simultaneously is 50 cents.	
Late Application Filing Fee	\$10.00
May be assessed on applications for fall term enrollment received after August 31.	
Annual Counseling Fee	\$5.00
College Board Aptitude and Achievement Test Fees.....	\$5.00 to \$13.00
Graduate Qualifying Examination Fee.....	\$1.00 to \$15.00
Microfilming Doctoral Thesis.....	\$20.00
Placement Fee (See SCHOOL OF EDUCATION). Initial registration . . .	no charge
Reregistration	per year, \$5.00
Applied Music Fees (See MUSIC).....	per term, \$20.00 to \$50.00
Horseback Riding Fee.....	per term, \$20.00

Fee Refunds. Students who withdraw from college and who have complied with regulations governing withdrawals are entitled to certain refunds of fees paid, depending on time of withdrawal. The refund schedule established by the State Board of Higher Education is on file in the Registrar's Office.

Any claim for refund must be made in writing before the close of the term in which the claim originated. Refunds are calculated from date of application for refund and not from date when the student ceases attending classes, except in unusual cases when formal withdrawal has been delayed through causes largely beyond the control of the student.

SPECIAL NOTICE

On April 23, 1963, the State Board of Higher Education tentatively approved a tuition and fee charge of \$110 per term for residents of Oregon and a charge of \$300 a term for nonresident students.

Student Interests

Office of the Dean of Students

THE COORDINATION of the student personnel services program, including counseling, general student welfare, and activities, is the responsibility of the Office of the Dean of Students. This program relates student life outside the classroom to the University's instructional program and assists students in deriving greater benefits from their University experiences. The following student services are administered through this office: Counseling Center, foreign student advising, residence hall advising, Student Health Service, Memorial Union, educational activities, student organizations and financial aids including loans, scholarships, and part-time employment. The Dean of Students is assisted by the Associate Dean of Students for Men and the Associate Dean of Students for Women who have special responsibilities in their respective areas.

The Offices of the Dean of Men and Dean of Women are responsible for standards of student life, for coordinating the social and activity programs, and for assisting individual students with personal problems. They also work closely with student organizations in developing student leadership and self government.

Student Housing

The kind and quality of housing in which students live has a decided effect upon their education. It is very important that the living environment be conducive to study, safe, and healthful. The right type of living conditions can aid students to do better in their studies and provide opportunities for personal and social growth.

At Oregon State students live in residence halls, cooperatives, sororities, fraternities, and in off-campus housing. The different living groups elect their own officers and plan their own social, recreational, and cultural programs.

All students are responsible for informing themselves about University housing policies which are outlined later in this section. Requests for exception to existing regulations must be approved by the appropriate Dean of Women or Dean of Men. Detailed information and descriptions of the various housing facilities follow:

Residence Halls

Hall	For men or women	Capacity	Living groups or clubs	Approximate multiple-room and board charges			
				Fall term	Winter term	Spring term	Year total
Buxton	Women	307	5	\$255.00	\$239.00	\$232.00	\$726.00
Cauthorn	Men	328	5	255.00	239.00	232.00	726.00
Hawley	Women	328	5	255.00	239.00	232.00	726.00
Poling	Men	328	5	255.00	239.00	232.00	726.00
Sackett A, B, and D	Women	345	3	255.00	239.00	232.00	726.00
Sackett C	Men	115	1	255.00	239.00	232.00	726.00
Snell	Women	366	5	255.00	239.00	232.00	726.00
Waldo	Men	302	5	240.00	224.00	217.00	681.00
Weatherford	Men	410	7	240.00	224.00	217.00	681.00
West	Women	315	5	255.00	239.00	232.00	726.00
Hall No. 6.....	Men	373	5	255.00	239.00	232.00	726.00

Single rooms are \$42.50 more per term in Buxton, Cauthorn, Hawley, Poling, Sackett, Snell, Hall No. 6, and West Halls and \$35 more per term in Waldo and Weatherford Halls. Board and room rates are subject to change by the State Board of Higher Education as circumstances demand.

Each of the halls has a lounge, recreation rooms, and laundry facilities. Most of them have snack kitchens, and several have sun decks. The halls provide for each occupant a single bed (some double or triple decked), mattress, mattress pad, two sheets, two single blankets, pillow, pillowcase, study table, chair, and dresser or wardrobe. Bed linen is laundered without additional charge. Occupants are responsible for care and cleanliness of rooms at all times and must furnish their own study lamps, towels, clock, water glass, and any other equipment to meet individual needs and preferences.

Room and board charges are due the first day of each month. Students paying after the first are charged a late fee of \$1 for the first day and \$1 for each additional day up to a maximum of \$5. For payments other than the first payment of each term, extension of time may be given by the Director of Dormitories if application is made before the first day of the month. If the bill is not paid by the 10th of the month, the student's registration may be canceled.

Special food service for students living in residence halls who require dietary help is available upon recommendation of the Student Health Service. There is an additional charge for this service. All students may consult with the Health Service staff at any time on special dietary problems.

Reserving a Room

To reserve a room in a residence hall a student should obtain an application blank from the Office of Admissions or Director of Dormitories, complete the application blank, and send it to the Business Office with a \$50 deposit. Money orders or checks should be made payable to Oregon State University.

Reservations should be made early, even though official admission may be delayed. If a student is found ineligible for admission after he has made the \$50 deposit, it will be returned to him. After he is admitted, \$35 of the deposit will be applied to the initial charge for board and room, and \$15 will be retained as a deposit.

When a student makes a \$50 deposit to reserve a room, he is holding that room for one term and is responsible for paying rent unless he cancels his reservation by the cancellation date. If he withdraws from college before the close of the term, he forfeits the deposit.

Cancellation, Assignment, and Refunds

Cancellation of a room reservation (or transfer of deposit to a later term) must be made before August 1 for fall term and not later than 14 days before the opening of winter or spring terms. If cancellation is made within the proper time limit, the deposit will be refunded. If the depositor registers and has not canceled his reservation as indicated above, he will be required to live in the residence hall. If he does not register and has not canceled his reservation, the entire \$50 deposit is forfeited. *Requests for cancellation or transfer should be made to the Dormitory Office.*

The \$15 deposit will be used for unpaid hall dues or for repair bills resulting from damaged fixtures for which the student is responsible. Any balance remaining after all charges are deducted will be returned in about six weeks after termination of occupancy. If the student withdraws before the end of the term, the \$15 room deposit is forfeited.

Assignment to a particular hall for fall term will be made between July 1 and August 1. After August 1, assignments are made as reservations are received and deposits made after this date may not be canceled without penalty.

Assignment for winter and spring term is made about one month before the beginning of the term.

Board refunds may be made for absences of 10 or more consecutive full days when the student is absent from Corvallis, but none will be made for shorter periods. No refunds are made for the examination period. Room rents are not refunded regardless of length of absence.

Sororities and Fraternities

Affiliation with fraternities and sororities is by invitation. The standards of scholarship maintained by these groups require study conditions that will promote achievement in academic growth. Board and room charges approximate those of the residence halls. Cost of membership, social fees, and sometimes building fees, are extra. Both fraternities and sororities have specified times during the year when "rushing" (selection of prospective members) takes place. Both groups "rush" at the beginning of fall term and at later periods.

Sororities provide supervised living accommodations for sophomore and upperclass women. Freshmen women, even though pledged, do not live in chapter houses. Pledges living outside sorority houses should plan on financial obligations to the social group in addition to obligations incurred where they live. A pamphlet on sororities may be obtained from the Panhellenic Council, Memorial Union, Oregon State University.

Sororities at Oregon State: Alpha Chi Omega, Alpha Delta Pi, Alpha Gamma Delta, Alpha Omicron Pi, Alpha Phi, Alpha Xi Delta, Chi Omega, Delta Delta Delta, Delta Gamma, Delta Zeta, Gamma Phi Beta, Kappa Alpha Theta, Kappa Delta, Kappa Kappa Gamma, Pi Beta Phi, Sigma Kappa, Zeta Tau Alpha.

Phrateres is a national social society for college women.

Fraternities provide comfortable, supervised accommodations for men. Freshman men pledged to a fraternity may live in the chapter house; in fact, if they do not have other housing arrangements they are expected to live in the house. If, however, a pledge has made other housing commitments he must fulfill them before moving into the fraternity house. A fraternity brochure and booklet are available from the Dean of Men, 111 Commerce Hall.

Fraternities at Oregon State: Acacia, Alpha Gamma Rho, Alpha Kappa Lambda, Alpha Sigma Phi, Alpha Tau Omega, Beta Theta Pi, Chi Phi, Delta Chi, Delta Sigma Phi, Delta Tau Delta, Delta Upsilon, Kappa Delta Rho, Kappa Sigma, Lambda Chi Alpha, Phi Delta Theta, Phi Gamma Delta, Phi Kappa Theta, Phi Kappa Psi, Phi Kappa Sigma, Phi Kappa Tau, Phi Sigma Kappa, Pi Kappa Alpha, Pi Kappa Phi, Sigma Alpha Epsilon, Sigma Chi, Sigma Nu, Sigma Phi Epsilon, Sigma Pi, Tau Kappa Epsilon, Theta Chi, Theta Xi, Zeta Psi.

Cooperatives

In cooperative houses students achieve desirable group and social life for about \$15 a month less than in other types of living groups. Students share all housework responsibilities. Each house has a hostess and a cook. Room rent for the year at all cooperatives is about \$210 and total board and room for a year is estimated at \$505 for men and from \$455 to \$500 for women. Rules

on keeping reservations, making cancellations, or moving apply in cooperatives as in other living organizations.

Women's Cooperative Houses. Azalea House and Coed Cottage on campus house 58 and 40 women respectively. Four off-campus units, Jameson House, The Pines, Heather Rae, and Winston House, are administered by Co-Resident Women, Inc. Applications should be made to the Dean of Women. A folder is available.

Men's Cooperative Houses. Reed and Heckart Lodges located on campus house 60 men each. Each lodge requires its residents to spend approximately four hours per person each week at kitchen work and housekeeping. Applications should be made to the Dean of Men. Four off-campus cooperatives, Beaver Lodge, Campus Club, Davenport House, and Hawthorne Manor, provide additional housing for men. For folder or information contact the Dean of Men.

Off-Campus Housing

Listings of approved private homes are maintained by the University. The Housing Committee urges that a written agreement be made between student and householder. Blank contract forms may be obtained from the Off-Campus Housing Office. Such agreements, if properly filed by the householder, will be binding upon both householder and student for one term and will be enforced by the Housing Committee. Housing agreements, whether oral or written, are for one school term and will be enforced when satisfactory facilities are provided.

Agreements may be terminated: (a) If the student properly withdraws from OSU; (b) upon mutual agreement and satisfaction to the student and householder with written notice to the Off-Campus Housing Office by the householder; or (c) by action of the Housing Committee. Since it is mutually beneficial for householder and student to meet each other before commitments are made, reservations in private homes are not made by Oregon State. Housing in a private home for fall term should be arranged soon after June 15. Costs in private homes are comparable to those in residence halls.

Housing for Married Students

Oregon State maintains a number of furnished apartments for married students. Rentals range from \$42 to \$80 per month with water and garbage disposal service furnished. Apply to the Director of Dormitories.

Off-Campus Apartments. A married student wishing to find living accommodations off campus should consult the Off-Campus Housing Office.

Housing Regulations

Each student is responsible for knowledge of housing regulations and for arranging, individually, for acceptable housing accommodations.

1. Living arrangements must be approved by the Dean of Men (men students) or the Dean of Women (women students) normally at the time of registration. Reservations in acceptable housing made by new students are tentative until official admission to Oregon State University has been granted.

2. Unmarried undergraduate students under 21 years of age, who are enrolled for 8 hours or more during any term, including the summer term, *are required to reside in approved housing*. Students reaching the age of 21 during a term may not change address until the next term.

3. Approved housing includes residence halls, cooperatives, fraternities, sororities, and, in the case of men students, rooming and boarding houses and "batching" accommodations approved by the Office of the Dean of Men. Occasionally, permission for women to live in the community is granted by the Office of the Dean of Women.

4. Established University rules regarding student conduct apply to all housing, on or off campus.

5. Students making duplicate housing arrangements will be held financially responsible for such arrangements.

6. Prior to any change of address or residence, approval must be obtained from the Dean of Men (men students) or the Dean of Women (women students).

7. All living arrangements in approved housing are for one full term. Should a request to move during the term be granted, the students will be held financially responsible for the payment of room rent for the remainder of the term.

8. Students required to reside in approved housing who are found to be residing in unapproved housing will be:

a. required to vacate such housing, and

b. shall be subject to appropriate disciplinary action by the Dean of Men or the Dean of Women.

9. Petitions for exceptions to these regulations shall be directed through the Offices of the Dean of Men or the Dean of Women to the Student Housing Committee.

For more detailed information see "Student Housing Regulations and Information."

University Counseling Center

The University Counseling Center provides counseling and testing services for students. Through personal interviews and use of various tests, students are helped in determining their interests and aptitudes for different vocational fields and the causes of difficulty in course work. Assistance is also provided in solving personal and social problems. A small fee is charged for some of the services.

Foreign Student Advising and Study Abroad

The Foreign Student Adviser assists students from abroad in their personal and academic adjustment to American university life. Additional help and assistance is given in connection with visas, immigration regulations, scholarships, employment, personal counseling, and finances. The Adviser helps to promote educational and social experiences between foreign students and American student groups, faculty, and community. Assistance is also provided American students planning study trips abroad.

Student Health Service

The Student Health Service safeguards the health of students through health education, preventive medicine, detection of incipient diseases, medical treatment of acute diseases, and maintenance of hygienic living conditions.

Students registered for credit who pay the Student Health Service fee may receive general medical attention and advice at the Student Health Service during dispensary hours. The Health Service does not provide house-call service at any time or medical service outside of dispensary hours or during vacation periods. Students who desire such attention should employ private physicians

at their own expense. This does not apply to those who are already under care of the Health Service as Infirmary in-patients. Limited hospital facilities are maintained for emergency cases which require hospitalization for general medical care. Such patients are admitted only upon advice of Health Service physicians. Maximum period of hospitalization for a student in any one academic year is 15 days. Extra charges are made to cover costs of such items as over time in the Infirmary and special medications.

All expenses connected with surgical operations, fractures, specialized medical care, and special nursing must be met by the student who requires such attention. In no case will the Health Service pay or be responsible for bills from private physicians or private hospitals.

Health Service privileges are not available to members of the faculty or members of the student's family.

The Health Service building contains a dispensary and semi-private patient rooms for students requiring confinement for general medical care or isolation for communicable diseases. The Health Service staff includes physicians, registered nurses, a laboratory technician, and an X-ray technician.

Medical Examination:¹ The medical examination is required of all entering students and of any former Oregon State University students (including those in the Graduate School) returning to school after a lapse of five years. It includes a tuberculin test within the past six months, vaccination against smallpox within the past five years, diphtheria-tetanus (adult type) immunization within the past four years, and other tests deemed necessary to protect the health of the student body. Immunization against poliomyelitis is recommended within the past year.²

Students transferring from a school within the Oregon State System of Higher Education may present a transcript³ of the medical examination on file at the institution previously attended. In addition, they are required to complete the first page of the Oregon State University medical examination form and to fulfill the smallpox and diphtheria-tetanus immunization and the tuberculin skin test requirements.

Students separated from military service within one year of registration may present a copy of the separation examination. In addition, they are required to complete the first page of the Oregon State University medical examination form and to fulfill the smallpox and diphtheria-tetanus immunization and the tuberculin skin test requirements.

Direct inquiries regarding the medical examination, or any other health requirements for admission, to the Student Health Service, Oregon State University.

Student Automobiles

Students may operate cars on campus only by permission obtained through registration with Campus Police in room 12 of the Home Economics Building.

¹ The medical examination, the tuberculin test, and the immunizations are to be done by a licensed M.D. or O.D. physician and surgeon of the student's own choice before he arrives on campus.

² Exception is made, however, for students who decline immunization because of religious convictions. Such students may be admitted, but only on the condition that they or, in case of minor or dependent students, their parents or guardians present a written statement expressing religious grounds for declining and agree in writing to assume all expenses incident to the care or quarantine should they fall ill with smallpox, tetanus, or diphtheria while students at the institution.

³ Request for the medical transcript must be made by the student and addressed to the Student Health Service at the institution previously attended.

and payment of yearly fees. Parking is restricted to certain assigned areas, and cars must carry stickers on windshields indicating areas assigned.

Students are responsible for knowing regulations pertaining to operation of a motor vehicle on campus and will be held responsible for any violation of these regulations in which a vehicle registered to them is involved regardless of who operates it. Specific information on parking and traffic regulations can be obtained in the leaflet *Your Car On The Campus*, available from the Campus Police Office.

Students are urged to ask assistance in resolving difficult automobile problems and to obtain answers to their questions by calling the Campus Police Office. The mutual cooperation between both groups will result in a better understanding.

Since campus traffic and parking are becoming overly congested and almost all living accommodations are within walking distance of the campus, students are advised to leave their cars at home.

Student Expenses

The table below gives estimated *average expenses* for the first term and the first year. Some courses of study require more expensive books and supplies than others; for example, drawing instruments and slide rule for engineering students cost about \$75. Board and room costs are based on charges in the halls of residence. Cost of clothing and other incidental items vary greatly with the individual.

Average expenses per month may vary from \$150 to \$190 but a student meets large financial demands in the first two weeks of college. He pays registration fees for the whole term, room and board a term in advance,¹ and he must buy books at the beginning of the term. For this reason students from Oregon should come prepared for an initial expense of about \$400. Nonresident students should be prepared for an initial outlay of \$545. Personal checks in the exact amount provide the most convenient and the safest method of payment.

First Year Expenses

	Oregon residents		Nonresidents	
	<i>First term</i>	<i>First year</i>	<i>First term</i>	<i>First year</i>
Regular fees and tuition ..	\$ 90.00	\$ 270.00	\$230.00	\$ 690.00
Books, supplies, etc.	45.00	90.00	45.00	90.00
Board and room	255.00	726.00	255.00	726.00
Deposit	15.00	15.00	15.00	15.00
Incidentals	60.00	175.00	60.00	175.00
TOTALS	\$465.00	\$1,276.00	\$605.00	\$1,696.00

The State Board of Higher Education reserves the right to make changes in the fee schedule without notice. For further information on fees see page 28.

Financial Aids

The University provides assistance for students who need financial aid by helping them secure part-time and summer employment, by loans from special funds provided by private donors, and through scholarships and fellowships supported by both state funds and by private endowment.

¹ Students should come prepared to pay for room and board for the whole term. If this is possible, they may arrange to pay this item on a monthly basis.

Student Employment. The University provides a student employment office to aid those seeking part-time work while enrolled in school and to assist students in obtaining vacation jobs. This makes it possible for many students to earn a portion of their University expenses.

Some students earn their room and board by working in private homes. Usually this involves about three hours of work per day. Other students living in residence halls obtain employment in the food services where they are able to earn most of their room and board. Students desiring such employment must contact the Manager of the Residence Hall Food Service after arriving on campus.

Student Loan Fund, a perpetual, revolving trust fund established for the purpose of lending money to worthy students attending Oregon State University, is administered by the Student Loan Fund, a membership organization, incorporated under the laws of the State of Oregon. Trustees are appointed by the President of OSU. This fund has arisen through the generosity of friends of the institution and through the accumulation of interest on loans.

The purpose, as expressed by one of the donors, is "not to induce students to attend school by providing money that can be obtained easily, but rather to aid those who are determined to secure an education and are paying the cost wholly or in part from their own earnings." Students are eligible to loan aid for necessary college expenses after attending Oregon State *at least one term*.

In making loans the trustees follow these fundamental principles: Care in the selection of student character as a credit basis; detailed budgeting of expenses and receipts to assure that the sums borrowed are not disproportionate with the student's capacity to pay; insurance against loss by a Contract of Guaranty signed by the parent or guardian; and effective follow-up system in collections.

Loans to students are also made under the provisions of the National Defense Education Act of 1958. Special consideration is given to students in the fields of education, science, mathematics, engineering, and modern foreign languages. Eligibility for NDEA loans requires an accumulative grade point average of 3.25 for high school seniors, 2.75 for college undergraduates and 3.00 for graduate students.

Applications for loans should be made at the Student Loan Office, 102 Memorial Union, where additional information is available.

Other Loan Funds administered by the trustees of the Student Loan Fund: the CIVIL ENGINEERING LOAN FUND for students in civil engineering; HARDING MCKINNEY FUND for juniors and seniors in electrical engineering; OREGON FEED AND SEED DEALERS for juniors and seniors in agriculture; GEORGE W. PEAVY MEMORIAL LOAN FUND for students in forestry; JAMES AND DELMER SHAVER LOAN FUND for senior men and women; OREGON STATE PHARMACEUTICAL ASSOCIATION EDUCATIONAL FUND; E. B. LEMON LOAN FUND; and ALVA W. BLACKERBY MEMORIAL LOAN FUND for students in forestry. W. C. WILLIAMS LOAN FUND for seniors in engineering; OREGON STATE HORTICULTURAL SOCIETY FUND for studying varied phases of horticulture; OREGON HOME ECONOMISTS IN HOME MAKING LOAN FUND for home economic students.

The trustees also cooperate in the administration of the J. T. APPERSON EDUCATIONAL FUND (administered by the State Land Board), CRAWFORD LOAN

FUND (administered by the U. S. National Bank, Portland), FRED A. ROSENKRAZ LOAN FUND (administered by First National Bank, Portland—application made through Student Loan Office, OSU), BEN SELLING SCHOLARSHIP LOAN FUND (administered by First National Bank, Portland, and United Student Aid Funds).

Scholarships

The scholarship program is coordinated through the University Committee on Scholarships. Most scholarships require evidence of ability, promise, and reasonable need for help in meeting minimum college expenses. Students who apply to the committee will be considered for all scholarships for which they qualify.

Application blanks are available from the Oregon State University Scholarship Office or from any Oregon high school principal. Applications, including transcripts of all academic work to date of application, should be forwarded to the Office of the President by March 1 of each year. Exceptions to these procedures will be noted for certain of the scholarships administered by other agencies.

All-Campus

ASSOCIATED WOMEN STUDENTS SCHOLARSHIP: Tuition and fees to a junior woman in recognition of outstanding campus service and high scholarship.

BASH SCHOLARSHIP: \$300 provided by the Portland chapter of the Oregon State Mothers Club for an outstanding freshman woman from an Oregon high school, in memory of the late Dean of Women, Mary Bash.

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% of his graduating class, be of excellent character, have an outstanding record of service to school and community.

ORVALLIS ROTARY CLUB SCHOLARSHIP: \$400 annually to an incoming freshman or upperclassman who is a resident of Oregon. Selection made on basis of scholastic promise, need, and evidence of good citizenship.

DALY SCHOLARSHIPS: A limited number of scholarships awarded annually to worthy young men and women of Lake County by the Bernard Daly Educational Fund, established through the will of the late Dr. Bernard Daly of Lakeview, Oregon. Selections are made on the basis of a qualifying examination held in Lake County.

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

DOUGLAS COUNTY HOME EXTENSION SCHOLARSHIP: Annual tuition and fee scholarship awarded to a worthy man or woman graduating from a Douglas County high school and planning to attend Oregon State University. Application through high school principal with approval of local unit extension officers.

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

HONORA H. KERR-FOLK CLUB SCHOLARSHIP: \$300 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 College Folk Club.

MORTAR BOARD SCHOLARSHIP: Financial aid to one or more outstanding women students.

NAVY ROTC SCHOLARSHIPS: Tuition, textbooks, laboratory and other instructional fees, and \$50 per month living expenses for twelve months per year for four years, provided by United States Navy.

OREGON STATE UNIVERSITY EDUCATIONAL FOUNDATION, INC. SCHOLARSHIPS: Partial and full tuition scholarships annually for two or three outstanding students in need of financial assistance.

OREGON STATE UNIVERSITY FOUNDATION: Partial and full-tuition scholarships as made available through contributions to the OSU Foundation.

OREGON STATE UNIVERSITY DADS CLUB SCHOLARSHIPS: Tuition and fees to men and women selected by the Oregon State University Dads Club in conjunction with the Dean of Men and Dean of Women. Recipients chosen on basis of scholastic attainment and financial need.

- OREGON STATE UNIVERSITY MOTHERS CLUB SCHOLARSHIPS:** Tuition and fees to men and women selected by Mothers Club Scholarship Committee with approval of Dean of Men and Dean of Women. Recipients must need financial aid, must be of high character, must have average or above grades. Honor scholarships will be given to a man and a woman with grade-point averages above 3.00. If a woman recipient marries, she relinquishes the scholarship.
- PACIFIC RESINS AND CHEMICALS, INC. SCHOLARSHIP:** One \$300 scholarship annually to entering freshmen of outstanding scholastic ability interested in chemistry, chemical engineering, forestry, or high school teaching in science or mathematics.
- PAPER INDUSTRY MANAGEMENT ASSOCIATION SCHOLARSHIP:** \$300 annually to an outstanding undergraduate who may enter chemical engineering, chemistry, or forestry; provided by the Pacific Division of the American Pulp and Paper Mill Superintendents Association. Award made on the basis of scholarship, adaptability, and financial need.
- PHI SIGMA KAPPA FRATERNITY SCHOLARSHIP:** \$100 annually to a male high school senior for his freshman year in college. Recipients selected by Phi Sigma Kappa fraternity on basis of scholarship, character, and financial need. Applicants write to Oregon State Chapter of Phi Sigma Kappa.
- SCABBARD AND BLADE SCHOLARSHIPS:** Three \$75 annual scholarships to seniors, one from each ROTC Service Unit provided by local company of Scabbard and Blade society.
- STATE SCHOLARSHIPS:** Under law created by the State legislature partial tuition and fee scholarships are awarded by the State Scholarship Commission equal in number to 24% of the enrollment in State-supported institutions. Entering freshmen are eligible to apply if ranked in upper one-half of their high school class. College students may apply if they have achieved a term and cumulative GPA of 2.50 or better. Applications available from Scholarship Committee of the State institution student desires to attend or from high school principals.
- In addition, the State Scholarship Commission will award annually one four-year scholarship for each Oregon county and one for each State legislative seat. These scholarships are transferable within the State System after the initial year of the award.
- STATE CASH SCHOLARSHIPS:** Outstanding high school seniors are eligible to apply for cash scholarships awarded by the State Scholarship Commission. These awards have an annual maximum value of \$500 and are renewable until graduation provided a term and cumulative GPA of 2.50 is maintained. Selection based on academic achievement and financial need. The Commission provides each high school principal with scholarship application forms. Recipients may attend any State or private accredited institution.
- VARSIITY "O" SCHOLARSHIP:** \$75 annually to a male high school senior planning to enter OSU. Selection on basis of leadership, citizenship, scholarship, and proficiency in athletics specifically in golf, tennis, wrestling, or swimming.

School of Humanities and Social Sciences

- KAPPA PI SCHOLARSHIP:** \$100 annually provided by Kappa Pi, national art honorary, to Oregon student who has completed at least 9 term hours in art with grade-point average of 3.0 or above. Application through the society or head of Art Department.
- MUSIC STUDY SCHOLARSHIPS:** Annual scholarships of \$60 to \$90 each, established by friends of Music Department, to cover special fees for individual instruction in piano, organ, voice, stringed instruments, and wind instruments. Open to all students. Application through Music Department.

School of Science

- BENTON COUNTY MEDICAL SOCIETY SCHOLARSHIP:** \$500 to a premedical student. Selected based on outstanding scholarship and financial need. Recipient need not be an Oregon resident, may be in any class, and may be of any race, color, or creed.
- BOEING SCHOLARSHIPS:** Four \$150 scholarships to undergraduates in the School of Science, two majoring in mathematics and two majoring in physics.
- 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 Bacteriology Department. Recipient must be a junior or senior with outstanding promise in School of Science.
- CROWN ZELLERBACH FOUNDATION SCHOLARSHIP IN HONOR OF DR. LEO FRIEDMAN:** \$1,000 to an upper division student in chemistry, preferably wood or pulp and paper chemistry. A memorial to Dr. Leo Friedman, for many years on the Chemistry faculty, a pioneer in wood chemistry in Oregon.
- LONGVIEW FIBRE COMPANY PULP AND PAPER SCHOLARSHIP:** \$300 to a sophomore or a junior in chemistry. Final selection by donor.
- PAPER INDUSTRY MANAGEMENT ASSOCIATION SCHOLARSHIP:** (See All-Campus Scholarships.)
- SIMMONS SCHOLARSHIP:** Established by the widow and friends of the late Professor Joseph E. Simmons, formerly head of Bacteriology Department, for a worthy, promising junior in microbiology in need of financial assistance for the senior year.
- TEXACO SCHOLARSHIPS:** Financial assistance for upper division male U. S. citizens majoring in chemistry, physics, mathematics, or geology, and qualified for careers in petroleum industry. Awards based on scholastic ability, qualities of leadership, financial need, and sound health.

School of Agriculture

- ASSOCIATED BLUE LAKE GREEN BEAN CANNERS, INC. SCHOLARSHIP:** \$300 to a freshman in Food Technology. Applicants use State Scholarship Application form. Recipients selected by representatives of Department of Food and Dairy Technology, approved by Oregon State University Scholarship Committee.
- BLUE LAKE PACKERS, INC. SCHOLARSHIP:** \$300 to a freshman in Food Technology. Preference given sons and daughters of members or employees of Blue Lake Packers, Inc. or to high school graduates from Marion, Polk, Benton, Yamhill, Linn, and Lane counties. Recipients selected by representatives of Department of Food Science and Technology, approved by Oregon State University Scholarship Committee.
- BORDEN SCHOLARSHIP:** \$300 provided by the Borden Company Foundation, for a senior in agriculture who has completed six term hours in dairying and who among all similarly eligible students has the highest grade-point average.
- P. M. BRANDT MEMORIAL SCHOLARSHIP:** \$1,000 over a four-year period provided by Oregon Dairy Industries to an entering freshman man or woman in Dairy Technology.
- CROWN ZELLERBACH FOUNDATION SCHOLARSHIP IN FISH AND GAME MANAGEMENT:** \$500 annually to a junior or senior in Fish and Game Management, preferably fisheries.
- GENERAL FOODS FUND SCHOLARSHIPS:** Ten \$400 scholarships for entering freshman in pomology, vegetable crops, food science and technology, or agricultural engineering. Awards based on intellectual competence, demonstrated leadership ability, high moral character, and financial need. Five recipients will receive \$200 their sophomore year. Applications made to dean of Agriculture, OSU.
- 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.
- JACOBS FOUNDATION SCHOLARSHIP:** \$250 annually to sophomore in agriculture who ranks in upper third of class; application through dean of Agriculture.
- LAMB-WESTON, INC. SCHOLARSHIP:** \$300 to an entering freshman in Food Technology from a high school in the general area of Weston, Oregon.
- 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.
- MILWAUKIE ROD AND GUN CLUB SCHOLARSHIP:** \$150 annually for two outstanding seniors in fisheries or wildlife management. Preference given qualified students from Milwaukie area. Selection based on scholastic ability, leadership, career interest in fish and game management, and financial need.
- MULTNOMAH ANGLERS AND HUNTERS CLUB SCHOLARSHIP:** \$175 for a male student, junior or senior, majoring in fish and game management to assist him in continuing his studies in wildlife conservation and management.
- NORTHWEST PACKING COMPANY SCHOLARSHIP:** \$300 to a freshman in Food Technology.
- OREGON FEDERATION OF GARDEN CLUBS SCHOLARSHIPS:** Two \$200 grants-in-aid for sophomore or upperclassman, one in landscape architecture and one in ornamental horticulture.
- PACIFIC NORTHWEST PLANT FOOD ASSOCIATION SCHOLARSHIP:** \$100 to an outstanding junior or senior in School of 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% of the class and who have financial need may apply through dean of Agriculture.
- SEARS ROEBUCK SCHOLARSHIPS:** \$3,000 provided by Sears Roebuck Foundation for men in agriculture who have been reared in Oregon. Recipients must show good character, scholastic attainment, leadership ability through participation in 4-H Club, Future Farmer, or community activities.
- STAYTON CANNING COMPANY SCHOLARSHIP:** Two \$300 scholarships for freshmen in Food Technology, graduates from Cascade, Jefferson, Scio, Stayton, or St. Boniface high schools.
- WADE FOUNDATION SCHOLARSHIP:** \$250 annually for a junior or senior majoring in agricultural education.
- WESTERN ROD AND REEL CLUB SCHOLARSHIP:** Tuition and fees for one year to a junior or senior of outstanding promise in wildlife management or fisheries.
- G. H. WILSTER SCHOLARSHIP:** Full tuition and fees for sophomore year provided by Oregon Dairy Industries to an outstanding freshman in dairy technology.

School of Business and Technology

- BOEING SCHOLARSHIPS:** Four \$150 scholarships annually to undergraduates in business administration with emphasis on accounting, finance, business statistics, and production.
- BERTHA W. STUTZ-CORVALLIS WOMAN'S CLUB SCHOLARSHIP:** \$300 annually to a sophomore, junior, or senior girl from the Corvallis area who is majoring in business education or secretarial science; award based on merit and need. Selection by Corvallis Woman's Club Scholarship Committee from nominations by departments of Business Education and Secretarial Science.

STANDARD OIL COMPANY OF CALIFORNIA UNDERGRADUATE SCHOLARSHIP: \$750 annually provided by the Standard Oil Company of California for an undergraduate student in business administration with an area of concentration in accounting.

School of Education

PARENT-TEACHER SCHOLARSHIPS: \$250 annually 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, Education Center Building, Portland.

School of Engineering

ALCOA FOUNDATION UNDERGRADUATE SCHOLARSHIPS: Two \$500 scholarships annually to juniors and seniors in electrical, mechanical, industrial, and chemical engineering. Provided by Aluminum Company of America Foundation.

AMERICAN SOCIETY OF CIVIL ENGINEERS SCHOLARSHIP (Oregon section): \$300 annually for a student in civil engineering.

BECHTEL CORPORATION SCHOLARSHIP: \$1,500 annually for four seniors in engineering; recipients must be under 26 years of age, and anticipating careers in private industry.

BOEING SCHOLARSHIPS: Four \$200 scholarships annually to undergraduates majoring in the School of Engineering.

COLLINS RADIO COMPANY SCHOLARSHIPS: \$2,000 annually to an outstanding senior, graduate student, or combination in electrical or mechanical engineering. Research project or teaching services required.

CO-SIGNERS SCHOLARSHIP: The Co-Signers (Engineers' wives club) makes a scholarship award each year in variable amount, preferably to a married student in need of financial assistance. Final selection of recommended candidates by donor.

COVERT SCHOLARSHIP: Approximately \$150 to a student in chemical engineering; provided by Mr. Lloyd W. Covert. Award made on basis of scholarship, ability, and potential leadership.

FREIGHTLINER SCHOLARSHIPS: An annual amount of \$1,000 will be distributed in sums of not less than \$200 or more than \$500 to candidates from the Department of Mechanical Engineering.

HERMANN SCHOLARSHIP: Approximately \$300 annually to an outstanding senior in civil engineering in memory of the late Otto Hermann, graduate of School of Engineering.

LONGVIEW FIBRE COMPANY PULP AND PAPER SCHOLARSHIPS: Five full tuition scholarships to sophomores, juniors, and seniors in mechanical or chemical engineering.

MOBILE OIL COMPANY SCHOLARSHIP: \$500 to senior or graduate student in mechanical engineering.

PAPER INDUSTRY MANAGEMENT ASSOCIATION SCHOLARSHIP: (See All-Campus Scholarships.)

RAYONIER INCORPORATED SCHOLARSHIPS: Two \$250 scholarships annually to undergraduates in the School of Engineering, one in chemical engineering, and one from among the Departments of Mechanical, Electrical, or Civil Engineering. Candidates must be U. S. citizens. Applications through the School of Engineering.

STANDARD OIL COMPANY OF CALIFORNIA UNDERGRADUATE SCHOLARSHIP: \$750 provided by the Standard Oil Company of California for an undergraduate scholarship to a student in chemical engineering.

STANDARD OIL COMPANY OF CALIFORNIA UNDERGRADUATE SCHOLARSHIP: \$750 provided by the Standard Oil Company of California for an undergraduate scholarship to a student in electrical engineering.

TEXACO SCHOLARSHIPS: Financial assistance for upper division majors in chemical engineering qualified for careers in the petroleum industry; awards based on scholastic ability, qualities of leadership, financial need, and sound health.

WESTERN ELECTRIC FUND SCHOLARSHIP: \$400 to a student in electrical or mechanical engineering above the freshman year, preferably a junior.

WESTERN ELECTRONIC MANUFACTURERS ASSOCIATION SCHOLARSHIP: \$750 divided in variable amounts to students in electrical engineering, generally to one sophomore, one junior, and one senior.

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.

AUTZEN FOUNDATION SCHOLARSHIP: \$500 provided for all outstanding student in forestry.

COLE, CLARK, AND CUNNINGHAM, INC. SCHOLARSHIP: \$400 to an outstanding senior in forestry.

- CROWN ZELLERBACH FOUNDATION SCHOLARSHIP:** \$1,000 provided by Crown Zellerbach Foundation for two outstanding juniors or seniors in forestry who are citizens of the U. S. and have not previously held scholarships sponsored by the Foundation.
- EVANS PRODUCTS COMPANY UNDERGRADUATE SCHOLARSHIP:** \$750 annually for an outstanding student in forestry.
- HART SCHOLARSHIP:** Income from an endowment fund, a memorial to Floyd Hart, prominent Oregon lumberman, for a senior in forestry.
- PAPER INDUSTRY MANAGEMENT ASSOCIATION SCHOLARSHIP:** (See All-Campus Scholarships.)
- SLATER MEMORIAL SCHOLARSHIP:** Income from an endowment fund, a memorial to Durward F. Slater, class of 1952, to an upper division forestry student.
- SNELLSTROM SCHOLARSHIP:** Income from endowment fund, a memorial to John R. Snellstrom, prominent Oregon lumberman and legislator, for outstanding forestry student nominated by forestry faculty.
- SOUTH SANTIAM EDUCATIONAL AND RESEARCH PROJECT SCHOLARSHIPS:** \$2,500 annually, provided by Louis W. and Maud Hill Family Foundation for at least five Oregon students in forestry in the sophomore, junior, or senior years.
- TUCKER SCHOLARSHIPS:** Three \$1,000 scholarships, provided by the will of Max D. Tucker, for Oregon students in forestry.
- WILLAMETTE VALLEY LUMBER OPERATORS SCHOLARSHIP:** Income from endowment fund; for an outstanding forestry student, preferably in forest products, nominated by forestry faculty.

School of Home Economics

- BORDEN SCHOLARSHIP:** \$300, provided by the Borden Company, for a senior in home economics who has completed two or more courses in foods and nutrition and who, among all similarly eligible students, has the highest grade-point average.
- LEONE ELLIOTT COVERT SCHOLARSHIP:** Approximately \$150 to a student in Home Economics; provided by Mrs. Covert. Award made on basis of scholarship, ability, and potential leadership.
- ELECTRICAL WOMEN'S ROUND TABLE OF PORTLAND SCHOLARSHIP:** \$150 to a junior, awarded on basis of financial need, scholarship, and interest and aptitude in electrical equipment.
- FHA SCHOLARSHIP:** \$200 for a home economics student provided by the Oregon Association of Future Homemakers of America for graduate of an Oregon high school.
- SEARS ROEBUCK SCHOLARSHIPS:** Three \$300 freshman scholarships for study in home economics, provided by the Sears Roebuck Foundation, awarded on merit to Oregon girls who would otherwise not be able to attend college.

School of Pharmacy

- A. K. BERMAN PHARMACY SCHOLARSHIP:** \$50 annually to a deserving upper division pharmacy student selected by the faculty of the School.
- MARTHA BAKER DIXON SCHOLARSHIP:** \$100 annually to a student in pharmacy for superior scholarship and need of financial assistance.
- LANE COUNTY REGISTERED PHARMACISTS SCHOLARSHIP:** \$150 annually to a deserving student in pharmacy from Lane County or surrounding area.
- OREGON STATE PHARMACEUTICAL SCHOLARSHIPS:** \$50 annually for four years, to two sophomore pharmacy students who have distinguished themselves in leadership and scholarship.
- PAYLESS DRUG STORES SCHOLARSHIP:** \$300 annually to a junior or senior who shows promise in pharmacy and who will benefit from financial support.
- STANLEY DRUG PRODUCTS SCHOLARSHIP:** \$300 annually to a junior and a senior who show aptitude and scholarship in manufacturing pharmacy.
- WOMEN'S AUXILIARY OREGON STATE PHARMACEUTICAL ASSOCIATION TUITION SCHOLARSHIP:** One year's full tuition for a junior or senior girl in pharmacy who is a resident of Oregon; based on merit and need.
- WOMEN'S AUXILIARY OREGON STATE PHARMACEUTICAL ASSOCIATION SCHOLARSHIP:** \$100 given annually to a deserving woman student in pharmacy.

For Foreign Students

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

- BUSINESS AND PROFESSIONAL WOMEN'S CLUB SCHOLARSHIP:** \$1,500 annually to a graduate student in home economics from the Orient; provided by the Oregon Federation of Business and Professional Women's Clubs.
- INTERFRATERNITY SCHOLARSHIPS:** Room and board for one academic year provided for two undergraduate foreign students (men) selected on the basis of scholarship and need; provided by fraternities.
- MILAM FELLOWSHIP:** For an undergraduate or graduate woman foreign student in home economics, established in tribute to Ava B. Milam Clark, dean of the School of Home Economics 1917-1950.

- PANHELLENIC SCHOLARSHIP:** Room and board for one academic year provided for one undergraduate foreign student (woman) selected on the basis of scholarship and need; provided by sororities.
- STATE SCHOLARSHIPS FOR FOREIGN STUDENTS:** Tuition and course fees for a limited number of students from foreign countries attending institutions of the Oregon State System of Higher Education. Student pays building fee and incidental fee (\$34), plus \$15 refundable breakage deposit fall term.

Administered by Other Agencies

- AUXILIARY TO PROFESSIONAL ENGINEERS OF OREGON SCHOLARSHIP:** \$300 to a Portland State College student transferring into professional engineering at Oregon State University. Application through Portland State College Scholarship Committee.
- CROWN ZELLERBACH FOUNDATION SCHOLARSHIP:** \$500 per year for four years to students in education. Information through high school principals.
- 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.
- 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.
- IRON FIREMAN MANUFACTURING COMPANY SCHOLARSHIP:** Tuition and fees to graduates of Oregon high schools in upper one-third of their class. Awarded on basis of scholarship and a 500-word written discussion of "Modern Heating Methods." State System application blank must be completed and mailed with theme by May 5, to Scholarship Committee, Iron Fireman Manufacturing Co., 3205 S.E. 13th Avenue, Portland, Oregon.
- 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.
- KAPPA DELTA PI SCHOLARSHIP:** \$75 annually to a junior or senior in School of Education who has shown scholastic ability and an interest in the profession.
- 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 STATE EMPLOYEE'S ASSOCIATION SCHOLARSHIPS:** Three \$300 scholarships to students whose parents are members of O.S.E.A. Selection based upon scholastic achievement and financial need.
- OREGON STATE EMPLOYEE'S ASSOCIATION SCHOLARSHIP (OSU Faculty Chapter No. 72):** \$100 annually to a son or daughter of a chapter member; for outstanding scholastic achievement.
- OREGON STATE PHARMACEUTICAL CONTINUING SCHOLARSHIPS:** Two Oregon high school graduates awarded \$50 per year for a period of five years while registered in the School of Pharmacy at Oregon State University. Selection based upon excellent grades, leadership, and need.
- 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.
- PEPSODENT PRESIDENTIAL SCHOLARSHIP:** \$100 a year for freshman in pharmacy to be continued for five years if scholarship is maintained. Awarded on basis of scholastic ability and financial need. Selection by Oregon State Pharmaceutical Association.
- 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.
- ST. REGIS PAPER COMPANY SCHOLARSHIP:** \$800 a year for two years, provided by St. Regis Paper Company for a junior at either OSU, U of W, U of Idaho, or MSU, including opportunity for work at company plant over the summer.
- 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 Conflict, 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.

Honors and Awards

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 only 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-round distinction.

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 upon those members of the graduating class, candidates for a bachelor's degree, who through their entire college course have maintained a grade-point average of at least 3.25. Recipients must have attended Oregon State for two regular academic years. Limited to 10% of graduating seniors in each school.

LIPMAN WOLFE AWARDS: Presented in the proportions of \$50, \$30, and \$20 respectively to the man or woman of highest standing in the senior, junior, and sophomore classes based on (a) scholarship, (b) qualities of manhood and womanhood with special emphasis on unselfishness and kindness, (c) qualities of leadership, and (d) contribution to campus welfare.

CHIEF OMEGA AWARD: An annual award of \$50 to the senior woman who is adjudged by a college committee on honors and awards to approach most nearly an ideal of intellect and spirituality and to have exerted the most wholesome influence upon her associates.

CUMMINGS AWARDS: Presented each spring in the proportions of \$50, \$30, \$20, and \$10 respectively to the man of highest standing in the senior, junior, sophomore, and freshman years; based on (a) scholarship, (b) success in student activities, (c) qualities of manhood, and qualities of leadership; a memorial to Edward A. Cummings.

DELTA DELTA DELTA AWARDS: Yearly awards of \$75 each made to two women students judged to have exerted, through personal resourcefulness and unselfish effort, the most constructive influence on their associates during the academic year.

DUBACH AWARDS: Presented annually by Oregon State chapter of Blue Key to five graduating senior men outstanding in perpetuation of high ideals and unselfish service to Oregon State University; in honor of Dr. U. G. Dubach, dean of men 1913-1947; names are inscribed on plaque in foyer of Library.

FRIENDS OF THE LIBRARY BOOK AWARDS: Two prizes of books donated annually by the Oregon State University Cooperative Association to students judged to possess the most outstanding personal libraries.

HAMILTON AWARDS: \$50 each to a freshman and a sophomore (man or woman) who are one-half self-supporting and are making most purposeful progress toward useful and active citizenship; a memorial to Beatrice Hamilton, mother of W. D. Hamilton, '15.

MACKENZIE-BLUE KEY MEMORIAL AWARD: In memory of Donald Wilson MacKenzie, class of 1953, to any man student who exhibits outstanding qualities and ability as a student leader and in service and loyalty to the institution. Cash and plaque.

SMITH AWARD: Income from \$500 to the senior woman having highest scholastic standing during the eight terms preceding her selection for this award; not given to any student who receives another award during same year; a memorial to Drucilla Shepard Smith, formerly of Polk County, established by her son, Mr. John E. Smith, '02.

WALDO AWARDS: Presented each spring in the proportions of \$40, \$30, \$20, and \$10 respectively to the woman student of highest standing in the senior, junior, sophomore, and freshman years; based on (a) scholarship, (b) success in student activities, (c) qualities of womanhood, and (d) qualities of leadership; a memorial to Clara H. Waldo.

School of Humanities and Social Sciences

- ALPHA CHI OMEGA CUP:** Awarded to the woman student of music who has rendered the greatest service to the campus.
- 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*, student newspaper.
- INGALLS AWARD:** Trophy given annually to the senior who has contributed most to welfare of student publications; award is recorded on a plaque, a memorial to Claude E. Ingalls, formerly editor of the *Corvallis Gazette-Times*.
- "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.
- SIGMA DELTA CHI CITATION:** Certificate awarded by national organization to outstanding male senior interested in journalism.
- SIGMA DELTA CHI SCHOLARSHIP AWARD:** Certificate awarded by national organization 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.

School of Science

- AMERICAN INSTITUTE OF CHEMISTS AWARD:** Engraved medal awarded to an outstanding senior in chemistry, in recognition of leadership, character, and excellence in scholarship.
- 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:** Certificate of merit to an outstanding junior in chemistry and chemical engineering; recipient's name engraved on plaque in Chemistry Hall.
- PHI SIGMA AWARDS:** Two certificates to the outstanding undergraduate and graduate students who have shown creative interest in biology.
- PI MU EPSILON-DEPARTMENT OF MATHEMATICS AWARD:** \$35 for first place and \$20 for second place in a mathematics competition for freshmen and sophomores; winner's name to be engraved on plaque.
- SIGMA PI SIGMA AWARD:** Junior membership in American Association of Physics Teachers to the outstanding sophomore in physics.

School of Agriculture

- AGRICULTURAL COOPERATIVE COUNCIL OF OREGON AWARD:** An annual award of \$100 to a junior or senior in agricultural economics who has shown interest in farmer cooperatives and agricultural business management. In honor of Paul Carpenter, long a devoted Agricultural Extensionist at Oregon State University, and Council Secretary.
- ALPHA GAMMA RHO FRESHMAN AWARD:** Rotating trophy to student in agriculture who has completed 45 term hours with a grade-point average of at least 2.75 and who is enrolled for his fourth term in college; purpose to promote scholarship, develop leadership and character.
- ALPHA ZETA SCHOLARSHIP CUP:** Awarded during the first term of the sophomore year to the student in agriculture receiving the highest grade average in the freshman class.
- BURPEE AWARD IN HORTICULTURE:** \$100 to an outstanding student in horticulture majoring in floriculture or vegetable crops.
- DANFORTH AWARD IN AGRICULTURE:** Expenses for two weeks in St. Louis, Missouri, and two weeks in a Michigan summer camp; provided by the Danforth Foundation and Ralston-Purina Mills of St. Louis, for outstanding agriculture students.
- HANSON AWARD:** An annual award of \$100 to a student in agriculture demonstrating outstanding achievement or interest in poultry husbandry.
- JACOBS FOUNDATION AWARD:** \$250 to a deserving sophomore in agriculture in the upper one-third of his class scholastically; provided by the Ralph and Adolph Jacobs Foundations.
- LENDERKING AWARD:** \$500 to a student in food technology who makes a real contribution toward improving the quality of frozen food; provided by Mr. William R. Lenderking.
- NORTHWEST CANNERS AND FREEZERS ASSOCIATION AWARD:** \$100 to an outstanding junior in food technology.
- RODENWOLD AWARDS:** Medals awarded each year to the members of the five-man team representing Oregon State in the intercollegiate livestock judging contest at the Pacific International Livestock Show in Portland; a memorial to Ben Rodenwold.
- ERNEST H. WIEGAND AWARD:** \$100 and name of outstanding senior in food technology inscribed on plaque in foyer of Food Technology Building. Selection by Oregon section and student chapter of Institute of Food Technologists.

School of Business and Technology

- BUSINESS AND TECHNOLOGY CLUB AWARD:** Inscription on Business and Technology Honor Plaque of names of outstanding men and women graduates determined by representatives of Business and Technology Club and faculty of Departments of Business Administration, Business Education, and Secretarial Science.
- OREGON SOCIETY OF CERTIFIED PUBLIC ACCOUNTANTS AWARD:** Accounting books valued at \$50 awarded to a senior for high academic standards and leadership qualities in accounting.
- PHI CHI THETA AWARD:** For women in business and technology: (a) a prize of \$5 to the freshman having the highest scholastic standing, (b) a senior key.
- UBEA-SMEAD AWARD:** Certificate of merit, leather magazine holder, and 1-year membership in United Business Education Association to outstanding senior in business education; provided by Smead Manufacturing Company. Selection made by departmental faculty.
- WALL STREET JOURNAL AWARD:** Medallion and subscription to best all-round man or woman graduate in business and technology as determined by the business administration faculty based on scholarship and leadership abilities.

School of Education

- KAPPA DELTA PI AWARD:** \$75 annually to a junior or senior in education who is outstanding scholastically, has great promise as a teacher, and has need for financial assistance.

School of Engineering

- 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 ELECTRICAL ENGINEERS AWARD:** \$10 and certificate plus travel allowance.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS AWARDS:** Awards of \$20, \$15, \$10, and \$5 are given annually for the best papers prepared and delivered in the student branch of the society.
- AMERICAN SOCIETY OF METALS:** Cash awards of \$50, \$25, and \$15 for the best papers prepared by student members of the society.
- ETA KAPPA NU AWARD:** Certificate of merit to the outstanding student in the sophomore electrical engineering class; name engraved on a bronze plaque in Dearborn Hall.
- HAMILTON WATCH COMPANY:** \$100 Hamilton watch for a senior in engineering attaining highest academic accomplishment in humanistic-social science subjects as combined with scholastic accomplishment.
- INSTITUTE OF AERONAUTICAL SCIENCES AWARDS:** Certificate of merit and one-year membership (\$10) in the Institute to the senior or graduate student attaining the best scholastic record and to student presenting best lecture to regular meeting of student branch. Additional award of \$25 from student branch for best lecture.
- PI TAU SIGMA AWARD:** One mechanical engineering handbook presented to the outstanding student in the sophomore mechanical engineering class.
- DELROY F. RYNNING AWARD:** Initiation fee and half-year's junior membership dues to A.I.Ch.E. to a graduating member of the student chapter judged by his classmates to become most valuable member to the society. A memorial to the late Delroy F. Rynning established by his friends and associates.
- SIGMA TAU AWARD:** A medal awarded each year to the sophomore student in engineering who as a freshman was the most outstanding student.
- TAU BETA PI LOCAL AWARDS:** Award of \$5 for the best essay submitted in the student chapter of the society. Certificates of merit are also awarded to freshmen in engineering having the highest scholastic standing during the first two terms of the year.

School of Forestry

- ANNUAL CRUISE CUP:** Revolving cup to staff member of the *Annual Cruise*, School of Forestry yearbook, who is judged to have contributed most to success of the publication.
- SENIOR SCHOLARSHIP PLAQUE:** Presented annually to the graduating forestry senior with the highest scholastic average.
- 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 AWARDS:** Presented by Kelly Axe Company to the senior in forestry who has contributed most to the success of the School of Forestry.
- PACK FORESTRY AWARD:** Income from a gift of \$2,000 made by Mr. Charles Lathrop Pack of New Jersey awarded annually to the student in forestry who produces the most interesting, logical, and technically significant paper for publication.
- XI SIGMA PI PLAQUE:** Awarded each year to the student in forestry who has maintained the highest grade average during the sophomore year.

School of Home Economics

- DANFORTH AWARDS IN HOME ECONOMICS:** All-expense trip for a four-week program in St. Louis and at a Michigan summer camp awarded to an outstanding junior; cost of two weeks' leadership training at a Michigan summer camp awarded to an outstanding freshman; provided by Ralston Purina Company of St. Louis, Missouri.
- ELECTRICAL WOMEN'S ROUND TABLE OF PORTLAND AWARD:** \$100 to a home economics junior. Awarded on the basis of financial need, good scholarship, and interest and aptitude in electrical equipment studies.
- HOME ECONOMICS FRESHMAN AWARD:** An award of \$10 to promote scholarship and leadership in home economics, the recipient being selected by a committee representing Omicron Nu and the faculty in home economics.
- JOHNSON AWARD:** \$40 annually as a memorial to Miss A. Grace Johnson, professor of household administration 1915-1933, for a home economics junior or sophomore whose grade-point average is above student body average.
- LATHROP AWARD:** An annual award of \$50 by the Oregon Home Economics Extension Council to a junior or senior in home economics in memory of K. and Ethel Lathrop.
- LEE AWARD:** \$40 annually as a memorial to Mrs. Minnie E. Lee and Mr. J. B. Lee, awarded each year to a junior in home economics who has shown improvement in her college work, stability and meritorious record in all her activities, and general all-round worthiness.
- OMICRON NU PLAQUE:** Awarded each year to the senior woman who has best lived the teachings of home economics throughout her college career.

School of Pharmacy

- BRISTOL LABORATORIES AWARD:** A personalized copy of the Modern Drug Encyclopedia, awarded annually to a senior who has achieved notably during his academic residence.
- KAPPA PSI AWARD:** An advanced reference in pharmacy or pharmacology given each year to the senior student who, in opinion of his classmates, has most outstandingly displayed qualities of character, leadership, and service.
- LAMBDA KAPPA SIGMA SCHOLARSHIP KEY:** Awarded annually to the senior member of Lambda Kappa Sigma, women's honorary in pharmacy, who has maintained the highest scholastic average.
- MCKESSON AND ROBBINS AWARD:** \$50 awarded annually by the Portland Branch of the company to the senior student scoring highest in a comprehensive examination in pharmacy.
- MERCK AWARDS:** Two sets of reference books awarded annually to senior students having highest scholastic averages in pharmacy and in pharmaceutical chemistry.
- RHO CHI AWARD:** An advanced reference in pharmacy or related field awarded each year to junior student having achieved highest scholastic rating in professional studies.
- WOMEN'S AUXILIARY, OREGON STATE PHARMACEUTICAL ASSOCIATION AWARD:** \$100 annually to a deserving woman student in pharmacy.

Oregon State University Student Affiliates of National Professional Societies

American Association of Health, Physical Education, and Recreation	American Society of Tool and Manufacturing Engineers
American Chemical Society	Associated Western Forestry Clubs (West)
American Foundryman's Society	Institute of the Aeronautical Sciences
American Guild of Organists	Institute of Radio Engineers (OSU branch)
American Institute of Chemical Engineers	Institute of Food Technologists
American Institute of Electrical Engineers	National Education Association
American Institute of Industrial Engineering	Oregon Education Association
American Meteorological Society	Pacific Northwest Personnel Management Association
American Pharmaceutical Association	Semper Fidelis Society (Marines)
American Society of Agricultural Engineers	Society for the Advancement of Management
American Society of Agronomy	Society of American Military Engineers
American Society of Civil Engineers	Society of Automotive Engineers
American Society of Mechanical Engineers	

Honor Societies*

Organization	Men or women	Date established nationally	Date established at Oregon State	Type or field of interest
<i>General Honor Societies</i>				
Alpha Lambda Delta	W	1924	1933	Freshman scholarship
Gamma Theta Upsilon	Both	1928	1956	Geography
Mortar Board	W	1918	1933	Senior leadership
Omicron Nu	W	1912	1919	Home Economics
Phi Eta Sigma	M	1923	1949	Freshman scholarship
Phi Kappa Phi	Both	1897	1924	Scholarship
Sigma Tau	M	1904	1913	Engineering
Sigma Xi	Both	1886	1937	Science Research
Tau Beta Pi	M	1885	1925	Engineering
Xi Sigma Pi	M	1908	1921	Forestry
<i>Departmental Honor Societies</i>				
Beta Alpha Psi	Both	1919	(1923) 1959	Accounting
Eta Kappa Nu	M	1904	1921	Electrical Engineering
Iota Sigma Pi	W	1900	1960	Chemistry
Phi Alpha Theta	Both	1921	1954	History
Kappa Delta Pi	Both	1911	1928	Education
Pi Tau Sigma	M	1916	1941	Mechanical Engineering
Rho Chi	Both	1908	1922	Pharmacy
Sigma Delta Pi	Both	1919	1959	Spanish
Sigma Pi Sigma	Both	1921	1934	Physics
<i>Men's Professional Fraternities</i>				
Alpha Delta Sigma	M	1913	1926	Advertising
Alpha Zeta	M	1897	1918	Agriculture
Kappa Psi	M	1879	1912	Pharmacy
Sigma Delta Chi	M	1909	1920	Journalism
<i>Women's Professional Fraternities</i>				
Lambda Kappa Sigma	W	1913	1930	Pharmacy
Phi Chi Theta	W	1924	1924	Commerce (Secretarial Science)
Theta Sigma Phi	W	1909	1925	Journalism
<i>Recognition Societies</i>				
Alpha Phi Omega	M	1925	1946	Service (Boy Scouts of America)
Arnold Air Society	M	1947	1951	Air Science
Blue Key	M	1924	1934	Service (Seniors)
Delta Sigma Rho	Both	1906	1926	Forensics
Epsilon Pi Tau	M	1927	1929	Industrial Arts
Kappa Kappa Psi	M	1919	1922	Band
Kappa Pi	Both	1911	1949	Art
National Collegiate Players ..	Both	1922	1923	Dramatics
Pershing Rifles	M	1894	1925	Military (Army)
Phi Lambda Upsilon	M	1899	1928	Chemistry
Phi Sigma	Both	1915	1933	Biology
Pi Mu Epsilon	Both	1914	1933	Mathematics
Scabbard and Blade	M	1904	1920	Military
<i>Local Honor Societies</i>				
Euterpe	W	.....	1920	Music
Masque and Dagger	Both	.....	1917	Dramatics
Mu Beta Beta	Both	.....	1928	4-H Club
Orange O	W	.....	1922	Physical Education
Orchesis	W	.....	1930	Dancing
Parthenia	W	.....	1929	Physical Education
Silver Wings	M	.....	1956	Air Science

* As classified by *Baird's Manual*, 1957.

Activities

Oregon State recognizes the value of student activities as part of a University education. Leadership experience through self-governed clubs and societies encourages the formation of habits of civic responsibility. Activities enhance cultural development by fostering participation in the intellectual and esthetic life of the campus. Because of their close relationship to the educational program, many activities are cocurricular rather than extracurricular.

Memorial Union

The Memorial Union, located near the center of campus, is the hub around which student activity revolves. It provides the campus center for democratic fellowship among students, faculty, alumni, and friends of Oregon State. Every day hundreds of students flow through its social rooms, bookstore, and post office. They study, relax, and visit in the comfortable lounges; they hold committee meetings and social hours in the club and game rooms; they pause between classes at the counter or in the booths of the coffee shop, or in the impressive Commons dining hall.

The building contains offices for student organizations and activities. It provides a tearoom and a cafeteria open to the public, a telegraph office, a barber shop, a ballroom, and new bowling lanes. From the roof the carillon bells ring out the changing of classes and the close of the day.

The president of the Memorial Union is a student; other students share actively in its management and in organizing the social program.

The Memorial Union honors the memory of the men and women who gave their lives in the service of their country in the Spanish-American War, World War I, World War II, and the Korean conflict. The building was financed from funds provided by students, alumni, faculty members, and other friends of OSU.

Student Self-Government

The Associated Students of Oregon State University (ASOSU) is the voice of the students organized to participate in campus government. Among its many activities it sponsors and coordinates all campus-wide student programs such as Homecoming, Dads Weekend, Mothers Weekend, Campus Chest Drive, and special emphasis weeks.

Associated Women Students, a group within the general student body organization, coordinates, sponsors, and supervises activities of all women students' organizations.

Class organizations, formed by each entering class, retain their identity throughout the four undergraduate years. Class reunions are held regularly after graduation by alumni. Graduating classes usually leave a gift to the institution. Classes returning after twenty-five years for their silver anniversary jubilee also make gifts as an expression of their loyalty to their alma mater.

Women's Councils which are related to living groups and which play important roles in student self-government include the House Presidents' Council, Panhellenic Council, Interhall Council, and Co-Resident Council.

Men's Councils which are related to living groups and which provide opportunity for campus-wide experience in student leadership include the Interfraternity Council, Interdormitory Council, and Co-op Council.

Other Activities

Art and Music. Exhibits, lectures, concerts, and recitals sponsored by the Art and Music departments, the Associated Students, and student musical and art organizations play a central part in the cultural life of the community. Under the patronage of the Memorial Union Student Committee and the Art Department, exhibitions in the Memorial Union stimulate interest in architecture, painting, sculpture, and related arts. They give the student acquaintance with the best of his historical inheritance and knowledge of contemporary art movements throughout the world. Student and faculty exhibits of art work are shown in the Kidder Hall galleries throughout the year.

Membership in the student musical organizations is open to all students after consultation with the directors concerned.

The Corvallis-OSU Symphony, the Concert Band, the University Chorus, and the Choralaires present several concerts annually on the campus. The Men's Glee Club and the Women's Madrigal Club present seasonal concerts both as separate choruses and as one large choir, the Chorus. The Choralaires, selected from the membership of the Chorus, is the traveling group, making several off-campus appearances annually.

OSU groups are members of the American Symphony Orchestra League and the American Choral Foundation. Students in these activities earn regular credit.

In cooperation with the Corvallis and OSU Music Association, the Educational Activities Board brings 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 Division of Physical Education, Orchesis, and other organizations.

Forensics, Dramatics, and Radio and Television. 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 and the Intercollegiate Forensic Association of Oregon. Special student organizations, such as Masque and Dagger, the Telemike Club, the Campus Puppeteers, and chapters of Delta Sigma Rho and National Collegiate Players, also provide outlets for forensic and dramatic talent.

Training and experience in acting, play production, and stagecraft are provided by the Speech Department. Each season, seven major plays and groups of one-act plays are presented in Mitchell Playhouse in connection with course work. The well-equipped radio and television studios in Shepard Hall afford practical training in the mass media of communication. Radio programs are written and broadcast over local radio stations; television programs are prepared and telecast over a closed-circuit system. The Forensic Division of the Associated Students sponsors a full schedule of forensic activities for both men and women students, including debate, oratory, extempore speaking, after-dinner speaking, and discussion—all under direction of the Speech Department. Each year, thirty to forty students compete in eight state intercollegiate speaking contests and at least a half dozen regional and national forensic tournaments. Many students are also given an opportunity to speak or read before

service clubs, lodges, granges, and other groups. For participation in these activities, a student may earn regular credit.

Lectures. Frequent public lectures by faculty members and visiting scholars and persons prominent in national affairs supplement the regular curriculum. Campus sponsors of lectures include the Committee on Concerts and Lectures, Faculty Men's Club, American Association of University Women, Faculty Women's Club, College Folk Club, Liberal Arts Programs, Committee on Religious Education, Round Table, Associated Students, Associated Women Students, Phi Kappa Phi, Sigma Xi, and others.

Sports and Athletics. In addition to intercollegiate athletics, a comprehensive program of intramural sports is closely correlated with instruction in physical education. Stimulation and recognition of achievement in athletics and sports are provided through the Division of Physical Education, honor societies in physical education, and a variety of sports interest groups.

Student Publications. Student publications include the following: *The Oregon State Daily Barometer* (five days a week); *The Beaver* (yearbook issued in May); *Oregon State Student Handbook* (Book Guide); *The Annual Cruise* (illustrated annual published by Forestry Club); *The Oregon State Student Directory* (published by student journalism and advertising societies).

Eligibility for Participation

To be eligible to hold office or to participate in any extracurricular activity supervised by OSU a student must:

- (1) Have earned at least 12 hours of credit in his most recently completed term.
- (2) Be registered for at least 12 hours currently.
- (3) Not be on probation.
- (4) Obtain a Certificate of Eligibility from the Dean of Men or the Dean of Women.

Parent and Alumni Cooperation

Dads and Mothers Clubs

The Dads Club of Oregon State University, composed of fathers or male guardians of students attending Oregon State, has as its purposes to preserve the traditions and the future usefulness of the institution; to cooperate with the administration of higher education in Oregon; and to cooperate with similar organizations throughout the State. Scholarships are donated annually to worthy students in need of financial aid. An emergency fund of \$1,000 is made available each year to the Deans of Men and Women.

The Mothers Club of Oregon State University is open to all mothers and other women interested in furthering the interest and welfare of students of Oregon State. "Once an Oregon State Mother, always an Oregon State Mother." Individual units of the Mothers Club are organized in many communities of the State. Also, there are clubs of mothers of individual fraternity residence hall, and organized independent groups. Annual meetings of the State organization are held on campus Mothers Weekend. The clubs donate tuition scholarships to deserving and needy students.

Alumni Association

Informed, organized alumni backing of Oregon State projects is provided by the Oregon State University Alumni Association. The Association publishes the *Oregon Stater*, a semimonthly alumni magazine which is distributed to all alumni fund contributors. *News of Oregon State* is mailed four times each year to all alumni with good addresses. Attendance at Oregon State makes one eligible for membership in the Association. All contributions to the Oregon State Fund are considered by the Alumni Board of Directors for allocation to the various categories of need. Contributions to the Fund will accumulate toward a \$100 life membership.

Officers and directors of the association are elected at the annual business meeting which is held in June. Officers are elected annually; directors serve for a three-year period. Officers and directors are:

Executive Committee:

HILBERT S. JOHNSON, '36, Portland—*President*
 FREIDA L. BLAKELY, '37, Portland—*Vice President*
 ED C. LEWIS, '34, Salem—*Vice President*
 ROBERT R. ADAMS, '48, Corvallis—*Treasurer*

M. M. HUGGINS, '38, Medford
 DONALD E. JOHNSON, '36, Corvallis
 RUDY M. KALLANDER, 40, Corvallis

HUB KIRKPATRICK, '34, Portland
 MILTON E. SCHULTZ, '55, Bend
 ROBERT G. SWAN, '50, Portland

Directors:

JOHN ALEXANDER, '49, Enterprise
 HOPE H. BENNETT, '38, Portland
 W. W. BURKHART, JR., '47, Hillsboro
 JACK BYRNE, '33, Eugene
 M. JOE CARTER, '40, Spokane, Washington
 MAE C. COPENHAGEN, '41, Oswego
 THOMAS DELZELL, '23, Portland
 JOSEPH DYER, '23, Astoria
 FRANK HILL, '33, La Canada, California
 ROBERT HOUSE, '41, Stockton, California
 E. J. KEEMA, '33, Sacramento, California
 FLOYD MULLEN, '38, Albany

JOHN MULLIGAN, '51, Pendleton
 LEE NELSON, '41, Coos Bay
 JOE OLIVER, '40, John Day
 ED RIDDERBUSCH, '50, Tillamook
 EARL RILEY, '12, Portland
 ROBERT RUSHING, '36, Oswego
 JERRY SCHAUERMANN, '50, Seattle, Wash-
 ington
 A. H. SMITH, '40, Corvallis
 RUSS STEARNS, '24, Piedmont, California
 ROBERT THOMPSON, '25, Klamath Falls
 CLYDE WILLIAMSON, '08, Albany

School Representatives:

Agriculture: TERRY ELDER, '47, Corvallis
 Business and Technology: DONALD ELDER-
 REDGE, '48, Camas, Washington
 Education: RALPH JONES, '27, Grants Pass
 Engineering: HENRY BURNS, '38, Beaver-
 ton
 Forestry: RUDY KALLANDER, '40, Corvallis

Home Economics: BARBARA B. PECK, '32,
 Portland
 Humanities and Social Sciences: ALICE I.
 WALLACE, '32, Corvallis
 Pharmacy: WILLIAM RAW, '29, Corvallis
 Science: DR. JAMES A. RILEY, '42, Cor-
 vallis

Staff:

C. H. "SCRAM" GRAHAM, '35, Corvallis—
Director of Alumni Relations

TED H. CARLSON, '50, Corvallis—*Assistant
 Director-Editor*

Oregon State University Federation. The Oregon State University Federation, organized in 1951, includes representatives of the Associated Students, the University administration, the Mothers Club, the Dads Club, and the Alumni Association. Its purpose is to coordinate, implement, and encourage activities of the various member groups in behalf of Oregon State and its students. Officers are URSEL H. NARVER, Portland, Chairman; and MRS. JOHN WIEMAN, Portland, Secretary.

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, con-

struct, 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.

Board of Trustees:

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Officers:

CHARLES W. FOX, President; ROBERT M. KERR, Treasurer; and JAMES H. JENSEN, Secretary.

Councilors:

HILBERT JOHNSON, President, Oregon State Alumni Association, Portland
FLOYD MULLEN, President, Oregon State Dads Club, Albany
MRS. JOSEPH K. ROE, President, Oregon State Mothers Club, Corvallis
CRAWFORD H. GRAHAM, Director of Alumni Relations, Corvallis

Summer Session

FRANKLIN ROYALTON ZERAN, Ph.D., Director of the Summer Session.

THE EIGHT-WEEK SUMMER SESSION serves several groups of students; undergraduate and graduate students who wish to shorten time for completing degree requirements, mature students who have the summer free for study and travel, junior-college graduates and transfer students who need to make adjustment in their programs before entering advanced or professional training, recent high school graduates, and others who find the campus of Oregon State University a pleasant and profitable place for summer studies in many fields.

Instead of the eight-week program followed in other schools and departments, the School of Home Economics operates on a six-week basis in the Summer Session. A student may earn up to 9 term hours in this period.

Summer Courses. Courses offered include: basic courses in humanities and social sciences; undergraduate and graduate work in all departments of science, business administration, secretarial science, and business education; six-week undergraduate and graduate courses in home economics; a limited number of agriculture, engineering, and forestry courses; programs in industrial arts education and trade and industrial education; basic and advanced work in guidance, recreational and professional courses in physical education; and workshops and seminars which supplement the regular courses.

Intersession. This session begins on the Monday following the regular eight-week session and continues for four weeks. An individual may earn up to 6 term hours in this period.

Credit and Fees. Students may earn a total of 12 term hours of credit in the eight-week session. An Intersession of four weeks permits a student to take an additional 6 term hours of undergraduate and/or graduate work. For fees and tuition see pages 28-30.

Summer Information. For this year's Summer Session Calendar see pages 4, 5. The Summer Bulletin and other special announcements may be obtained by writing the Director of the Summer Session, Oregon State University.

School of Humanities and Social Sciences

Faculty

as of January 1963.

EDMUND H. VOLKART, Ph.D., Dean of the School of Humanities and Social Sciences.

FRANK LOVERN PARKS, Ph.D., Head Counselor.

Architecture: Professor SINNARD (department head); Associate Professors ELLIS, METZGER, WASSON; Assistant Professors BONSTEEL, GLASS.

Art: Professors GILKEY (department head), SPONENBURGH; Associate Professors FOX, GUNN, JAMESON, SANDGREN, TAYSON, WASSON, WHITE; Assistant Professors S. LEVINE, MUNRO, ROCK, TROJAN.

Economics: Professors FRIDAY (department chairman), DREESEN (emeritus), M. N. NELSON (emeritus); Assistant Professors L. G. HARTER, ORZECZ, PATTERSON, TOWEY, WILKINS; Instructors C. T. HARTER, NORTON.

Geography: Professors JENSEN (chairman), HIGHSMITH, MYATT; Associate Professors HEINTZELMAN, RUDD; Instructors LEVERENZ, SUTTON.

English: Professors H. B. NELSON (department head), CHILDS, COLBY, FOREMAN, GIBSON, JENKINS, ORDEMAN, M. E. SMITH (emeritus); Associate Professors BROWN, GROSHONG, HEWITT, LIGON, MITCHELL, SCHROEDER, E. D. SMITH; Assistant Professors CARLSON, DUBBÉ, FINNIGAN, GARRISON, GILBERT, HAINSLIP, R. E. KING,¹ LAWRENCE, LUDWIG, McCLANAHAN,¹ McELFRESH (emeritus), NORRIS, ONSTAD, STAYER, N. W. WILSON; Instructors BUTTS, CARTER, CROCKER, DIXON, ENGLEMAN, HENLEY, JONES, KRATZ, LEV, P. B. NELSON, PATTY, POTTS, SOMMERS, WEAVER, WHEELER, WILLEY.

History: Professors CARSON (department chairman), ELLISON (emeritus), C. K. SMITH, R. W. SMITH, VAUGHN (emeritus); Associate Professors ADOLPH,¹ BERKELEY, CARLIN, SHAW; Assistant Professors D. B. KING, MEEHAN, McCLINTOCK, PUTNAM; Instructors, HOLSINGER, WAX.

Journalism: Professor SHIDELER (department head); Associate Professors BAILEY, I. C. HARRIS, LAKE, MASON, ZWAHLEN.

Landscape Architecture: Professor MARTEL (department head); Associate Professor SOLBERG (emeritus), FREDEEN; Assistant Professor BLAKELEY.

Modern Languages: Professors KRAFT (department chairman), BOURBOUSSON (emeritus), DAWES (emeritus), GILFILLAN; Associate Professors FILIPS-JUSWIG, JURGENSON, KUNEY (emeritus), LEWIS (emeritus), RICHTER, UHER; Assistant Professors G. A. LEVINE, C. O. SJOGREN; Instructors GOERTZ, HARDING, HARTLE.

Music: Professors WALLS (department chairman), BRYE, SITES;¹ Associate Professors GRAY, MESANG, MOLTSMANN, O'CONNOR, ROBERTS; Assistant Professors MURRAY, O. J. WILSON; Instructor KNAPP.

Philosophy: Professor HOVLAND (department chairman); Assistant Professors ANTON,¹ UNSOELD,¹ YONKER; Instructors DALE, ZEIGLER.

Political Science: Professors WALTER (department chairman), DUBACH (emeritus), MADDOX, SWYGARD; Associate Professors FUQUAY, McCLENAGHAN; Assistant Professor GREEN.

Psychology: Professors CROOKS (department chairman), MILLS; Associate Professors CRAWFORD, ROHDE,¹ SIMPSON, WARNATH; Assistant Professors R. E. ADOLPH, BRODY, DAMM, LEWIS, MADDEN, SIMMONS; Instructors STEWART, TAUBMAN, S. A. WILSON.

Religion: Professor HOVLAND (department chairman); Assistant Professors UNSOELD,¹ YONKER; Instructor ZEIGLER.

Sociology: Professors PLAMBECK (department chairman), BAKKUM (emeritus), PARKS; Associate Professor FETTER; Assistant Professors CANTRELL, CURRY, FOSTER; Instructor GRAVATT.

Speech: Professors YOUNG (department chairman), WELLS (emeritus), CORTRIGHT, LIVINGSTON, WINGER; Associate Professors HARRIS, HILDEBRANDT; Assistant Professors BENNETT, DOLER, GROVER, HENRY, PETERSON, PHILLIPS,¹ WALLACE; Instructors GONZALEZ, NESBIT.

¹ On leave 1962-63.

General Statement

THE DIVISIONAL MAJOR PROGRAMS of the School of Humanities and Social Sciences provide a broad liberal education in accord with a philosophy which encourages breadth rather than specialization at the undergraduate level.

The **Humanities** are those fields of knowledge and experience having to do with the productions of man as a feeling, thinking creator, and communicator of beauty and truth. They include the fields of architecture, art, English, journalism, landscape architecture, modern languages, music, philosophy, religion, and speech.

The **Social Sciences** are those fields of knowledge having especially to do with human institutions, customs, and behavior which define man's social relationships. They include economics, geography, history, political science, psychology, and sociology.

Majors: If a student majors in humanities he must complete two minors, one in social sciences and the other in science or science-technology. If he majors in general social sciences he must complete two minors, one in humanities and the other in science or science and technology. The maximum number of credit hours in any one specific subject matter field which a student may count toward meeting degree requirements is 36.

The School of Humanities and Social Sciences does not offer departmental or specialized majors. A student who wishes a departmental major should enter at the beginning of the freshman year an institution where such majors are offered. A student who, after enrolling in the School of Humanities and Social Sciences, decides that he wishes a specialized major will need to transfer to another institution.

Science and Science-Technology Minors. The student has a wide choice among approved minors in science or in science combined with technological courses. These minors range from 28 to 36 term hours, 33 hours being most frequent. (See list on a following page.) The aim of these minors is not to prepare the specialist but to provide the student with insight and understanding in some area of particular significance in the technological society of which he is a part.

Co-majors in Defense Education. Under the principles establishing Defense Education at Oregon State University it is stipulated that the prescribed four-year program in air science, or military science, or naval science may be taken by men as a co-major in any school (see DEGREES AND CERTIFICATES). The approved co-major in naval science is accepted in the School of Humanities and Social Sciences as satisfying the requirements of a minor in science or science and technology. It is expected that approved co-majors in air science and in military science, when accompanied by prescribed science courses, will be similarly accepted at a later date.

Degree Requirements. In addition to fulfilling institutional requirements (see DEGREES AND CERTIFICATES), the candidate for a baccalaureate degree must complete (1) a minimum of 72 hours of prescribed and elective courses in either humanities or social sciences, 36 of which must be upper division; (2) a minor in the other area (social sciences or humanities), a minimum of 18 approved hours; (3) an approved minor in science or science and technology.

Individual Counseling. Each entering student is assigned to a faculty adviser in his major field who assists him in building a study program in line with his needs and interests and with school and institutional requirements. Special advisers are provided for prelaw students.

Curricula in Humanities and Social Sciences

B.A., B.S. Degrees

General Notes

a. In the School of Humanities and Social Sciences the minimum number of term hours required is 192 with a maximum of 170 in a major curriculum. As many as 36 hours in any social science or humanities subject matter field may be counted toward the bachelor's degree. Students should choose elective courses suited to their interests and vocational and educational goals.

b. In the freshman year, General Hygiene (PE 150, 1 term for men; PE 160, 2 hours for men or women) is taken instead of physical education.

c. Students expecting to meet the foreign language requirement for a B.A. degree in the general social science curriculum should elect a language in the freshman and sophomore years. If two years of a language are elected in these years, completion of minor requirements in humanities may be postponed until the junior and senior years.

d. For a State Teacher's Certificate, 6 hours of psychology should be elected in the sophomore year, as it is prerequisite to prescribed upper division courses in education and psychology. This requirement may be met by Psy 201,202.

e. Students wishing to qualify for a State Teacher's Certificate should elect 14 term hours in prescribed education and psychology courses in the junior year, at least 13 term hours in the senior year. Students must have a GPA of 2.50 in a recognized teaching major (see SCHOOL OF EDUCATION) and must have a teaching minor. Arrangements to do student teaching during the senior year must be made with the director of student teaching during registration for winter term of the junior year.

f. For graduation each student in the school is required to maintain a 2.00 GPA in his major field.

HUMANITIES

Freshman Year

	<i>Hours</i>
English Composition (Wr 111,112,113)	9
Survey of English Lit (Eng 101,102,103) or World Lit (Eng 107,108,109)	9
Journalism, speech, or writing courses	6
Approved speech course	3
History of Western Civilization (Hst 101,102,103)	9
Physical education	3
Electives	6-0
Defense education or other electives	3-9

Sophomore Year

Approved electives in architecture, art, landscape architecture, or music	9-3
Approved philosophy courses	9
First-year foreign language	12
Approved natural science or science-technology courses	9-12
Physical education	3
Electives	3-0
Defense education or other electives	3-9

Junior Year

Approved electives in art, landscape architecture, or music	0-6
¹ Upper division courses in humanities	18
Second-year foreign language	9
Approved natural science or science-technology courses	9-12
Humanities Seminar (Hum 307)	3
Electives	9-0

Senior Year

¹ Upper division courses in humanities	9
Humanities Seminar (Hum 407)	6
Approved natural science or science-technology courses	9-15
Social science electives	9
Electives	15-9

¹ Upper division courses in the major area must include 18 hours of work in one department and 9 hours in one or more other departments.

GENERAL SOCIAL SCIENCE

Freshman Year		<i>Hours</i>
English Composition (Wr 111,112,113)		9
History of Western Civilization (Hst 101,102,103)		9
Approved social science sequence		9
Approved sequence in literature		9
Physical education		3
Electives		6-0
Defense education or other elective		3-9
Sophomore Year		
Approved social science sequence		9
A second approved social science sequence		9
Journalism, speech, or writing courses		6
Approved natural science or science-technology courses		9-12
Physical education		3
Electives		9-0
Defense education or other elective		3-9
Junior Year		
¹ Upper division social science		18
Social Science Seminar (SSc 307)		3
Approved speech course		3
Approved natural science or science-technology courses		9-12
Electives		15-12
Senior Year		
¹ Upper division social science		9
Social Science Seminar (SSc 407)		6
Approved natural science or science-technology courses		9-15
Electives		24-18

Science Minors

Specialized or Departmental

	<i>Hours</i>
BOTANY: Ch 101,102,103 or Ch 201,202,203; Bot 201,202; Bot 203; Bot 331; Bot 341; Bot 351	32
CHEMISTRY: (Mth 100); Ch 101,102,103 or Ch 201,202,203; Ph 211,212; Ch 206; Ch 226,227; Ch 340	33 (37)
<i>Note:</i> Students electing a chemistry minor in lieu of the physical science teaching minor may substitute Ph 201,202,203—12 hours—for Ph 211,212—6 hours—and Ch 221—4 hours—in place of Ch 226,227—10 hours.	
ENTOMOLOGY: Z 201,202,203; Ent 200; Ent 314; Ent 451,452,453; electives (upper division courses in entomology)	34
GEOLOGY: G 201,202,203; G 204,205,206; G 315,316,317; G 330,331,332; G 352	33
ECONOMIC GEOLOGY: G 201,202,203; G 204,205,206; G 315,316,317; G 421,422; G 423; elective (upper division course in geology)	33
MATHEMATICS: Mth 101; Mth 102; Mth 200; (Plus 21 hours of mathematics and/or statistics including at least 9 hours of work at the upper division level. Minor may not include Mth 10.)	33
METEOROLOGY: (Mth 100); Ph 191; Ph 201,202,203; Ph 390; NR 327 or Oc 331; Ph 391,392,393	28 (32)
ZOOLOGY: Z 201,202,203; Z 331,332; Z 341; Z 345; upper division courses in zoology	33

General or Nonspecialized

GENERAL SCIENCE	<i>Hours</i>
<i>Minor A:</i> GS 101,102,103; GS 104,105,106; plus any one of the following options: (1) G 315,316,317; (2) G 330,331,332; (3) G 340,341,342; (4) NR 327,328,329; (5) NR 421,422,423; (6) NR 327 plus 328 or 329, Oc 331; (7) Z 374,375,376; (8) GS 321,322,323, (Mth 100); (9) GS 411,412,413 and Phl 471	33-36
<i>Minor B:</i> (Mth 100); Mth 101; Mth 102; GS 101,102,103; GS 341; GS 342; GS 421,422,423; Z 341; Z 345	32 (36)
<i>Minor C:</i> Ch 101,102,103 or Ch 201,202,203; Z 201,202,203; Z 331,332; Z 341 or Z 345; GS 341; GS 342	33
<i>Minor D:</i> Z 201,202,203; G 340,341,342; G 330, 331,332; Z 345	33

¹Upper division courses in the major area must include 18 hours of work in one department and 9 hours in one or more other departments.

BIOLOGICAL SCIENCE

Minor A: Z 201,202,203; Bot 201,202; Ent 200; electives (upper division work in any or all of the above fields or general science) 33

Minor B: Z 201,202,203; Psy 201,202; Psy 205 or Psy 314; Psy 208,209,210; Z 331, 332; Z 341 and St 311 or St 314,315 33

PHYSICAL SCIENCE: Any combination of the following courses totaling at least 33 hours provided a minimum of 9 hours of work is undertaken in each of two departments and GS 321,322,323 is a part of the program. (Mth 100); Mth 101; Mth 102; Mth 200; Ch 101,102,103 or Ch 201,202,203; Ph 201,202,203 or Ph 211, 212; Ph 204,205,206; Ph 390; G 201,202,203 or G 200; G 204,205,206. Required of students in this minor: GS 321,322,323 33

EARTH SCIENCE: G 201,202,203; G 204,205,206; G 350; G 322; G 352; NR 421,422, 423; Oc 331 34

Agriculture

FOOD PROCESSING AND UTILIZATION: Ch 101,102,103 or Ch 201,202,203; Ch 221; Mb 204; FST 221,222,223; AEc 331; FST 350; FST 417 35

LAND RESOURCES CONSERVATION: Bot 201,202; Bot 203 or Bot 321; Bot 341; F 260; FG 310,311; FC 341; AEc 461; AEc 462; FC 407 34-35

SOIL AND WATER CONSERVATION: Ch 101,102,103 or Ch 201,202,203; G 200; Sls 210; Sls 311; Sls 314; Sls 424; AEc 461; NR 411 34

Forestry

FOREST CONSERVATION AND RECREATION: Bot 201,202; Bot 203; F 153; F 260; F 231; F 365; FG 310,311,312; F 407 33

Home Economics

FOODS AND NUTRITION: Ch 101,102,103 or Ch 201,202,203 or Ch 204,205; Ch 221; Ch 350; Mb 204 or Z 331,332; FN 220,221; FN 225; FN 381 or FN 425 or FN 435. Minimum required in Minor 33

TEXTILES: Ch 101,102,103 or Ch 201,202,203; Ch 221; AA 160; CT 211; CT 235; CT 250; CT 350; CT 450; AnS 481; AnS 483 36

Defense Education Co-Major

NAVAL SCIENCE: Mth 101; Mth 102; Mth 200; Ph 201,202,203; NS 111,112,113; NS 211,212; NS 311,312,313 or NS 321,322,323; NS 411,412,413 or NS 421,422, 423 57

HUMANITIES

Included under this heading for administrative convenience as well as the nature of their subject matter are the courses in humanities and the work offered in the departments of architecture, art, English, journalism, landscape architecture, modern languages, music, philosophy, religion, and speech.

Upper Division Courses

- Hum 307. **Seminar.** Terms and hours to be arranged.
- Hum 311,312,313. **Creative Epochs in Western Thought.** 3 hours each term. 1 ③
 History, philosophy, science, art, and literature defining Western civilization. Creative periods of Western culture; fifth century Greece; imperial Rome, and early Christianity; high middle ages; Renaissance; Reformation; English, American, and French Revolutions; nineteenth and twentieth centuries. Consent of committee required. Prerequisite: year sequence in literature or social science. HOVLAND, D. B. KING, NORRIS.
- Hum 327,328,329. **Survey of Russian Culture.** 3 hours each term. 3 ①
 Achievements of old and new Russia in art, science, music, literature, and education that have contributed significantly to Western civilization. FILIPS.
- Hum 407. **Seminar.** Terms and hours to be arranged.

Architecture

Courses in architecture and allied arts serve the cultural and informational needs of students interested in architecture, interior design, and building construction and may form part of a minor for students majoring in certain other fields. Professional courses permit a student to prepare for a major in architectural design, structural design, or interior design in the upper division at the University of Oregon. The recommendation from the Department of Architecture will satisfy the architectural requirements for students transferring into the upper division School of Architecture and Allied Arts at the University of Oregon.

All student models and drawings remain the property of the department.

Lower Division Courses

- AA 111,112. **Graphics.** 3 hours each term. 3 ②
Light, color, and space in typical architectural forms, media, and methods; manipulation of instruments; freehand perspective, shades, shadows; projection, sectioning. BONSTEEL.
- AA 121. **Construction Materials.** 2 hours. 2 ①
Materials and techniques of constructing buildings and furnishings; framing, fabrication, enveloping, surfacing, and finishing: color, scale, texture—techniques for use. Manufacture, distribution, availability, maintenance, and depreciation. Field trips, demonstrations, illustrated lectures, and laboratory investigation. ELLIS.
- AA 178. **House Planning and Architectural Drawing.** 3 hours any term. 1 ① 2 ③
Domestic architecture. Small-house planning and graphic communication with reference to the needs of students in agriculture, business and technology, education, engineering, forestry, and home economics.
- AA 179,180. **House Planning and Architectural Drawing.** 3 hours each term. 1 ① 2 ③
Small-house construction; detail drawing; development of working drawings begun in AA 178; presentation plans, advanced planning, and design. Prerequisite: AA 178. SINNARD.
- AA 187. **Design Studio.** 2 hours each term, three terms. 2 ②
Human environment and design processes, integration of natural materials with man-made materials in studio exercises, color phenomena and use in architectural design, three-dimensional design applied to structural space, model construction. Six hours required for majors in architecture, interior architecture, and landscape architecture.
- AA 211,212,213. **Graphics.** 2 hours each term. 2 ③
Orthographic projection and descriptive geometry; application to construction of plans and elevations; projections of points, lines, and planes; location of shades and shadows; mechanical and freehand perspective techniques; media and techniques of architectural presentation. BONSTEEL, GLASS.
- AA 218,219,220. **Construction.** 2 hours each term. 2 ①
Materials and methods; individual research and observation; sketching existing examples; discussion. Prerequisite: AA 179. AA 218 not offered 1963-64. SINNARD, ELLIS.
- AA 221. **Construction Theory.** 3 hours. 2 ① 1 ③
Structural materials and systems, historical and modern; simple ideas of force and counter force; trends in structural design in new materials and methods. Not offered 1963-64. ELLIS.
- AA 223. **Elements of Interior Design.** 2 hours. 2 ②
Scope, aim, and technique to give understanding of professional field. All work done in drafting room. Open to nonmajor students with consent of instructor. GLASS, WASSON.
- AA 287. **Architectural Design.** 2 hours each term, three terms. 2 ③
Processes by which architectural structures are conceived and executed; site location, function, organization of space and form, scale, proportion, executed models and drawings. Coordinated with AA 288,289. Six hours required of majors in architecture, interior architecture, and landscape architecture. Prerequisite: AA 187. BONSTEEL, GLASS.

- AA 288. **Interior Design.** 2 hours. 2 ③
Interior spaces and forms; color, materials, fabrics, fixtures, and furnishings and selection and arrangement for functional needs and environment. Coordinated with AA 287, 289. Required of majors in architecture, interior architecture, and landscape architecture. Prerequisite: AA 187. GLASS.
- AA 289. **Landscape Design.** 2 hours. 2 ③
Exterior spaces and landscape developments; site utilization, circulation, orientation, exposure, contours, grading; plant materials, growth, and composition; relation of site exterior to structures. Coordinated with AA 287, 288. Required of majors in architecture, interior architecture, landscape architecture. Prerequisite: AA 187. BLAKELEY, GLASS.
- AA 297. **Lower Division Architectural Design.** 1 to 3 hours each term. 1 ③ to 3 ③
Principles, methods, concepts, and ideas in architectural design and planning. Series of related problems studied and executed in plan, elevation, isometric perspective, and model in two-year sequence. ELLIS, BONSTEEL.

Art

Individual creative work in the basic principles of drawing, painting, sculpturing, and designing in the different media, techniques, and crafts is offered in the Department of Art, together with instruction in art history and art education. Students majoring in other fields may take art as a minor or may study specific art subjects as service courses.

Lower Division Courses

- AA 160,161. **Color and Composition.** 3 hours each term. 1 ① 2 ②
Studio classes in the everyday use of principles of composing or creating with lines, colors, and textures. Required in School of Home Economics.
- AA 201,202,203. **Survey of Visual Arts.** 3 hours each term. 2 ① 1 ①
Architecture, painting, sculpture, and other arts; best of man's creations studied to develop individual taste and increased appreciation.
- AA 250,251. **Recreational Use of Art Crafts.** 3 hours each term. 2 ② 1 ②
Various mediums with particular attention to age levels, hobby interests, cost of equipment and materials. Required for recreation majors and minors and camp education minors; suggested for physical education, elementary education, and education majors.
- AA 255. **Ceramics.** 3 hours each term, three terms. 2 ① 1 ②
Pottery-making materials and techniques. Laboratory hours to be arranged.
- AA 257. **Jewelry and Metalsmithing.** 3 hours each term, three terms. 2 ② 1 ②
Design, tools, and techniques of jewelry introduced through individual student problems in semiprecious materials and nonferrous metals.
- AA 259. **Art Craft.** 3 hours each term, two terms. 2 ② 1 ②
Application of original designs to textile and other materials by block and silk-screen printing and in weaving.
- AA 281,282,283. **Industrial Arts Drawing and Design.** 3 hours each term. 2 ② 1 ②
Freelhand drawing with experience in the design of industrial arts objects; workshop techniques in art crafts. AA 281,282,283 required for all industrial arts education majors.
- AA 290. **Painting.** 3 hours any term, six terms. 2 ③ 1 ③
Oil and mixed painting techniques; creative expression; special interests in painting. Twelve hours required of students who expect to major in drawing and painting at the University of Oregon.
- AA 291. **Drawing.** 3 hours each term, three terms. 2 ② 1 ②
Primary means of art expression and communication; composition and techniques of fine draftsmanship; specialized classes in fashion illustrating, sketching, and figure sketching. Three terms required of students who expect to major in the School of Architecture and Allied Arts at the University of Oregon.

- AA 292. **Water Color.** 3 hours each term, three terms. 2 ② 1 ②
Basic creative composing with colors, lines, and textures in casein and water colors. Abstract composition leading into representational problems to develop creativeness.
- AA 293. **Sculpture.** 3 hours each term, three terms. 2 ② 1 ②
Creative clay and plaster modeling and stone and wood carving; technical methods developed in conjunction with expressive design.
- AA 294. **Scientific Illustration.** 3 hours each term, two terms. 2 ② 1 ②
Freehand technical drawing adapted to needs of students in science and forestry.
- AA 295. **Basic Design.** 2 hours each term, three terms. 2 ②
Individual projects leading to creative mastery of basic design in major visual arts and understanding of design factors involved in professional art. The work is correlated with that of AA 201,202,203.
- AA 296. **Advertising Design.** 3 hours each term, three terms. 2 ② 1 ②
Practical design experience in commercial art lettering, layouts, packaging, and display advertising. Offered for pharmacy, agriculture, and business and technology students.

Upper Division Courses

- AA 311,312,313. **Art in the Elementary Schools.** 3 hours each term. 1 ① 2 ②
Studio projects, discussions, and observations to give practical approach to arts and crafts instruction at preschool and elementary school levels.
- AA 363,364,365. **History of Art.** 3 hours each term. 3 ①
Visual arts from prehistoric to modern times; painting, sculpture, architecture, and other arts in relation to cultures producing them. Prerequisite: junior standing.
- AA 380. **Printmaking.** 3 hours each term, three terms. 2 ② 1 ②
Basic techniques of intaglio, relief, and lithography; development of craftsmanship and creative possibilities of the media. Prerequisite: junior standing.
- AA 395. **Creative Art Projects.** 2 hours each term, six terms. 2 ②
Advanced studio work on approved projects in drawing, painting, sculpture, and graphic arts. Upper division standing, one year lower division work in the selected medium, and approval of instructor required.
- AA 414. **Art in the Secondary School.** 3 hours. 1 ① 2 ②
Art Education: current thinking and practice regarding the processes of learning through art. Examination of the creative process through laboratory work and individual research. Prerequisite: a program of studies leading to a minor in art.
- AA 415. **Art in the Secondary School.** 3 hours. 1 ① 2 ②
Art Education on the Junior High School level; role of art experiences in early adolescence examined through laboratory work, reading, and classroom observation. Prerequisite: AA 414 or AA 313.
- AA 429. **Art Problems in Elementary Schools.** (g) 3 hours. 1 ① 2 ②
Research and literature in early childhood art education. Laboratory work and research coordinated with observation of children working with art materials. Investigation of problems related to classroom procedure. Prerequisite: AA 313.
- AA 480. **Advanced Printmaking.** 3 hours each term, three terms. 2 ② 1 ②
Workshop instruction in making and printing engravings, etchings, lithographs, linoleum cuts, and wood cuts. Prerequisite: upper division standing.
- AA 490. **Advanced Painting.** 3 hours each term, three terms. 2 ③ 1 ③
Application of techniques used in contemporary painting with emphasis upon student's personal development. Prerequisite: AA 290.
- AA 494. **Advanced Sculpture.** 3 hours each term, three terms. 2 ② 1 ②
Mature use of sculptor's materials and media; exploration of sculptor's potentialities. Prerequisite: AA 293.

English

The Department of English offers instruction in literature and in writing. The courses are intended to supply the training in reading and writing necessary to every educated man, to afford a cultural background or a minor for students in professional schools, and to prepare liberal arts students to major in English at the upper division level.

Literature. The study of English literature may begin with a historical presentation of the tradition of English literature or with an examination of the motives and ideas of literature. Other courses present a more detailed study of periods or centuries of literary movements; a careful analysis of the chief literary forms such as the novel, drama, poetry, and short story; or a more intensive study of the major authors. Sequences in literature, although preferably taken three terms in order as numbered, may be taken any one term separately or in any order.

Writing. The study and practice of writing aim to teach students to express their ideas clearly, simply, and accurately. An examination in English is required of all entering freshmen and all transfer students who have not completed three or more term hours of college English composition. Exceptional students are placed in honors sections.

Courses in Literature

Lower Division Courses

- Eng 101,102,103. **Survey of English Literature.** 3 hours each term. 3 ①
Chronological sequence. Recommended for a major or minor in English. GIBSON, HEWITT, NELSON, ORDEMAN.
- Eng 104,105,106. **Appreciation of Literature.** 3 hours each term. 3 ①
Emphasis throughout on ideas and motives.
- Eng 107,108,109. **World Literature.** 3 hours each term. 3 ①
Masterpieces of the ancient, medieval, Renaissance, and post-Renaissance world. COLBY, BROWN.
- Eng 131. **Directed Recreational Reading.** 2 hours spring. 2 ①
Reading and discussion to stimulate enjoyment of good literature. For students who normally do not take other literature courses.
- Eng 201,202,203. **Shakespeare.** 3 hours each term. 3 ①
The major plays. Recommended for a major or minor in English. FOREMAN.
- Eng 253,254,255. **Survey of American Literature.** 3 hours each term. 3 ①
American literature from its beginning to present day. Recommended for a major or minor. CHILDS, JENKINS, NELSON.
- Eng 263. **Great Books.** 3 hours spring. 3 ①
Great books of the world and their influence. BROWN.
- Eng 275. **The Bible as Literature.** 3 hours fall. 3 ①
Structure, literary types, ideas of the Bible; its influence on our literature. GIBSON.

Upper Division Courses

- Eng 354,355,356. **Continental European Literature.** 3 hours each term. 3 ①
Those writers, chiefly modern, whose works in translation have become part of our literary heritage and an aid in understanding the world today. Eng 354: Romance; Eng 355: Germanic; Eng 356: Slavic. COLBY.

- Eng 374. **The Short Story.** 3 hours. 3 ①
Reading and analysis of masterpieces of the short story. JENKINS.
- Eng 394,395,396. **Twentieth-Century Literature.** 3 hours each term. 3 ①
Twentieth-century American and British fiction, drama, and poetry. CHILDS.
- Eng 414,415,416. **Literary Criticism.** (g) 3 hours each term. 3 ①
Theory and practice of chief literary critics from Plato to the present. Prerequisite: 18 hours of literature. SCHROEDER.
- Eng 417,418,419. **The English Novel.** (g) 3 hours each term. 3 ①
Selected English novels of eighteenth and nineteenth centuries. Eng 417: Richardson through Austen. Eng 418: Scott through Trollope. Eng 419: Bronte to present. Prerequisite: 9 hours of literature. GROSHONG.
- Eng 454,455. **Individual Authors.** 3 hours winter and spring. 3 ①
Major English authors as listed in the *Schedule of Classes*. GIBSON.
- Eng 488. **Literature for Teachers.** (g) 3 hours winter. 3 ①
For students who plan to teach English. Critical reading and analysis of literature selected primarily from State-adopted texts. NORRIS.
- Eng 490. **Development of the English Language.** (g) 3 hours. 3 ①
CHILDS.
- Eng 495,496,497. **The Democratic Tradition in Literature.** (g) 3 hours each term. 3 ①
The ideas of democracy as reflected in English and American literature. Prerequisite: 9 hours of literature. CHILDS.

Graduate Service Courses

Courses numbered 400-499 and designated (g) may be taken toward a graduate minor.

Auxiliary Courses

Lower Division Courses

- Eng 91,92,93. **English for Foreign Students.** 3 hours each term. 3 ①
Vocabulary building, reading, writing, speaking, and comprehension of spoken discourse adapted to needs of individual. BUTTS.
- Eng 115. **Effective Reading.** 3 hours any term. 3 ①
To develop better comprehension and greater speed in reading. Not offered 1963-64.
- Eng 211. **Vocabulary Building.** 3 hours any term. 3 ①
GIBSON, LAWRENCE, WILSON.

Courses in Writing

Lower Division Courses

- Wr 49. **Corrective English.** No credit. 3 ①
Refresher course in English fundamentals. Not offered 1963-64.
- Wr 111,112,113. **English Composition.** 3 hours each term. 3 ①
Frequent written compositions with emphasis on clarity and accuracy. Courses must be taken in sequence. Prerequisite: English placement examination. Students who pass placement test with distinction should enroll in honors sections in Wr 111,112,113.
- Wr 214. **Business English.** 3 hours any term. 3 ①
Common types of business letters. Prerequisite: Wr 113. HEWITT, LIGON.
- Wr 218. **Creative Writing.** 3 hours. 3 ①
For students in professional schools who desire training and practice in such writing as may be called for in their vocational or cultural pursuits. Prerequisite: Wr 113. NORRIS.

Wr 227. **Technical Report Writing.** 3 hours any term. 3 ①
Writing effective reports for business and industry. Prerequisite: Wr 113. DUBBÉ, GROSHONG, LIGON, P. NELSON, SMITH.

Wr 230. **Effective Writing.** 3 hours. 3 ①
Practice to develop exactness and facility of expression; course varied to suit individuals. Prerequisite: Wr 113. GROSHONG.

Upper Division Courses

Wr 316,317. **Advanced Expository Writing.** 3 hours each term. 3 ①
Practice in various forms. Prerequisite: Wr 113. SMITH.

Wr 324,325,326. **Short Story Writing.** 3 hours each term. 3 ①
Proficiency in art of writing short story. Courses may be taken separately. Prerequisite: Wr 113. NORRIS.

Wr 411. **English Composition for Teachers.** (g) 3 hours. 3 ①
For students expecting to teach English. FOREMAN.

Courses in Library

Upper Division Courses

Lib 379. **Elementary School Library.** 3 hours. 3 ①
Organization, administration, and function; ordering and processing materials; care and repair of books; library resources in community, state. Not open to freshmen and sophomores. Prerequisite: Lib 388. CARTER.

Lib 380. **Secondary School Library.** 3 hours. 3 ①
Planning, organizing, and administering a public school library. Relation of library to curriculum; acquisition, processing, care, and use of library materials; routines; records. Not open to freshmen and sophomores. Prerequisite: Lib 388. CARTER.

Lib 385. **Literature for High School Libraries.** 3 hours. 3 ①
Books and periodicals for public school students, including reading for information and recreation; approved lists; individual books considered. Prerequisite: Lib 388. CARTER.

Lib 388. **Children's Literature.** 3 hours. 3 ①
Reading material suitable for elementary grades and criteria used in selecting books for children. CARTER, HENLEY.

Journalism

Elementary courses in journalism, besides furnishing a certain background in newspaper methods, introduce students to the fundamentals of newswriting. These courses also enable students to get additional benefit from work on the *Barometer*, student newspaper, and serve to some extent as training in this work in an endeavor to keep student publications on a high plane. The Department of Journalism also gives instruction that is designed to train students in professional schools to write competently for newspapers and magazines on the subjects or in the fields in which they are specializing. These courses meet the needs of a large number of persons who, either in public service or in private life, have occasion to prepare material for the press on industrial or technical subjects. Training is also offered in the popularization of scientific material for the press.

Students intending to major in journalism at another college or university may take two years of college work at Oregon State. At the University of Oregon, only upper division and graduate students are admitted to the School of Journalism. Prejournalism students should consult the catalog of the institution to which they intend to transfer to determine the required and recommended courses. They should learn to type well and should engage in extracurricular activities in journalism.

Students desiring to prepare for positions in the field of agricultural journalism may major in general agriculture with a minor in journalism. Students in home economics may take a minor in journalism. A teaching minor in journalism is offered for students in the School of Education.

Lower Division Courses

- J 111,112. **Journalism.** 3 hours each term. 3 ①
Journalistic style of writing; workings of the press, both general and technical. J 111 is required for eligibility to serve on editorial staffs of student publications. J 111 offered each term; J 112, spring term. Must be taken in sequence. HARRIS, LAKE, ZWAHLEN.
- J 121. **Journalism Laboratory.** 1 hour any term.
Given only in coordination with J 111 sections offering news beat experience.
- 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 111.
- J 223. **Editorial Writing.** 3 hours fall. 3 ①
Materials, style, and arrangement of periodicals; writing editorials; policy and ethics; makeup of editorial page of farm and trade journals. Prerequisite: J 111. HARRIS.

Upper Division Courses

- J 317. **Special Feature Articles.** 3 hours winter. 3 ①
Writing of special articles along line of student's own major; study of media of such articles; practice in popularization of scientific material. Prerequisite: J 111. ZWAHLEN.
- J 318. **Public Information Methods.** 3 hours fall or winter. 3 ①
Planning and executing informational campaigns; methods of informing public of public affairs and other enterprises in which one is interested. Prerequisite: J 111. BAILEY
- J 319. **Technical Writing.** 3 hours spring. 3 ①
Editing popular and scientific bulletins; preparing reports and writing articles for scientific publications; preparing radio manuscripts. Prerequisite: J 111. BAILEY.
- J 334. **Photo-Journalism.** 3 hours spring. 1 ① 2 ②
Planning, taking, and processing pictures for newspapers, magazines, and television. Prerequisite: J 111. ZWAHLEN.
- J 351,352,353. **Journalism Projects.** 2 hours each term. 1 ① 1 ②
Newswriting, copyediting, feature-writing, and technical-writing principles; experience on student publications; articles for trade and technical publications or material for general publications. Consent of instructor required. Prerequisite: J 111,214. SHIDELER

Landscape Architecture

Instruction includes landscape design theory and practice in solving the landscape problems of people under various social, economic, and environmental influences. Supervised field trips acquaint students with solutions to landscape design and construction problems. All student drawings and models remain the property of the department.

A four-year curriculum in landscape construction and maintenance is offered in the Department of Horticulture leading to the degree of Bachelor of Science. A student may complete a lower division curriculum in landscape architecture at Oregon State University and transfer to the University of Oregon for the last three years of professional work.

Lower Division Courses

- LA 279. **Home Ground Planning.** 3 hours winter. 1 ① 2 ②
Organization and improvement of rural and urban home grounds.
- LA 280. **Landscape Design Theory.** 3 hours fall and spring. 2 ②
Functional and aesthetic aspects of landscape planning in the creation and preservation of human environment.
- AA 289. **Landscape Design.** 2 hours. 2 ③
(See ARCHITECTURE courses.)
- LA 290. **Applied Landscape Design.** 3 hours each term, three terms. 3 ③
Design of city and suburban residence properties and other related problems. Prerequisite: LA 280.

Upper Division Courses

- LA 326,327,328. **Plant Materials.** 3 hours each term. 1 ① 2 ②
Trees, shrubs, vines, and perennials and their uses in plant composition.
- LA 356,357,358. **History and Literature of Landscape Architecture.** 2 hours each term. 2 ①
Gardens as an outgrowth of living conditions from early Egyptian to modern American times.
- LA 359,360,361. **Maintenance and Construction.** 3 hours each term. 3 ③
Maintenance of private and public landscape; landscape construction problems. Prerequisite: LA 280.
- LA 382,383,384. **Layout of Small Properties.** 2 hours each term. 2 ③
City lot, small suburban properties, and other areas; sketch plans, finished renderings, and contour problems. Prerequisite: LA 280, 290.
- LA 390. **Landscape Design Problems.** 3 hours each term, three terms. 3 ③
Analysis and problem solving. Prerequisite: LA 280,290.
- LA 392,393,394. **Planting Plans.** 2 hours each term. 1 ① 1 ③
Planting plans; estimates of costs; construction and seasonal care of planting areas. Prerequisite: LA 290,326,327,328.

Modern Languages

The Department of Modern Languages offers instruction in Chinese, French, German, Portuguese, Russian, and Spanish. Courses are planned to meet the demand for practical use of languages as well as cultural needs of all students, to provide foreign-language requirements needed in connection with various professions, and to prepare students to concentrate in one of these languages at the upper division level. Teaching minors in French, German, Russian, and Spanish are offered for students in the School of Education. The Department of Modern Languages will endorse candidates for elementary and secondary teacher certification who meet the required teaching norms with a minimum of 30 term hours of instruction in a given language beyond the first-year course.

Students who enter with one unit of high school French, German, Spanish, or Russian, and wish to continue the study of the language should register for the first-year course. Those entering with two units should register for the second-year college course; those with three or more units should register for a course in the literature of the language or in scientific or directed reading. Students having other preparation and those entering from colleges offering more or fewer hours per week in a course should confer with the instructor.

Courses in German

Lower Division Courses

- GL 50,51,52. **First-Year German.** 4 hours each term. 4 ①
Pronunciation, grammar, reading, and conversation. Engineering students and others may, with consent of instructor, enroll for 3 hours each term. KRAFT, UHER, SJOGREN, GOERTZ.
- GL 101,102,103. **Second-Year German.** 3 hours each term. 3 ①
Grammar review, composition, and reading of modern German authors. Oral use of the language. Prerequisite: GL 50,51,52. KRAFT, UHER, SJOGREN, GOERTZ.
- GL 111,112,113. **German Conversation.** 2 hours each term. 2 ①
Intensive course at second-year level. Taken independently of or concurrently with GL 101,102,103. Prerequisite: GL 50,51,52. KRAFT, UHER, SJOGREN, GOERTZ.
- GL 211,212,213. **Directed Reading in German.** 1 or 2 hours each term. 1 or 2 ①
Reading in field of student's major interest. Students who register for one hour may register for an additional hour in a subsequent year. Prerequisite: two years of college German or equivalent. KRAFT, SJOGREN, GOERTZ.

Upper Division Courses

(Courses 300-399 are open to lower division students.)

- GL 320,321,322. **Scientific German.** 1, 2, or 3 hours each term. 1, 2, or 3 ①
Recommended to students interested in science or medicine. Articles in science, surgery, history of medicine, and current clinical literature are read. A maximum of 3 term hours may be taken under each course number. Consent of instructor required. KRAFT.
- GL 343,344,345. **Survey of German Literature.** 3 hours each term. 3 ①
Masterpieces of various periods through the nineteenth century. Prerequisite: GL 101, 102,103, or equivalent. KRAFT.
- GL 421,422,423. **German Literature of the Twentieth Century.** 3 hours each term. 3 ①
Representative prose, poetry, and drama of contemporary German writers and those of the recent past; dominant literary currents in German letters since 1900. Prerequisite: GL 101,102,103, or equivalent. SJOGREN.

Courses in Oriental Languages: Chinese

Lower Division Courses

- OL 50,51,52. **First-Year Chinese.** 4 hours each term. 4 ①
Essentials of colloquial Mandarin with emphasis on conversation and easy reading. Consent of instructor required. YANG.

Courses in Romance Languages: French

Lower Division Courses

- RL 50,51,52. **First-Year French.** 4 hours each term. 4 ①
Pronunciation, grammar, reading, and conversation. Engineering students and others may, with consent of instructor, enroll for 3 hours each term. RICHTER, UHER, HARTLE.
- RL 101,102,103. **Second-Year French.** 3 hours each term. 3 ①
Grammar review, composition, and reading of modern French authors; oral use of the language. Prerequisite: RL 50,51,52. RICHTER, UHER, HARTLE.
- RL 114,115,116. **French Conversation.** 2 hours each term. 2 ①
Intensive course at the second-year level. Taken independently of or concurrently with RL 101,102,103. Prerequisite: RL 50,51,52. RICHTER, UHER, HARTLE, SOLINIS.
- RL 211,212,213. **Directed Reading in French.** 1 or 2 hours each term. 1 or 2 ①
Reading in field of student's major interest. Students who register for 1 hour any term may register for an additional hour in a subsequent year. Consent of instructor required. RICHTER, HARTLE.

Upper Division Courses

- RL 311,312,313. **Survey of French Literature.** 3 hours each term. 3 ①
Masterpieces of various periods through the nineteenth century. Prerequisite: two years of college French or equivalent. RICHTER.
- RL 423,424,425. **Twentieth-Century French Literature.** 3 hours each term. 3 ①
Representative prose, poetry, and drama of contemporary French writers and those of the recent past; dominant literary currents in French letters since 1900. Prerequisite: RL 311,312,313, or equivalent. HARTLE.

Courses in Romance Languages: Portuguese**Lower Division Courses**

- RL 80,81,82. **First-Year Portuguese: Brazilian.** 4 hours each term. 4 ①
Pronunciation, grammar, reading, and conversation. Engineering students and others may, with consent of instructor, enroll for 3 hours each term. 1 or 2 ①
- RL 217,218,219. **Directed Reading in Portuguese.** 1 to 2 hours each term.
To help students maintain facility in the language. Consent of instructor required.

Courses in Romance Languages: Spanish**Lower Division Courses**

- RL 60,61,62. **First-Year Spanish.** 4 hours each term. 4 ①
Pronunciation, grammar, reading, and conversation. Engineering students and others may, with consent of instructor, enroll for 3 hours each term. LEVINE, GOERTZ, SOLINIS.
- RL 107,108,109. **Second-Year Spanish.** 3 hours each term. 3 ①
Grammar review, composition, and reading of modern Spanish authors. Oral use of the language. Prerequisite: RL 60,61,62. RICHTER, LEVINE, GOERTZ.
- RL 117,118,119. **Spanish Conversation.** 2 hours each term. 2 ①
Intensive course at the second-year level. Taken independently of or concurrently with RL 107,108,109. Prerequisite: RL 60,61,62. RICHTER, LEVINE, GOERTZ. 1 or 2 ①
- RL 214,215,216. **Directed Reading in Spanish.** 1 or 2 hours each term.
Reading in field of student's major interest. Students who register for 1 hour any term may register for an additional hour in a subsequent year. Consent of instructor required. LEVINE, GOERTZ.

Upper Division Courses

- RL 341,342,343. **Survey of Spanish Literature.** 3 hours each term. 3 ①
Reading of masterpieces of various periods. Prerequisite: two years of college Spanish or equivalent. GOERTZ.
- RL 444,445,446. **Spanish-American Literature.** 3 hours each term. 3 ①
Reading of masterpieces of the several national literatures of Hispanic America; general survey and analysis of literary movements. Prerequisite: RL 107,108,109, or equivalent. LEVINE.

Courses in Slavic Languages: Russian**Lower Division Courses**

- SL 50,51,52. **First-Year Russian.** 4 hours each term. 5 ①
Pronunciation, grammar, reading, and conversation. JURGENSON.
- SL 101,102,103. **Second-Year Russian.** 3 hours each term. 3 ①
Grammar review, composition, and reading of modern Russian authors; oral use of the language. Prerequisite: SL 50,51,52. FILIPS-JUSWIGG, JURGENSON.

- SL 111,112,113. **Russian Conversation.** 2 hours each term. 2 ①
Intensive course at the second-year level. Taken independently of or concurrently with SL 101,102,103. Prerequisite: SL 50,51,52. FILIPS-JUSWIGG, JURGENSON.
- SL 211,212,213. **Directed Reading in Russian.** 1 or 2 hours each term. 1 or 2 ①
Reading in field of student's major interest. Students who register for 1 hour in any term may register for an additional hour in a subsequent year. Consent of instructor required. Prerequisite: two years of college Russian or equivalent. FILIPS-JUSWIGG, JURGENSON.
- Hum 327,328,329. **Survey of Russian Culture.** 3 hours each term. 3 ①
See page 59 for course description.

Upper Division Courses

- SL 311,312,313. **Readings in Russian Literature.** 3 hours each term. 3 ①
Masterpieces of various periods, particularly the nineteenth and twentieth centuries. Prerequisite: SL 101,102,103. FILIPS, JURGENSON.
- SL 320,321,322. **Scientific Russian.** 1, 2, or 3 hours each term. 1, 2, or 3 ①
Provides opportunity to study beyond second year and to read in various fields of science. JURGENSON.

Music

Musical activities at Oregon State University are an essential part of campus life. The variety in the offerings of the Department of Music enables students interested in furthering their music education to find some activity to suit their individual needs and abilities. They may participate in music solely for its cultural and avocational benefits or, by following a planned course of study, they may prepare for majoring in music at the University of Oregon.

Musical Organizations. The Bands, Orchestra, University Chorus, and Chorales are open to all students after consultation with the directors. Each group appears frequently in public concerts.

Applied Music. Private lessons in voice, piano, organ, and instruments of the band and orchestra carry one hour of credit for one lesson per week and two credits for two lessons per week. Class lessons in voice are also offered. See following schedule of fees.

Music Minors. A minor in music is available to students majoring in secondary education. See SCHOOL OF EDUCATION.

Scholarships. Certain scholarships in applied music are available to all interested students. See section on SCHOLARSHIPS.

Regulations and Fees. Students are expected to consult the departmental office regarding regulations governing registration, attendance, public performance of music students, etc. All fees for private music lessons must be paid in advance at the Business Office. No deduction is made for lessons missed by the student nor will such lessons be made up except in the case of serious illness. All students are expected to do their practicing in the practice rooms provided unless other arrangements are made specifically with the departmental office. The schedule of music fees is as follows:

APPLIED MUSIC (private lessons):	Per term
Piano, Voice, Stringed Instruments, Organ	
One lesson a week, one-half hour (1 term hour credit)	\$30.00
Two lessons a week, one-half hour each (2 term hours' credit).....	\$50.00
Wind Instruments	
One lesson a week, one-half hour (1 term hour credit).....	\$20.00
Two lessons a week, one-half hour each (2 term hours' credit).....	\$40.00
CLASS LESSONS (one lesson a week—50 minutes):	
Voice, piano, stringed instruments	\$15.00
Wind instruments and percussion	\$10.00
PRACTICE ROOM RENTAL—with piano:	
One-half hour a day, per term	\$ 2.50
One hour a day, per term	\$ 4.00
Two hours a day, per term	\$ 7.00
Three hours a day, per term	\$10.00
PRACTICE ROOM RENTAL—without piano:	
One hour a day, per term	No charge
ORGAN RENTAL:	
One hour a day, per term (Hammond spinet)	\$ 7.50
One hour a day, per term (Connsonata)	\$10.00

Lower Division Courses

- Mus 111. **Rudiments of Music.** 4 hours fall. 5 ①
Music fundamentals, scales, key relationships, intervals, triads, with emphasis on ear training.
- Mus 112,113. **Music Theory I.** 4 hours each term. 5 ①
Harmonization of various triad and seventh chords in all positions, nonchord tones, free harmonization, and simple modulation; keyboard work, chord recognition, sight-singing, and analysis correlated with written work.
- Mus 181. **Class Lessons in Voice.** 1 hour each term, three terms. 1 ①
Elementary instruction for beginners. Special fee.
- Mus 182. **Class Lessons in Piano.** 1 hour each term, three terms. 1 ①
Elementary instruction for beginners. Special fee.
- Mus 183. **Class Lessons in Strings.** 1 hour each term, three terms. 1 ①
Elementary instruction for beginners. Special fee.
- Mus 184. **Class Lessons in Wind Instruments.** 1 hour each term, three terms. 1 ①
Elementary instruction for beginners. Special fee.
- Mus 185. **Class Lessons in Percussion.** 1 hour each term, three terms. 1 ①
Elementary instruction for beginners. Special fee.
- Mus 190. **Applied Music.** 1 or 2 hours any term.
Freshman year: Individual instruction in piano, organ, voice, and instruments of band and orchestra. Term hours on basis of number of lessons per week (one or two half-hour periods). Attendance at class sessions and recitals required. Special fee.
- Mus 195. **Band.** 1 hour each term. 3 ①
Division I band: concert organization of men and women who have obtained membership by tryout. *Division II band:* those who need more experience and training to meet standards of concert band. The marching band which plays at football games, parades, etc., is composed of all men in the Division I and II bands. Membership of all three groups is interchangeable at discretion of conductor.
- Mus 196. **Orchestra.** 1 hour each term. 1 ② 1 ①
Symphonic group including all instruments common to such an organization. Membership is open to all string players and those wind and percussion players who, in opinion of conductor, can meet the special requirements of the orchestra.
- Mus 197. **Chorus.** 1 hour each term. 3 ①
Open to all students subject to tryout. *University Chorus:* meets twice a week in sections, once a week combined; several campus concerts annually. *Choralaires:* concert choir of fifty to sixty voices; concerts on and off campus.

- Mus 211,212,213. **Music Theory II.** 3 hours each term. 3 ①
Continuation of Mus 113 involving use of secondary and altered chords in harmonization and analysis of master works; modulation and keyboard harmony further developed.
- Mus 221. **Introduction to Music Literature.** 3 hours. 3 ①
A beginner's course in listening to music.
- Mus 241. **Recreational Use of Music.** 3 hours. 3 ①
Use of musical activities in organized community recreational program. Primarily for students majoring in recreation.
- Mus 290. **Applied Music.** 1 or 2 hours each term. 3 ①
Sophomore year. Prerequisite: 3 hours of Mus 190 (or 181-185) or qualifying examination.
- Mus 311,312,313. **Counterpoint.** 2 hours each term. 2 ①
Study, through analysis and writing, of basic contrapuntal principles from the sixteenth century through the Baroque period, to current twentieth century techniques. One term devoted to each of the three styles. Prerequisite: Mus 213 or equivalent.
- Mus 323. **Conducting.** 2 hours. 2 ①
Basic baton techniques in simple meters.
- Mus 324,325. **Choral Conducting.** 2 hours each term. 2 ①
Baton techniques in compound meters, score reading, principles of developing choral excellence. Practical experience conducting campus organizations. Prerequisite: Mus 323.
- Mus 326,327. **Instrumental Conducting.** 2 hours each term. 2 ①
Baton techniques in compound meters, instrumental score reading, principles of developing band and orchestra excellence. Practical experience conducting campus organizations. Prerequisite: Mus 323.
- Mus 335. **Instrumental Music in the High School.** 3 hours. 3 ①
Planning and administration of the instrumental program in the high school.
- Mus 350. **Vocal Music in the High School.** 3 hours. 3 ①
Planning and administration of the vocal program in the high school.
- Mus 354,355. **Band Arranging.** 2 hours each term. 2 ①
Scoring and arranging for full concert and military band as well as for smaller combinations of instruments.
- Mus 360,361. **History of Music.** 3 hours each term. 3 ①
Development of music in relation to social, economic, and political influences from primitive times to the present. Must be taken in sequence. Prerequisite: Mus 221.
- Mus 371. **Music for Elementary Teachers.** 3 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.
- Mus 373. **Music for Elementary Teachers.** 3 hours. 5 ①
Experiences in teaching the various music activities found in the elementary school. Prerequisite: Mus 371.
- Mus 390. **Applied Music.** 1 or 2 hours any term. 3 ①
Junior year. Prerequisite: 3 hours of Mus 290 or qualifying examination.
- Mus 395. **Band.** 1 hour each term. 3 ①
Prerequisite: six terms of Mus 195 and 295.
- Mus 396. **Orchestra.** 1 hour each term. 1 ② 1 ①
Prerequisite: six terms of Mus 196 and 296.
- Mus 397. **Chorus.** 1 hour each term. 3 ①
Prerequisite: six terms of Mus 197 and 297

- Mus 411. **Vocal Music Literature.** (g) 2 hours. 2 ①
From the early Italian art song to the present. Prerequisite: Mus 390 (voice).
- Mus 437,438,439. **Composition and Arranging.** (g) 2 hours each term. 2 ①
Principles and their application to the smaller forms. Written work with emphasis on analysis of representative forms and styles of the nineteenth and twentieth centuries. Prerequisite: Mus 313 or equivalent.
- Mus 441,442,443. **Advanced Conducting.** (g) 3 hours each term. 3 ①
Advanced techniques of conducting—both choral and instrumental. Baton technique, interpretation, study of major scores. Prerequisite: Mus 325 or 327.
- Mus 444. **Choral Literature for Public Schools.** (g) 2 hours. 2 ①
Repertory of choral groups in secondary schools; literature for girls' and boys' glee clubs, and the mixed choir. Analysis and performance in class. Program planning. Prerequisite: Mus 325 or equivalent.
- Mus 445. **String Literature for Public Schools.** (g) 2 hours. 2 ①
Repertory of orchestra and string groups in elementary and secondary schools; "methods" series; program planning. Prerequisite: Mus 327 or equivalent.
- Mus 446. **Wind Instrument Literature for Public Schools.** (g) 2 hours. 2 ①
Repertory for bands and other wind-instrument groups in elementary and secondary schools; "methods" series; program planning. Prerequisite: Mus 327 or equivalent.
- Mus 448. **Keyboard Literature.** (g) 2 hours. 2 ①
Styles, interpretation, editions, and technical problems of the representative literature of selected master composers from the pre-Bach period to the present. Illustrative performances by class members and faculty. Prerequisite: Mus 390 (piano) or equivalent.

Philosophy

Instruction in philosophy is intended both for students who anticipate more advanced study of philosophy and for those who desire a brief introductory study only.

Lower Division Courses

- Phl 201. **Problems of Philosophy.** 3 hours. 3 ①
Some of the persistent problems of philosophy.
- Phl 202. **Elementary Ethics.** 3 hours. 3 ①
The philosophy of morality; critical consideration of various interpretations of the ideals and standards of moral conduct.
- Phl 203. **Elementary Logic.** 3 hours. 3 ①
The standard forms of reasoning; recognizing, analyzing, criticizing, and constructing main types of argument and proof.
- Phl 211,212,213. **Great Works in Philosophy.** 2 hours each term. 2 ①
Selected readings of individual philosophers designed to acquaint the student with classic philosophical documents.

Upper Division Courses

- Phl 301,302,303. **History of Philosophy.** 3 hours each term. 3 ①
Western philosophy from the pre-Socratic Greeks to twentieth century. Prerequisite: Phl 201.
- Phl 460. **Philosophy of Religion.** (g) 3 hours. 3 ①
Religious concepts of reality and human nature; ideas of God; problem of faith and reason; religious language and symbolism; religious concepts of man and history.
- Phl 461,462. **Symbolic Logic.** 3 hours each term. 3 ①
Phl 461: Symbolic logic; analysis and deduction.
Phl 462: Metalogic; propositional calculus and lower functional calculus. Prerequisite: for 461, Phl 203; for 462, Phl 461.

- Phl 471. **Philosophy of Science.** (g) 3 hours. 3 ①
 Nature and structure of scientific concepts, theories, and laws; revolutions in science and their causes; influences of science and philosophy on each other.

Religion

Establishment of a chair of religion at Oregon State University was authorized in 1928, and the first courses were offered in the fall of 1928-29. The Department of Religion is nonsectarian in spirit and organization. Its purpose is threefold: (1) Courses in religion seek to develop an appreciation of the nature and processes of religion in light of conditions affecting life today, thus enabling students to make such adjustments as will vitalize religion for them. (2) Courses are determined for the most part by the needs of students who are preparing for service in the fields of science, engineering, agriculture, home economics, teaching, etc. (3) Special attention is given to the religious education of those who anticipate lay-leadership in churches of their local communities and those who plan to enter social service or religious vocations such as missionary work, the ministry, director of religious education, pastor's assistant, professional leadership of religious organizations, etc.

Lower Division Courses

- R 220. **The Sermon on the Mount.** 2 hours. 2 ①
 Philosophy of Jesus' teaching as embodied in selected passage.
- R 225. **The Prophets and Their Message.** 3 hours. 3 ①
 Hebrew prophetic tradition; significance and value for present day; selections from individual prophets.
- R 230. **History of Christian Thought.** 3 hours. 3 ①
 Rise and spread of Christian religion; thought of its various leaders; movements within Christianity; present tendencies in religious thought.
- R 231. **The American Religious Heritage.** 3 hours. 3 ①
 Development of main religious groups in America: Catholicism, Judaism, Protestantism; role of religion in American life.
 See also Eng 275. *The Bible as Literature*, under ENGLISH.

Upper Division Courses

- R 311. **The New Testament and Its Historical Background.** 3 hours. 3 ①
 Time and conditions out of which New Testament writings came; problems that gave rise to Christian movement.
- R 312. **The Old Testament and Its Historical Background.** 3 hours. 3 ①
 Times and conditions which produced Old Testament; religion of Israel with critical survey of sources.
- R 370. **Religion and Education.** 3 hours. 3 ①
 Historical relationship of church to education; situation in America; the church and the university community; faith and learning.
- R 407. **Seminar.** Terms and hours to be arranged.
- R 463. **Psychology of Religion.** (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.

Speech

Instruction in speech aims to build strength of personality by aiding students to develop clear, original thinking and by giving training in effective correlation, organization, and presentation of knowledge gained through study and experience. Much drill and criticism are given on organization of material, on platform work, and on principles that underlie effective reading and speaking. The training helps to overcome self-consciousness and other emotional inhibitions and to build a strong personal address.

Courses in interpretation and dramatics are conducted not only as a means of rounding out speech training but also as an aid to prospective teachers and other community leaders in the directing of plays; in the design and construction of stage settings, costumes, and other equipment; and in stage make-up and management. Seven full-length plays, several one-act plays, and a number of puppet shows are produced each year.

Courses in radio and television are offered. Well-equipped studios, in addition to those at station KOAC and station KOAC-TV, are maintained by the department for those wishing to acquire a knowledge of and practice in the use of radio and television techniques.

Intramural and intercollegiate debates, extempore speaking, and oratorical contests take place each year, and individual attention is given to students who wish to prepare for such work. Regular academic credit may be earned by the participants.

In connection with the courses in speech science and correction, a clinic is maintained by the department for those who are handicapped with various speech impediments such as stammering, lispings, and nasality. Advice and treatment are given for overcoming both organic and functional difficulties. Foreign students are aided in acquiring acceptable standards of English speech. Any student may have a hearing test with the audiometer in the clinic.

Lower Division Courses

- Sp 90. **Corrective Speech.** 1 hour. 2 ①
Designed specifically for students having organic or functional speech disorders; group meetings of class, supplemented by clinical periods devoted to individual diagnosis and treatment. HARRIS, HILDEBRANDT.
- Sp 91. **Speech for Foreign Students.** 2 hours winter. 2 ①
Designed 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. HILDEBRANDT.
- Sp 111,112,113. **Extempore Speaking.** 3 hours each term. 3 ①
Original speeches; analysis and synthesis of material, adaptation to audience, outline construction; development of confidence and release on platform; voice, enunciation, gesture, and bearing in delivery; speeches for special occasions; the extended address. Must be taken in sequence. STAFF.
- Sp 120. **Voice and Diction.** 3 hours. 3 ①
Vocal tone and correct speech sounds, pronunciation standards, vocabulary building, and word usage in relation to social integration of student; principles underlying good business and technical speaking on platform, radio, and television. HARRIS, WINGER.
- Sp 121,122. **Interpretation.** 3 hours each term. 3 ①
Analysis and presentation of printed materials; emotional reactions that give color and interest; expressive vocal and bodily responses; pantomime; characterization; interpretative techniques. Must be taken in sequence. CORTRIGHT, YOUNG, HENRY, BENNETT.
- Sp 231. **Parliamentary Procedure.** 3 hours winter or spring. 3 ①
Rules of order; practice in application; forming temporary and permanent organizations; preparation of constitutions and bylaws. Students serve as chairman and secretary and learn how to participate effectively in meetings. WINGER, DOLER.

- Sp 232. **Group Discussion.** 3 hours winter or spring. 3 ①
Preparing for, leading, and participating in conferences, panels, lecture-forums, and symposiums; strong emphasis on problem-solving and interpersonal relations. Prerequisite: Sp 111. WINGER, DOLER.
- Sp 237. **Argumentation.** 3 hours. 3 ①
Analysis; brief-drawing; collection and use of evidence; deductive and inductive reasoning; fallacies; construction of speeches. Prerequisite: Sp 111. PETERSON.
- Sp 238. **Persuasion.** 3 hours fall or winter. 3 ①
Study of models; composition exercises; writing a term speech; mastery of audience psychology and effective style. Prerequisite: Sp 111. GROVER.
- Sp 240. **Creative Drama for Elementary Teachers.** 3 hours. 3 ①
Creative dramatics in elementary classroom; principles and methods of developing original dramatization with children; methods in acting, staging, and costuming for assembly programs; correlation with classroom studies. Consent of instructor required. HENRY, BENNETT.
- Sp 242. **Recreational Use of Drama.** 3 hours spring. 3 ①
Leadership and participation in recreational-creative dramatics; story-telling; creating original story; pantomime; improvisation in acting, staging, and costuming; correlation of music, art crafts, and drama for camp and playground. Prerequisite: recreation major or minor or consent of instructor. HENRY, BENNETT.
- Sp 243. **Puppetry.** 3 hours winter. 3 ①
History; adapting plays, stories, and historical events for puppet dramatization; manipulating puppets and marionettes; application to television. HARRIS.
- Sp 244. **Stagecraft and Lighting.** 3 hours. 2 ① 2 ③
Constructing scenery and stage properties; lighting equipment and basic principles of lighting; practical experience in lighting, backstage procedures, and designing and construction of settings both realistic and suggestive. CORTRIGHT, YOUNG, BENNETT.
- Sp 247. **Stage Make-up.** 3 hours. 3 ①
Basic principles; laboratory experience in various types of straight and character make-up as related to the community theatre and the school play. HENRY, BENNETT.
- Sp 248. **Fundamentals of Acting.** 3 hours spring. 3 ①
Acting theories and techniques; stage deportment; scenes illustrative of historical styles in acting; public performance. Prerequisite: Sp 122. CORTRIGHT, HENRY.
- Sp 253. **Workshop Theater.** 1 to 3 hours each term, maximum 6 hours.
Principles of acting and dramatic production. Consent of instructor required. CORTRIGHT, YOUNG, HARRIS, HENRY, BENNETT.
- Sp 260. **Radio-Television Projects.** 2 hours.
Educational projects in radio-television under supervision, chosen for variety of experience in microphone interpretation, production planning, script preparation, studio acoustic practices; practical laboratory experimentation under broadcast conditions. Consent of instructor required. LIVINGSTON, GONZALEZ.
- Sp 271. **Oratory.** 1 hour each term, four terms. 2 ①
Principles of persuasion; organization and presentation of one or more formal addresses. Prerequisite: Sp 238 or consent of instructor. PETERSON.
- Sp 274. **General Forensic Speaking.** 1 hour each term, four terms.
Preparing oral reports, demonstrations, discussions, radio talks, or after-dinner speeches for presentation in seminars or before community organizations. Prerequisite: Sp 112 or consent of instructor. DOLER, PETERSON.
- Sp 277. **Debate.** 1 hour each term, four terms. 2 ①
Principles of argumentation; organization and presentation of debate speeches. Prerequisite: Sp 237 or consent of instructor. PETERSON.

Upper Division Courses

- Sp 311. **Advanced Interpretation.** 3 hours winter. 3 ①
Interpretative theory and programing; materials for oral interpretation; experimentation in presentational forms. Prerequisite: Sp 122. YOUNG, CORTRIGHT, BENNETT.

- Sp 346. **Scene and Stage Design.** 3 hours. 2 ① 2 ③
Physical theater; auditoriums and stages; scene design; stage settings; application to high school and community dramatics. Prerequisite: Sp 244 or consent of instructor. YOUNG, BENNETT.
- Sp 354. **Fundamentals of Play Direction.** 3 hours spring. 3 ①
Responsibilities and methods of the play director in secondary schools and in community dramatics; choosing, casting, and rehearsing a one-act play for public performance. Prerequisite: Sp 248. YOUNG, CORTRIGHT, HENRY.
- Sp 355. **Workshop Theater.** 1 to 3 hours each term, maximum 6 hours.
Advanced work in acting and dramatic production. Prerequisite: 3 term hours of Sp 253. CORTRIGHT, YOUNG, HARRIS, HENRY, BENNETT.
- Sp 361,362,363. **Radio Speaking.** 3 hours each term. 2 ① 1 ③
Sp 361: Radio delivery techniques; adapting informational materials to broadcasting; radio station policies. Sp 362: Basic production techniques for talks and dramatic programs; program planning and promotion. Sp 363: Writing for radio, including theory and principles adaptable to both educational and commercial broadcasting. Prerequisite: for Sp 361: Sp 111; for Sp 362: Sp 361 or Sp 111 and Sp 121; for Sp 363: Sp 361. LIVINGSTON, GONZALEZ.
- Sp 365. **Radio-Television Projects.** 2 hours.
Educational projects in radio-television similar to work in Sp 260. Prerequisite: Sp 260 or Sp 361. LIVINGSTON, GONZALEZ.
- Sp 367. **Basic Television.** 3 hours fall or winter. 2 ① 1 ③
Station policies and practices; television planning and production with emphasis on information methods applied to television including lecture-demonstration and interview; laboratory experiences in performance and direction of television programs. Prerequisite: Sp 361. LIVINGSTON, GONZALEZ.
- Sp 368. **Television Programing.** 3 hours winter. 2 ① 1 ③
Educational and commercial programing; methods of audience measurement and program evaluation; programs in the public interest. Prerequisite: Sp 367. LIVINGSTON.
- Sp 372. **Oratory.** 1 hour each term, six terms.
Advanced work in oratory. Prerequisite: Sp 271. PETERSON.
- Sp 375. **General Forensic Speaking.** 1 hour each term, six terms.
Advanced work in general forensic speaking. Prerequisite: Sp 274. DOLER, PETERSON.
- Sp 378. **Debate.** 1 hour each term, six terms.
Advanced work in debate. Prerequisite: Sp 277. PETERSON.
- Sp 451. **Audio-Visual Aids in Radio-Television.** (g) 3 hours. 3 ①
Audio-visual effects in broadcasting; use of sound, music, graphics, film, and special studio and electronic effects in communicating information through broadcast media. Prerequisite: Sp 367. LIVINGSTON.
- Sp 480. **Speech Science.** 3 hours fall or winter. 3 ①
Scientific bases; nature and purpose; origin and development in race and individual; anatomy and physiology of speech mechanisms; speech sounds; phonetic elements; psychological aspects. HARRIS.
- Sp 493. **Principles and Techniques of Speech Correction.** (G) 3 hours 3 ①
Nature, causes, diagnosis, and treatment of speech defects; for students requiring knowledge of speech problems of children and adolescents especially. Recommended prerequisite: Sp 480. HARRIS, HILDEBRANDT.
- Sp 494. **Clinic Procedures.** (G) 3 hours winter or spring. 3 ①
Practical experience in handling cases, including taking of case history, making diagnosis, and giving remedial treatment. Prerequisite: Sp 493. HILDEBRANDT.

Graduate Service Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

SOCIAL SCIENCES

Included under this heading for administrative convenience as well as the nature of their subject matter are the courses in general social science and the work offered in the Departments of Economics (including geography), History, Political Science, Psychology, and Sociology.

General Social Science

Lower Division Courses

- SSc 101,102,103. **Background of Social Science.** 3 hours each term. 3 ①
Orientation emphasizing integration of all the social sciences into a discipline of learning; general influences on human behavior; scientific method in social sciences. Open to freshmen and sophomores only.

Upper Division Courses

- SSc 307. **Seminar.** Terms and hours to be arranged.
- SSc 407. **Seminar.** Terms and hours to be arranged.
- SSc 441,442,443. **International Politics and National Power.** (g) 3 hours each term. 3 ①
First term: foreign relations and basic policy affecting power position of United States. *Second term:* relative power position of states with reference to military, economic, social, geographic, and psychological factors and the stability and effectiveness of governments. *Third term:* national power and international organization; United Nations and national power. Prerequisite: for SSc 441: PS 201, PS 322; for SSc 442, 443: PS 205, PS 417. Students who have not had prerequisite must have consent of instructor. SWYGARD.

Economics

Instruction in the Department of Economics is intended to serve the cultural and informational needs of all students interested in economic problems in relation to citizenship; to provide courses for students majoring in the humanities and social sciences; to supply a foundation for law, business, or public service; and to meet the prescriptions found in professional curricula.

Under the Department of Economics, courses in geography are designed to meet needs within the major curricula on the campus. Courses provide for study of world environmental patterns; interrelationships of physical and cultural complexes; patterns of economics and human occupation fundamental to the education of every citizen. Courses in physical and resource geography are offered in the Department of Natural Resources in the School of Science.

Courses in Economics

Lower Division Courses

- Ec 201,202,203. **Principles of Economics.** 3 hours each term. 3 ①
Principles underlying production, exchange, and distribution; practical problems such as monetary and banking reform, trade regulations, taxation, labor movements, unemployment, business cycles. A three-term sequence.
- Ec 212. **Outlines of Economics.** 3 hours. 3 ①
Principles and institutions. May not be taken in place of Ec 201,202, or 203.
- Ec 215. **Economic Development of the United States.** 3 hours. 3 ①
Economic institutions including industry, agriculture, commerce, transportation, labor, and finance; economic progress of the United States. FRIDAY.

Upper Division Courses

- *Ec 407. **Seminar.** (g) Terms and hours to be arranged.
- Ec 420. **Business Combinations.** (g) 3 hours. 3 ①
American business combinations; cooperatives, trade associations, trusts, holding companies and consolidations; monopolies; fair and unfair practices, monopoly price problems; control. Prerequisite: Ec 203.
- Ec 421. **Economic Fluctuations.** (g) 3 hours. 3 ①
Economic activity viewed in historical perspective; fluctuations and cycles; prosperity and depression; measurement and control. Prerequisite: Ec 203. TOWEY.
- *Ec 423,424. **Money and Banking.** (g) 3 hours each term. 3 ①
Nature and functions of money; functions of banks; history of banking; monetary theory; monetary policy. Prerequisite: Ec 203. TOWEY.
- 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 203. HARTER.
- Ec 426. **Labor Legislation.** (g) 3 hours. 3 ①
Basis of labor law; legality of unions and their activities; labor injunctions; unions and anti-trust laws; the Norris-LaGuardia Act; the National Labor Relations Act and its amendments; the N.L.R.B. and unfair labor acts; cases interpreting labor laws. Prerequisite: Ec 203. HARTER.
- 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 203. HARTER.
- Ec 429,430. **Public Finance.** (g) 3 hours each term. 3 ①
Survey of government taxing, spending, borrowing with emphasis on current issues of theory and practice at federal, state, and local levels; shifting and incidence; fiscal policy for stability and growth. Prerequisite: Ec 203. PATTERSON.
- Ec 440,441. **International Economics.** (g) 3 hours each term. 3 ①
International trade; international financial arrangements; trade restrictions; capital movements; exchange rates; international economic organizations and financial institutions; comparative growth. Prerequisite: Ec 203. WILKINS.
- Ec 450. **Comparative Economic Systems.** 3 hours. 3 ①
Contemporary economic systems; capitalism, socialism, communism. Prerequisite: Ec 203. PATTERSON.
- Ec 454. **Economic History of Modern Europe.** 3 hours. 3 ①
The industrialization of Europe; origin and development of economic institutions; implications for the industrialization of underdeveloped areas. Prerequisite: Ec 203. FRIDAY.
- *Ec 457. **Theory of the Firm.** (g) 4 hours. 4 ①
Decision making in an enterprise economy. Price and output under various market structures. Prerequisite: Ec 201,202,203.
- *Ec 462. **Economics of Public Utilities and Transportation.** (g) 3 hours. 3 ①
Economic and legal characteristics; problems of regulation, rates, service, finance. Prerequisite: Ec 203.
- Ec 470. **History of Economic Thought.** (g) 3 hours. 3 ①
Theory dealing with socio-economic problems. Prerequisite: Ec 201,202,203. FRIDAY.
- *Ec 475,476,477. **Current Economic Theory and Problems.** (g) 3 hours each term. 3 ①
Nature and scope of economics; role of economic theory; national income and employment; consumption; investment; multiplier; accelerator; monetary and fiscal policy; economics of growth; long run changes in national income and structure of economic institutions; growth theories; underdeveloped economies. Prerequisite: Ec 203. ORZECZ.

* Applicable toward a graduate major in agricultural economics, School of Agriculture.

- *Ec 480,481,482. **Mathematical Economics.** (g) 3 hours each term. 3 ①
Quantitative methods of economic research; economic programing; input-output analysis.
Prerequisite: Ec 203; Mth 101. ORZECH, NORTON.

Graduate Service Courses

Courses numbered 400-499 and designated (g) may be taken toward a graduate minor.

Courses in Geography

Lower Division Courses

- Geog 105,106,107. **Introductory Geography.** 3 hours each term. 3 ①
Elements and implications. *Geog 105:* World Regions; patterns of world environment; man and his activities. *Geog 106:* Economic Geography; world commodity production. *Geog 107:* Political Geography; influence of geography on world political entities. To be taken in sequence.

Upper Division Courses

- Geog 313. **Geography of Pacific Northwest.** 3 hours. 3 ①
Human and economic geography of Pacific Northwest with special attention to Oregon. Prerequisite: Geog 107. MYATT.
- Geog 326. **Geography of Europe.** 3 hours. 3 ①
Physical and cultural environment and economic activities of each political unit (excluding U.S.S.R.). Prerequisite: Geog 107. HEINTZELMAN.
- Geog 328. **Geography of Latin America.** 3 hours. 3 ①
Geographic foundations of the Latin American nations; industrial and commercial development and potentialities. Prerequisite: Geog 107. JENSEN.
- Geog 329. **Geography of North America.** 3 hours any term. 3 ①
Regional analysis of Canada and Alaska but not Mexico. Prerequisite: Geog 107. MYATT.
- Geog 331. **Geography of Asia.** 3 hours. 3 ①
Asiatic countries including the island fringe; human, cultural, and economic conditions; national economies and world relationships; implications for present and future. Prerequisite: Geog 107. HIGSMITH.
- Geog 332. **Geography of Africa.** 3 hours. 3 ①
African nations and colonies; human, cultural, and economic conditions; national economies and world relationships; implications. Prerequisite: Geog 107. MYATT.

History

A knowledge of the history of the civilizations of the world is fundamental as background for the social sciences and humanities. It is of special value to the students of law, journalism, and business. It is necessary for a liberal education and is preparation for intelligent, informed citizenship. Courses are designed both for those who wish to major in the field and for general students.

Lower Division Courses

- Hst 101,102,103. **History of Western Civilization.** 3 hours each term. 3 ①
History of man; his governmental, economic, social, religious, intellectual, and esthetic activities in Europe, Asia, and Americas. Special effort made to relate past to contemporary events and institutions.

* Applicable toward a graduate major in agricultural economics, School of Agriculture.

- Hst 208,209. **English History.** 3 hours each term. 3 ①
Political, economic, social, intellectual, and religious developments since 1485; evolution from Empire to Commonwealth and Britain's part in transition. Prerequisite: Hst 101, 102, 103. Students not having prerequisite must have consent of instructor. C. K. SMITH.
- Hst 224,225,226. **History of American Civilization.** 3 hours each term. 3 ①
Rise and development from beginning to present; economic, social, and cultural life, political changes, and international relations.
- Hst 230,231,232. **Great Americans in Thought and Action.** 2 hours each term. 2 ①
Personality and leadership of men and women who have been outstanding in various fields of endeavor, great movements, and critical periods. BERKELEY.

Upper Division Courses

- Hst 341,342,343. **Europe Since 1789.** 3 hours each term. 3 ①
Political, social, economic, and cultural trends since fall of Napoleon; political institutions, national states, imperial rivalries, problems of race, origin of World War I, peace settlement; totalitarianism, Munich, World War II, contemporary scene. *Fall:* 1789-1870; *winter:* 1870-1918; *spring:* 1918-present. Prerequisite: Hst 101,102,103 or consent of instructor. C. K. SMITH.
- Hst 360,361. **Latin-American Civilization.** 3 hours each term. 3 ①
Mexico, Central America, and South America; impact and blending of these cultures with those of Spain and Portugal in colonial age; struggle for independence; development of Latin-American republics. R. W. SMITH.
- Hst 391,392,393. **The Far East.** 3 hours each term. 3 ①
History, civilization, and political, economic, cultural, and social problems of modern China, Japan, India, Korea, South Asia, and the Pacific Islands. ADOLF.
- Hst 447. **Tsarist Russia.** (g) 3 hours fall. 3 ①
Russian Empire and its institutions; rise of revolutionary thought and movement. Prerequisite: Hst 101,102,103. C. K. SMITH.
- Hst 448. **Soviet Union.** (g) 3 hours. 3 ①
Political, diplomatic, economic, and social development of Russia from 1917 to present. Prerequisite: Hst 101,102,103. C. K. SMITH.
- Hst 460,461,462. **American Thought and Culture.** (g) 3 hours each term. 3 ①
American thought, ideals, and institutions; contribution to American culture by schools, newspapers, magazines, motion pictures, radio, art, literature, television, and philosophy. Prerequisite: Hst 224,225,226. CARLIN.
- Hst 478. **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 224,225, or equivalent. R. W. SMITH.
- Hst 480,481,482. **The United States in the Twentieth Century.** (g) 3 hours each term. 3 ①
Political and economic institutions developed since 1897; relevant social and cultural changes. Prerequisite: Hst 224,225,226. SHAW.

Graduate Service Courses

Courses numbered 400-499 and designated (g) may be taken toward a graduate minor.

Political Science

The courses in political science are designed primarily to prepare for intelligent citizenship and effective participation in public affairs; to give the student an active interest in the principles and structure of political life and the operation of governments, and an understanding of current political questions. The course offerings in public administration and foreign relations are designed to help prepare students contemplating careers in public service both at home and abroad.

Lower Division Courses

- *PS 201,202,203. **American Governments.** 3 hours each term. 3 ①
First term: principles of American constitutional system, political process, and organization of national government. *Second term:* powers and functions of national government. PS 201 may be taken separately but is prerequisite for PS 202. *Third term:* Practical operation and contemporary reforms in government at state and local levels.
- PS 206. **European Political Systems.** 3 hours. 3 ①
 Ideological foundations, forms, and practices of political systems of major European countries; comparison to and contrast with American political system. WALTER.

Upper Division Courses

- PS 306. **Political Parties and Elections.** 3 hours. 3 ①
 Nature, role, functions, organization, and operation of parties in the American two-party system and the structure and operation of the electoral system. Prerequisite: PS 201. McCLENAGHAN.
- PS 312. **Basic American Constitutional Law.** 3 hours. 3 ①
 Interpretation of Constitution; judicial review; nation-state relationship; civil rights; powers of President and Congress. Prerequisite: PS 201. FUQUAY.
- PS 334,335,336. **Current Problems in American Democracy.** 2 hours each term. 2 ①
 Domestic and foreign policy, organization and operation of American political system; individual and state in democratic society.
- PS 411,412,413. **Public Administration.** (g) 3 hours each term. 3 ①
PS 411: principles of public administration; administrative organization and procedures; public relations. *PS 412:* administrative functions; public personnel and fiscal problems and practices. *PS 413:* basic administrative law; control of administrative agencies; powers, limitations, and remedies. Prerequisite: PS 201. Students who have not had prerequisite must have consent of instructor. MADDOX, FUQUAY.
- PS 417. **International Relations.** (g) 3 hours. 3 ①
 International relations from emergence of modern state system to present. Designed to provide student with essential backgrounds and to show significance and interrelationships of international law, war, power politics, peaceful settlement of disputes, and international organization. Prerequisite: PS 205. WALTER.
- PS 419. **Pacific Area Relations.** (g) 3 hours. 3 ①
 Problems in government and foreign relations of Pacific powers; revolutionary ferment and postwar adjustments, with particular attention to American security and commercial interests. SWYGARD.
- PS 423. **Municipal Government.** (g) 3 hours spring. 3 ①
 Organization, functions, and problems of city governments. Prerequisite: PS 201,203. Students who have not had prerequisite must have consent of instructor. MADDOX.
- PS 430. **Political Theory.** (g) 3 hours. 3 ①
 General issues; basic problems of normative and causative systems past and present. Prerequisite: PS 201 and any 6 upper division hours in political science. GREEN.
- PS 432,433. **Political Theory.** (g) 3 hours each term. 3 ①
PS 432: political stability and change; social-political change; role of groups, classes, and elites. *PS 433:* American political thought; political values and theoretical systems in the American tradition. Prerequisite: PS 201 and any 6 upper division hours in political science. GREEN.

* Sequence begins with PS 201 and may be completed with any two of the following taken in order: PS 202,203,206.

- SSc 441,442,443. **International Politics and National Power.** (g) 3 hours each term. 3 ①
(See GENERAL SOCIAL SCIENCE courses.)

Graduate Service Courses

Courses numbered 400-499 and designated (g) may be taken for credit toward a graduate minor.

Psychology

Psychology courses are intended to meet the needs of students desiring a knowledge of psychology as a part of their general education or as a foundation for work in education, child development, and other professions; to prepare students to major in psychology at the upper division level; and to meet the service needs of various schools and departments that require psychology as a part of their program of training. The School of Education offers courses in the psychology of childhood, adolescence, education, guidance, and vocations.

Lower Division Courses

- Psy 111. **Personality and Development.** 3 hours. 3 ①
Self-understanding and development; emphasis upon habits, attitudes, emotional problems, and efficient learning techniques. Open only to freshmen and sophomores.
- Psy 201,202. **General Psychology.** 3 hours each term. 3 ①
Behavior and experience; facts and principles of motivation, learning, perceiving, and individual difference. Two-term sequence; with Psy 205 forms year sequence. Prerequisite: sophomore standing.
- Psy 205. **Applied Psychology.** 3 hours. 3 ①
Applications of psychological facts and principles to such fields as education, industry, business, and other professions. Prerequisite: Psy 202.
- Psy 208,209,210. **Psychology Laboratory.** 1 hour each term. 1 ③
Laboratory experimental methods. Operated in coordination with Psy 201,202,205. Must be taken in sequence.
- Psy 212. **Practical Psychology.** 3 hours. 3 ①
Basic facts and principles of human behavior particularly useful to students of engineering, forestry, and agriculture. Not open to students who have taken Psy 202. Prerequisite: sophomore standing.

Upper Division Courses

- Psy 311. **Human Development.** 3 hours. 3 ①
Psychological problems in child's development from 5 to 14; muscular activities; perception; language; motivational and emotional patterns; intelligence; social behavior; measurement of child behavior. Prerequisite: Psy 202.
- Psy 314. **Human Adjustment.** 3 hours. 3 ①
Motivation, perception, communication, learning, and adjustment with emphasis on their discovery and application in life patterns of student; self-understanding and self-acceptance fundamental to increasing human efficiency and effectiveness requisite for happy living. Prerequisite: Psy 202.
- Psy 361. **Group Dynamics.** 3 hours. 2 ① 1 ②
Principles and techniques; interaction of individuals within groups. For students preparing to work with groups in industry, extension work, youth organizations. Prerequisite: Psy 202.
- Psy 371. **Quantitative Methods.** 3 hours. 3 ①
Experimentation; design and conduct of experiments; analysis and interpretation of data; reporting of research in human behavior. Prepares for critical reading of literature of research in psychology, social sciences, business, education, and home economics. Not primarily computational. Prerequisite: Psy 202.

- Psy 411. **Mental Hygiene.** (g) 3 hours. 3 ①
Principles and application to problems of individual in home, school, and occupational situations. Prerequisite: Psy 314 or equivalent.
- Psy 430. **Human Factors in Engineering.** 3 hours. 3 ①
Human behavior as related to fundamentals of equipment design, layout, and operation. Special attention to abilities and limitations of human operators and effect of such on accuracy, speed, safety, training, comfort, and fatigue in equipment operation. Prerequisite: Psy 202 or 212.
- Psy 431. **Industrial Psychology.** (g) 3 hours. 3 ①
Human relationships in industry, human engineering, personnel placement and selection. Prerequisite: Psy 205 or equivalent.
- Psy 462. **Behavior Deviations.** (g) 3 hours. 3 ①
Normal and abnormal behavior contrasted; understanding of bases for deviant behavior; role of society in promoting deviant behavior. Prerequisite: Psy 311 or 314 or equivalent.
- Psy 472,473,474. **Individual Differences.** (g) 3 hours each term. 3 ①
Theories of personality; individual differences; evaluation of differences; guiding and directing normal development. Prerequisite: Psy 371 or equivalent. Prerequisite for 473 or 474: Psy 472.
- Psy 478,479,480. **Psychological Tests and Testing.** (g) 3 hours each term. 3 ①
Theory and practice; administration, scoring, and interpretation of individual mental tests; group tests of intelligence, personality, interests, etc. Prerequisite: Psy 371 or equivalent. Prerequisite: for Psy 479,480: Psy 478.
- Psy 482. **Practice in Psychological Services.** (g) 3 hours each term, two terms. 3 ①
Experience in use of psychological and related methods in dealing with individuals at adolescent and adult levels. Consent of instructor required. Prerequisite: Psy 473,479.

Graduate Service Courses

Courses numbered 400-499 and designated (g) may be taken toward a graduate minor.

Sociology

All instruction in sociology, like that in the related social sciences, is intended to contribute to training for good citizenship through a better understanding of principles that govern human associations and relationships. Particular attention is given to gaining an insight into the structures and functioning of society and into contemporary social problems. Basic courses are provided for students planning to major in sociology elsewhere. All courses are designed to meet the special needs of students in other fields.

Lower Division Courses

- Soc 204,205,206. **General Sociology.** 3 hours each term. 3 ①
Structure and functioning of human groups. Soc 206 stresses application of sociological principles to social problems. Soc 212 may be substituted for Soc 204.
- Soc 212. **Introduction to Sociology.** 3 hours. 3 ①
Selected sociological principles. Not open to students who have taken Soc 204.
- Soc 214,215,216. **Anthropology.** 3 hours each term. 3 ①
Interplay of man with his environment through the ages; factors influencing physical and cultural development of man. Soc 214: physical anthropology; Soc 215: cultural anthropology—general; Soc 216: cultural anthropology—American. Prerequisite: Soc 215 must be taken before 216. PARKS.

Upper Division Courses

- Soc 312. **Sociology of the Family.** 3 hours. 3 ①
Historical development of the family as an institution; its structure and functions; changes in process. Prerequisite: Soc 204 or 212. FETTER.
- Soc 327. **Introduction to Social Research.** 3 hours. 3 ①
Nature of scientific inquiry; sources of data for the social sciences; basic methods and techniques in social research. Prerequisite: 9 hours of social science. CURRY.
- Soc 364. **Sociology of Rural Life.** 3 hours. 3 ①
Basic social factors in rural life; rural communities in a changing society. FOSTER.
- Soc 411,412,413. **Social Problems.** (g) 3 hours each term. 3 ①
May be taken separately. Soc 411: delinquency; Soc 412: criminology and penology; Soc 413: race relations and minority groups. Prerequisite: 6 hours of sociology or sociology and psychology. CANTRELL, PLAMBECK.
- Soc 468. **Sociology of Urban Life.** (g) 3 hours. 3 ①
The modern city; its history, structures, functions, and problems. Prerequisite: 6 hours of sociology or of sociology and psychology. FOSTER.
- Soc 469. **Rural Social Organization.** (g) 3 hours. 3 ①
Rural institutions and communities in a changing society. Prerequisite: 6 hours of sociology or sociology and psychology.
- Soc 474. **Social Psychology.** (g) 3 hours. 3 ①
Human behavior; individual and social adjustments; behavior in presence of others; social psychology of institutions; social conflict. Prerequisite: 6 hours of sociology or sociology and psychology. CURRY.
- Soc 475. **Community Organization.** (g) 3 hours. 3 ①
Nature and problems; adjustments in community organization to meet changing needs. Prerequisite: 6 hours of sociology or sociology and psychology.
- Soc 490. **Educational Sociology.** (g) 3 hours. 3 ①
Contributions of sociology to educational problems and practices. Prerequisite: 6 hours of sociology or sociology and psychology. FETTER.

Graduate Service Courses

Courses numbered 400-499 and designated (g) may be taken toward a graduate minor.

School of Science

Faculty

As of January 1963

VERNON H. CHELDELIN, Ph.D., Dean of the School of Science.

F. A. GILFILLAN, Ph.D., Dean (emeritus).

DAVID B. NICODEMUS, Ph.D., Assistant Dean of the School of Science.

GRAYDON T. CREWS, Ed.D., Science Student Personnel Adviser.

Botany: Professors YOUNG (department chairman), ATWOOD (emeritus), EVANS, GILKEY (emeritus), HARDISON, McWHORTER, MILBRATH, MILLER, PHINNEY, ROTH, SMITH, VAUGHAN; Associate Professors CAMERON, CHAMBERS (Curator, Herbarium), CHILCOTE, CORDEN, CULYER, DEEP, DOBIE, HORNER, H. J. JENSEN, JONES, LEACH; Assistant Professors ALLEN, BRANDT, FORD, MURPHY; Senior Instructor LUND; Instructors BROWN, CARLBOM, CLARK, DENNIS, KLIEWER, KUMLER, PEEK; Assistants in Plant Pathology DOOLEY, DAYISON, LACY, REYNOLDS, MARTINSON; Assistant in Botany LOWE.

Chemistry: Professors CHRISTENSEN (chairman), CALDWELL, CHELDELIN, DECIUS, FREED, FREUND, GILBERT (emeritus), GILFILLAN, HAAG, KING, KURTH, LOGAN, MACDONALD, MARYELL, MEHLIG (emeritus), NEWBURGH, NORRIS, PEASE (emeritus), REMMERT, RICHARDSON, SCOTT, SLABAUGH, WANG, WESWIG, WILLIAMS; Associate Professors BECKER, FANG, FONG, FREDERICKS, HEDBERG, KICE, LOOMIS, PARSONS, REESE, TERRIERE; Assistant Professors BOND, GAMBLE, HEISLER, KRUEGER, PEEKEMA, REED; Research Fellows ALLISON, HINKS, INSKEEP, LEWIS, PATTON, PROPP, TASHIRO, WALL, WATSON, WRIGHT, L.; Teaching Fellow CURTICE; Research Assistants BAIN, BARTSCH, BLANK, BRESHEARS, ENGBRECHT, HEALY, JACOBSEN, KENNEDY, KRAFT, MORKVED, ODEN, ONG, PETERSON, QUENELLE, RAMSEY, STRAUCH; Graduate Assistants ALLEN, C., ALLEN, W., BARNHART, BRADWAY, BRAY, BROWN, BURNS, CHIBA, CLAEYS, CONANT, CLOUGH, DALTON, DAMEWOOD, DEGROOT, DENNISON, ENGLE, FITZGERALD, FUJIWARA, GOSINK, HAASE, HANSEN, HARRIS, HOFELDT, HOLMES, KUHN, LEE, LERCH, LINDBECK, LEUTZINGER, LINGSCHIED, MADSEN, NAZEERI, OISHI, OTTINGER, PETCOFF, POSSEHL, PROYANT, RYAN, SCHATZ, STAHL, STANCLIFT, STURMER, SUNSET, TANAKA, TONG, VENIER, WALCH, WARREN, WHITE, WHITMAN, WIGGLE, WONG, WRIGHT, K.

Entomology: Professors RITCHER (department chairman), CHAMBERLIN (emeritus), MARTIN, MOTE (emeritus), SCULLEN (emeritus), RUDINSKY, SWENSON, TERRIERE, THOMPSON; Associate Professors BROOKES, DICKASON, GOULDING, KRANTZ, STEPHEN; Assistant Professor LATTIN; Teaching Assistant EPPLEY.

General Science: Professors HUMPHREY (department chairman), C. L. ANDERSON, HANSEN, TROUT, WILLIAMSON;¹ Associate Professors BEER, CREWS, FOX; Assistant Professors CONTE, WILLIS; Instructors CRAYEN, NEELEY, PRINCE; Teaching Assistants ALLEN, HOWE, LYFORD, PEMBROOK, PORTER, REINHARDT, TAYLOR.

Geology: Professors WILKINSON (department chairman), ALLISON, PACKARD (emeritus); Associate Professors BOSTWICK, OLES, TAUBENECK; Assistant Professor CUMMINGS; Instructor TAYLOR; Teaching Assistants GLENN, HANSEN, HILL, LENZER, MCKNIGHT, WHITE.

Mathematics: Professors LONSETH (department chairman), ARNOLD,² BEATY (emeritus), CARTER, FULKS, GASKELL, GOHEEN, HOSTETTER (retired), KIRKHAM, MILNE (emeritus), OBERHETTINGER, A. R. POOLE, STONE; Associate Professors BUSCHMAN, FIREY, GROEMER, KAPLAN, R. REYNOLDS,³ SAUNDERS, STALLEY, YOUNG; Assistant Professors BAKKUM (emeritus), BALLANTINE, BROWN, DE PREE, GODARD, G. MALOOF, MCLEOD;³ Instructors BACHELOR, DIGBY, FLOOD, HERRMANN, OYERHOLSER, N. REYNOLDS,³ SHEN, WITCRAFT, WYSE; Research Associates BRENNE, PHILLIPS; Graduate Assistants S. ANDERSON, APPELEE, C. BALOGH, M. BALOGH, BISHOP, BREGEL, CATON, CHOW, COMSTOCK, CRESSWELL, GAMON, GREEN, HENDERSON, JOHNSON, KULM, LARSON, LATHROP, LAWRENCE, M. MALOOF, MASON, MATZDORFF, MCCOY, MORGALI, NESTELL, NOONCHESTER, M. POOLE, PRENTER, PROTHERO, K. SONI, R. SONI, WEINGARTEN; Research Assistants J. ANDERSON, BOLES, KYARDA, MARSH; National Defense Education Act Fellows FREEDMAN, HARMER, KLOSINSKI, KROGH, LINDQUIST, SMITH, WASSMUTH.

Microbiology: Professors ELLIKER (department chairman), C. L. ANDERSON, BOLLEN, GILMOUR, LANGTON, PILCHER, THORNE; Associate Professors A. W. ANDERSON, MORITA, PARKS, SANDINE; Assistant Professor GOLDBERG; Instructor NISHIKAWA; Research Assistants HOBBS, MCGREGOR; Teaching Assistants GAARDER, KOGUT, SOUTH, STARR, B. WAGNER, S. WAGNER, WINGFIELD.

¹ Sabbatical leave fall, 1963-64.

² On leave 1962-63.

³ On leave 1962-63 and 1963-64.

- Natural Resources:** Professors JENSEN (department chairman), HIGHSMITH, MYATT; Associate Professors HEINTZELMAN, RUDD; Instructors LEVERENZ, SUTTON; Teaching Assistants SCRIPTER, MARESH, SCHMIDT, SCOTT, DETERING.
- Oceanography:** Professors BURT (department chairman), BERG, DEHLINGER, WEHL; Associate Professors BYRNE, FROLANDER, MCCAULEY, PATTULLO, SHAFER; Assistant Professors CAREY, CURL, McALISTER, MORITA, PARK, OSTERBERG, PEARY, SMALL; Instructors BALES, HUBBARD, KUJALA, RINEHART, SMITH, STRONG, STUMP (acting), WYATT; Assistants in Oceanography BERNHARDT, BORDEN, LARSEN, OLIPHANT, STANLEY, STILL, TRIONE; Research Assistants ALBIN, BLANTON, BUSHNELL, CHIBURIS, COLLINS, CRANDELL, CROSS, DAVEY, DENNER, HEBARD, INGHAM, KARINEN, KULM, LANE, LAUN, LAURS, MALONEY, MATSON, MAUGHAN, NEAL, NORTH, ODEGARD, REDO, RENSHAW, RUSSELL, RUNGE, TONT, TREMBLY, WHITCOMB.
- Physics:** Professors YUNKER (department chairman), BRADY, JACK, VARNER (emeritus); Associate Professors BURCH, DECKER, EASTERDAY, GARMAN, MORGAN (emeritus), NICODEMUS, SCHECTER,¹ VINYARD; Assistant Professors CHURCH, FAIRCHILD, FORREST, PIERCE, SOMMERFELDT, TATOM; Research Associate COLEMAN; Research Assistants DARRAH, ELIASON, EVENSON, GILBERT, HOGAN, ROBERTS; Graduate Assistants AQUINO, BERRYMAN, BLACKBURN, CHAU, COOPER, CRAWFORD, CUDERMAN, DICKERSON, DOERFLING, DONALLY, FAHRENBRUCH, FICKETT, FRENCH, GALLAGHER, GRAMMENS, HOGAN, HOLST, KHANNA, LIBS, McMULLIN, MORACK, MURRAY, O'REILLY, PAILTHORP, PARKER, ROBERTS, STOMP, SYMANSKI, TUCKER, WHITEFIELD, WHITSETT; National Defense Education Act Fellows GRISCHKOWSKY, HAFNER, MARKS, REUDINK, SCHMITTROTH, SIEMENS, WALKER.
- Statistics:** Professor CALVIN (department chairman); Associate Professor LINK; Assistant Professors HUGHES, JENSEN; Assistants in Statistics BUTLER, YATES; Graduate Assistants BUTLER, PEURA.
- Zoology:** Professors DORNFIELD (department chairman), ALLMAN, GORDON, HILLEMANN, KRUEGER,² PRATT, STORM, WULZEN (emeritus); Associate Professors HISAW, MAYSHARK, MOHLER, OSBORN (emeritus), OWCZARZAK, PRITCHARD; Assistant Professors ALVARADO, NEWSTEAD; Instructor KERLEY; Assistant GLORIA M. HEATH; Research Assistants HATTON, MARTIN, MURRAY; Teaching Assistants ANDERSON, BELTON, DARROW, DORSCH, ALAN HEATH, MERRITT, MORSE, PUYEAR, RITSCHARD, STEWART, THOMPSON, VOTH, WHITE, WILKES, YUEN; National Institutes of Health Fellows DE MARTINI, MONROE; National Science Foundation Fellow RINARD.

General Statement

THE SCHOOL OF SCIENCE at Oregon State University offers: (1) Liberal arts courses with majors in science leading to the degree of Bachelor of Arts or Bachelor of Science. (2) Professional education for students planning to enter some occupation within the realm of science. Such students may take an undergraduate science major and from one to three years or more of graduate study in science. (3) Elective and service courses in science for students majoring in other schools, or for students who take science as a basis for professional or technical work in other schools.

Degree Honors Program

THE HONORS PROGRAM in the School of Science seeks to enrich educational opportunities for the more able student and to recognize scholarly achievement.

Application. Entering freshmen may apply to participate in the program. Interested high school graduates may obtain application forms from the dean of the School of Science as soon as they have been accepted for admission to Oregon State. Thereafter, a student registered in the School of Science may make such application at the time of registration for any term through the first term in the junior year. Transfer students may also apply.

Eligibility. To be eligible for the Honors Program, an entering freshman must have been in the upper one-fifth of his high school graduating class and must have an average above B in science and mathematics. Consideration also

¹ On Sabbatical leave 1962-63.

² On leave 1962-63.

will be given to the student's performance on college placement examinations. The applicant must be recommended for the Honors Program by one of his high school science teachers or the principal of his high school. This written recommendation must accompany the application for admission to the Honors Program. Other students who have been in the School of Science for at least one term, but not more than six terms, and have a grade-point average of 3.00 or higher also may apply for admission to the Honors Program.

The School of Science Honors Council passes on the qualifications of applicants and makes its recommendations to the dean of the School of Science who has the authority to approve candidates for the Honors Program.

Basic Science Honors Program. All freshmen and sophomores in the Honors Program follow the same basic honors requirements. They enroll in honors sections in chemistry, English, mathematics, and physics and must develop a reading knowledge in a foreign language approved by the major department. They enroll in a special one-credit course each term.

Departmental Honors Program. Department honors requirements include honors readings, seminars, special projects, special course work, research, thesis, and comprehensive written examinations. All departments have a requirement of an oral examination of at least one hour's duration. A student may receive from 9 to 18 hours of credit for work in the Honors Program during the junior and senior years. Honors are awarded in the field of the department recommending the student for honors.

Withdrawal. A candidate for honors may withdraw or be dropped from the program without prejudice when the Honors Council and the dean deem such action to be in the best interests of the student, the program, the department, and the school.

Other Special Programs

General Science. A student in general science takes at least 51 term hours of science. He may choose electives in the humanities and social sciences, or professional fields. For students interested in fields that involve two or more of the traditional sciences—e.g., biophysics, geophysics, life sciences, paleobiology, seismology—special curricula will be outlined. Interdepartmental majors are administered through the Department of General Science, and student programs are supervised jointly by the departments concerned.

Special Curricula. In addition to the special curricula described below, programs of study and guidance are provided students preparing to enter optometry schools and physical therapy and occupational therapy schools.

Dentistry and Dental Hygiene

The minimum educational requirement for admission to a dental school is successful completion of two years of college-level study including a year's work each in English, biology, physics, and inorganic chemistry, and a half-year's study in organic chemistry. Science courses must include laboratory practice.

The School of Science offers two-year and three-year pre dental curricula. Both curricula satisfy the requirements set by the Council on Dental Education of the American Dental Association for admission to University of Oregon Dental

School in Portland or other standard dental school. Students completing the three-year curriculum may qualify for a bachelor's degree from Oregon State after one year at dental school. See detailed curricula on a later page.

Students who complete the two-year program in dental hygiene at the Dental School may qualify for a bachelor's degree from Oregon State by two additional years on the campus at Corvallis. One year at Corvallis may be taken before entering Dental School but the senior year must be spent at Oregon State.

Counselors for pre-dental students are Dr. A. W. Pritchard, associate professor of zoology, chairman; Dr. Wm. G. Percy, assistant professor of oceanography; and Dr. Frank C. Morris, D.M.D.

THREE-YEAR PREDENTAL CURRICULUM

Freshman Year		Sophomore Year	
	Hours		Hours
English Composition (Wr 111,112,113).....	9	Approved courses in social science.....	9
General Chemistry (Ch 204,205,206)	15	General Physics (Ph 201,202,203).....	12
General Zoology (Z 201,202,203)	9	Comp Vert Embryology (Z 326)	4
Intermediate Algebra (Mth 100)	4	Comp Vert Anatomy (Z 324,325)	8
College Algebra (Mth 101)	4	Physical education	3
Physical education	2	Electives	9
Hygiene	2	Defense education or other elective.....	3
Electives	4-3		
Defense education or other elective.....	3		
Junior Year¹			
			Hours
Organic Chemistry (Ch 226,227)			10
Quantitative Analysis (Ch 234)			5
Approved courses in humanities			9
Electives			24

TWO-YEAR PREDENTAL CURRICULUM

This curriculum should be attempted only by students with excellent high school records. The student must have completed a year of high school chemistry, or must take Ch 206 in summer session following his freshman year.

Freshman Year		Sophomore Year	
	Hours		Hours
English Composition (Wr 111,112,113).....	9	Organic Chemistry (Ch 226,227)	10
Gen Chem (Ch 204,205,206)	15	Quantitative Analysis (Ch 234)	5
General Zoology (Z 201,202,203)	9	Gen Physics (Ph 201,202,203 or Ph 207, 208,209)	12
Mathematics (Mth 100,101)	8	Humanities or social science	9
Physical education	2	Comp Vert Embry (Z 326)	4
Hygiene	2	Comp Vert Anat (Z 324, 325)	8
Electives	2-3	Physical education	3
Defense education or other elective.....	3	Defense education or other elective.....	3

Medicine and Medical Technology

The School of Science offers a premedical curriculum preparing for entrance into standard medical schools.

The medical college admission test of the Association of American Medical Colleges is given each spring to all students who expect to apply during the next academic year for admission to a medical school. Further knowledge of the student's ability is obtained through frequent conferences between the student and his instructors and counselors.

¹ On successful completion of the three-year program and 48 term hours (32 semester hours) of dental-school work, the student may be awarded a bachelor's degree in general science. If two years of a language are completed during the three-year program, the student may satisfy requirements for the Bachelor of Arts degree.

The counselors for premedical students are: Dr. J. D. Mohler, Associate Professor of Zoology, chairman; Dr. R. M. Storm, Professor of Zoology; Dr. F. A. Gilfillan, Professor of Chemistry; Dr. Lewis J. Krakauer, M.D.

The entrance requirements of the University of Oregon Medical School in Portland are as follows:

(1) High School Preparation. The following high school course, which meets all the formal requirements, is strongly recommended:

	<i>Units</i>		<i>Units</i>
English	4	Latin	2
Algebra	1½	History	1
Physics	1	German or French	2
Chemistry	1	Electives	1½
Geometry	1		
Total	15		

(2) Collegiate Preparation. The medical school requires for admission at least three academic years of preparatory work (138 term hours exclusive of credit in air, military, or naval science). The following work is prescribed:

	<i>Term hours</i>
Chemistry	24
General inorganic, which may include qualitative analysis	12
Quantitative analysis with emphasis on volumetric analysis	4
Organic	8
Biology	15
General biology or zoology	9
Selections from comparative anatomy and embryology or genetics (in this order of preference)	6
Physics	12
Mathematics	6
English	9
Electives	72
Total prescribed credit	138

Foreign language is not specifically required for admission to the medical school, but some knowledge of a major modern foreign language (German, French, Russian, Spanish) is highly recommended as part of the cultural training of the physician. Students anticipating research in the medical sciences should have a basic knowledge of German and French. The premedical student should keep in mind that some medical schools require credit in foreign language for admission.

The work in organic chemistry must include the chemistry of both aliphatic and aromatic compounds. Biochemistry will not be accepted toward meeting the requirements. At least 25% of all chemistry credit must be for laboratory work.

Human anatomy is not accepted toward meeting the minimum requirements in biology.

The work in physics must include the divisions of mechanics, heat and sound, light and electricity.

The work in mathematics should be of standard college grade, and should include subjects such as algebra, elementary analysis, trigonometry, or calculus.

Recommended Elective Subjects. The student preparing to study medicine is advised to plan a balance in elective courses between courses in liberal arts and courses beyond the minimum requirements in subjects prescribed for admission to the medical school. Subjects suggested are: history, economics, sociology, psychology, English, public speaking, and foreign language.

The medical school also requires that the student who enters without a Bachelor of Arts or Bachelor of Science degree must complete the work at the institution at which he received his premedical preparation before entering upon the work of the third year at the medical school. At Oregon State, a maximum of 48 term hours of work in medicine may be counted as credit earned toward the bachelor's degree.

Before entering the medical school, the student should satisfy all requirements for senior standing and all requirements for a degree (including institutional and School of Science requirements) that cannot be satisfied at the medical school. The courses taken during the first year of medical training, together with science courses prescribed in the premedical curriculum, will satisfy all major requirements in general science. Students selecting other liberal arts majors in the School of Science must satisfy all major requirements before entering the medical school, except that Biochemistry (BCh 411,412), offered at the medical school, may be counted toward the satisfaction of the major requirements in chemistry, and Physiology (Phy 412) toward the major requirements in zoology.

PREMEDICAL CURRICULUM

(School of Science and Medical School)

A minimum of 138 term hours exclusive of air, military, or naval science is required before entering the University of Oregon Medical School.

Freshman Year		Sophomore Year	
	Hours		Hours
English Composition (Wr 111,112,113).....	9	Organic Chemistry (Ch 226,227)	10
General Chemistry (Ch 204,205,206)	15	Quantitative Analysis (Ch 234).....	5
General Zoology (Z 201,202,203)	9	General Physics (Ph 201,202,203)	12
Mathematics (Mth 101,102).....	8	Comparative Vert Embryology (Z 326)....	4
Approved courses in humanities	3	Comparative Vert Anatomy (Z 324,325) 8	
¹ Physical education	3	Physical education	3
Defense education or other elective.....	3	² Electives	3
		Defense education or other elective.....	3

Junior Year

The junior year should include a sequence in humanities (9 hours), a sequence in social science (9 hours), German, French, Russian, or Spanish (12 hours), and electives (18 hours).

Major in Science at Oregon State

B.A., B.S. Degrees

A student preparing to enter medical school should complete by the end of his junior year an approved major in science and requirements for a degree except fourth year of undergraduate residence. First year at the medical school may be counted in lieu of fourth year undergraduate residence. Courses taken during first year of medical training, together with science courses prescribed in premedical curriculum will satisfy all major requirements in general science. Biochemistry taken at medical school may be applied toward a major in chemistry, and physiology toward a major in zoology.

Curriculum in Medical Technology. The first three years of the curriculum in medical technology as given in regular courses at Oregon State University satisfy the new minimum requirements of the American Society of Clinical Pathologists. The fourth year includes: additional courses needed to qualify for the B.S. degree in medical technology. These are offered at the University of Oregon Medical School. The counselors for students pursuing this curriculum are Professor K. S. Pilcher and Professor C. M. Gilmour of the Department of Microbiology and Hygiene.

CURRICULUM IN MEDICAL TECHNOLOGY

B.S. Degree

The following curriculum is suggested as meeting the new requirements of the American Society of Clinical Pathologists for admission to approved training schools which became effective January 1, 1962. All approved schools of medical technology now require three years of college work and some a bachelor's degree. Students completing three years of work as outlined may receive a B.A. or B.S. degree from Oregon State University after completing a year of prescribed work in medical technology at the University of Oregon Medical School.

Students who wish to take a longer period of time to fulfill medical technology requirements may do so with approval of the adviser.

Freshman Year		Sophomore Year	
	Hours		Hours
³ General Chemistry (Ch 204,205,206)....	15	General Microbiology (Mb 204,205)	8
English Composition (Wr 111,112,113)...	9	Quantitative Analysis (Ch 234)	5
General Zoology (Z 201,202,203).....	9	Organic Chemistry (Ch 226,227)	10
⁴ Intermediate or College Algebra		Physiology (Z 331,332)	6
(Mth 100,101)	4	Social science	9
Physical education	2	Physical education	3
General Hygiene (PE 160)	2	Approved electives	7
Approved electives	7		
Junior Year		Senior Year (Medical School)	
	Hours		Hours
Pathogenic Microbiology (Mb 432,433) ..	5	Medical technology	49
Abridged General Physics (Ph 211,212) 6			
Upper division science	13		
Humanities	9		
Approved electives	14		

¹ Freshman women must take General Hygiene (PE 160), 2 term hours in any term.

² Students should confer with their premedical adviser in the selection of electives.

³ Students who have not had high school chemistry should take Ch 101,102,103, and 206.

⁴ Either Mth 100 or Mth 101 is required as indicated by the mathematics placement test.

Nursing

Oregon State offers the one year of prenursing required for entrance into the University of Oregon School of Nursing in Portland. Adviser of students in the prenursing program is Miss Guhli Olson.

BASIC NURSING DEGREE CURRICULUM

Freshman Year

	<i>Hours</i>
English Composition (Wr 111,112,113)	9
Literature (Eng 101,102,103 or 104,105,106 or 107,108,109)	9
General Chemistry (Ch 101,102,103 or Ch 201,202,203 or Ch 204,205,206)	9-15
Speech (Sp 111)	3
Nutrition (FN 225)	3
Electives (history, language, social science, anthropology, and Background for Nursing (Nur 111) recommended)	12
Physical education	3

Veterinary Medicine

The School of Science offers a two-year preparatory curriculum for students planning to enter a professional school of veterinary medicine. Beginning students who plan to complete the preveterinary curriculum within the two-year period must have adequate high school training in English, mathematics, and other basic sciences. The curriculum is designed to meet the general requirements for admission into the schools of veterinary medicine at Colorado State University, Fort Collins; Washington State University, Pullman; or the University of California, Davis. Admission requirements vary with each professional school; therefore, early in his preveterinary training each student should select the school of veterinary medicine he plans to attend.

A limited number of Oregon residents may attend the above-listed schools of veterinary medicine without paying out-of-state fees. For further information concerning interstate agreements write to: Commissioner, State of Oregon, Western Interstate Commission for Higher Education, P.O. Box 5175, Eugene, Oregon.

The adviser for preveterinary students on this campus is Dr. Ira W. Deep, Department of Botany.

PREVETERINARY CURRICULUM

Freshman Year

	<i>Hours</i>
Intermediate Algebra (Mth 100)	4
English Composition (Wr 111,112,113)	9
General Chemistry (Ch 204,205,206)	15
Approved sequence in social science	9
Physical education	3
¹ Approved electives	5
Defense education or other elective	3

Sophomore Year

	<i>Hours</i>
General Physics (Ph 201,202,203) or Abridged General Physics (Ph 211, 212)	12-6
Organic Chemistry (Ch 226,227)	10
General Zoology (Z 201,202,203)	9
Physical education	3
Approved electives	14-20
Defense education or other elective	3

¹Curriculum and electives must be adapted to meet the specific requirements for admission into the professional school of veterinary medicine the student plans to attend.

Curricula in Science

B.A., B.S., M.A., M.S., Ph.D. Degrees

General Notes

a. Maximum term hours required within the School of Science do not exceed 125 in any major curriculum. Maximum number of hours required for a major in any department is 72. The student thus has liberal opportunity to elect courses in other fields as well as in science.

b. In the freshman year General Hygiene (PE 150, 1 term hour for men; PE 160, 2 hours for women) is taken one term in place of physical education. For all baccalaureate degrees, one year of social science and one year of humanities are required.

c. At least one year each of biological and physical science is required in each curriculum.

d. Students expecting to meet the language requirements for a B.A. or to obtain a reading knowledge of Russian, German, or French in preparation for graduate work may elect a language in freshman and sophomore years. If two years of a language are elected in freshman and sophomore years, completion of requirements in either literature or social science may be postponed until junior year. Students expecting to major in certain of the science curricula may have to postpone some requirements.

e. For State Teacher's Certificate 6 hours of psychology should be elected in sophomore year as it is prerequisite to upper division courses in education. This requirement may be met by Psy 201,202.

f. Students wishing to qualify for a State Teacher's Certificate should elect 12 term hours in prescribed education courses in junior year, at least 11 term hours in senior year, and 9 term hours in first term of graduate year. Students must have a GPA of 2.50 in a recognized teaching major (See SCIENCE EDUCATION) and must have a teaching minor. Arrangements to do student teaching during senior year must be made with director of student teaching during registration for winter term of junior year.

g. Except in general science, each student in the School of Science is required to maintain for graduation a 2.00 GPA in his major field.

Department of General Science

Undergraduate and graduate general science majors: general science, biology, radiation biology, physical science.

Interdepartmental graduate majors: biophysics, geophysics, life sciences, paleobiology, seismology, and other fields involving joint majors.

Freshman Year		Sophomore Year	
	Hours		Hours
Approved biological science sequence.....	9-12	Approved courses in humanities	9
English Composition (Wr 111,112,113)....	9	Sophomore science sequence	9-15
Approved physical science sequence.....	9-15	Physical education	3
Physical education	3	¹ Approved electives	24-12
Electives	0-15	Defense education or other elective.....	3-9
Defense education or other elective.....	3-9		
Junior Year		Senior Year	
	Hours		Hours
Approved courses in social science.....	9	² Approved upper division science.....	12
² Approved upper division science.....	12	¹ Approved electives	36
¹ Approved electives	27		

Department of Botany

Undergraduate majors: general botany with emphasis, if desired, on one of the fields of the graduate majors.

Graduate majors: cytology, ecology, morphology, mycology, phycology, plant pathology, physiology, systematic botany.

Freshman Year		Sophomore Year	
	Hours		Hours
General Botany (Bot 201,202,203)	9	⁵ Upper division botany	12
English Composition (Wr 111,112,113)....	9	General Zoology (Z 200)	5
² General Chemistry (Ch 204,205,206)	15	Mathematics	4
⁴ Foreign language	9-12	Organic Chemistry (Ch 226,227)	10
Physical education	3	Genetics (Z 341)	3
Defense education or other elective.....	3-9	Physical education	3
		Electives	2-8
		Defense education or other elective.....	3-9

¹The electives may include courses in health education leading to special preparation in that field. See SCIENCE EDUCATION.

²These courses should be in fields related to work taken in lower division and must include one year sequence.

³Students interested in physiological and chemical aspects of plant life should take Ch 204,205,206, and Ch 226,227, and Ch 340, or equivalent, as early as convenient.

⁴Students having taken one year of high school French or German should continue the language. Those planning professional training in botany should elect to follow first year language with an appropriate language reading course.

⁵The student is required to take the following courses, each of which introduces a field of botanical specialization: Bot 321,331,341,351,371,470.

Junior Year		Senior Year	
	Hours		Hours
Upper division botany	12	Seminar	3
Statistical Techniques (St 314)	3	Social science or humanities	9
Humanities or social science	9	² Supporting science	9-15
¹ Electives	24	Electives	21-27

Department of Chemistry

Undergraduate and graduate majors: agricultural chemistry, analytical chemistry, biochemistry, forest products chemistry, inorganic chemistry, organic chemistry, physical (including colloidal) chemistry, radiochemistry.

Common Freshman Year		Common Sophomore Year	
	Hours		Hours
General Chemistry (Ch 204,205,206).....	15	Organic Chemistry (Ch 334,335,336)	9
Mathematics (Mth 104,200,201)	12	Organic Chemistry Laboratory (Ch 337, 338,339)	6
³ German	12	^{3, 4} Foreign language or approved courses in humanities or social sciences.....	9-12
English Composition (Wr 111,112,113)....	9	Mathematics (Mth 202,203,321)	11
Physical education	3	General Physics (Ph 207,208,209)	12
		Physical education	3

Major in Chemistry

Analytical chemistry, inorganic chemistry, organic chemistry, physical (including colloidal) chemistry, forest products chemistry.

Junior Year ⁵		Senior Year	
	Hours		Hours
Analytical chemistry (Ch 420,421,422 or 435)	11-12	⁴ Approved upper division chemistry course	9-15
Physical Chemistry (Ch 440,441,442).....	9	⁷ Biology requirement or other science elective	9
Physical Chemistry Laboratory (Ch 443, 444,445)	3	⁸ Special project (thesis) or elective	9
⁷ Biology requirement or other science elective	9	Descriptive Inorganic Chemistry (Ch 411,412,413)	6
Elective (honors)	3-6	Elective, or approved courses in humanities or social sciences.....	9
⁴ Approved courses in humanities or social sciences	9		

Major in Agricultural Chemistry

(See Common Freshman and Sophomore Year)

Junior Year		Senior Year	
	Hours		Hours
Analytical chemistry (Ch 420,421,422 or 435)	12	Approved electives in biochemistry or plant biochemistry	12
Physical Chemistry (Ch 440,441,442).....	9	Approved courses in social science.....	9
Physical Chemistry Laboratory (Ch 443, 444,445)	3	Statistical Techniques (St 314).....	3
⁴ Approved courses in humanities	9	⁹ Electives	10
⁹ Electives including biological science sequence	15-12		

¹ Should be devoted largely to upper division courses in botany.

² Courses may be taken in entomology, genetics, geology, microbiology, or physics, or additional work may be taken in the fields of chemistry, mathematics, or zoology.

³ Students may postpone German or social sciences during the freshman and sophomore year in order to take defense education.

⁴ Students in air, military, or naval science will adjust electives and other courses to make this work possible.

⁵ The student is encouraged to take, if possible, a year of modern physics (Ph 311,312, 313) in his junior year.

⁶ The 9 hours of advanced chemistry must be courses having prerequisite of 3 years of chemistry and must include 3 credit hours of actual laboratory work. Students interested in forest products chemistry should include Ch 470,471,472,473,474 and some microbiology.

⁷ Students having one year of biological science in high school may by petition reduce this requirement to 5 term hours.

⁸ Senior Honors program.

⁹ Junior or senior electives must include at least 9 hours of life sciences, which may include approved courses in agriculture or home economics.

Major in Biochemistry

(See Common Freshman and Sophomore Year)

Junior Year	<i>Hours</i>	Senior Year	<i>Hours</i>
¹ Analytical chem (Ch 420,421,422 or 435).....	12	Approved electives in biochemistry.....	15
Physical Chemistry (Ch 440,441,442).....	9	Approved courses in social science.....	9
Physical Chem Lab (Ch 443,444,445).....	3	Statistical Techniques (St 314).....	3
Biological science sequence (approved life science electives).....	15	² Electives.....	6
² Approved courses in humanities.....	9		

Department of Entomology

Undergraduate and graduate major: entomology.

Freshman Year ⁴	<i>Hours</i>	Sophomore Year	<i>Hours</i>
General Zoology (Z 201,202,203).....	9	General Entomology (Ent 200).....	3
⁶ General Chemistry (Ch 204,205,206).....	15	Economic Entomology (Ent 314).....	4
English Composition (Wr 111,112,113).....	9	Mathematics (Mth 100 or 101).....	4
Physical education.....	3	General Botany (Bot 201,202,203).....	9
Electives.....	9-3	Approved courses in humanities.....	9
Defense education or other elective.....	3-9	General Microbiology (Mb 204).....	4
		Physical education.....	3
		Electives.....	12
		Defense education or other elective.....	3-9
Junior Year	<i>Hours</i>	Senior Year	<i>Hours</i>
Approved courses in social science.....	9	Statistical Techniques (St 314).....	3
App upper div courses in entomology.....	15	Plant Ecology (Bot 341).....	4
Plant Pathology (Bot 351).....	5	App upper div courses in entomology.....	14
⁶ Electives.....	19	Electives.....	27

Department of Geology

Undergraduate and graduate majors: Geology, Paleontology.

Major in Geology

Freshman Year	<i>Hours</i>	Junior Year	<i>Hours</i>
English Composition (Wr 111,112,113).....	9	Structural Geology (G 321).....	4
Geology (G 201,202,203).....	9	Geomorphology (G 322).....	4
Geology Laboratory (G 204,205,206).....	3	Photogeology (G 323).....	4
General Chemistry (Ch 101,102,103).....	9	Approved courses in social science.....	9
Mathematics (Mth 101,102,200).....	12	Technical Report Writing (Wr 227).....	3
Physical education.....	3	Field Methods (G 380).....	3
Defense education or other elective.....	3-9	⁸ Electives.....	21
Sophomore Year	<i>Hours</i>	Senior Year	<i>Hours</i>
Mineralogy, Rock Study (G 312,313,314).....	12	Upper division geology sequence.....	12
Approved courses in humanities.....	9	Seminar (G 407).....	3
General Physics (Ph 201,202,203).....	12	Paleontology or other biological science.....	9-12
Physical education.....	3	⁹ Electives.....	18
⁷ Electives.....	19		
Defense education or other elective.....	3		

Major in Paleontology

Students majoring in paleontology follow the geology curriculum but substitute zoology for physics.

¹ Chemistry 435 is recommended.² Students in defense education will adjust electives and other courses to make this advanced work possible.³ Students majoring in agricultural chemistry or biochemistry may take a life science elective instead of Mth 321.⁴ Students planning to specialize in forest entomology should confer with Dr. Julius Rudinsky.⁵ Prospective economic entomologists should elect Ch 226,227, and 252, or their equivalent as early as convenient.⁶ Junior or senior electives must include at least 9 hours of life sciences, which may include approved courses in agriculture or home economics.⁷ Recommended courses are Ch 206; Mth 201,202,203; languages (German, French, or Russian).⁸ Recommended courses are Ch 234,241,321,322, 323 or 340; NR 421,422,423; Ph 311,312, 313; Oc 331, 432; St 314,315.⁹ Students intending to pursue graduate training should elect an approved language.

Department of Mathematics

Undergraduate majors: mathematics with emphasis on any of the fields of the graduate majors; actuarial mathematics; computer mathematics; secondary teaching.

Graduate majors: analysis, algebra, geometry, applied mathematics.

Freshman Year		Sophomore Year	
	Hours		Hours
Approved courses in humanities	9	¹ Mathematics (Mth 202,203)	8
¹ Mathematics (Mth 104,200,201).....	12	Approved courses in social science.....	9
English Composition (Wr 111,112,113)..	9	Approved courses in physical science.....	9
Physical education	3	Physical education	3
² Electives	12-6	² Electives	16-10
Defense education or other elective.....	3-9	Defense education or other elective.....	3-9
Junior Year		Senior Year	
	Hours		Hours
Upper division mathematics	18	⁴ Approved senior mathematics sequence..	9
³ Approved group in biological science	9	Electives (including courses leading to	
Electives	21	graduate minors)	39

Department of Microbiology and Hygiene

Undergraduate majors: microbiology, sanitary microbiology.

Graduate majors: microbiology, dairy microbiology, food microbiology, hygiene and sanitation, industrial microbiology, microbial physiology, soil microbiology.

Common Freshman Year		Common Sophomore Year	
	Hours		Hours
General Zoology (Z 200)	5	Approved courses in humanities	9
English Composition (Wr 111,112,113)..	9	Organic Chemistry (Ch 226,227).....	10
General Chemistry (Ch 204,205,206).....	15	Quantitative Analysis (Ch 234)	5
Physical education	3	General Microbiology (Mb 204,205).....	8
Electives	14-8	Physical education	3
Defense education or other elective.....	3-9	Electives	10-1
		Defense education or other elective.....	3-9

Microbiology

Junior Year		Senior Year	
	Hours		Hours
Approved courses in social science.....	9	Approved upper division microbiology	
General Physics (Ph 201,202,203).....	12	courses	15
Elementary Physical Chemistry (Ch 340)	3	⁵ Approved electives	30
⁴ Approved upper division microbiology.....	15	Seminar (Mb 407)	1
⁵ Approved electives	9		

Sanitary Microbiology

Junior Year		Senior Year		
	Hours		Hours	
Approved courses in social science.....	9	Approved upper division microbiology.....	13	
Clinical Laboratory Methods (Mb 341)..	5	Pathogenic Microbiology (Mb 432).....	3	
Food Sanitation Microbiology (Mb 411)	4	Pathogenic Microbiology Lab (Mb 433)	2	
Approved upper division microbiology.....	3	Epidemiology (Mb 453)	3	
Community Health Problems (Mb 424, 425,426)	9	Food Microbiology (Mb 460)	4	
Abridged General Physics (Ph 211,212)	6	Microb of Water and Sewage (Mb 470)	4	
Market Milk (FST 310)	3	Fed and State Food Reg (FST 421)	2	
Approved electives	9	Seminar (Mb 407)	3	
		Approved electives	15	
		Suggested electives: Mb 321,401,412, 421, 431, 441, 442, 451, 452, 480, 481, 490; Ch 234,450,451,452; Ent 412; SED 431,432,433; Mth 101,102,200; AnS 351; FST 412,423,424; CE 414; Wr 227; Z 331,332,456.		

¹ Well prepared freshmen may enroll directly in Mth 200 by passing appropriate placement tests. Attention is also directed to Mth 107,108, and several junior level courses in mathematics open to freshmen or sophomores who have passed Mth 200.

² A foreign language (French, German, Russian) is strongly recommended for those who plan to do graduate work in mathematics.

³ On petition, this requirement may be reduced to 5 hours for those with a year of high school biology who wish to earn degrees in both mathematics and engineering.

⁴ Approved sequences are Mth 411,412,413; Mth 421,422,423; Mth 431,432,433; Mth 441, 442,443; Mth 451,452,453; Mth 462, 463; Mth 471,472,473.

⁵ Mathematics, modern language, biochemistry, and physical chemistry recommended for those who plan to obtain the Ph.D.

Department of Natural Resources

Undergraduate major: natural resources.
Graduate major and minor: natural resources.

Freshman Year		Sophomore Year	
	Hours		Hours
English Composition (Wr 111,112,113).....	9	Approved courses in humanities.....	9
General Chemistry (Ch 101,102,103).....	9	Cartography (NR 261,262,263).....	9
Intro Geography (Geog 105,106,107).....	9	General Botany (Bot 201,202,203).....	9
Physical education	3	Soils (SlS 210)	5
¹ Electives	15-9	Physical education	3
Defense education or other elective.....	3-9	¹ Electives	9-3
		Defense education or other elective	3-9
Junior Year		Senior Year	
	Hours		Hours
Physical Geography (NR 327,328,329).....	9	Aerial Photointerpretation (NR 413)	3
Phys Geog Lab (NR 321,322,323).....	3	World Resources (NR 421,422,423).....	9
Techniques of Field Research (NR 361)	5	Conserv (NR 411)	3
Geog of Pacific Northwest (Geog 323).....	3	Seminar (NR 407)	3
¹ Electives in resource fields.....	18	Thesis (NR 403)	6
¹ Electives	10	¹ Electives	24

Department of Oceanography

Degrees in oceanography are granted only at the graduate level in the fields of physical oceanography, biological oceanography, chemical oceanography, geological oceanography, or geophysics.

Undergraduate preparation should include: (1) a bachelor's degree in one of the following subjects—a physical science, a biological science, fisheries, or engineering; (2) mathematics through calculus; (3) general chemistry; and (4) general physics.

Department of Physics

Undergraduate majors: classical and modern physics with emphasis, if desired, on one of the fields of the graduate majors.

Graduate majors: atomic physics, theoretical physics, applied physics, nuclear physics, physics of the solid state, photography, electronics, and meteorology.

Freshman Year		Sophomore Year	
	Hours		Hours
General Physics (Ph 207,208,209).....	12	Intro Mod Physics (Ph 311,312,313).....	9
Trigonometry (Mth 104).....	4	Calc with Anal Geom (Mth 202,203).....	8
Calc with Anal Geom (Mth 200,201).....	8	Applied Diff Equations (Mth 321).....	3
English Composition (Wr 111,112,113).....	9	General Chemistry (Ch 204,205,206).....	15
Physical education	3	Physical education	3
Electives	9-3	¹ Electives	7-3
Defense education or other elective.....	3-9	Defense education or other elective.....	3-7
Junior Year		Senior Year	
	Hours		Hour
Electricity and Magnetism (Ph 331,332)	8	Mechanics (Ph 424,425,426)	9
Thermodynamics and Heat Measurements (Ph 353).....	4	Atomic & Nuc Phys (Ph 474,475,476).....	9
Geometrical and Physical Optics (Ph 465,466).....	6	Electronics (Ph 430) if Ph 437,438,439 is not elected	3
Applied Diff Equations (Mth 322,323).....	6	Approved courses in social science.....	9
Approved courses in humanities.....	9	² Electives	18
Approved courses in biological science.....	9		
² Electives	6		

Curriculum in Engineering Physics

Students electing the program in engineering physics should register in the School of Engineering.

¹ See departmental recommendations on use of electives.

² Mathematics; German, Russian, French; Ph 477,478,479 and Ph 511,512,513 recommended for those who plan to do graduate work.

Department of Science Education

Undergraduate and graduate majors: biological science (general biology, health education), general science, mathematics, physical science.
For requirements of this department see "Science Education" under SCHOOL OF EDUCATION. Students who complete the health education teaching major meet the requirements for a major in the School of Science.

Department of Zoology

Undergraduate majors: zoology with emphasis, if desired, on one of the fields of the graduate majors.
Graduate majors: anatomy and embryology, physiology, invertebrate zoology and parasitology, cellular biology, genetics, and natural history and ecology.

Freshman Year

	<i>Hours</i>
English Composition (Wr 111,112,113).....	9
General Zoology (Z 201,202,203).....	9
General Chemistry (Ch 204,205,206).....	15
Physical education.....	3
Electives.....	3-9
Defense education or other elective.....	3-9

Sophomore Year

	<i>Hours</i>
Approved courses in humanities.....	9
Comp Vert Anat (Z 324,325).....	8
Comp Vert Embry (Z 326).....	4
General Botany (Bot 201,202).....	6
Mathematics or physics sequence.....	12
Physical education.....	3
Electives.....	0-3
Defense education or other elective.....	3-9

Junior Year

	<i>Hours</i>
Approved electives in invert zoology.....	8-10
Genetics (Z 341).....	3
Organic Chemistry (Ch 226,227).....	10
Approved courses in social science.....	9
Electives.....	16-18

Senior Year

	<i>Hours</i>
Approved electives in physiology.....	9-15
Zoology option (see requirements under zoology).....	10-13
Electives.....	20-29

General Science

The Department of General Science offers the opportunity of studying science in its broad aspect. It is an ally of all the science departments, integrating and correlating the specialized branches. Courses aim to give the student a comprehensive view of science as a division of knowledge.

Through a general science major students pursue a broad program of study in science, either for a liberal arts degree or as preparation for professional service involving general science. Through the interdepartmental undergraduate and graduate majors, students pursue one of the sciences such as biophysics, geophysics, life sciences, seismology, oceanography, and other fields involving joint majors. The courses also are open to students majoring in a particular science and to students in the professional schools.

Lower Division Courses

GS 101,102,103. **General Biology.** 4 hours each term. 3 (1) 1 (2)
Biological principles applied to both plants and animals.

GS 104,105,106. **Physical Science.** 4 hours each term. 3 (1) 1 (2)
Physics, chemistry, astronomy, and geology; the scientific method. For majors in fields other than the physical sciences.

GS 111,112,113. **Readings in Science.** 1 hour each term.
Independent reading in science, self-directed study through a modified tutorial approach emphasizing individual conferences. Reserved for School of Science Honors Freshmen.

¹ Students who have earned 6 term hours in one or more of the biological sciences prior to taking GS 101,102,103 are not allowed to count credit earned in the latter toward graduation except with the approval of the dean of the School of Science. A similar limitation exists regarding GS 104,105,106.

- GS 214,215,216. **Explorations in Science.** 1 hour each term.
Independent, self-directed reading with conferences on the nature of scientific thought and discovery. Reserved for School of Science Honors Sophomores.

Upper Division Courses

- GS 321,322,323. **Advanced Physical Science.** 3 hours each term. 3 ①
A synthesis of modern ideas concerning man's physical environment. Prerequisite: one year of college physical science and Mth 100. CREWS.
- GS 341. **Bioecology.** 3 hours. 2 ① 1 ③
Plants and animals in their life processes and their reaction upon the environment; human relations and bioeconomics. Prerequisite: one year of biological science and junior standing. BEER.
- GS 342. **Biogeography.** 3 hours. 3 ①
Plant and animal distribution; faunas and floras; biogeographic areas. Prerequisite: one year of biological science, GS 341, and junior standing. BEER.
- GS 401. **Research.** Terms and hours to be arranged.
- GS 403. **Thesis.** Terms and hours to be arranged.
- GS 405. **Reading and Conference.** Terms and hours to be arranged.
- GS 407. **Seminar.** Terms and hours to be arranged.
- GS 411,412,413. **History of Science.** (G) 2 hours each term. 2 ①
Science from beginnings with emphasis on scientific method and spirit. Prerequisite: 18 hours of science. Offered alternate years. Offered 1963-64. HUMPHREY.
- GS 421,422,423. **Classics of Science.** (G) 2 hours each term. 2 ①
Works notable in development of science studied for (1) significance to science and (2) form; biographies of men of science studied as background. Prerequisite: 18 hours of science. Offered alternate years. Not offered 1963-64. HUMPHREY.
- GS 431. **Physical Limnology.** (G) 3 hours spring. 3 ①
Physical and chemical processes in lakes and rivers; making physical measurements; field work. Prerequisite: senior or graduate standing; two years of biological science.
- GS 451. **Radiation Biology.** (G) 3 hours. 3 ①
Effects on living organisms; genetic effects; atomic bombs and fall-out injury; research application of radiation. Senior standing in School of Science or equivalent required. CONTE.
- GS 452,453. **Radiation Biology.** (G) 3 hours each term. 2 ① 1 ③
Effects on living organisms; experiments and research applications. Senior standing in School of Science or equivalent required.
- GS 454. **Experimental Radiobiology.** (G) 2 hours spring. 1 ① 1 ③
Interaction with physical and biological media; methods and measurement with associated problems in radiation protection. Prerequisite: GS 451. Not offered 1963-64.

Backgrounds for Nursing

- Nur 111. **Backgrounds for Nursing.** 3 hours. 3 ①
Modern social and health movements; relation to evolution of nursing as a profession; present aims and problems in nursing at home and abroad. OLSON.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- GS 501. **Research.** Terms and hours to be arranged.
- GS 503. **Thesis.** Terms and hours to be arranged.
- GS 505. **Reading and Conference.** Terms and hours to be arranged.

GS 507. **Seminar.** Terms and hours to be arranged.

*The courses below marked * are for high school teachers of science. They do not prepare for science research. Graduate standing is prerequisite to all these courses which are applicable toward the M.S. in general science for high school science teachers. These courses are not applicable toward a graduate major in one of the special sciences. For full descriptions see Summer Session Catalog.*

*Bot 521. **Taxonomy and Field Botany.** 3 hours summer.

*Bot 522. **Preparation of Botanical Materials.** 3 hours summer.

*Bot 571. **Morphology of Lower Plants.** 3 hours summer.

*Bot 572. **Morphology and Anatomy of Seed Plants.** 3 hours summer.

*Ch 561. **Advanced Inorganic Chemistry.** 6 hours summer.

*Ch 562. **Organic Chemistry.** 6 hours summer.

*Ch 563. **Physical Chemistry.** 6 hours summer.

Physical chemical principles applied in engineering and the biological sciences. Use of mathematics minimized, but some knowledge of physics expected.

*GS 511. **History of Biological Science.** 3 hours summer.

*GS 541. **Bioecology.** 3 hours summer.

*G 517. **Geology for Teachers.** 3 hours summer.

*G 530. **Historical Geology.** 3 hours summer.

*G 550. **Rocks and Minerals.** 3 hours summer.

*G 552. **Geology of Northwest.** 3 hours summer.

Mth 591. **Mathematics for High School Teachers: Arithmetic.** 3 hours summer.

*Mth 592. **Mathematics for High School Teachers: Algebra.** 3 hours summer.

*Mth 593. **Mathematics for High School Teachers: Geometry.** 3 hours summer.

Ph 520. **Astronomy.** 3 hours summer.

*Ph 581. **Modern Physics.** 3 hours summer.

Ph 582. **Modern Physics.** 3 hours summer.

Ph 583. **Modern Physics.** 3 hours summer.

Nuclear reactions; molecular and solid state physics. Prerequisite: Ph 582.

Ph 591. **Meteorology.** 3 hours summer.

Z 541. **Heredity.** 3 hours summer.

*Z 554. **Invertebrate Zoology.** 3 hours summer.

- *Z 556. **Collection and Preparation of Zoological Materials.** 3 hours summer.
- *Z 560. **Cells and Tissues.** 3 hours summer.
- *Z 577. **Ornithology.** 3 hours summer.
- *Z 578. **Field Natural History.** 3 hours summer.

Botany

Courses offered provide comprehensive and advanced training for majors in all fields of botany or for those who wish a liberal arts major in botany. Selected courses will also provide a foundation for work in such professional fields as farm crops, horticulture, range management, forestry, and fish and game management.

Training in the professional fields prepares students: (1) to be plant pathologists, plant physiologists, or to fill other specialized positions at experiment stations, or to teach or do research in colleges or universities; (2) for technical positions in which a knowledge of botany is essential, such as in agricultural extension, plant disease control, plant quarantine inspection, fish and game management, and seed testing; and (3) for advanced study and research in such fields as farm crops, horticulture, forestry, and paleontology.

Excellent greenhouse facilities are available for botanical instruction and research. The herbarium collections total more than 180,000 specimens including classified specimen sheets of higher plants and collections of parasitic fungi.

An extensive and diversified research program relating to plant disease is conducted by state and federal investigators. A number of graduate students are granted research assistantships that enable them to gain valuable training in research under guidance of these investigators. Undergraduate students also have opportunity to obtain part-time employment and experience in research.

Lower Division Courses

- 3 ②; 3 ②; 1 ① 1 ② 1 ③
- Bot 201,202,203. **General Botany.** 3 hours each term.
How plants get their food, grow, differentiate, and reproduce. *Bot 201*: seed plants; *Bot 202*: lower plants; *Bot 203*: identification of native plants; use of keys, floral morphology.

Upper Division Courses

- Bot 314. **Agrostology.** 3 hours fall. 2 ① 2 ③
Taxonomy of grasses. Identification in vegetative condition and in flower. Prerequisite: Bot 203. CHAMBERS.
- Bot 316. **Aquatic Plants.** 3 hours fall. 1 ① 2 ③
Ecology, taxonomy, and economic significance. Prerequisite: Bot 203 or equivalent. PHINNEY.
- Bot 320. **Fungus Deterioration of Wood Products.** 3 hours winter. 2 ① 1 ③
Relation of decay in standing timber to decay of wood products; fungus deterioration of logs, lumber, and remanufactured products. Prerequisite: Bot 201,202. Offered alternate years. Not offered 1963-64.
- Bot 321. **Systematic Botany.** 4 hours spring. 2 ① 2 ③
Vascular plants. Plant classification; collection and identification. Prerequisite: Bot 201, 203, or equivalent. CHAMBERS.

- Bot 331. **Plant Physiology.** 5 hours fall or spring. 2 ① 3 ②
Physiological processes stressing modern concepts and areas of research. Prerequisite: Bot 201,202, and one year of chemistry.
- Bot 341. **Plant Ecology.** 4 hours fall or spring. 2 ① 2 ②
Structure, methods of analysis, environmental relations, and dynamics of vegetation with application to fields of agriculture. Prerequisite: Bot 201,202,203. CHILCOTE.
- Bot 351. **Plant Pathology.** 5 hours fall or spring. 2 ① 3 ②
Cause, symptoms, effects, spread, and control of plant diseases. Prerequisite: Bot 201, 202. DEEP.
- Bot 371. **Structure of Seed Plants.** 4 hours winter. 2 ① 2 ③
Morphology, anatomy, and reproduction. Prerequisite: Bot 201,202. SMITH.
- Bot 401. **Research.** Terms and hours to be arranged.
- Bot 403. **Thesis.** Terms and hours to be arranged.
- Bot 405. **Reading and Conference.** Terms and hours to be arranged.
- Bot 407. **Seminar.** 1 hour each term.
- Bot 411,412,413. **Morphology.** (G) 4 hours each term. 2 ① 2 ②
Fall: algae, fungi, lichens. *Winter:* bryophytes, pteridophytes. *Spring:* spermatophytes. Prerequisite: Bot 201,202,203, and three terms of upper division biology. PHINNEY.
- Bot 415. **Forest Pathology.** (g) 4 hours winter. 2 ① 2 ②
Disease in relation to forest development, protection, and harvest. Prerequisite: Bot 201,202; F 231 or Bot 351. ROTH.
- Bot 421,422,423. **Advanced Systematic Botany.** (G) 3 hours each term. 2 ① 1 ③
Fall: variation; ecotypes, introgressive hybridization, genetic isolation. *Winter:* speciation; genetic systems, polyploidy, apomixis, structural hybridity. *Spring:* selected studies of phylogeny of vascular plants. Prerequisite: Bot 321. CHAMBERS.
- Bot 431,432,433. **Advanced Plant Physiology.** (G) 3 hours each term. 3 ①
Plant-water relationships; synthesis and metabolism of organic compounds; mineral nutrition; hormones; bioelectric phenomena. Prerequisite: Bot 331 and one term organic chemistry.
- Bot 441,442,443. **Advanced Plant Ecology.** (G) 3 hours each term. 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. CHILCOTE.
- Bot 452. **Field Crop Diseases.** (g) 3 hours spring. 1 ① 2 ②
Identification, development, and control. Prerequisite: Bot 351. Offered alternate years. Offered 1963-64. HORNER.
- Bot 453. **Diseases of Ornamental and Nursery Plants.** (g) 3 hours spring. 1 ① 2 ②
Identification, development, and control. Prerequisite: Bot 351. Offered alternate years. Not offered 1963-64. DEEP.
- Bot 461. **Mycology.** (G) 4 hours fall. 2 ① 2 ③
Occurrence, significance, structure, function, and relationships of molds and other saprophytic fungi and plant pathogenic forms. Prerequisite: Bot 201,202, and three terms of upper division biological science. ROTH.
- Bot 462,463. **Mycology.** (G) 3 hours winter, spring. 1 ① 2 ③
Winter: identification of fungi with emphasis on plant pathogenic forms. *Spring:* special problems. Prerequisite: Bot 461. ROTH.
- Bot 470. **Microtechnique.** (G) 4 hours winter. 3 ③
Preparation of permanent microscope slides of plant materials. Prerequisite: Bot 201, 202, and two terms of upper division biology. SMITH.

- Bot 471. **Plant Anatomy.** (G) 4 hours fall. 2 ① 2 ③
Origin, structure, and development of plant tissues. Prerequisite: Bot 201,202,371, and two terms of upper division botany or equivalent. SMITH.
- Bot 472. **Plant Cytology.** (G) 5 hours spring. 3 ① 2 ②
Cell components; nuclear and cell division, meiosis, heteroploidy, gametophyte development, and fertilization. Prerequisite: Bot 201,202, and two terms of upper division botany or equivalent. SMITH.
- Bot 490. **Paleobotany.** (G) 4 hours spring. 2 ① 2 ③
Paleobotanically important plants; plant history revealed in fossil records; tertiary flora of Oregon. Prerequisite: general geology or general botany. Offered alternate years. Not offered 1963-64. PHINNEY.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- Bot 501. **Research.** Terms and hours to be arranged.
- Bot 503. **Thesis.** Terms and hours to be arranged.
- Bot 505. **Reading and Conference.** Terms and hours to be arranged.
- Bot 507. **Seminar.** Terms and hours to be arranged.
GENERAL SEMINAR. 1 hour each term.
PLANT PATHOLOGY SEMINAR. 1 hour each term.
- Bot 511. **Fresh-Water Algae.** 4 hours spring. 2 ① 2 ③
Taxonomy and ecology. Prerequisite: Bot 411 or Z 451. PHINNEY.
- Bot 512. **Marine Algae.** 4 hours spring. 2 ① 2 ③
Taxonomy and ecology. Prerequisite: Bot 411 or Z 451. PHINNEY.
- Bot 515. **Forest Pathology.** 3 hours winter. 2 ① 1 ③
Forest disease problems; organized to meet needs of individual students in forest management or forest pathology. Prerequisite: Bot 351 or 415, or equivalent. Offered alternate years. Offered 1963-64. ROTH.
- Bot 531,532,533. **Research Methods in Plant Physiology.** 2 hours each term. 2 ③
Modern methods used in research in plant physiology supplemented by assigned reading and conference. Prerequisite or parallel: Bot 431.
- Bot 534. **Mineral Metabolism.** 3 hours winter. 2 ① 1 ③
Mineral elements in metabolic processes; ion accumulation in cells. Prerequisite: Ch 450. EVANS.
- 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. CHILCOTE.
- Bot 551. **Virus Diseases of Plants.** 3 hours fall. 2 ① 1 ③
Nature and properties; plant reactions; classification and nomenclature; transmission; control. Prerequisite: Bot 351; 6 hours of upper division biological science. MILBRATH.
- Bot 552. **Bacterial Diseases of Plants.** 3 hours winter. 2 ① 1 ③
Symptoms, etiology, and control; causal agents. Prerequisite: Bot 351; Mb 204; 6 hours of upper division biology. Offered alternate years. Offered 1963-64. DEEP.
- Bot 553. **Fungus Diseases of Plants.** 3 hours spring. 2 ① 1 ③
Symptoms, etiology, and control; infection phenomena; host-parasite relationships. Prerequisite: Bot 351 or equivalent; 6 hours of upper division botany. VAUGHAN.
- Bot 554. **Nematode Diseases of Plants.** 4 hours winter. 2 ① 2 ②
Nematology; identification and biology of nematodes; symptoms and control. Prerequisite: Bot 351 or equivalent and 6 hours of upper division biology. JENSEN.

- Bot 560. **Plant Disease Control.** 3 hours winter. 2 ① 1 ③
Principles; action of fungicides and antibiotics. Prerequisite: Bot 351; Ch 226,227, or equivalent. Offered alternate years. Not offered 1963-64. CORDEN.
- Bot 564. **Physiology of Fungi.** 4 hours spring. 3 ① 1 ③
Fungus growth, reproduction, survival; their raw materials, metabolism, products; chemical and physical agents; variation. Prerequisite: Bot 461; Organic Chemistry. BRANDT.
- Bot 566. **Physiology of Parasitism.** 4 hours winter. 2 ① 2 ③
Fungal and bacterial plant pathogens and their hosts. Prerequisite: Bot 432,532; Ch 451. Offered alternate years. Offered 1963-64. CORDEN.
- Bot 570. **Cytological Microtechnique.** 4 hours spring. 3 ③
Preparation of slides for study of chromosomes during mitosis, meiosis, and pollen tube formation; smear techniques. Prerequisite: Bot 470 or equivalent. SMITH.
- Bot 573. **Plant Cytogenetics.** 4 hours winter. 2 ① 2 ②
Effects of variations in chromosome structure and number. Prerequisite: Z 341 and Bot 472.
- Bot 580. **Biological Micrography.** 2 hours winter. 2 ③
Applying optical research tools to various types of biological materials and problems. Prerequisite: graduate standing in biological science. PHINNEY.

Chemistry

The first three years of the chemistry curricula make provision for thorough grounding in fundamental chemistry and related sciences and other liberal studies. Undergraduate students major in chemistry as a field of concentration for a liberal arts degree or as preparation for professional work in the field of chemistry. Beginning with the second or third year numerous elective choices permit the student to begin more intensive study in one of the classical fields—analytical, inorganic, and physical, or in some field of special interest such as agricultural chemistry, biochemistry, colloids, electrochemistry, or forest products chemistry. The student is urged to broaden his training by utilizing some of the large number of elective hours to take courses in the humanities.

The Department of Chemistry aims to prepare its major students for (1) graduate work in pure or applied chemistry; (2) governmental work under the Civil Service; (3) teaching positions in colleges, universities, junior colleges, and secondary schools; (4) positions as research chemists and technical experts in commercial testing laboratories of all types and in chemical industries; (5) positions as chemists in laboratories of agricultural experiment stations or in industries specializing in manufacture of food or agricultural products. A student with an interest in chemistry who does not expect to make it a profession may, by careful choice and full use of the many electives, use the undergraduate curriculum as a core for an attractive liberal arts program.

Additional training beyond the baccalaureate degree is highly advantageous in obtaining better positions in any field of chemical activity whether it be teaching, governmental, or industrial work. Undergraduate curricula serve as a foundation for this specialization, and qualified students are encouraged to continue toward the master's or doctor's degree involving research.

Prerequisite to graduate work leading to an advanced degree with a major in chemistry is the completion of undergraduate work in chemistry, mathematics, physics, and biology substantially equivalent to that required of undergraduate students in the several chemistry curricula.

The curriculum, staff, library, and laboratory facilities of the Department of Chemistry have been examined by the Committee on Professional Training of Chemists of the American Chemical Society. Graduating chemistry majors are approved as having met all requirements of the American Chemical Society. The department is well equipped for graduate study and research, with a well-trained and diversified staff.

Lower Division Courses

- ¹Ch 101,102,103. **General Chemistry.** 3 hours each term. 2 ① 1 ③
For students who have had no previous training in chemistry and for those whose college aptitude test scores indicate need for a more elementary approach. This sequence and Ch 241 are prerequisite to Ch 221, Ch 226, Ch 234, or Ch 251.
- ¹Ch 201,202,203. **General Chemistry.** 3 hours each term. 2 ① 1 ③
Service course covering basic principles of general chemistry. Prerequisite: one year of high school chemistry and acceptable college aptitude scores.
- Ch 204,205,206. **General Chemistry.** 5 hours each term. 3 ① 2 ③
Professional course for students majoring in chemistry, pharmacy, and related sciences. Prerequisite: one year of high school chemistry and acceptable college aptitude scores.
- ¹Ch 221,222. **Organic Chemistry.** 4 hours each term. 3 ① 1 ③
General service course covering aromatic and aliphatic chemistry (for home economics students). Prerequisite: Ch 203 or Ch 241.
- Ch 226,227. **Organic Chemistry.** 5 hours each term. 3 ① 2 ③
Service course covering aromatic and aliphatic chemistry. Prerequisite: Ch 203 or 241.
- ^{1,2}Ch 234. **Quantitative Analysis.** 5 hours fall, winter, or spring. 2 ① 3 ③
Gravimetric and volumetric analysis. Service course for pharmacy, premedical, and medical-technology students. Prerequisite: Ch 203 or Ch 241.
- Ch 241. **Chemical Theory.** 4 hours fall. 3 ① 1 ②
Service course covering chemical principles. Designed to bring Chemistry 103 students up to level of training equivalent to that of Chemistry 203. Prerequisite: Ch 103.
- 3 ① 2 ③; 3 ①
- ¹Ch 251,252. **Organic Chemistry.** 5 hours fall, 3 hours winter.
General service course covering aromatic and aliphatic chemistry. Designed for agricultural students. Prerequisite: Ch 203 or Ch 241.

Upper Division Courses

- Ch 321,322,323. **Metallurgical Chemistry.** 3 hours each term. 1 ① 1 ⑥
Winning various metals from ores, including fire assaying; chemical treatment and analysis of Northwest minerals. Prerequisite: Ch 203 or Ch 241.
- Ch 334,335,336. **Organic Chemistry.** 3 hours each term. 3 ①
Professional course designed to meet the requirement of majors in chemistry and chemical engineering. Prerequisite: Ch 203 or Ch 206.
- Ch 337,338,339. **Organic Chemistry Laboratory.** 2 hours each term. 2 ③
Laboratory arranged to support the Ch 334,335,336 sequence and to include elementary organic analysis.
- Ch 340. **Elementary Physical Chemistry.** 3 hours. 3 ①
Aspects having application in engineering, biological sciences, and medicine. Mathematics minimized. Some knowledge of physics required. Prerequisite: Ch 203 or equivalent.
- Ch 350,351,352. **Biochemistry.** 3 hours each term. 3 ①
Service course for students majoring in agriculture and home economics. Prerequisite: Ch 227, or Ch 252, or Ch 222.

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 103, a maximum of 9 term hours is allowed; the terminal course being Ch 206, a maximum of 15 term hours is allowed. Credit for Ch 221 will not be allowed if Ch 226 is taken. Ch 251 and Ch 226 will not both be credited. Credit cannot be had for both Ch 420 and Ch 234.

² Ch 234 will be offered with 4 hours of credit in special section for students majoring in some curricula.

- Ch 353,354,355. **Biochemistry Laboratory.** 1 hour each term. 1 ③
Laboratory work to accompany Ch 350-2 sequence.
- Ch 370,371,372. **Glass Blowing.** 1 hour each term. 2 ②
Manipulation of glass and assembling setups. Prerequisite: Ch 226; Ph 311; or graduate standing. May be started any term.
- Ch 401. **Research.** Terms and hours to be arranged.
- Ch 403. **Thesis.** Terms and hours to be arranged.
- Ch 405. **Reading and Conference.** Terms and hours to be arranged.
- Ch 407. **Seminar.** Terms and hours to be arranged.
- Ch 411,412,413. **Descriptive Inorganic Chemistry.** (G) 2 hours each term. 2 ①
Inorganic elements and compounds from standpoint of periodic table and atomic structure; chemical conversion for industrial use. Prerequisite: three years of college chemistry. PARSONS.
- Ch 414. **Inorganic Laboratory.** (G) 1 hour each term, maximum 3 hours. 1 ③
- Ch 418. **History of Chemistry.** (G) 3 hours. 3 ①
Chemical theories and laws. Prerequisite: three years of chemistry.
- Ch 419. **Radioactive Tracer Methods.** (g) 4 hours. 2 ① 2 ③
Radiochemistry; radioisotopes; radioactivity; radiotracer methods as research tool in physical and biological science. Prerequisite: two years of college chemistry. WANG.
- Ch 420. **Quantitative Analysis.** (g) 4 hours. 2 ① 2 ③
Fundamental principles and laboratory practice. For chemistry majors. Prerequisite: Ch 206; Mth 321; and Ph 209. FREUND.
- Ch 421,422. **Instrumental Analysis.** (g) 4 hours each term. 2 ① 2 ③
Principles and practice; problems in quantitative chemistry. Prerequisite: Ch 420. FREUND.
- Ch 423,424,425. **Advanced Quantitative Analysis.** (g) 3 hours each term. 1 ① 2 ③
Alloys, ores, and other materials analyzed by classical, electroanalytical, and instrumental techniques. Prerequisite: Ch 421. PEEKEMA.
- Ch 426. **Chemical Microscopy.** (G) 3 hours fall. 1 ① 2 ③
Theory and use of microscope in microscopic measurements, quantitative analysis of mixtures, identification of organic compounds, optical crystallography, crystallization phenomena, etc. Prerequisite: three years of college chemistry, college physics. WILLIAMS.
- Ch 427,428,429. **Advanced Laboratory Methods.** (G) 2 hours each term. 1 ① 1 ③
Principles and practice in advanced organic laboratory techniques; distillation, fractionation, crystallization, filtration, chromatography, extraction, high and low pressure hydrogenation, chlorination, oxidation, and important methods of synthesis. Prerequisite: Ch 336,442. CHRISTENSEN.
- Ch 434. **Organic Preparations.** (G) 1 or 2 hours each term, maximum 5 hours. 1 ③ 2 ③
Important methods of synthesis, such as Grignard's, Friedel-Craft's, Perkin's reaction, and others. Prerequisite: Ch 336 or equivalent. PEASE.
- Ch 435. **Organic Analysis.** (G) 3 hours winter. 1 ① 2 ③
Qualitative tests and analysis of organic compounds and mixtures. Prerequisite: Ch 420, Ch 336 or 427. MARVELL.
- Ch 437,438. **Survey of Organic Chemistry.** (G) 3 hours each term. 3 ①
For advanced chemistry students who are not major students in organic chemistry, and for students who plan to take advanced work in organic chemistry, but have not passed the organic qualifying examinations. Prerequisite: Ch 336 or equivalent.

- Ch 440,441,442. **Physical Chemistry.** (g) 3 hours each term. 3 ①
Molecular weights, properties of liquids, solids, and solutions; chemical equilibrium, reaction kinetics, electrochemistry, atomic and molecular structure. Prerequisite: Mth 203. DECIUS, SCOTT.
- Ch 443,444,445. **Physical Chemistry Laboratory.** (g) 1 hour each term. 1 ③
- Ch 448,449. **Colloidal Chemistry.** (G) 3 hours each term. 3 ①
Classical and modern surface theory, absorption, membrane and bulk diffusion, nucleation and Donnan potential, lyophilic and lyophobic colloids, including proteins and clays. Prerequisite: three years of college chemistry. SLABAUGH.
- Ch 450,451,452. **Biochemistry.** (g) 2, 3, or 5 hours each term. 3 ① 2 ③
Lectures (3 hours) and laboratory (2 hours) may be taken either together or separately. *Fall:* Carbohydrates, proteins, and fats of importance in biological systems. *Winter:* Enzymes and vitamins. *Spring:* Metabolism. Prerequisite: Ch 222 or 227 or 252, or equivalents. Students who have taken the lecture for 3 hours each term may take the laboratory for 2 hours in later terms. Students qualifying for Ch 490 will not ordinarily be admitted to this course for credit.
- Ch 453. **Plant Biochemistry.** (G) 3 or 5 hours spring. 3 ① 2 ③
Chemical processes and metabolism in plant systems. Prerequisite: Ch 451. REMBERT.
- Ch 454,455,456. **Agricultural Biochemical Methods.** (G) Hours to be arranged. 2 ①, 2 or 3 ③
Advanced chemistry of colloids, carbohydrates, lipids, amino acids and proteins, vitamins, enzymes, pigments, etc., of both plant and animal significance. Newer analytical methods and techniques, both instrumental and chemical. Prerequisite: Ch 452. REESE.
- Ch 457. **Dairy Chemistry.** (g) 3 hours. 3 ①
Milk and milk products; the individual constituents of milk, including the enzyme systems; processing dairy products. Prerequisite: Ch 251. Ch 340 recommended. RICHARDSON.
- Ch 458. **Dairy Chemistry Laboratory.** (g) 2 hours. 2 ③
Laboratory course to accompany Ch 457. RICHARDSON.
- Ch 467. **Molecular Spectroscopy.** (G) 2 hours. 1 ① 1 ③
Infrared and other types of spectroscopy; identification and analysis of gases, liquids, crystalline and polymeric solids; molecular structure. Prerequisite: Ch 442. DECIUS.
- 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. KRUEGER.
- Ch 470. **Forest Products Chemistry.** (G) 3 hours fall. 3 ①
Natural plant materials with special attention to woods and other sources of cellulose, hemicellulose, lignin, and extractives. Prerequisite: Ch 336. KURTH.
- Ch 471. **Chemical Analysis of Wood and Related Products.** (G) 3 hours winter. 1 ① 2 ③
Laboratory methods. Prerequisite: Ch 234,336. KURTH.
- Ch 472,473. **Pulp and Paper Chemistry.** (G) 3 hours winter and spring. 3 ①
Fundamental processes of pulp and paper industry. Prerequisite: Ch 470. KURTH.
- Ch 474. **Pulp and Paper Chemistry.** (G) 3 hours spring. 2 ① 1 ③
Cellulose pulp and papers; cellulose-water relationships; properties of surfaces; raw materials, cooking, bleaching, beating, formation, pressing, and drying; the properties of pulps and papers. Prerequisite: Ch 203; Mth 203.
- Ch 480,481. **Survey of Physical Chemistry.** (G) 3 hours each term. 3 ①
For advanced chemistry students majoring in physical chemistry and for students who plan to take advanced work in physical chemistry but have not passed the physical chemistry qualifying examination. Prerequisite: Ch 442.
- Ch 482,483. **Thermodynamics.** (G) 3 hours each term. 3 ①
Chemical principles from standpoint of thermodynamics. Prerequisite: Ch 442. SCOTT, HEDBERG.

- Ch 484. **Electrochemistry.** (G) 3 hours. 3 ①
Theoretical and applied electrochemistry, including electrochemistry of solutions. With Ch 482,483 constitutes a year sequence. Prerequisite: Ch 442. SCOTT.
- Ch 490,491,492. **Biochemistry.** (G) 3 hours each term. 3 ①
Professional course to meet the requirements of majors in biochemistry. Students who have taken the lecture course may take the laboratory course in later terms. Prerequisite: Ch 336 and Ch 442.
- Ch 493,494. **Biochemistry Laboratory.** (G) 2 hours each term. 2 ③
Laboratory work to accompany Ch 490,491, and 492. GAMBLE.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- Ch 501. **Research.** Terms and hours to be arranged.
- Ch 503. **Thesis.** Terms and hours to be arranged.
- Ch 505. **Reading and Conference.** Terms and hours to be arranged.
- Ch 507. **Seminar.** Terms and hours to be arranged.
A reading knowledge of German and French is expected.
- Ch 511,512,513. **Advanced Inorganic Chemistry.** 2 hours each term. 2 ①
Chemistry of several groups of nonmetals and metals, complex compounds, and acid-base reactions and reactions in nonaqueous solvents. Prerequisite: Ch 442. NORRIS.
- Ch 516,517,518. **Radiochemistry.** 2 hours each term. 2 ①
Radioactivity, nuclear properties, nuclear reaction, and associated nuclear-chemical phenomena; application to theoretical and applied chemistry; instrumentation and laboratory techniques. Prerequisite: Ch 442. NORRIS.
- Ch 519. **Radioactive Tracer Technology.** 3 hours spring. 1 ① 2 ③
Radioactivity measurements; radioactive substances; simple tracer experiments; labeled compounds. Prerequisite: Ch 516,517. Ch 518 may be taken concurrently. WANG.
- Ch 520,521,522. **Advanced Analytical Chemistry.** 3 hours each term. 3 ①
Two terms on modern methods of analysis and their application to analytical chemistry of elements. Third term on special fields of current interest. Prerequisite: Ch 442. FREUND.
- Ch 523. **Organic Quantitative Microanalysis.** 3 hours. 1 ① 2 ③
Laboratory practice in methods. Prerequisite: Ch 336,422. WANG.
- Ch 525,526. **Instrumental Methods.** 3 hours winter and spring. 1 ① 2 ③
Special optical and electrical instrumental methods of analysis; spectroscopy, colorimetry, spectrophotometry, etc. Prerequisite: Ch 442. WILLIAMS, FREUND.
- 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. WANG.
- Ch 530,531,532. **Advanced Organic Chemistry.** 3 hours each term. 3 ①
Gives advanced students acquaintance with facts and theories essential to organic research. Prerequisite: passing grade in graduate qualifying examination. MARVELL.
- Ch 533,534,535. **Theoretical Organic Chemistry.** 3 hours each term. 3 ①
Three-term sequence serves as physical basis for structural organic chemistry, reaction mechanisms. Prerequisite: Ch 438,481, or equivalent. KICE.
- Ch 536,537,538. **Selected Topics in Organic Chemistry.** 2 hours each term. 2 ①
Topics: (1) organic nitrogen compounds; (2) carbohydrates; (3) terpenes; (4) organo-metallic compounds; (5) steroids; (6) heterocyclic compounds. Prerequisite: Ch 336 or equivalent. LOGAN.

- Ch 540,541,542. **Advanced Physical Chemistry.** 3 hours each term. 3 ①
Atomic and molecular structure; chemical bond; thermodynamic functions. Prerequisite: Ch 442. DECIUS.
- Ch 543,544,545. **Selected Topics in Physical Chemistry.** 2 hours each term. 2 ①
Reaction kinetics including photochemistry, phase rule, magnetochemistry, physical chemistry of solids, experimental determination of molecular structure, and solution chemistry. Not all topics covered each year. SLABAUGH, SCOTT, DECIUS, and HEDBERG.
- Ch 546. **Chemical Literature.** 1 hour. 1 ①
Use; character of various chemical journals, dictionaries, reference books, and other sources of information. GILBERT.
- Ch 550,551,552. **Selected Topics in Biochemistry.** 3 hours each term. 3 ①
Nonsequence courses designed to acquaint student with recent advances in biochemistry and their application to special fields of study. Ch 550: proteins or nucleic acids; Ch 551: enzymes; Ch 552: biological oxidation. Prerequisite: Ch 491. Students who have not had Ch 491 must have consent of instructor. BECKER, NEWBURGH, BAICH, MACDONALD, KING.
- Ch 554. **Biochemical Preparations.** 1 or 2 hours each term.
Preparation, purification, and analysis; chemical and biological resolutions. Maximum credit 6 hours. Prerequisite: Ch 336.
- Ch 555. **Biochemical Techniques.** 3 hours winter. 1 ① 2 ③
Concentration of biochemical compounds by recently developed methods; enzymic, manometric, and other special techniques. Prerequisite: Mth 203; Ch 452 or 453 or equivalent. GAMBLE.
- Ch 560,561,562. **Natural Products.** 2 hours each term. 2 ①
Organic chemistry of naturally occurring compounds, particularly steroids and terpenes. Prerequisite: Ch 438 or equivalent. BOND.

Entomology

Entomology courses are planned to acquaint the student with the relationship of entomology to other sciences, to train for commercial positions in entomology, to prepare for state and federal service in entomology, and to meet the needs of students from other departments. A student may major in entomology for a liberal arts degree as well as prepare for professional service in entomology or allied fields. Advanced work is offered in general entomology, economic entomology, forest entomology, insect toxicology, insect physiology, systematic entomology, aquatic entomology, and insect pathology. In addition to the regularly scheduled courses listed on the following pages, advanced seminars and reading and conference courses are offered in specialized subjects to provide further training tailored to the specific needs of the student. Various state and federal entomologists, not formally included on the teaching staff, are available for consultation in specialized areas. Advanced courses equip students specializing in entomology with sufficient fundamental groundwork for effective service in entomology or for further study.

Certain types of commercial and inspection work may not require more training than is represented by the bachelor's degree. The student who intends to engage in research work or college teaching should clearly appreciate the fact that the four-year curriculum does not give him adequate preparation for a career in these fields; additional study at the graduate level of from one to three years is essential.

Because of the department's close ties with agricultural experiment station work in entomology, many research facilities are available for use by students

and staff. These include the entomology farm, compartmented greenhouses, and the forest insect research laboratory. The entomology museum, containing over 350,000 specimens of insects and mites, is also available for research purposes. Research or teaching assistantships open to qualified graduate students provide valuable work experience.

Lower Division Course

- Ent 200. **General Entomology.** 3 hours spring. 2 ① 1 ②
For entomology majors and others interested in biology. Study of insects with emphasis on biology, ecology, classification, morphology, and physiology.

Upper Division Courses

- Ent 314. **Economic Entomology.** 4 hours fall or winter. 2 ① 2 ②
Primarily for agriculture and forestry students. Typical economic insect forms; insect-pest control. Prerequisite: one term of zoology or chemistry.
- Ent 321. **Forest Entomology.** 3 hours fall. 2 ① 1 ②
Forest losses due to insects; groups responsible; prevention and control. Prerequisite: one year of forestry or Ent 200.
- Ent 341. **Aquatic Entomology.** 3 hours spring. 1 ① 2 ②
Identification, collection, and ecology of aquatic insects. Prerequisite: upper division standing.
- Ent 401. **Research.** Terms and hours to be arranged.
Work on approved problems carried on in library, laboratory, or field.
- Ent 403. **Thesis.** Terms and hours to be arranged.
- Ent 405. **Reading and Conference.** Terms and hours to be arranged.
- Ent 407. **Seminar.** Terms and hours to be arranged.
- Ent 412. **Insects Affecting Man and Animals.** (G) 3 hours fall. 2 ① 1 ②
Life histories, disease vectors and carriers, control measures. Prerequisite: fundamental courses in entomology or zoology. Offered alternate years. Not offered 1963-64. GOULDING.
- Ent 423. **Advanced Forest Entomology.** (G) 3 hours winter. 2 ① 1 ③
Bark beetles, sawflies, Lepidoptera, and Homoptera injurious to forest trees. Prerequisite: Ent 321 or equivalent. Offered alternate years. Not offered 1963-64. RUDINSKY.
- Ent 425. **Forest Insect Dynamics.** (G) 3 hours spring. 2 ① 1 ③
Population dynamics; host susceptibility and resistance; host selection. Prerequisite: Ent 321, Ent 423. Offered alternate years. Offered 1963-64. RUDINSKY.
- Ent 431. **Biological Control.** (G) 3 hours spring. 3 ①
Relation of insect enemies to insect populations. Prerequisite: Ent 314 or equivalent. Offered alternate years. Offered 1963-64. MARTIN.
- Ent 441,442,443. **Advanced Economic Entomology.** (G) 3 hours each term. 2 ① 1 ③
Pesticides; legal aspects, residues, and resistance; field use of chemicals; cultural control, biological control, physical control, and resistant plants; insect sampling, rearing, experimental design and interpretation. Need not be taken in sequence. Prerequisite: For Ent 441: Chemistry through organic; for Ent 442 and Ent 443: Ent 314.
- Ent 451,452,453. **Systematic Entomology.** (G) 3 hours each term. 2 ③
Taxonomy, nomenclature, literature, phylogeny, and distribution of insects. Prerequisite: Ent 200,314. LATTIN.
- Ent 461. **General Acarology.** (G) 3 hours fall. 1 ① 2 ②
Taxonomy of mites and ticks; collection and preservation. Consent of instructor required. Prerequisite: Ent 314. Offered alternate years. Offered 1963-64. KRANTZ.

- Ent 463. **Historical Entomology.** (G) 3 hours winter. 3 ①
Basic and applied entomology and its relationship to the development of natural science. Prerequisite: Ent 200 or equivalent. LATTIN.
- Ent 472. **Forest Insect Survey and Control.** (G) 3 hours winter. 1 ② 1 ①
Aerial and ground survey techniques; population sampling methods; control by forest management, insecticides, and natural enemies. Prerequisite: Ent 321 or equivalent. Offered alternate years. Offered 1963-64. RUDINSKY.
- Ent 473. **Insect Ecology.** (G) 3 hours spring. 3 ①
Influence of environment on insect development, distribution, and behavior. Prerequisite: Ent 200 or 314. Offered alternate years. Not offered 1963-64. MARTIN.
- Ent 481. **Insect Morphology.** (G) 3 hours fall. 2 ① 1 ③
The external skeleton and its appendages. Prerequisite: Ent 200 or 314. MARTIN.
- Ent 482. **Insect Morphology.** (G) 3 hours winter. 3 ②
Morphology of internal organs. Prerequisite: Ent 200 or 314. MARTIN.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- Ent 501. **Research.** Terms and hours to be arranged.
- Ent 503. **Thesis.** Terms and hours to be arranged.
- Ent 505. **Reading and Conference.** Terms and hours to be arranged.
- Ent 507. **Seminar.** Terms and hours to be arranged.
- Ent 515. **Principles of Research.** 3 hours winter. 2 ① 1 ①
Investigative procedures; applied biometry; insect populations. Prerequisite: Ent 314 or equivalent, Ent 473; St 421. Offered alternate years. Not offered 1963-64. MARTIN.
- Ent 525. **Insect Transmission of Plant Viruses.** 3 hours fall. 2 ① 1 ③
Plant virus transmission by arthropods applied to field and laboratory. Prerequisite: Ent 452; Bot 551. Offered alternate years. Offered 1963-64. SWENSON.
- Ent 533. **Aquatic Entomology.** 4 hours fall. 2 ① 2 ②
Aquatic insects with emphasis on biologies, habitats; classification of major groups. Prerequisite: Ent 341 or equivalent. LATTIN.
- Ent 554. **Immature Insects.** 3 hours winter. 3 ②
Collection, preservation, and identification; taxonomy and morphology. Prerequisite: Ent 453,481. RITCHER.
- Ent 572. **Insect Physiology.** 3 hours spring. 2 ① 1 ③
Peculiar hexapod systems and functions such as metamorphosis, excretion, the integument, and haemolymph. Prerequisite: Ent 482 and organic chemistry. BROOKES.
- Ent 582. **Principles of Systematics.** 3 hours winter. 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 1963-64. STEPHEN.
- Ent 583. **Speciation and Distribution.** 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; genetics. Students who have not had genetics must have consent of instructor. Offered alternate years. Not offered 1963-64. STEPHEN.

- Ent 584. **Insect Pathology.** 3 hours winter. 2 ① 1 ③
 Diseases, including processes of infection, ecological factors, epizootiology, and biological control. Prerequisite: Ent 200 or equivalent, Ent 482. Offered alternate years. Offered 1963-64. THOMPSON.

Geology

The Department of Geology offers undergraduate majors for students who are interested in geology for a liberal arts degree, for a professional major in geology, and for a major in paleontology. The general major affords opportunity for wide electives in other fields. The department is equipped to offer graduate work in geology including advanced petrology, economic geology, advanced studies in structure, stratigraphy, sedimentation, or paleontology. A field course of at least nine hours is prerequisite to candidacy for an advanced degree.

Lower Division Courses

- ¹G 200. **Physical Geology.** 3 hours. 3 ①
 Elective short course on earth materials, processes, and history.
- ¹G 201,202,203. **Geology.** 3 hours each term. 3 ①
 Earth materials, processes, and structures; history of earth and life.
- G 204,205,206. **Geology Laboratory.** 1 hour each term. 1 ②
 Laboratory and field work to accompany G 201,202,203.
- G 221. **Basic Geology.** 3 hours. 2 ① 1 ③
 Physical geology including laboratory study of minerals, rocks, and topographic maps.

Upper Division Courses

- ¹G 312,313,314. **Mineralogy and Rock Study.** 4 hours each term. 2 ① 2 ③
 Crystal forms, physical and chemical properties; economic and rock-forming minerals; common rock types of special industrial importance. Prerequisite: chemistry. Students who have not had chemistry may take it concurrently.
- ¹G 315,316,317. **Mineralogy and Rock Study.** 3 hours each term. 1 ① 2 ②
 Prerequisite: one year of physical science.
- G 321. **Structural Geology.** 4 hours. 3 ① 1 ③
 Origin, interpretation, and mapping of joints, faults, cleavage, plutons, and folds. Prerequisite: G 201,202.
- G 322. **Geomorphology.** 4 hours. 3 ① 1 ③
 Surface features of the earth developed by erosion, deposition, earth movements, and volcanism. Prerequisite: general geology.
- G 323. **Photogeology.** 4 hours. 2 ① 2 ③
 Topographic maps, areal geologic maps, air photographs. Prerequisite: G 321,322.
- G 324,325. **Engineering Geology.** 3 hours each term. 2 ①
 Physical geology and its application in engineering and industry. Prerequisite: upper division standing. Some field trips required.
- G 330,331,332. **Life of the Past.** 3 hours each term. 3 ①
Fall: fossil collecting and classification; history of fossil plants and invertebrates. *Winter:* rise of vertebrates; emphasis on reptiles and mammals. *Spring:* geologic history of primates, especially man. Prerequisite: one year of biology or geology. G 330 not open to geology majors. May be taken in any sequence.

¹G 312,313,314 and 315,316,317 are parallel sequences and credit may not be obtained for both. Similarly, credit may not be obtained for both G 200 and G 201.

- G 340,341,342. **Invertebrate Paleontology.** 4 hours each term. 2 ① 2 ③
Major phyla of fossil invertebrates, with emphasis on comparative morphology of fossil and living representatives; important Paleozoic and Mesozoic guide fossils. Prerequisite: general geology or one year of biological science.
- G 350. **Rocks and Minerals.** 3 hours. 2 ① 1 ②
Prerequisite: upper division standing.
- G 352. **Geology of Oregon.** 3 hours. 3 ①
Origin and history of landscape features; for students without prior geologic background.
- G 380. **Field Methods.** 3 hours. 1 ① 1 ⑥
Geologic mapping and surveying; pace-and-compass traverses, plane table plotting. Prerequisite: one year of general geology.
- G 401. **Research.** Terms and hours to be arranged.
- G 403. **Thesis.** Terms and hours to be arranged.
- G 405. **Reading and Conference.** Terms and hours to be arranged.
- G 407. **Seminar.** 1 hour any term. 1 ①
- G 412,413,414. **Petrography.** (G) 4 hours each term. 2 ① 2 ③
Microscope used in identification of minerals and in rock classification. Prerequisite: G 312,313,314.
- G 420. **Geophysical Exploration.** (g) 3 hours. 3 ①
Physical methods used in mining and oil prospecting. Prerequisite: Ph 203; G 321,323.
2 ① 1 ②
- G 421,422. **Mining Geology and Industrial Minerals.** 3 hours each term.
Origin, occurrence, exploration, mining, technology, and uses of metals, nonmetallic minerals, and other geologic resources. Prerequisite: G 315,316,317 or G 312,313,314. Some field trips required.
- G 423. **Oil Geology.** 3 hours spring. 3 ①
Origin, occurrence, exploration, and technology of gas and oil. Prerequisite: G 201,202, 203. Some field trips required.
- G 424. **Biostratigraphy.** (G) 4 hours fall. 2 ① 2 ③
Use of fossils in chronology and correlations; paleo-ecology; stratigraphic succession of invertebrates; collection, preparation, and identification of megafossils. Prerequisite: G 340,341,342.
- G 430. **Principles of Stratigraphy.** (G) 4 hours fall. 3 ① 1 ③
Stratigraphic column; environmental, biologic, tectonic factors; correlation; field, laboratory procedures. Prerequisite: two years of geology including G 323.
- G 431. **Stratigraphy of North America.** (G) 4 hours. 3 ① 1 ③
The geologic development of the North American continent. Prerequisite: G 323,430.
- G 432. **Geologic History of the Pacific Coast.** (G) 4 hours. 3 ① 1 ③
Prerequisite: G 323,340,341.
- G 440. **Micropaleontology.** (g) 4 hours. 2 ① 2 ③
Collecting, preparation, classification, and identification of microfossils; biostratigraphy and ecologic evaluation of fossil foraminiferal assemblages. Prerequisite: three years of geology or zoology; G 340.
- G 441. **Advanced Micropaleontology.** (G) Terms and hours to be arranged.
Morphologic and stratigraphic studies of Paleozoic microfossils; fusulinids, conodonts, and ostracodes; study and photography of microfossils. Prerequisite: G 440.
- G 480. **Field Geology.** 12 hours.
Small area studied intensively in eight-week summer camp. Prerequisite: G 380.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- G 501. **Research.** Terms and hours to be arranged.
- G 503. **Thesis.** Terms and hours to be arranged.
- G 505. **Reading and Conference.** Terms and hours to be arranged.
- G 507. **Seminar.** Terms and hours to be arranged.
- G 512,513,514. **Petrology.** Hours to be arranged.
 Petrogenesis of igneous and metamorphic rocks. Prerequisite: G 414.
- G 520. **Petroleum Geology.** 3 hours spring. 2 ① 1 ③
 Origin, occurrence, and exploration of natural gas, petroleum, and oil shales. Prerequisite: G 321.
- G 521,522. **Economic Geology.** 3 hours each term. 2 ① 1 ③
 Origin and occurrence of metallic and nonmetallic ore deposits. Prerequisite: G 312, 313,314,414.
- G 523,524,525. **Sedimentary Petrology.** 3 hours each term. 1 ① 2 ③
 Laboratory analysis of sedimentary rocks. Prerequisite: G 323,414.
- G 541. **Spore and Pollen Analysis.** 4 hours spring. 2 ① 2 ③
 Preparation of sediments; interpretation of pollen profiles and diagrams. Prerequisite: G 440 or graduate standing in botany.
- G 560,561,562. **Fundamental Problems.** 3 hours each term. 3 ①
 Interior of the earth; basin deposition and case histories; igneous and metamorphic processes in continental evolution.
- OC 561. **Geological Oceanography.** 4 hours.
 See OCEANOGRAPHY.
- G 571,572,573. **Tectonics.** 3 hours each term. 3 ①
 Theoretical structural geology; geotectonics and regional structure of selected areas.
- G 580. **Graduate Field Geology.** Terms and hours to be arranged.
 Advanced field problems assigned to meet the requirements of the graduate student.

Mathematics

Mathematics is "the science which draws necessary conclusions" (Benjamin Peirce, 1870). The typical mathematician, whether "pure" or "applied," makes definitions and hypotheses, and then traces out their logical consequences. This "mathematical method" can be applied to any object of thought, including thought itself. Courses offered in the department develop this method in directions which will help students in the various branches of science and technology, as well as along paths which will produce mathematical specialists.

Placement examinations for incoming students are described under PROCEDURES AND REQUIREMENTS elsewhere in this catalog. Attention is especially directed to the procedure for advanced standing.

Undergraduate Majors. Informal options include: pure, applied, or actuarial mathematics; secondary teaching; and digital computing. Suggested course programs for these options, details about honors degree programs, and other information are included in a special departmental publication, obtainable on request.

Graduate Study. Master's and doctor's degrees may be earned in pure or applied mathematics. A program in computer science and technology is carried on jointly with the Department of Electrical Engineering. Further information will be sent on request.

Staff and Facilities. The faculty includes outstanding research workers and teachers in both pure and applied mathematics. There is an exceptionally good library. The department's Computing Laboratory is equipped with an Alwac III-E electronic digital computer, a magnetic drum machine with 8,192-word memory. Several research projects in analysis and applied mathematics, largely financed by government agencies and industry, help provide a stimulating environment.

Lower Division Courses

- Mth 10. Elementary Algebra.** No credit. 4 ①
Fundamental operations with polynomials and rational fractions, linear equations, and stated problems. For students with little or no algebra.
- Mth 100. Intermediate Algebra.** 4 hours. 4 ①
Functions and graphs, linear equations in two unknowns, quadratic equations, negative and fractional exponents, radicals, progressions, binomial theorem, logarithmic computation. Prerequisite: Mth 10 or equivalent.
- Mth 101. College Algebra.** 4 hours. 4 ①
Number systems, mathematical induction, determinants, theory of equations. Prerequisite: Mth 100 or equivalent.
- Mth 102. Trigonometry.** 4 hours. 4 ①
Trigonometric functions for general angles, solution of triangles, addition formulas, trigonometric equations, graphs, complex numbers, and De Moivre's theorem. Prerequisite: Mth 101 or equivalent.
- Mth 104. Algebra and Trigonometry.** 4 hours. 4 ①
Real numbers and sets, functions, inequalities, linear algebra, mathematical induction, trigonometric functions and graphs, algebraic and trigonometric equations. Prerequisite: mathematics placement examination.
- Mth 107,108. Finite Mathematics.** 4 hours each term. 4 ①
Symbolic logic, sets, and Venn diagrams; probability; vectors, and matrices; linear inequalities and programming; game theory. Prerequisite: Mth 100.
- Mth 110. Mathematics of Finance.** 4 hours. 4 ①
Simple and compound interest, annuities certain, present value, insurance, and elements of actuarial mathematics. Prerequisite: Mth 101.
- Mth 111,112. Mathematics for Elementary Teachers.** 3 hours each term. 3 ①
To aid prospective elementary teachers in understanding the nature of arithmetic. Concepts stressed rather than techniques.
- Mth 190. Freshman Honors.** 1 hour each term. 1 ①
Consent of instructor required.
- Mth 200,201,202,203. Calculus With Analytic Geometry.** 4 hours each term. 4 ①
Mth 200: Differentiation and integration; applications to rates, areas, volumes. *Mth 201:* Applications in mechanics; plane analytic geometry, elementary transcendental functions. *Mth 202:* Integration, vectors, solid analytic geometry. *Mth 203:* Partial differentiation, multiple integration, infinite series. Prerequisite: Mth 102 or Mth 104.
- Mth 290. Sophomore Honors.** 1 hour each term. 1 ①
Consent of instructor required.

Upper Division Courses

- Mth 321,322,323. **Applied Differential Equations.** 3 hours each term. 3 ①
 Linear ordinary differential equations arising in mechanics and electricity, numerical methods, vector calculus, complex variable, Laplace transforms, partial differential equations. Prerequisite: Mth 203.
- Mth 331. **Coordinate Geometry.** 3 hours. 3 ①
 A careful second look at Cartesian geometry of two and three dimensions. Prerequisite: Mth 200.
- Mth 332. **Projective Geometry.** 3 hours. 3 ①
 Analytic and synthetic projective geometry. Prerequisite: Mth 202.
- Mth 333. **Topology.** 3 hours. 3 ①
 Combinatorial and point set topology. Discussions of traversing networks and coloring maps followed by more rigorous general developments. Prerequisite: Mth 200.
- Mth 341. **Linear Algebra.** 3 hours. 3 ①
 Linear systems of equations, determinants. Prerequisite: Mth 202.
- Mth 342. **Theory of Equations.** 3 hours. 3 ①
 Algebraic polynomials and methods for finding their zeros. Prerequisite: Mth 201.
- Mth 343. **Theory of Numbers.** 3 hours. 3 ①
 Integers, Euclid's algorithm, diophantine equations, prime numbers, congruences, residues of powers, and quadratic residues. Prerequisite: Mth 200.
- Mth 351. **Computer Coding.** 3 hours. 3 ①
 Coding instruction and practical laboratory work on electronic digital computer. Prerequisite: Mth 200 or BA 213 and Mth 100.
- Mth 352. **Computer Laboratory.** 1 hour. 1 ①
 Prerequisite: Mth 351.
- Mth 353. **Symbolic Language Programing.** 3 hours. 3 ①
 Writing computer programs in the symbolic compiler languages ALCOM and FORTRAN. Prerequisite: Mth 200 or BA 213 and Mth 100.
- Mth 354. **ALGOL Programing.** 3 hours spring. 3 ①
 Writing computer programs in ALGOL, a universal algorithmic language for digital computers. Prerequisite: Mth 351 or 353.
- Mth 361. **Probability.** 3 hours. 3 ①
 Combinatorial problems, continuous distributions, expectation, laws of large numbers. Prerequisite: Mth 200.
- Mth 362. **Finite Differences.** 3 hours. 3 ①
 Difference techniques used in finite integration and series summations; solution of difference equations. Prerequisite: Mth 200.
- Mth 363. **Linear Programing and Games.** 3 hours. 3 ①
 Optimization subject to linear constraints, zero-sum two-person games; industrial and economic problems. Prerequisite or parallel: Mth 341.
- Mth 390. **Junior Honors.** 1 hour each term. 1 ①
 Enrollment in School of Science Honors Program or consent of instructor required.
- Mth 401. **Research.** Terms and hours to be arranged.
- Mth 403. **Thesis.** Terms and hours to be arranged.
- Mth 405. **Reading and Conference.** Terms and hours to be arranged.
- Mth 407. **Seminar.** Terms and hours to be arranged.
- Mth 411,412,413. **Pure Analysis.** (G) 3 hours each term. 3 ①
 Logically rigorous examination of the calculus. Prerequisite: Mth 203; 6 hours of upper division mathematics.

- Mth 414. **Foundations of Elementary Mathematics.** (g) 3 hours. 3 ①
Arithmetic, algebra, and geometry. Prerequisite: 3 hours of upper division mathematics.
- Mth 415. **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 416. **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.
- Mth 421. **Vector Analysis.** (G) 3 hours. 3 ①
Calculus of functions of two or more variables. Prerequisite: Mth 322.
- Mth 422. **Orthogonal Series.** (G) 3 hours. 3 ①
Fourier series and their convergence; expansions in terms of other orthogonal functions. Prerequisite: Mth 322.
- Mth 423. **Complex Functions.** (G) 3 hours. 3 ①
Analytic functions of a complex variable. Prerequisite: Mth 323.
- Mth 424,425,426. **Theoretical Differential Equations.** (G) 3 hours each term. 3 ①
Ordinary differential equations including existence theorems, systems of equations, and nonlinear oscillation theory. Prerequisite: 6 hours of upper division analysis.
- Mth 431,432,433. **Principles of Geometry.** (G) 3 hours each term. 3 ①
Hilbert's axioms; coordinate systems, linear transformations and matrices; the affine and projective groups and geometries. Moebius transformations; the elliptic, parabolic, and hyperbolic groups, and representations of the geometries of Lobachevski and Riemann. Prerequisite: 6 hours of upper division mathematics.
- Mth 434,435,436. **Differential Geometry.** (G) 3 hours each term. 3 ①
Metric geometry of 3-space with introduction to tensor theory of Riemannian space. Prerequisite: Mth 322.
- Mth 441. **Matrices and Quadratic Forms.** (G) 3 hours. 3 ①
Vectors in n-dimensional linear spaces; linear transformations and matrices; matrix algebra; vector and matrix norms; determinants; quadratic forms, characteristic numbers and vectors, reduction to canonical form by orthogonal transformations. Prerequisite: 6 hours of upper division mathematics.
- Mth 442. **Logic and Boolean Algebra.** (G) 3 hours. 3 ①
Logical constants and variables; sentences; sentential and designatory functions; quantifiers; connectives; truth functions; postulates for sentential calculus; postulates for Boolean algebra; partial ordering, lattices. Prerequisite: 6 hours of upper division mathematics.
- Mth 443. **Abstract Algebra.** (G) 3 hours. 3 ①
Mappings and semigroups, isomorphism, equivalence; groups, rings, integral domains, ideals; examples from number theory, algebra, logic, matrix theory and analysis. Prerequisite: 6 hours of upper division mathematics.
- Mth 451,452,453. **Numerical Calculus.** (G) 3 hours each term. 3 ①
Finite differences, interpolation, numerical differentiation and integration, numerical solution of differential equations, use of electronic digital computer. Prerequisite: Mth 322 and Mth 351,353 or 354.
- Mth 462,463. **Mathematical Methods in Statistics.** (G) 3 hours each term. 3 ①
Various formulas used in statistical analysis and some applications to practical problems. Prerequisite: Mth 361 and Mth 322 or Mth 411.
- Mth 464,465,466. **Theory of Probability.** (G) 3 hours each term. 3 ①
Random variables, central limit theorem; distributions of standard statistics; Markov chains, continuous and discontinuous stochastic processes. Prerequisite: Mth 413 or Mth 463.

- Mth 471,472,473. **Mathematics in Engineering and Physics.** (G) 3 hours each term. 3 ①
 Vibrating systems, boundary value problems in electricity and elasticity, operational calculus, numerical methods, and techniques of operations research. Prerequisite: Mth 323.
- Mth 491,492,493. **Mathematics for Secondary Teachers.** (g) 3 hours each term. 3 ①
Mth 491: Arithmetic. *Mth 492:* Algebra. *Mth 493:* Geometry. History, number systems, basic laws and operations, measurement, solution of equations, curve-tracing, geometrical proof and constructions, non-Euclidean geometry. Prerequisite: 3 hours of upper division mathematics. Enter any term. Equivalent to summer session courses Mth 591,592,593.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- Mth 501. **Research.** Terms and hours to be arranged. Staff.
- Mth 503. **Thesis.** Terms and hours to be arranged.
- Mth 505. **Reading and Conference.** Terms and hours to be arranged.
- Mth 507. **Seminar.** Terms and hours to be arranged.
- Mth 510. **Foundations of Analysis.** 3 hours. 3 ①
 Axiomatic development of the real number system. Prerequisite: Mth 411.
- Mth 511,512,513. **Theory of Analytic Functions.** 3 hours each term. 3 ①
 Interchange of limits, analytic functions of a complex variable, continuation, conformal mapping, integral functions. Prerequisite: Mth 413 or Mth 421,422,423.
- Mth 517,518,519. **Measure and Integration.** 3 hours each term. 3 ①
 Measurable sets and functions; Lebesgue integral. Applications to such topics as Fourier series, surface area, or probability. Prerequisite: Mth 413.
- Mth 521,522,523. **Partial Differential Equations of Physics.** 3 hours each term. 3 ①
 Second order partial differential equations governing various physical phenomena; orthogonal expansions, Green's functions. Prerequisite: Mth 423 or Mth 413.
- Mth 524. **Calculus of Variations.** 3 hours. 3 ①
 Minimization of integrals involving functions of one or more variables. Prerequisite: Mth 413 or Mth 421,422,423.
- Mth 525. **Linear Integral Equations.** 3 hours. 3 ①
 Volterra and Fredholm type linear equations; solutions by iteration and other methods; existence theories, eigenvalue problems. Prerequisite: Mth 413 or Mth 421,422,423.
- Mth 526. **Hilbert Space.** 3 hours. 3 ①
 Sequential and functional spaces; linear operators and bounds; strong and weak convergence; complete continuity, solutions of infinite linear systems and integral equations. Prerequisite: Mth 413 or Mth 421,422,423.
- Mth 531,532,533. **Topology.** 3 hours each term. 3 ①
 Point sets, metrisation, compactness, continua, mappings, homology, combinatorial topology. Prerequisite: Mth 413.
- Mth 541,542,543. **Modern Algebra.** 3 hours each term. 3 ①
 Advanced theory of matrices, finite groups, rings, and fields. Galois theory of equations; associative linear algebras, nonassociative algebras, group representations. Prerequisite: Mth 441,443.
- Mth 551. **Computer Logic.** 3 hours fall. 3 ①
 Prerequisite: Mth 351 and Mth 442 or equivalent.
- Mth. 552. **Computer Algorithms.** 3 hours winter. 3 ①
 Prerequisite: Mth 351 and Mth 442 or equivalent.

- Mth 553. **Computer Languages.** 3 hours spring. 3 ①
Prerequisite: Mth 351 and Mth 442 or equivalent.
- Mth 561,562,563. **Limit Theorems and Stochastic Processes.** 3 hours each term. 3 ①
Limit theorems; central-limit problem in modern form; extensions to theory of stochastic processes. Prerequisite: Mth 519.
- Mth 571,572,573. **Functional Analysis.** 3 hours each term. 3 ①
Linear transformations on Banach spaces and other topological spaces. Applications to differential and integral equations and selected topics in analysis. Prerequisite: 12 hours of graduate mathematics taken from real and complex variable, linear algebra, topology.
- Mth 581,582,583. **Theory of Functions of Complex Variables.** 3 hours each term. 3 ①
Differential equations in the complex domain, elliptic functions, Abelian integrals, conformal mapping. Prerequisite: Mth 513. Students who have not had prerequisite must have consent of instructor.

Microbiology and Hygiene

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 curricula include a thorough background in chemistry, biology, and liberal arts. During the third and fourth years students may elect either microbiology or sanitary microbiology.

Many specialized fields of microbiology are available to the student and research worker. These include fundamental aspects such as the physiology, structure, or genetics of microorganisms, the applications of microbiology concerned with soil fertility, marine environments, food and dairy production and processing, industrial fermentations, antibiotic production, sanitation, applied immunology, and human, animal, and plant diseases. The sanitary microbiology option in the undergraduate curriculum provides training for city, county, and state sanitarian, food and drug inspection, and public health laboratory positions.

Lower Division Courses

- Mb 204,205,206. **General Microbiology.** 4 hours each term. 2 ① 2 ②
Mb 204: Bacteria, yeasts, molds, viruses, and related organisms; elementary technique in cytology, taxonomy, and physiology. *Mb 205:* Application of microbiology to dairy, foods, water, soils, industry, sanitation, and the home. *Mb 206:* Growth and death of microorganisms; identification of microorganisms and a study of their metabolisms. Prerequisite: one year of chemistry. Mb 204 is offered fall and winter; Mb 205 offered spring term.
- Mb 230. **Principles of Microbiology.** 3 hours spring. 3 ①
Applications to agriculture, industry, sanitation, disease. Prerequisite: one year of chemistry.
- Mb 261. **Sanitary Microbiology.** 3 hours fall. 2 ① 2 ②
Water and sewage microbiology applied to problems in sanitary engineering.

Upper Division Courses

- Mb 321. **Sanitation.** 3 hours winter. 3 ①
Sanitation in home, school, city; control of communicable diseases and their relation to foods, rodents, swimming pools, eating establishments, insects, ventilation, industrial hygiene, etc. Prerequisite: one term of general microbiology or equivalent.

- Mb 341. **Clinical Laboratory Methods.** 5 hours fall. 3 ① 2 ③
Used to aid the physician in diagnosis and treatment of disease; theory and interpretation. Prerequisite: Mb 204; Ch 226,234, or 221.
- Mb 401. **Research.** Terms and hours to be arranged.
- Mb 403. **Thesis.** Terms and hours to be arranged.
- Mb 405. **Reading and Conference.** Terms and hours to be arranged.
- Mb 407. **Seminar.** 1 hour each term. Staff.
- Mb 411. **Food Sanitation Microbiology.** (g) 4 hours fall. 2 ① 2 ②
Dairy and food spoilage microorganisms; production and processing of milk, cream, and other foods with emphasis on sanitation and public health. Prerequisite: Mb 204 and one year of chemistry. ELLIKER.
- Mb 412. **Dairy Microbiology.** (G) 4 hours winter. 2 ① 2 ②
Continuation of Mb 411. A more thorough study of specific problems and training in advanced techniques. Prerequisite: Mb 411. ELLIKER.
- Mb 421. **Soil Microbiology.** (G) 4 hours fall. 2 ① 2 ③
Soil fertility; ammonification; nitrification; nitrogen fixation; organic decomposition and humification. Prerequisite: Mb 204. BOLLEN.
- Mb 422. **Soil Microbiology.** (G) 3 hours winter. 1 ① 2 ③
Continuation of Mb 421. Literature and special problems. Prerequisite: Mb 421. Offered alternate years. Offered 1963-64.
3 ①
- Mb 424,425,426. **Community Health Problems.** (g) 3 hours each term.
Sanitary, statistical, governmental, epidemiological, and sociological problems. Prerequisite: junior or senior standing, one year of upper division biological science. C. L. ANDERSON.
- Mb 431. **Microbiological Technique.** (G) 5 hours fall. 3 ① 2 ②
Principles involved in the study of bacteria. Prerequisite: Mb 206 or equivalent and two years of chemistry. BOLLEN.
- Mb 432. **Pathogenic Microbiology.** (G) 3 hours. 3 ①
Bacteria pathogenic for man, emphasizing morphological, physiological, and disease-producing properties; methods of isolation and identification. Prerequisite: Mb 204; Ch 227.
- Mb 433. **Pathogenic Microbiology Laboratory.** (G) 2 hours. 2 ③
Laboratory studies to accompany Mb 432.
- Mb 441. **Systematic Microbiology.** (G) 3 hours winter. 3 ①
Taxonomy and nomenclature; bacterial classification; International Rules of Nomenclature and Bacteriological Code; Bergey's Manual. Prerequisite: Mb 206 or equivalent and two years of chemistry. GILMOUR.
2 ②
- Mb 442. **Systematic Microbiology Laboratory.** (G) 2 hours winter. 3 ①
Laboratory studies to accompany Mb 441. Prerequisite: Mb 431. GILMOUR.
- Mb 451. **Microbial Physiology.** (G) 3 hours spring. 3 ①
Microbial growth, reproduction, and death; environmental factors; metabolic pathways; microbial nutrition. Prerequisite: Mb 205 and organic chemistry. PARKS.
- Mb 452. **Microbial Physiology Laboratory.** (G) 2 hours spring. 1 ④
Laboratory studies to accompany Mb 451. Prerequisite: Mb 442. PARKS.
- Mb 453. **Epidemiology.** (G) 3 hours spring. 3 ①
Communicable diseases in general population; occurrence of epidemics; basic principles underlying control. Prerequisite: Mb 205 or equivalent, plus one year of upper division biological science. C. L. ANDERSON.

- Mb 460. **Food Microbiology.** (g) 4 hours spring. 2 ① 2 ②
Control of microorganisms in production and handling of foods; microbiological methods of examining foods. Prerequisite: Mb 205 or equivalent. A. W. ANDERSON.
- Mb 470. **Microbiology of Water and Sewage.** (g) 4 hours spring. 2 ① 2 ②
Numbers and kinds of microorganisms in water and sewage; indicators of water pollution, tests for pollution, acceptable standards; purification of water and microbiology of sewage disposal. Prerequisite: Mb 204,205, one year of chemistry or equivalent. Offered alternate years. Offered 1963-64. GILMOUR.
- Mb 480. **Immunology and Serology.** (G) 3 hours spring. 3 ①
Theory and applications of immunity in infectious diseases and of serological reactions in diagnosis of disease and in medicolegal problems. Prerequisite: Mb 432 or 205 and two years of chemistry. Offered alternate years. Offered 1963-64. PILCHER.
- Mb 481. **Immunology and Serology Laboratory.** (G) 2 hours spring. 2 ③
Laboratory exercises to accompany Mb 480.
- Mb 490. **Industrial Microbiology.** (G) 4 hours spring. 2 ① 2 ②
Microorganisms in industrial processes; organic acids, solvents, antibiotics, and enzymes of microbiological origin. For advanced students in microbiology, chemistry, pharmacy, and chemical engineering. Consent of instructor required. Prerequisite: one year of microbiology; two years of chemistry. Offered alternate years. Not offered 1963-64.
- Mb 495. **Microbial Genetics.** (G) 4 hours winter. 2 ① 2 ③
Genetic principles as applied to microorganisms; available techniques and experimental procedures. THORNE.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- Mb 501. **Research.** Terms and hours to be arranged.
- Mb 503. **Thesis.** Terms and hours to be arranged.
- Mb 505. **Reading and Conference.** Terms and hours to be arranged.
- Mb 507. **Seminar.** Terms and hours to be arranged. Staff.
- Mb 530. **Marine Microbiology.** 4 hours spring. 2 ① 1 ④
Microorganisms of ocean water, their ecology and economic importance. Prerequisite: one year of upper division microbiology. MORITA.
- Mb 551,552. **Advanced Microbial Physiology.** 3 hours each term, fall and winter. 3 ①
Growth, fermentation, and death of microorganisms; morphology, cytology, and cell microchemistry. Prerequisite: Mb 451 or equivalent; organic and physical chemistry. SANDINE, PARKS.
- Mb 553. **Microbial Biochemistry of Bacteria.** 3 hours fall. 1 ① 2 ②
Carbohydrates, proteins, fats, minerals, and accessory growth factors in nutrition of microorganisms; microbiological assay techniques. Prerequisite: Mb 451 and one year of biochemistry. Offered alternate years. Not offered 1963-64. A. W. ANDERSON.
- Mb 582. **Virology.** 3 hours spring. 3 ①
Properties of viruses; determining their properties; serological reactions; cultivation. Emphasis on animal viruses, including the major groups and their relation to disease. Prerequisite: Mb 204,432,480; two years of chemistry. Offered alternate years. Offered 1963-64. PILCHER.
- Mb 583. **Virology Laboratory.** 2 hours spring. 2 ③
Prerequisite or parallel: Mb 582.
- Mb 590. **Principles and Applications of Microbiology.** 4 hours spring. 3 ① 1 ③
For course description see ACADEMIC YEAR INSTITUTE, page 131.

Natural Resources

The Department of Natural Resources offers courses for all students in resource and physical geography, techniques of geographic research, cartography, and conservation. The major curriculum prepares resource geographers for employment in such fields as area and industrial resource analysis, planning, government services, chamber of commerce, and teaching.

The undergraduate program is designed to provide a background in related sciences, a study of world resources as the basis of man's economies, a geographic point of view, and experience in library and field research, and in report writing. At the graduate level, emphasis is placed on the study of United States resources, practice in resource and area analysis, and in writing and making oral reports. Advanced students may develop concentration in systematic resource geography, in physical geography, and in selected areas.

Oregon State University offers outstanding facilities for the study of resource geography. As one of the nation's land-grant universities, the campus has specialists available for consultation and course work in many fields of technology and applied science dealing with specific resources, as well as strong faculties in the social sciences and business fields. The Library has an outstanding collection of scientific and technical source material and there is opportunity for a variety of field study.

Lower Division Courses

- NR 261,262,263. **Cartography.** 3 hours each term. 1 ① 2 ②
Development and utility; tools and materials; using, compiling, and drafting maps, charts, and diagrams; reproduction problems.

Upper Division Courses

- NR 321,322,323. **Physical Geography Laboratory.** 1 hour each term. 1 ②
Laboratory to accompany NR 327,328,329; required of all majors and recommended for all students desiring more intimate knowledge of physical geography.
- NR 327,328,329. **Physical Geography.** 3 hours each term. 3 ①
Physical aspects of earth's surface; their distribution, classification, interpretation, utility, and interrelationships. *Fall:* elements of climate. *Winter:* climates of the World. *Spring:* landforms. Prerequisite: upper division standing and one year of college geography or physical science.
- NR 361. **Techniques of Field Research.** 5 hours spring. 1 ② 2 ③
Gathering, recording, classifying, and analyzing natural resources data.
- NR 401. **Research.** Terms and hours to be arranged.
- NR 403. **Thesis.** Terms and hours to be arranged.
- NR 405. **Reading and Conference.** Terms and hours to be arranged.
- NR 407. **Seminar.** Terms and hours to be arranged.
- NR 411. **Conservation.** 3 hours spring. 3 ①
Examination and appraisal; resources development; policies of public agencies and private enterprise. Prerequisite: upper division standing.
- NR 413. **Aerial Photointerpretation.** 3 hours. 1 ① 2 ②
Identification, analysis, and interpretation of landscape elements from aerial photographs; use in geographic analysis, map compilation, planning, and intelligence. Prerequisite: NR 329 or equivalent background. RUDD.
- NR 421,422,423. **World Resources.** 3 hours each term. 3 ①
Resource inventory, distribution, development, and potentialities. *Fall:* forest, range, and sea. *Winter:* agricultural geography. *Spring:* minerals. Prerequisite: upper division standing. JENSEN, HIGHSMITH, HEINTZELMAN.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- NR 501. **Research.** Terms and hours to be arranged.
- NR 503. **Thesis.** Terms and hours to be arranged.
- NR 505. **Reading and Conference.** Terms and hours to be arranged.
- NR 507. **Seminar.** Terms and hours to be arranged.
- NR 511. **Conservation in the United States.** 3 hours fall. 3 ①
Principles and needs. Prerequisite: graduate standing. *HIGHSMITH.*
- NR 512. **Asiatic Pacific.** 3 hours. 3 ①
Resource geography of the Asiatic Pacific. *HEINTZELMAN.*
- NR 513. **Pacific Latin America.** 3 hours. 3 ①
Resource geography of Pacific Latin America. *JENSEN.*
- NR 524. **Physical Geography.** 3 hours fall. 2 ① 1 ②
Elements of physical environment and their interrelationships; investigation, interpretation, and classification systems. Prerequisite: NR 327,328,329. *RUDD.*
- NR 527,528,529. **United States.** 3 hours each term. 3 ①
Resource, inventory, distribution, development, and potentialities. *Fall:* agricultural geography. *Winter:* minerals. *Spring:* forest, range, and seas. Prerequisite: NR 327, 328,329 or equivalent. *HIGHSMITH, JENSEN, HEINTZELMAN.*
- NR 538. **Soviet Union.** 3 hours. 3 ①
Strengths and weaknesses; resource inventory distribution, development, potentialities, and problems. *HIGHSMITH.*
- NR 561. **Research Techniques.** 3 hours fall. 1 ① 2 ②
Data gathering, analysis, and interpretation; model studies in resource and area analysis; research reports. Graduate standing required. Prerequisite: NR 361. *HIGHSMITH.*

Oceanography

Oceanography, a composite subject, uses the sciences of physics, chemistry, biology, and geology to study the processes which are taking place in the ocean and estuaries. Oceanographers are usually specialists in one of the above sciences but are required to have some training in each of the others.

The Department of Oceanography aims to prepare students for: (1) government work under Civil Service; (2) research and technical positions at oceanographic laboratories; (3) advanced research and study in fisheries, geology, meteorology, or one of the other sciences with oceanographic applications.

The department offers work leading to the Ph.D. and M.S. degrees in Oceanography. Advanced students may specialize in the fields of physical oceanography, biological oceanography, geological oceanography, chemical oceanography, or geophysical oceanography. Minors for both the Ph.D. and M.S. degrees are offered to students majoring in other fields. Candidates for the Ph.D. degree in the Department of General Science may choose oceanography as one of their fields of study and do thesis research in oceanography.

The prerequisites for graduate work leading to the M.S. degree in oceanography are: (1) a bachelor's degree in one of the following subjects—a physical science, a biological science, fisheries, or engineering; (2) mathematics through calculus; (3) general chemistry; and (4) general physics. Deficiencies in these

prerequisites must be removed during the first year of study. Students are expected to take part in field work and research projects carried out by the department.

Geophysics Options. Course work in geophysics, the application of physics to problems involving the earth and other planets, includes both marine and terrestrial aspects of the science. The three options preparing students to enter careers in different branches of geophysics lead to M.S. or Ph.D. degrees. All three require course work and a thesis in geophysics, but each has slightly different emphasis.

OCEANOGRAPHY WITH GEOPHYSICS OPTION: Emphasizes marine and terrestrial geophysics for students preparing for careers in general geophysics. Courses in oceanography are required.

APPLIED PHYSICS WITH GEOPHYSICS OPTION: Emphasizes theoretical and laboratory work. Courses required in physics and geology.

GEOLOGY WITH GEOPHYSICS OPTION: Emphasizes use of geophysical methods to solve geological problems. Courses required in geology.

Lower Division Course

- Oc 133. **Elements of Oceanography.** 3 hours spring. 3 ①
Development of principles of oceanography by pioneers in the field; their backgrounds and contributions; ships and equipment used from Polynesian times to present.

Upper Division Courses

- Oc 331. **Introduction to Oceanography.** 3 hours any term. 3 ①
Elective nontechnical course designed to give student broad general background. Emphasis on relationship between oceanography and other fields. Prerequisite: junior standing.
- G 420. **Geophysical Exploration.** (g) 3 hours fall. 3 ①
Mining and oil prospecting, emphasizing geologic interpretation. Prerequisite: Ph 203; G 321,323.
- GS 431. **Physical Limnology.** (G) 3 hours spring. 3 ①
Physical and chemical processes in lakes and rivers; physical measurements; some field work. Prerequisite: senior or graduate standing; two years of biological science.
- Oc 432. **Physical Oceanography.** (G) 3 hours fall. 3 ①
Physical processes in ocean and estuaries; some field work. Prerequisite: senior or graduate standing; one year of mathematics; one year of physics.
- Oc 433. **Currents and Water Masses.** (G) 3 hours winter. 3 ①
Factors contributing to origin and preservation of water masses and currents of oceans; distribution of variables in the sea. Prerequisite: Oc 432.
- Oc 434. **Estuarine and Shoreline Processes.** (G) 3 hours spring. 3 ①
Estuarine and nearshore processes. Waves, surf, and beach effects, tides and tidal currents; types and mechanism of estuarine circulation. Prerequisite: Oc 432.
- Oc 441. **Biological Oceanography.** (G) 4 hours fall. 3 ① 1 ③
Physical, chemical, and biological factors characterizing marine environment; factors controlling plant and animal populations; methods of sampling, identification, and analysis. Prerequisite: 18 hours of upper division science.
- Oc 442. **Marine Plankton.** (G) 5 hours winter. 3 ① 2 ③
Floating plant and animal life in the sea; population and production; regional distribution; sampling; identification; nuisance forms. Prerequisite: two years of biology or Oc 441.
- Oc 443. **Marine Nekton.** (G) 4 hours spring. 3 ① 1 ③
Squid, fishes, and marine mammals; vertical and horizontal distribution; migrations; physical, chemical, and biological factors affecting distribution and abundance; food-chain relationships; special problems of deep-sea life; methods of sampling. Prerequisite: two years of biology; Oc 441.

- Oc 444. **Marine Phytoplankton Ecology.** (G) 4 hours fall. 3 ① 1 ③
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 441 or two years of biology.
- Oc 445. **Marine Phytoplankton Physiology.** (G) 3 hours winter. 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 444 or two years of chemistry.
- Oc 446. **Marine Primary Production.** (G) 5 hours spring. 3 ① 2 ③
Experimental procedures for measuring primary biological production. Evaluation of experimental results and their interpretation. Consent of instructor required. Prerequisite: Oc 445.
- Oc 480. **Marine Geophysics.** (G) 3 hours winter. 3 ①
Geophysical methods, including seismic, gravity, magnetic, etc. Prerequisite: Mth 203; G 203; Ph 203.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- Oc 501. **Research.** Terms and hours to be arranged.
- Oc 503. **Thesis.** Terms and hours to be arranged.
- Oc 505. **Reading and Conference.** Terms and hours to be arranged.
- Oc 507. **Seminar.** Terms and hours to be arranged.
- Oc 551. **Chemical Oceanography.** 4 hours winter. 3 ① 1 ③
Chemical composition of sea water; standard chemical methods for oceanographers; salinity, pH, dissolved gases, nutrients, carbonate cycle, geochemistry, and extraction. Prerequisite: Ch 203 or 205; Oc 432.
- Oc 552. **Theoretical Chemical Oceanography.** 4 hours spring. 3 ① 1 ③
Dissolved salts, oxygen, and carbon dioxide in the sea; photosynthesis; organic matter; biogeochemistry of carbonates; marine corrosion; sorption reaction. Prerequisite: Oc 551; Ch 233.
- Oc 561. **Geological Oceanography.** 4 hours spring. 3 ① 1 ③
Sedimentation, bottom topography, erosion, shorelines, and physics; sampling and analysis of marine sediments. Prerequisite: Oc 432.
- Oc 565. **Geology of the Ocean Basins.** 3 hours winter. 3 ①
Geological and geophysical measurement in the ocean basins; topographic, geologic, and geophysical nature of the ocean basins and the major features occurring in them, their origin and development. Prerequisite: undergraduate degree in geology.
- Oc 566. **Marine Sedimentation.** 3 hours spring. 3 ①
Sediment collection; sediments in the various marine environments; physical and biological processes affecting sedimentation; chemical deposits; engineering applications of marine sedimentation; recent marine sediments as a key to paleoecology. Prerequisite: undergraduate degree in geology.
- Oc 571. **Marine Hydrodynamics.** 4 hours fall. 4 ①
Mathematical treatment of motion in the ocean; solving physical problems. Prerequisite: Mth 322.
- Oc 572. **Underwater Sound.** 4 hours winter. 3 ① 1 ③
Sound transmission; factors affecting sound transmission in the sea; uses of sound; active and passive sonar, sonar, Swallow, sediment study, depth determination, navigation. Prerequisite: Oc 432; Mth 201.
- Oc 573. **Waves and Tides.** 4 hours spring. 3 ① 1 ③
Cause, nature, measurement, analysis, and prediction of surface waves, tides, and tidal currents; tsunamis; storm surges. Prerequisite: Mth 322.

- Oc 580. **Theoretical Geophysics: Sound Transmission.** 3 hours fall. 3 ①
 Fundamental relations between stress-strain, wave transmission, shallow water and deep water transmission, reflectivity, attenuation. Prerequisite: Mth 323; two years of physics including 332 or 426; Oc 480.
- Oc 581. **Theoretical Geophysics: Earth Gravity.** 3 hours winter. 3 ①
 Internal constitution of the earth, gravity field and gravity potential, earth ellipsoid, gravity measurements (sea, land, and space), isostasy, reduction of gravity measurements, gravity anomalies, deviations from isostatic equilibrium, convection currents, polar migrations. Prerequisite: Mth 323; two years of physics; one year of geology; Oc 480.

Physics

Undergraduate students may major in physics either for a liberal arts degree or as preparation for professional service in physics and allied fields. Students planning to major in physics should offer a maximum of high school mathematics and physics for entrance. Those planning for graduate study and research should lay foundations of a reading knowledge of German, Russian, or French, or all three. In special cases courses in related departments, involving considerable study of physical principles, may be accepted as part of a major in physics.

Lower Division Courses

- Ph 201,202,203. **General Physics.** 4 hours each term. 2 ① 2 ②
 Mechanics, sound, heat, light, electricity, and magnetism. Prerequisite: Mth 101 previously or parallel with Ph 201.
- Ph 204,205,206. **Astronomy.** 3 hours each term. 2 ① 1 ②
 Descriptive treatment. Coordinate systems; astronomical instruments; the solar system; star types and groupings.
- Ph 207,208,209. **General Physics.** 4 hours each term. 2 ① 1 ② 1 ③
 Mechanics, heat, light, sound, electricity, and magnetism. For students in engineering and the physical sciences. Prerequisite: Mth 104,200,201 previously or parallel.
- Ph 211,212. **Abridged General Physics.** 3 hours each term. 1 ① 2 ②
 Mechanics, heat, sound, light, electricity, and magnetism. Sequence starts in fall and winter.
- Ph 213. **Introductory Modern Physics.** 3 hours. 3 ①
 Special relativity; elementary quantum physics; atomic structure; spectra; instruments and particle accelerating machines; nuclear structure; molecular and solid-state physics. Prerequisite: Ph 209.

Upper Division Courses

- Ph 311,312,313. **Introductory Modern Physics.** 3 hours each term. 2 ① 1 ②
 Kinetic theory, the electron, radioactivity, photoelectricity, thermionic emission, X-rays, electronic devices, gaseous conduction, cosmic rays, atomic physics, solid state, and nuclear physics. Prerequisite: Ph 203 or 209; Mth 200; Mth 201,202,203 previously or parallel.
- Ph 331,332. **Electricity and Magnetism.** 4 hours each term. 3 ① 1 ②
 Electrical and magnetic theory and measurements. Prerequisite: Ph 203 or 209; Mth 321,322 previously or parallel.
- Ph 334. **Fundamentals of Radio.** 3 hours. 2 ① 1 ②
 Vacuum tubes and solid state electronic devices and circuits; antennas and wave propagation. Prerequisite: Ph 203 or 209.

¹ The sequences Ph 201,202,203; Ph 207,208,209; and Ph 211,212 cover somewhat similar topics although in a different order, and credit cannot be obtained for duplication. For any combination of courses for which either Ph 203 or Ph 209 is a terminal course, a maximum of 12 term hours is allowed. Unless otherwise stated either consent of instructor is required or the preceding course in the same sequence is prerequisite for all sequence courses.

- Ph 353. **Thermodynamics and Heat Measurements.** 4 hours. 3 ① 1 ②
Prerequisite: Ph 203 or 209; Mth 203.
- Ph 361. **Photography.** 3 hours any term. 1 ① 2 ②
Hand and miniature cameras and their uses; film processing, printing, toning, enlarging. Prerequisite: college-level chemistry or physics or approved photographic experience.
- Ph 362. **Commercial Photography.** 3 hours winter. 1 ① 2 ②
View cameras; copying, photography of small objects, lighting, photo-sketching, photographic solutions. Prerequisite: Ph 361.
- Ph 363. **Commercial Photography.** 3 hours spring. 1 ① 2 ②
Continuation of Ph 362. Composition; exteriors, interiors, flashlights, infrared.
- Ph 401. **Research.** Terms and hours to be arranged.
- Ph 403. **Thesis.** Terms and hours to be arranged.
- Ph 405. **Reading and Conference.** Terms and hours to be arranged.
- Ph 407. **Seminar.** 1 hour.
- Ph 424,425,426. **Mechanics.** 3 hours each term. 3 ①
Kinematics, dynamics of particles and rigid bodies; generalized coordinates. Prerequisite: Ph 203 or 209; Mth 322.
- Ph 430. **Electronics.** 3 hours. 2 ① 1 ③
Thermionic and solid state electronic devices and circuits. Prerequisite: Ph 332.
- Ph 434,435,436. **Experimental Electronics.** (G) 3 hours each term. 1 ① 2 ②
Special topics to fit needs of individual students. May include: microwaves; electronic and high-frequency techniques; modern electronic devices and research methods as applied to physics, chemistry, engineering, psychology, and medicine. Prerequisite: Ph 439 or EE 323.
- Ph 437,438,439. **Electronics and Radio.** 3 hours each term. 2 ① 1 ②
Alternating current theory; circuits; electron tubes and solid state electronic devices; amplification; radio frequency generators; modulation; timing circuits; transmission and radiation; measurements at audio and high frequencies. Prerequisite: Ph 332 or GE 203.
- Ph 461,462,463. **Advanced Photography.** (G) 3 hours each term. 1 ① 2 ②
Color, X-ray, and ultraviolet photography; stereophotographs, photomicrography, photography of cathode ray screens. Students may enter any term. Prerequisite: Ph 362.
- Ph 465,466. **Geometrical and Physical Optics.** 3 hours each term. 2 ① 1 ②
Prerequisite: Ph 331,332 previously or parallel.
- Ph 468. **Spectroscopy.** (g) 3 hours. 2 ① 1 ③
Instruments, sources, spectra; qualitative and quantitative analysis. Prerequisite: Ph 313.
- Ph 470. **X-Rays.** (G) 3 hours. 2 ① 1 ③
Production, absorption, scattering, spectra, application. Prerequisite: Ph 313,466.
- Ph 474,475,476. **Atomic and Nuclear Physics.** (g) 3 hours each term. 3 ①
Atomic structure and atomic processes; introduction to quantum mechanics; properties of atomic nuclei; subatomic particles and their behavior. Prerequisite: Ph 313 and Mth 322 or graduate standing in chemistry or engineering and approval of instructor.
- ¹Ph 477,478,479. **Introductory Field Theory.** (G) 3 hours each term. 3 ①
Study of fields. Motion of rigid bodies, elasticity, fluid flow, heat flow, gravitation, electromagnetic fields, and the theory of relativity. Prerequisite: three years of approved physics; Mth 322.

¹ Required of all physics majors planning to earn doctorate at OSU.

Graduate Courses

Graduate courses are given only when warranted by demand. The dates are given when courses are offered alternate years. Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- Ph 501. **Research.** Terms and hours to be arranged.
- Ph 503. **Thesis.** Terms and hours to be arranged.
- Ph 505. **Reading and Conference.** Terms and hours to be arranged.
- Ph 507. **Seminar.** Terms and hours to be arranged. 3 ①
- Ph 511,512,513. **Introduction to Theoretical Physics.** 3 hours each term. 3 ①
Mathematical treatment of theories of classical physics. Prerequisite: three years of approved physics; Mth 322.
- Ph 515. **Relativity.** 3 hours. 3 ①
Application of Lorentz transformation theory to mechanics and electrodynamics; general relativity. Prerequisite: Ph 479 previously or parallel; Ph 522.
- Ph 517,518,519. **Quantum Mechanics.** 3 hours each term. 3 ①
Transformation theory; quantum mechanical equations of motion and their solutions; transition probabilities; relativistic quantum theory; illustrative applications. Prerequisite: Ph 476,479,521.
- Ph 521,522. **Dynamics.** 3 hours each term. 3 ①
Lagrangian and Hamiltonian mechanics; motion of rigid bodies; fluid flow; theory of small vibrations. Prerequisite: Ph 477,478 previously or parallel.
- Ph 523. **Statistical Mechanics.** 3 hours. 3 ①
Prerequisite: Ph 521,558.
- Ph 531,532. **Electromagnetic Theory.** 4 hours each term. 4 ①
Mathematical treatment of classical theories of electricity, magnetism, and radiation. Prerequisite: Ph 479 or 513 with consent of instructor.
- Ph 547,548. **Introductory Solid State.** 3 hours each term. 3 ①
Dielectric properties; paramagnetism; free electron theory; semiconductors; transistor theory; imperfections. Prerequisite: Ph 313,475, or graduate standing in chemistry, mathematics, or engineering.
- Ph 549. **Conduction of Electricity Through Gases.** 3 hours. 3 ①
Processes taking place at electrodes, in the gas, and at walls of tube; glow, arc, and spark discharges. Prerequisite: Ph 475 or graduate standing in chemistry, mathematics, or engineering.
- Ph 557. **Thermodynamics.** 3 hours. 3 ①
Prerequisite: Ph 523.
- Ph 558. **Kinetic Theory.** 3 hours. 3 ①
Prerequisite: three years of approved physics; Ph 426; Mth 322.
- Ph 563. **Physical Optics.** 4 hours. 4 ①
Prerequisite: Ph 532.
- Ph 571,572,573. **Nuclear Physics.** 3 hours each term. 3 ①
Prerequisite: Ph 519.
- 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.
- Ph 575,576,577. **Experimental Nuclear Physics.** 3 hours each term. 2 ③
Radiation detectors and detecting systems; characteristics and operation of accelerators and reactors; various experiments in nuclear physics using radioactive materials and the OSU machines. Prerequisite: Ph 571,572,573 previously or parallel.

- Ph 584,585,586. **Atomic Interactions.** 3 hours each term. 3 ①
Elastic and inelastic scattering; structure of atoms, molecules, and ions; spectra; transition probabilities. Prerequisite: Ph 519.
- Ph 587,588,589. **Plasmas in Gases and Solids.** 3 hours each term. 3 ①
Electrical, mechanical, and thermal properties of gases and solids; plasma theories and experiments. Prerequisite: Ph 519.

Courses in Meteorology

Lower Division Course

- Ph 191. **Rudiments of Meteorology.** 1 hour any term. 1 ①
A descriptive treatment of meteorological phenomena including winds, air masses, fronts, clouds, the wave cyclone, precipitation.

Upper Division Courses

- Ph 390. **Basic Meteorology.** 3 hours. 2 ① 1 ②
Weather phenomena; weather instruments. Prerequisite: Ph 202 or 208.
- Ph 391,392,393. **Synoptic Meteorology.** 3 hours each term. 2 ① 1 ②
Weather analysis and forecasting techniques with laboratory applications to classical meteorological situations. Prerequisite: Ph 203 or 209.
- Ph 491,492,493. **Meteorology.** (G) 3 hours each term. 3 ①
Atmospheric processes; structure of the atmosphere; atmospheric measurements. Prerequisite: Ph 203 or 209; Ph 390 or 393; Mth 203.
- Ph 494,495. **Radar Meteorology.** (G) 3 hours each term. 2 ① 1 ②
Microwave propagation effects in the atmosphere; case studies in weather radar to observe precipitation patterns, wind, and flight hazards. 3 ① .2 ②
- Ph 497,498,499. **Synoptic Meteorology.** (G) 3 hours each term.
Advanced course in synoptic meteorological analysis and forecasting theory and techniques. Prerequisite: Ph 391,392,393.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- Mtr 501. **Research.** Terms and hours to be arranged.
- Mtr 503. **Thesis.** Terms and hours to be arranged.
- Mtr 505. **Reading and Conference.** Terms and hours to be arranged.
- Mtr 507. **Seminar.** Terms and hours to be arranged.

Science Education

Preparation for prospective teachers of biological and physical sciences and mathematics is offered by the Department of Science Education, a joint department within the School of Science and the School of Education. Students preparing to teach science in secondary schools may major in one of the sciences, or in general science, according to the degree of emphasis on subject matter or professional preparation. Combination of subjects to be taught and scope of preparation desired influence the choice of major school.

For description of courses see SCHOOL OF EDUCATION.

Academic Year Institute

The following courses are designed for experienced high school science and mathematics teachers as a part of the Academic Year Institute program sponsored by the National Science Foundation. They also may be taken by other experienced high school teachers working toward the Master of Science degree, but may not be used for a departmental major.

- 3 ① 1 ③
- Bot 590,591. Fundamentals of Plant Science.** 4 hours winter and spring.
Growth, reproduction, and distribution of plants; recent advances and new techniques of investigation, integration of information, and application to teaching and research problems in botany. Prerequisite: two years of biological science. DEEP, JONES.
- Ch 590,591. Fundamental Principles of Chemistry.** 4 hours winter and spring.
Application in fields of inorganic, organic, analytical, and physical chemistry; recent advances in chemistry. Prerequisite: one year each of chemistry, physics, and mathematics. CALDWELL.
- G 590. Principles of Geology.** 4 hours fall. 3 ① 1 ③
Rock-forming minerals; common igneous, sedimentary, and metamorphic rocks; gradational processes, diastrophism, and vulcanism. Lectures, field trips, and laboratory. Prerequisite: two years of physical science. WILKINSON.
- GE 590. Engineering Fundamentals.** 4 hours fall. 3 ① 1 ③
Basic principles of physical science; material and energy balances, dimensional analysis, stoichiometric calculations, graphical analysis and representation, mass and energy transport, properties of materials. Prerequisite: one year each of college-level physics, chemistry, and mathematics. GLEESON.
- Mth 590,591. Advanced Mathematics for Science Teachers.** 4 hours fall and winter. 4 ①
Structure of the number system; algebra, analysis, and geometry with stress upon mathematical processes. Prerequisite: two years of mathematics. POOLE.
- 3 ① 1 ③
- Mb 590. Principles and Applications of Microbiology.** 4 hours spring. 4 ①
Bacteria, molds, yeasts, and viruses; microbiology in agriculture, industry, medicine, and sanitation. Prerequisite: two years of biological science. ANDERSON.
- NR 590. American Resources and their Conservation.** 4 hours winter. 4 ①
America's resource base. Inventory-presented development, climate and topography, soils, water, forest, range, wildlife, minerals, fisheries, and recreation. Special attention to teaching aids, materials, and sources. Prerequisite: two years of biological science. HIGSMITH.
- 3 ① 1 ③
- Ph 590,591. Recent Advances in Modern Physics.** 4 hours fall and winter.
Particle and wave phenomena; fundamental physical constants; solid state physics; nuclear physics. Prerequisite: one year each of chemistry, physics, and mathematics. BRADY.
- Z 590. Perspectives in Modern Zoology.** 4 hours fall. 3 ① 1 ③
Biological effects of radiation; the gene; cell division; embryonic development; mechanism of nervous transmission; parasite life cycles and host specificity; animal populations; animal homing and migratory movements. Prerequisite: two years of biological science. DORNFIELD, staff.

Statistics

The Department of Statistics offers three beginning courses, each designed to fit the needs of a particular group of students. St 311 is intended for the undergraduate student who desires only a cursory view of the field of statistics. The sequence St 314,315 is intended to acquaint the undergraduate student with

the basic techniques of statistics. The sequence St 421,422,423 is designed for prospective research workers and is taught as the technology of the scientific method. Graduate students may take work leading to a master's degree in statistics or to a minor for an advanced degree in another field. No undergraduate degrees in statistics are offered.

The department also provides consulting and computing services, and operates a computing laboratory which includes an IBM 1620 computer.

Upper Division Courses

- St 311. **Descriptive Statistics.** 3 hours. 3 ①
- St 314,315. **Statistical Techniques.** 3 hours each term. 3 ①
Prerequisite: junior standing; Mth 100 or equivalent.
- St 401. **Research.** Terms and hours to be arranged.
- St 405. **Reading and Conference.** Terms and hours to be arranged.
- St 406. **Projects.** Terms and hours to be arranged.
- St 407. **Seminar.** Terms and hours to be arranged.
- St 411. **Data Processing.** (G) 2 hours. 1 ②
Use of IBM equipment in the processing of statistical data. Prerequisite: St 422. YATES.
- St 412. **Data Processing Laboratory.** (G) 1 hour. 1 ②
Corequisite: St 411.
- St 421,422,423. **Statistical Inference.** (G) 3 hours each term. 3 ①
Prerequisite: senior standing; Mth 100 or equivalent.
- St 431. **Design of Experiments.** (G) 3 hours. 3 ①
Principles used; comparison of designs; interpretation of results. Prerequisite: St 423.
- St 441. **Sampling Methods.** (G) 3 hours. 3 ①
Simple and stratified random sampling, systematic sampling; estimates and their sampling errors; estimation of sample size. Prerequisite: St 315 or 422. CALVIN.
- St 471,472,473. **Operations Research.** (G) 3 hours each term. 3 ①
Statistical methods, queue theory, linear programming, game theory. Prerequisite: Mth 203. LINK.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- St 501. **Research.** Terms and hours to be arranged.
- St 503. **Thesis.** Terms and hours to be arranged.
- St 505. **Reading and Conference.** Terms and hours to be arranged.
- St 506. **Projects.** Terms and hours to be arranged.
- St 507. **Seminar.** Terms and hours to be arranged.
- St 521,522,523. **Theory of Statistics.** 3 hours each term. 3 ①
Sampling distributions, estimation, and tests of hypotheses. Prerequisite: Mth 203. HUGHES.
- St 524,525. **General Regression Analysis.** 3 hours each term. 3 ①
Application of the method of least squares to general linear regression models; analysis of nonorthogonal experiment data. Prerequisite: St 423. JENSEN.

Zoology

Basic requirements for an undergraduate major in zoology, whether for a liberal arts degree or as preparation for professional study at the graduate level, are included in the Curriculum in Zoology printed on a previous page. Approved electives in invertebrate zoology may be taken at a marine station.

The undergraduate major must also select two courses from group A below and one from group B, or *vice versa*:

A. Natural History of Oregon (Z 376), Ornithology (Z 371), Mammalogy (Z 372), Herpetology (Z 473), Animal Ecology (Z 483).

B. Comparative Vertebrate Histology (Z 461), Microtechnique (Z 462), Experimental Embryology (Z 463).

Graduate students who have met the basic requirements for an undergraduate major in zoology may specialize in one of the following areas: (1) anatomy and embryology, (2) physiology, (3) invertebrate zoology and parasitology, (4) cellular biology, (5) natural history and ecology, (6) genetics. The department is well equipped for graduate study and research in each of these areas and is staffed by competent specialists.

Both undergraduate and graduate majors in zoology are urged to attend a summer session at a marine station or at an inland field laboratory. Candidates for the Ph.D. are strongly advised to spend one summer at a marine station.

Lower Division Courses

- Z 114,115,116. **Human Biology.** 3 hours each term. 3 ①
Science as a process; characteristics of living organisms; maintenance of the individual; maintenance of the species; interrelationships; human population; history of life on earth. MAYSHARK.
- Z 117,118,119. **Human Biology Laboratory.** 1 hour each term. 1 ②
Laboratory work to accompany Z 114,115,116. MAYSHARK.
- Z 200. **General Zoology.** 5 hours spring. 3 ① 2 ③
Basic topics in present-day zoology. For students of biology, agriculture, and others. OW CZARZAK.
- Z 201,202,203. **General Zoology.** 3 hours each term. 2 ① 1 ③
For zoology majors and premedical, pre dental, pre nursing, pharmacy, physical education, psychology, fish and game management students, and others. HISAW, ALVARADO.

Upper Division Courses

- Z 321,322. **Elementary Human Anatomy.** 3 hours fall and winter. 2 ① 1 ②
For physical education students. Prerequisite: Z 114,115,116, or equivalent. ALLMAN.
- Z 323. **Applied Human Anatomy.** 3 hours spring. 2 ① 1 ②
For physical education students. Prerequisite: Z 321,322. ALLMAN.
- Z 324,325. **Comparative Vertebrate Anatomy.** 4 hours winter and spring. 2 ① 2 ③
Gross dissection and comparison of organ systems in representative vertebrates. Prerequisite: Z 200 or Z 203. HILLEMANN.
- Z 326. **Comparative Vertebrate Embryology.** 4 hours fall. 2 ① 2 ③
Comparative study of development of several representative vertebrate forms. Prerequisite: Z 200 or Z 203. HILLEMANN.

¹ Credit is granted for only one of the following combinations: Z 114,115,116; or Z 201 202,203; or Z 200.

- Z 331,332. **Physiology.** 3 hours fall and winter, or winter and spring. 2 ① 1 ②
For students in home economics, medical technology, pharmacy, and physical education; not for zoology majors. Prerequisite: Z 200,203, or Z 116, or one year of any laboratory science as required in home economics. PRITCHARD, ALVARADO.
- Z 336. **Applied Human Physiology.** 3 hours spring. 2 ① 1 ②
For students in physical education. Prerequisite: Z 331,332. ALLMAN.
- Z 341. **Genetics.** 3 hours fall or spring. 3 ①
The gene as basis of variation and heredity; principles of genetics. Prerequisite: college-level course in zoology, botany, or biology. MOHLER.
- Z 345. **Evolution.** 3 hours spring. 3 ①
Evidences and mechanisms, including genetic variation, selection, isolation. Prerequisite: college-level course in zoology, botany, or biology. MOHLER.
- Z 371. **Ornithology.** 3 hours spring. 2 ① 1 ③
Structure, identification, distribution, and life habits of birds. Prerequisite: Z 200 or Z 203. Students who have not had prerequisite must have consent of instructor. STORM.
- Z 372. **Mammalogy.** 3 hours winter. 2 ① 1 ③
Classification, distribution, life habits, and identification of mammals. Prerequisite: Z 200 or Z 203. STORM.
- Z 374,375. **Natural History of Oregon.** 3 hours fall and winter. 2 ① 1 ③
Environment: influence of topography, climate, and plant cover on distribution of animals. Common invertebrates: local distribution, habits, collection, and maintenance in laboratory. Prerequisite: one year of biology. GORDON.
- Z 376. **Natural History of Oregon.** 4 hours spring. 2 ① 2 ③
Identification, distribution, and habits of common land vertebrates. Prerequisite: Z 374, 375. GORDON.
- Z 401. **Research.** Terms and hours to be arranged.
- Z 403. **Thesis.** Terms and hours to be arranged.
- Z 405. **Reading and Conference.** Terms and hours to be arranged.
Reading and reports on special topics.
- Z 407. **Seminar.** 1 hour each term. 1 ①
- Z 434,435,436. **General and Comparative Physiology.** (G) 3 hours each term. 2 ① 1 ③
Function, both at the cellular and organismal level; comparison of physiological systems among major animal groups. Prerequisite: two years of zoology and organic chemistry. PRITCHARD.
- Z 442. **Drosophila Genetics.** (G) 2 hours winter. 2 ③
Experiments on *Drosophila* to illustrate operation of hereditary mechanisms. Prerequisite: Z 341. MOHLER.
- Z 451,452. **Invertebrate Zoology.** (G) 5 hours winter and spring. 3 ① 2 ③
Structure, classification, distribution, and life histories of the invertebrates. Prerequisite: two years of zoology. PRATT.
- Z 456. **Biology of Animal Parasitism.** (G) 4 hours fall. 2 ① 2 ③
Morphology, life cycles, physiological adaptations, evolution, and distribution of parasitic animals. Prerequisite: two years of biology. PRATT.
- Z 457. **Parasites of Fish.** (G) 2 hours fall. 1 ① 1 ③
Life histories, identification, economic importance, and control of more common parasites of fish. Prerequisite: two years of biology. PRATT.
- 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: Z 324,325,326. 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. OW CZARZAK.
- Z 463. **Experimental Embryology.** (G) 4 hours spring. 3 ① 1 ③
Cleavage and gastrulation; inductors and organizers; gradient fields; integration; regeneration; genic action. Prerequisite: Z 324,325,326. OW CZARZAK.
- Z 473. **Herpetology.** (G) 3 hours fall. 2 ① 1 ③
Classification, distribution, life habits, and identification of amphibians and reptiles. Consent of instructor required. Prerequisite: two years of zoology. STORM.
- Z 475. **Methods in Field Zoology.** (G) 4 hours spring. 2 ① 2 ③
Problems, principles, and methods in field zoology, including wildlife photography. Prerequisite: two years of upper division biology. STORM.
- Z 483. **Animal Ecology.** (G) 3 hours fall. 2 ① 1 ③
Living animals in relation to their environment. Prerequisite: two years of biology. GORDON.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- Z 501. **Research.** Terms and hours to be arranged.
- Z 503. **Thesis.** Terms and hours to be arranged.
- Z 505. **Reading and Conference.** Terms and hours to be arranged.
- Z 507. **Seminar.** Terms and hours to be arranged.
- Z 508. **Advanced Field Zoology.** 2 to 6 hours.
Special problems in field work; studies of limited areas. Field trips of variable length as conditions require. Consent of instructor required. Prerequisite: senior or graduate standing. GORDON and staff.
- Z 510. **Zoological Literature.** 1 hour fall. 1 ①
Character and use of journals and reference works. Prerequisite: one year of upper division zoology. OW CZARZAK.
- Z 513. **History of Zoology.** 3 hours winter. 3 ①
Rise and development of zoological theories and laws. Prerequisite: one year of upper division zoology. HILLEMANN.
- Z 521. **Organogeny and Fetal Physiology.** 4 hours fall. 2 ① 2 ③
Embryonic and fetal physiology; laboratory work on the later stages of morphogenesis (organogeny); student projects in developmental anatomy and physiology. Prerequisite: Z 331,332, and 326 or equivalent. HILLEMANN.
- Z 531,532,533. **Mammalian Physiology.** 3 hours each term. 3 ①
Neuromuscular system, central nervous system, autonomic system, circulation, respiration, gastro-enterology, kidney secretion, metabolism. Prerequisite: general zoology, histology, comparative vertebrate anatomy, general chemistry or equivalents. KRUEGER.
2 ③
- Z 534,535,536. **Mammalian Physiology Laboratory.** 2 hours each term.
Laboratory work accompanying Z 531,532,533. KRUEGER.
- Z 537. **Endocrinology.** 3 hours fall. 3 ①
Influence of endocrine glands on the physiology of the animal body, with special reference to mammals. Prerequisite: physiology and organic chemistry. HISAW.
- Z 538. **Endocrinology Laboratory.** 3 hours winter. 3 ③
Laboratory work to supplement Z 537. Prerequisite: Z 537. HISAW.
- Z 539. **Selected Topics in Physiology.** 3 hours. 2 ① 1 ③
Topics vary. May be repeated for credit. Prerequisite: Z 436 or equivalent. ALVARADO, HISAW, PRITCHARD.

- Z 542,543. **Theoretical Genetics.** 3 hours fall and winter. 3 ①
Genetical phenomena discussed at advanced levels with emphasis on contemporary problems in research. Prerequisite: Z 341 or equivalent. MOHLER.
- Z 551. **Biology of Protozoa.** 3 hours fall. 2 ① 1 ③
Morphology, physiology, and ecology of freshwater, marine, terrestrial, and parasitic protozoa. Prerequisite: Z 451,452. PRATT.
- Z 553. **Invertebrate Embryology.** 3 hours spring. 2 ① 1 ③
Cleavage, organogeny, and larval development of marine and freshwater invertebrates. Prerequisite: Z 451,452. PRATT.
- Z 558. **Selected Topics in Parasitology.** 3 hours winter. 2 ① 1 ③
Advanced laboratory training in parasitological methods and discussion of current problems. Prerequisite: Z 456 or 457 or equivalent. PRATT.
- Z 561,562,563. **Biology of the Cell.** 3 hours each term. 2 ① 1 ③
Structure, physics, and chemistry of cellular components; cellular physiology; chromosomes in genetics and evolution; problems of differentiation. Prerequisite: Z 461,462, 463. DORNFIELD.
- Z 565. **Selected Topics in Cellular Biology.** 3 hours. 1 ① 2 ③
Advanced laboratory training and theoretical discussion in the special fields of microscopic cytochemistry, tissue culture, electron microscopy, etc. Topic determined by demand. Prerequisite: Z 461,462,561,562,563, and biochemistry. DORNFIELD, OWCZARZAK, NEWSTEAD.
- Z 571,572,573. **Ichthyology.** 3 hours each term. 2 ① 1 ③
Orders and families of fishes; morphology, distribution, and ecology of selected groups and species. Prerequisite: FG 274,275,276, or equivalent. BOND.
- Z 581. **Zoogeography.** 3 hours winter. 2 ① 1 ③
Distribution of animals; general principles; faunal areas of world and of North America. Prerequisite: Z 371,372, and Z 483. GORDON.

School of Agriculture

Faculty

As of January 1963

- FREDERICK EARL PRICE, B.S.**, Dean of the School of Agriculture.
- WILBUR TARLTON COONEY, M.S.**, Associate Dean of the School of Agriculture.
- WILLIAM MARTIN LANGAN, B.S.**, Head Counselor.
- Agricultural Economics:** Professors WOOD (department head), BLANCH, CASTLE, HOLLANDS, KORZAN, MUMFORD, POTTER (emeritus); Associate Professors BECKER, BROWN, HALTER, SITON; Assistant Professors EDWARDS, HUTCHINGS, LANGMO.
- Agricultural Education:** Professor TEN PAS (department head); Assistant Professor DAVIS.
- Agricultural Engineering:** Professors RODGERS (department head), CROPSEY, LUNDE, SINNARD; Associate Professors BONNICKSEN,¹ CAMPBELL, KIRK, LONG, WOLFE; Assistant Professors BOOSTER, CHRISTENSEN; Instructor WATTS.
- Animal Science:** Professors MILLER (department head), BOGART, HAAG, HEDRICK, JONES, KRUEGER, MCKENZIE (emeritus), NELSON (emeritus), OLDFIELD, POULTON; Associate Professors ENGLAND, FOX, OLIVER (emeritus), RALSTON, WOLBERG; Assistant Professors CHURCH, ELLINGTON, KENNICK, WU; Instructors ADAIR, RUTLAND, STOUT.
- Extension Methods:** Professor C. L. SMITH; Assistant Professor BERGER.
- Farm Crops:** Professors COWAN (department head), FOOTE, FORE, HEDRICK, HILL (emeritus), POULTON; Associate Professors CHING, FURTICK, JENSEN, MCGUIRE; Assistant Professors CHILCOTE, FRAKES; Instructors CALLIHAN, KRONSTAD.
- Fish and Game Management:** Professors DIMICK (department head), DOUDOROFF, RAYNER; Associate Professors BOND, KUHN, LONG, WARREN; Assistant Professors CAMPBELL, LIGHTFOOT; Instructor HORTON.
- Food Science and Technology:** Professors SCHULTZ (department head), CAIN, LITWILLER, RICHARDSON, WIEGAND (emeritus), WILSTER (emeritus); Associate Professors DAY, ONSDORFF, SAMUELS, SINNHUBER, STEIN, WILDER, YANG; Assistant Professors DIETZ, SATHER; Instructor MONTGOMERY.
- Horticulture:** Professors APPLE (department head), BOUQUET (emeritus), COMPTON, FRAZIER, HANSEN, HARTMAN (emeritus), ROBERTS; Associate Professors BLANEY, GARREN, MACK, WADSWORTH, WESTWOOD, ZIELINSKI; Assistant Professors BAGGETT, CRABTREE, LAGERSTEDT.
- Poultry Science:** Professors PARKER (department head), BERNIER, HARPER; Associate Professor ARSCOTT; Assistant Professor MCCLUSKEY.
- Soils:** Professors CHENEY (department head), JACKSON, POWERS (emeritus), RUZEK (emeritus), STEPHENSON (emeritus), YOUNGBERG; Associate Professors ALBAN, DAWSON, EVANS, HARWARD, KNOX;¹ Assistant Professors BOERSMA, MOORE, SIMONSON.
- Veterinary Medicine:** Professors DICKINSON (department head), SHAW (emeritus); Associate Professors BABCOCK, BONE, KNAPP, PETERSON; Assistant Professor HARR.

General Statement

THE SCHOOL OF AGRICULTURE is dedicated to the philosophy of promoting the development of each student to the extent of his capacity. The faculty of the school tries, through the many courses offered and through extracurricular activities, to help each student discover and develop social, aesthetic, and ethical values as well as professional ability.

High School Preparation. Because of ever-increasing technical developments in agriculture, all students, regardless of major interest, should come to college prepared to study basic sciences, particularly chemistry, microbiology, botany, zoology, and entomology. In many programs of study, physics is essential. Each student should possess a good understanding of fundamental principles of grammar and be able to demonstrate these principles through effective oral and written expression. He also should be able to demonstrate a reasonable de-

¹ On leave 1962-63.

gree of competence in arithmetic, algebra, and geometry. Study in agriculture requires an ability to perceive, analyze, and work with problems involving surface areas, configurations, volumes, and equations in which at least one unknown exists. The ability to work with problems involving fractions, percentages, and proportions is necessary. Students in agriculture should be completely familiar with weights and measures in the metric system. The ability to read rapidly with good comprehension and to study effectively is extremely valuable.

Individual Counseling. Since every student is considered an important individual, his or her study program will be developed with the aid of an efficient and sympathetic faculty adviser. This person is selected from faculty members serving the department in which the student has expressed a major interest. At as early a date as informed judgment will permit, students are encouraged to select and become associated with instructors and other students of similar interests. Initial or early counseling will be based upon the student's high school record and all placement test scores. When preparation is found to be inadequate, the student will be 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.

Degree Requirements

A student working toward a B.S. (Bachelor of Science) degree must complete the general and institutional requirements listed on pages 24 and 25. In the School of Agriculture he may major in any one of several areas of specialization. In so doing he has an opportunity to vary his study program to fit his individual needs and interests, but he must fulfill requirements for one of the curriculum options listed on the following page. That is, he must work out his study program so that he will complete requirements as indicated for either agricultural science, agricultural business, or agricultural technology. The table below lists the areas of specialization in which an undergraduate may major and indicates which of the curriculum options on the next page are appropriate for each of the areas of specialization.

CURRICULUM OPTIONS

Area of specialization	Agricultural Science	Agricultural Business	Agricultural Technology
Agricultural economics	x	x	x
Agricultural education .....	.....	.....	x
Animal science	x	x	x
Farm crops	x	x	x
Fisheries	x	.....	.....
Food science and technology	x	.....	.....
General agriculture with minor in journalism .....	.....	x	x
Horticulture:			
Nursery management	x	x	x
Floriculture	x	x	x
Vegetable crops	x	x	x
Pomology	x	x	x
Landscape construction and maintenance		(specialized curricula)	
Mechanical technology .....	.....	x	x
Poultry science	x	x	x
Range management	x	.....	.....
Soils	x	x	x
Wildlife management	x	.....	x

Curriculum Options

(Minimum Requirements)

B.S., B.Agr., M.Agr., M.S., Ph.D. degrees

	Agricultural Science (term hours)	Agricultural Business (term hours)	Agricultural Technology (term hours)
Agriculture:			
Orientation	(2)	(2)	(2)
Departmental and subject area requirements	38	48	72
Agricultural economics .....	.....	(11)	(8)
Hours other than in ag econ and student's major department .....	.....	(9)	.....
Hours in other than stu- dent's major department including at least 3 hours in each of three departments .....	.....	.....	(34)
Communications:			
English composition	9	9	9
Oral communications	3	3	3
Electives	6	6	6
Humanities and Social Science:			
Majors in ag economics ...	36	24	18
Students other than ag econ majors	18	24	18
Economics	(3 to 15)	(9)	(3)
Electives	(15 to 21)	(15)	(15)
Business:			
Accounting .....	.....	6	.....
Production management ...	.....	4	.....
Finance .....	.....	4	.....
Marketing (business ad or ag econ) .....	.....	6	.....
Business law .....	.....	3	.....
Sales .....	.....	3	.....
Biological and Physical Science:			
Majors in ag economics ...	54	36	35
Students other than ag econ majors	72	36	35
¹ Botany	(6)	(6)	(6)
² Zoology	(5)	(5)	(5)
Genetics	(3)	(3)	(3)
Chemistry			
Majors in ag econ	(9)	(9)	(9)
Students other than ag econ	(14)	(9)	(14)
³ Physics	(6)	(3)	(3)
Mathematics			
Through Mth 200	(12)	.....	.....
Through Mth 101 .....	.....	(4)	(4)
Statistics			
Majors in ag econ	(9)	(6)	.....
Students other than ag econ .....	.....	(6)	.....
Electives			
Majors in ag econ	(4)	.....	(5)
Students other than ag econ	(26)	.....	.....
Physical education	6	6	6
Electives	40	34	43
Total term hours (mini- mum)	192	192	192

¹ Three additional hours of physics may be substituted for three hours of botany.

² Majors in agricultural education and landscape construction and maintenance may elect either zoology or botany.

³ Not required of majors in agricultural education.

OPTIONS

Agricultural Science is designed to provide an excellent, minimum education in sciences basic to agriculture and at the same time allow some latitude for specialization in a departmental subject area. It should be elected by students who intend to pursue specialized and professional careers in research, teaching, and other phases of agriculture requiring a good background in the physical and biological sciences.

Agricultural Business meets the needs of students interested in marketing, finance, sales management, and other business aspects of agriculture. Students completing this option may expect to find employment in industries serving agriculture such as feed and seed companies, credit agencies, farm supply and equipment companies, and firms processing and marketing agricultural products.

Agricultural Technology is designed primarily for students who wish to obtain a broad education in agriculture. Students interested in farming, teaching vocational agriculture, extension, soil conservation, and certain positions with food processing companies, chemical, feed, and seed companies may find this option best fitted to their needs.

At the earliest possible date following enrollment in this school, students will be expected to complete 9 credits in English composition, 24 credits in the biological and physical sciences, and 10 credits in agriculture—including the orientation courses. All candidates for a baccalaureate degree, School of Agriculture, are required to pass a comprehensive examination in English composition. Eligibility to take this examination comes with completion and acceptance of 90 college or university term hours.

Agriculture (General)

Ag 40,41. **A Concept of Agriculture.** 1 hour fall and winter. 1 ①
A perspective of agriculture in society and an understanding of educational and training opportunities. Credit not counted toward graduation.

Agricultural Economics

The Department of Agricultural Economics emphasizes the business and economic aspects of agriculture. Farming is a business, and the off-farm businesses serving agriculture require people trained both in agriculture and in business. In addition, the economic policies and programs affecting American agriculture require study and informed action. In order to serve people interested in these challenging areas, the Department of Agricultural Economics offers work in the following options:

Agricultural Business is designed to serve those who will seek employment with businesses closely associated with agriculture. The student will give considerable emphasis to course work and practical training in business, agricultural economics, and economics. Elective work in the various agriculture study areas (animal, plant, food sciences, and mechanical technology) may be included with this option.

Agricultural Technology provides the student an opportunity to combine technical agriculture and agricultural economics. Students who intend to return to the farm, or who believe they will be working closely with farmers on technical, economic, and production problems will find this option to be of interest.

Agricultural Science permits the student who wishes to prepare himself for graduate work in agricultural economics to develop a strong background in economics, statistics, mathematics, and the physical and biological sciences. People undertaking graduate training following the selection of this option may look forward to careers in research and teaching in agricultural economics. Employment opportunities exist with educational institutions, State and Federal governmental agencies, and private businesses.

Work is also offered leading to the M.S. and Ph.D. degrees. A variety of research projects within the Department permits the student to develop challenging thesis problems which are studied under the supervision of staff members.

Detailed information on course offerings and requirements is available from the Department upon request.

Lower Division Courses

- AEC 111. **Introduction to Agricultural Economics.** 3 hours. 3 ①
 Farm management, marketing, agricultural business, land economics, and agricultural finance; farm policies and programs.
- AEC 211. **Farm Business Management.** 5 hours spring. 5 ①
 Farming 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.

Upper Division Courses

- AEC 311. **Farm Income Tax Management.** 2 hours spring. 1 ① 1 ②
 Management and accounting procedures as influenced by Federal income tax laws and regulations; computation of taxable income. Prerequisite: AEC 211. BECKER.
- AEC 312. **Agricultural Economics Analysis.** 3 hours fall. 3 ①
 Problems of production, marketing, and policies in the agricultural industry. Prerequisite: Ec 203 or equivalent. SITTON.
- AEC 331. **World Food Problems.** 3 hours fall. 3 ①
 The demand for food over time on a world basis, with particular reference to the United States and its potential. Offered alternate years. Offered 1963-64. HOLLANDS.
- AEC 341. **Marketing Farm Products.** 3 hours fall or winter. 3 ①
 Marketing functions; marketing firms and their services; price determining forces; marketing problems; cooperatives. Prerequisite: Ec 203. HOLLANDS, HUTCHINGS.
- AEC 342. **Agricultural Cooperatives.** 3 hours fall. 3 ①
 Organization; financing; management; price policies; membership and public relations; and factors affecting success of cooperative associations with emphasis on Oregon cooperatives. Prerequisite: AEC 341. KORZAN.
- AEC 401. **Research.** Terms and hours to be arranged.
- AEC 405. **Reading and Conference.** Terms and hours to be arranged.
- AEC 407. **Seminar.** Terms and hours to be arranged.
- Ec 407. **Seminar.** (g) 3 hours spring.
- AEC 408. **Workshop.** (g) Terms and hours to be arranged.
 Application of agricultural economics to a specific locality in Oregon in areas of agricultural marketing, policy, finance, and farm management.
- AEC 411. **Agricultural Policy.** (g) 3 hours spring. 3 ①
 Economic principles applied to agricultural adjustment; agricultural price and income policies established by State and Federal agencies. Prerequisite: Ec 203. WOOD.

- AEc 412. Consumers and the Market.** 3 hours winter. 3 ①
Consumer behavior; consumer in the market; consumption patterns; business and pricing practices; laboratory periods devoted to sound buying practices discussed by representatives of businesses and professions. Prerequisite: Ec 203 or 212. HOLLANDS.
- AEc 414. Farm Organization.** (G) 3 hours fall. 2 ① 1 ③
Farm management principles applied to the individual farm; trips to farms showing organizational features; plans for selected farms. Prerequisite: AEc 211. BLANCH.
- AEc 418. Federal Programs and the Farmer.** (g) 3 hours winter. 3 ①
Federal and State programs (ASC, SCS, FHA, AMS, State and county committees) as they affect the operation of Oregon farms. Prerequisite: senior standing. MUMFORD.
- AEc 421. Plant Efficiency Analysis.** (g) 3 hours winter. 1 ① 1 ②
Determining costs and evaluating efficiency in handling, processing, and marketing of agricultural and forest products; analysis of work methods, materials, equipment, handling, and plant layout. Prerequisite: AEc 341. LANGMO.
- AEc 425. Farm Appraisal.** (g) 3 hours spring. 2 ① 1 ③
Theory and techniques; commercial and Federal appraisal methods; field work in appraisal of farms of different types. Consent of instructor required. Prerequisite: senior standing. BLANCH.
- AEc 431. Farm Finance.** (G) 3 hours spring. 3 ①
Finance and credit; capital requirements; credit agencies. Prerequisite: Ec 203. BLANCH.
- AEc 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. BLANCH.
- AEc 444. Pricing Arrangements for Farm Products.** (g) 3 hours spring. 3 ①
Impact on prices of dairy products, processed fruits and vegetables, eggs and poultry, grain and hay; State and Federal marketing orders. Prerequisite: AEc 341. KORZAN.
- AEc 451. Agricultural Prices.** (g) 3 hours spring. 3 ①
Function; factors influencing prices; elasticity coefficients and their application; price trends; relation to production and marketing. Prerequisite: AEc 341; 6 hours of statistics. KORZAN.
- AEc 461. Land and Water Economics.** (g) 3 hours winter. 3 ①
Economic principles and institutions; benefits and costs of development and conservation; allocation among uses and users. Prerequisite: Ec 203. CASTLE.
- AEc 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 203. SIRTON.
- AEc 471. Managerial Economics.** (g) 3 hours spring. 3 ①
Business policies in agricultural supply and marketing firms. Prerequisite: AEc 312; Ec 475. KORZAN.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit. See also courses in Department of Economics which may be taken as part of a graduate major in agricultural economics.

- AEc 501. Research.** Terms and hours to be arranged.
- AEc 503. Thesis.** Terms and hours to be arranged.
- AEc 505. Reading and Conference.** Terms and hours to be arranged.
- AEc 507. Seminar.** 1 hour. 1 ①
- AEc 508. Workshop.** Terms and hours to be arranged.
Application of agricultural economics to a specific locality in Oregon in areas of agricultural marketing, policy, finance, and farm management.

- Ec 512,513. **Economic History and Development.** 3 hours each term. 3 ①
Europe and United States (alternate years) with emphasis on major trends in agriculture, manufacturing, trade, transportation, money, banking, and finance. Limited to candidates for advanced degrees in Department of Agricultural Economics. 3 ①
- Ec 514,515,516. **Contemporary Economic Thought.** 3 hours each term.
Twentieth century economics; value theory, welfare economics, imperfect competition; institutionalism; theory of employment, money, national income, economic fluctuations; growth; innovations in methodology. Prerequisite: Ec 475,476,477, or equivalent. Limited to candidates for advanced degrees in Department of Agricultural Economics. 3 ①
- AEc 520. **Research Methodology.** 3 hours fall. 3 ①
Logic, theory, and statistics in economic research. BROWN.
- AEc 521,522. **Decision-Making Theory and Application.** 3 hours winter and spring. 3 ①
AEc 521: Theoretical production, cost, and revenue relationships with application to the firm under conditions of certainty. *AEc 522:* Application to the firm under conditions of risk and uncertainty. Prerequisite: Mth 200; Ec 475. CASTLE, BROWN, HALTER.
- AEc 523. **Analysis of Agricultural Policies.** 3 hours spring. 3 ①
Public policy; value conflicts; goals; development of policy; economic and political objectives; current and proposed agricultural policies. WOOD.
- Ec 527,528. **History of Economic Thought.** 3 hours each term. 3 ①
Contribution of greatest economic thinkers with particular attention to schools of thought. Limited to candidates for advanced degrees in Department of Agricultural Economics. 3 ①
- AEc 561. **Economics of Natural Resource Development.** 3 hours winter. 3 ①
Allocation over time and among uses; conservation, optimum and multiple use concepts. Prerequisite: Ec 475 or AEc 461. CASTLE.
- AEc 567,568. **Econometrics.** 3 hours winter and spring. 3 ①
Application of mathematics and statistics to problems in specification, estimation, and verification of economic relationships. Prerequisite: Mth 202; St 525. HALTER.
- AEc 572. **Agricultural Marketing.** 3 hours fall. 3 ①
Objectives; costs and organization; margins, transportation, advertising, and cooperative theory; problems, research, and progress. Prerequisite: AEc 341. HOLLANDS.
- AEc 573. **Agricultural Price Analysis.** 3 hours spring. 3 ①
Supply and demand theory; statistical procedures; relation of price research to production and distribution of agricultural commodities. Prerequisite: AEc 451; St 423; Ec 477. EDWARDS.
- AEc 585,586. **Mathematical Economics.** 3 hours fall and winter. 3 ①
Application of mathematics to economics. Prerequisite: Mth 202. HALTER.

Agricultural Education

The Department of Agricultural Education is a joint department within the Schools of Agriculture and Education. It trains teachers and supervisors of agriculture for secondary schools and for schools and classes of adult farmers and young men not enrolled in regular day schools. For requirements, graduate credit, and course listing see SCHOOL OF EDUCATION.

Agricultural Engineering

Mechanical Technology in Agriculture

The curriculum in Mechanical Technology in Agriculture (MTA) is one of three types of instruction offered by the Department of Agricultural Engineering: (1) a curriculum leading to a Bachelor of Science degree in Mechanical

Technology in Agriculture, (2) a curriculum leading to a Bachelor of Science degree in Agricultural Engineering (See SCHOOL OF ENGINEERING), (3) service courses for students majoring in other departments. The Agricultural Engineering Department is jointly administered by the Schools of Agriculture and Engineering.

The MTA curriculum provides a broad course of study which will enable a student to acquire a background in the agricultural sciences, business, communicative and manipulative skills, and elementary engineering principles. This course of study qualifies him for work of an applied nature in many phases of industry, public and self-employment.

Students enrolled under Mechanical Technology in Agriculture may elect one of two options: Agricultural Business or Agricultural Technology. In addition to the minimum basic school requirements for these two options, all MTA students must complete satisfactorily the following departmental requirements:

	<i>Hours</i>
Mechanical Problems in Agriculture (AE 101,102,103).....	6
Trigonometry (Mth 102).....	4
Farm Mechanics (AE 221).....	3
Abridged General Physics (Ph 212).....	3
Engineering Drawing (GE 115).....	3
Plane Surveying (CE 226).....	3
Engines and Tractors (AE 311).....	3
Motor Vehicles (AE 313).....	3
Land Drainage (AE 319).....	3
Pumps and Irrigation (AE 321).....	3
Farm Electricity (AE 331).....	3
Elementary Hydraulics (CE 322).....	3
Farm Buildings (AE 361).....	3
Seed Processing (AE 371).....	3
Farm Implements (AE 391).....	3
Seminar (AE 407).....	2
Utilities in the Home (AE 435).....	3

The increasing importance of modern agricultural machinery in reducing production costs and improving rural living conditions necessitates more complete and effective use of fundamental principles of agricultural and engineering sciences. Accordingly, there are facilities available for teaching and experimental work in farm power and machinery, soil and water control and conservation, farm structures, rural electrification, and crop processing. Adequate facilities are also available for teaching farm and automobile mechanics. The farm power laboratory is equipped with an engine-testing dynamometer, several makes and types of internal combustion engines, sectionalized automobile and tractor motors, and accessories. Farm machinery distributors loan the very latest farm equipment for study and observation. The department has samples of many different kinds of building material. Models of farm water systems and centrifugal and turbine pumps for sprinkler irrigation systems are available for study.

Lower Division Courses

- AE 101,102,103. **Mechanical Problems in Agriculture.** 2 hours each term. 1 ① 1 ②
Lectures and elementary problems. LONG.
- AE 211. **Agricultural Engineering Survey.** 3 hours any term. 1 ① 2 ②
Mechanics, hydraulics, soil conservation, and electricity applied to farm problems. Prerequisite: Mth 100 or equivalent. LONG.
- 1 ① 2 ③
- AE 213. **Mechanical Applications in Agriculture.** 3 hours spring.
Farm surveying, mechanics, maintenance of equipment, and dehydration. Prerequisite: AE 211. LONG.

AE 221. **Farm Mechanics.** 3 hours any term. 1 ① 2 ③
 Hand and power tools for wood and metal working, roof framing, arc and acetylene welding; construction of wood and metal farm appliances; concrete work. KIRK.

AE 222. **Farm Mechanics.** 3 hours spring. 1 ① 2 ③
 Farm machinery; farm equipment; farm-type electrical equipment. Prerequisite: AE 221. CHRISTENSEN.

Upper Division Courses

AE 311. **Engines and Tractors.** 3 hours any term. 2 ① 1 ③
 Internal combustion engine; engine principles, construction; parts, accessories, lubrication and fuels; tractor design and construction. Cannot be taken for credit if credit has previously been earned in AE 312. Prerequisite: Ch 103; Ph 212. LUNDE.

AE 312. **Motor Vehicles.** 3 hours fall. 2 ① 1 ③
 Preventive maintenance procedures for automotive equipment; maintenance schedules, lubrication, and fuels; current developments. Cannot be taken for college credit if credit has previously been earned in AE 311. Prerequisite: Ph 211. LUNDE.

AE 313. **Motor Vehicles.** 3 hours any term. 1 ① 2 ③
 Preventive maintenance procedures for automotive equipment; maintenance schedules, lubrication, adjustments, engine tuneup, carburetion, brake service, chassis and accessory unit repairs. Prerequisite: AE 311 or 312. LUNDE.

AE 314. **Motor Vehicles.** 3 hours spring. 2 ① 1 ③
 Precision diagnostic, test, and repair equipment and tools; engine and other major unit rebuilding procedures; electrical systems. Prerequisite: AE 313. LUNDE.

AE 319. **Land Drainage.** 3 hours spring. 2 ① 1 ③
 Surface and subsurface farm drainage; soil erosion control. Prerequisite: SI 210. WATTS.

AE 321. **Pumps and Irrigation Equipment.** 3 hours fall. 2 ① 1 ③
 Pumps, household water systems, and sprinkler irrigation equipment; planning sprinkler and gravity irrigation; farm water systems. Recommended: SIs 311; CE 322. WATTS.

AE 331. **Farm Electricity.** 3 hours winter. 2 ① 1 ③
 Fundamentals, electrical codes, electrical motors, and use of electricity in agriculture. Prerequisite: AE 211 or equivalent. CROPSEY.

AE 341. **Use of Explosives.** 2 hours winter. 1 ① 1 ③
 Removing stumps, constructing drainage ditches, and rock blasting; 30 hours of field work arranged on Saturdays. WATTS.

AE 361. **Farm Buildings.** 3 hours spring. 1 ① 2 ②
 Creation and evaluation; building services, uses and economics, materials and types of construction. BONNICKSEN.

AE 371. **Seed Processing.** 3 hours fall. 2 ① 1 ③
 Effective cleaning requirements; separation principles and characteristics; machinery operation and plant layout. Prerequisite: AE 211. BOOSTER.

AE 381,382,383. **Farm Skills.** 1 hour each term. 1 ②
 Arc and gas welding techniques; application for high school farm mechanics instruction in repair and construction of farm machinery and equipment. CHRISTENSEN.

AE 391. **Farm Implements.** 3 hours fall or spring. 2 ① 1 ③
 Construction, operation, hitching of equipment used for seed-bed preparation, planting, fertilizing, cultivating, and harvesting. Prerequisite: Mth 100 or equivalent. RODGERS.

AE 401. **Research.** Terms and hours to be arranged.

AE 405. **Reading and Conference.** Terms and hours to be arranged.

AE 406. **Projects.** Terms and hours to be arranged.

AE 407. **Seminar.** Terms and hours to be arranged.

AE 408. **Workshop.** Terms and hours to be arranged.

- AE 435. **Utilities in the Home.** (g) 3 hours spring. 2 ① 1 ③
Use, economy, and function of heating, air conditioning, plumbing, and electricity. Prerequisite: AE 361 or AA 178, or senior standing. CROFSEY.
- AE 441. **Food Engineering.** 3 hours fall. 3 ①
Engineering graphics and mechanics of solids and fluids fundamental to food plant operations. Prerequisite: Mth 200; Ph 212; FST 223. KIRK.
- AE 442. **Food Engineering.** 3 hours winter. 2 ① 1 ②
Electricity and thermodynamics applied to problems in food plant management. Prerequisite: AE 441. KIRK.
- AE 443. **Food Engineering.** (G) 4 hours spring. 3 ① 1 ②
Thermodynamics and heat transfer applied to the processing of food. Prerequisite: AE 442. KIRK.
- AE 451. **Rural House Planning.** (g) 3 hours winter. 1 ① 2 ②
Structural materials and methods of construction; typical dwellings using planning and building standards developed by Agricultural Experiment Station and other research. Prerequisite: AA 178 and senior standing. SINNARD.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- AE 501. **Research.** Terms and hours to be arranged.
- AE 503. **Thesis.** Terms and hours to be arranged.
- AE 505. **Reading and Conference.** Terms and hours to be arranged.
- AE 506. **Projects.** Terms and hours to be arranged.
- AE 507. **Seminar.** Terms and hours to be arranged.
- AE 508. **Workshop.** Terms and hours to be arranged.

Animal Science

Animal Science includes the breeding, feeding, management, and marketing of dairy cattle, meat animals, horses, and fur bearing animals. The subject area is so broad that three options are offered leading to the B.S. degree. These are designed for students from both rural and urban areas. Departmental staff will guide students in the selection of one of these options and help them to develop a program of study.

Graduate students under supervision of staff members have the opportunity to pursue research problems through the Agricultural Experiment Station as part of their program leading to the M.S. or Ph.D. degree.

Agricultural Science Option. This curriculum prepares young people for a career in one of the challenging areas of Animal Science. Within this option, one of three areas may be emphasized: nutrition, genetics, or physiology. Electives and foundation courses are taken in the School of Science and applications of these are provided through advanced courses in the Department of Animal Science.

Agricultural Business Option. Because Agriculture is a venture in which good business management holds the key to success, this curriculum is directed along business lines. The option will permit a student to take a core of courses amounting to 30-35 credit hours in the area of business including courses

relating to finance, accounting, statistics, business and real estate law, investments, salesmanship, and human relations in business. Also courses in the Department of Agricultural Economics will be required. Courses within the Department of Animal Science will be recommended depending upon the student's previous experience and interest.

Agricultural Technology Option. This option is intended for students who desire training in the area of animal production. Basic principles of breeding, feeding, management, and marketing of farm animals and their products are stressed. Courses in range management are integrated with offerings of the Department of Farm Crops. Extensive purebred herds and flocks of dairy cattle, beef cattle, sheep, swine, and mink are maintained for demonstration of principles in livestock production. Well equipped laboratories and small animal facilities supplement the use of domestic animals in instruction.

Lower Division Courses

- AnS 121. **Animal Science.** 3 hours any term. 3 ①
WOLBERG.
- AnS 122. **Animal Science Laboratory.** 2 hours spring. 2 ②
Prerequisite: AnS 121 prerequisite or parallel.
- AnS 200,201,202. **Livestock Practices.** 1 hour each term. 2 ②
Skills necessary in operation of an efficient enterprise. Prerequisite: AnS 121.
- AnS 221. **Horse Husbandry.** 3 hours fall. 2 ① 1 ②
Feeding, care, and management of light horses.
- AnS 231. **Selection of Farm Animals.** 2 hours winter. 2 ③
RALSTON.

Upper Division Courses

- AnS 311. **Animal Nutrition.** 3 hours fall. 3 ①
Digestion and metabolism; nutritional deficiencies. Not recommended for animal, dairy, or poultry science majors. Credit will not be given for both AnS 311 and 411. Prerequisite: Ch 103. CHURCH.
- AnS 316. **Animal Fertility.** 3 hours winter. 3 ①
Male and female genital organs; fertility complex and factors affecting it. WU.
- AnS 321. **Evaluation of Farm Animals.** 2 hours spring. 2 ③
Performance as a guide to evaluation of farm animals. RALSTON, WOLBERG.
- AnS 322. **Dairy Herd Management.** 3 hours fall. 3 ①
Factors influencing dairy herd production. Prerequisite: AnS 121. JONES.
- AnS 331. **Market Livestock Evaluation.** 3 hours winter. 1 ① 2 ②
Evaluation in terms of carcass merit. Prerequisite: AnS 121. Offered alternate years. Offered 1963-64. KENNICK.
- AnS 351. **Meats.** 3 hours fall or spring. 1 ① 2 ②
Slaughtering, cutting, sanitation and inspection, packing house, retail markets. Prerequisite: junior standing and consent of instructor. KENNICK.
- AnS 352. **Wholesale and Retail Meat.** 3 hours winter. 2 ① 1 ②
Identification, selection, and utilization. Prerequisite: junior standing. Offered alternate years. Not offered 1963-64. KENNICK.
- AnS 401. **Research.** Terms and hours to be arranged.
- AnS 405. **Reading and Conference.** Terms and hours to be arranged.
- AnS 407. **Seminar.** 1 hour fall, winter, or spring. 1 ②

- AnS 411. **Animal Nutrition.** (g) 4 hours fall. 3 ① 1 ②
Principles; growth, maintenance, reproduction, lactation; functions and metabolism of nutrients in animal body; relation of chemical composition of feeds to their functions. Prerequisite: Ch 251. Recommended: Ch 252. OLDFIELD.
- AnS 412. **Animal Feeding.** (G) 5 hours winter. 5 ①
Nutrition principles; research at agricultural experiment stations and elsewhere. Prerequisite: AnS 311 or 411. OLDFIELD, JONES.
- AnS 422. **Sheep Production.** (G) 3 hours winter. 2 ① 1 ②
Prerequisite: Z 341 and AnS 311 or 411. FOX.
- AnS 423. **Swine Production.** (G) 3 hours fall. 2 ① 1 ②
Prerequisite: Z 341; AnS 311 or 411. ENGLAND.
- AnS 424. **Beef Cattle Production.** (G) 3 hours spring. 2 ① 1 ②
Prerequisite: Z 341 and AnS 311 or 411. RALSTON.
- AnS 426. **Stock Judging.** 1 hour fall. 1 ③
Swine, sheep, horses, beef, and dairy cattle. Prerequisite: AnS 321 or equivalent. RALSTON, WOLBERG.
- AnS 427. **Artificial Insemination.** 3 hours winter. 1 ① 2 ②
Consent of instructor required. Prerequisite: AnS 316. WOLBERG.
- AnS 432. **Milk Secretion.** (G) 3 hours spring. 2 ① 1 ②
Anatomical, physiological, and biochemical aspects. Prerequisite: VM 321; Ch 252. Offered alternate years. Offered 1963-64. ELLINGTON.
- AnS 433. **Pedigree and Herd Records.** (G) 3 hours spring. 2 ① 1 ②
Blood lines of dairy breeds and interpretation of production records. Prerequisite: AnS 322; Z 341. Offered alternate years. Not offered 1963-64. JONES, WOLBERG.
- AnS 476. **Reproduction Problems.** (G) 3 hours fall. 1 ① 2 ②
Breeding efficiency of livestock; nutritional, genetic, and physiological factors; pregnancy tests. Prerequisite: AnS 316. ELLINGTON, WU.
- AnS 478. **Animal Improvement.** (G) 5 hours spring. 5 ①
Genetics, breeding systems, and selection principles. Prerequisite: Bot 201 or Z 201 or Z 200. BOGART, ENGLAND, JONES.
- AnS 481. **Wool Production.** (G) 3 hours fall. 2 ① 1 ②
Preparation, sorting, grading, scouring, and manufacturing. Offered alternate years. Offered 1963-64. FOX.
- AnS 483. **Wool Technology.** (G) 2 hours spring. 1 ① 1 ③
Techniques in evaluating physical properties. Prerequisite: AnS 481. Offered alternate years. Not offered 1963-64. FOX.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- AnS 501. **Research.** Terms and hours to be arranged.
- AnS 503. **Thesis.** Terms and hours to be arranged.
- AnS 505. **Reading and Conference.** Terms and hours to be arranged.
- AnS 507. **Seminar.** Terms and hours to be arranged.
- AnS 511. **Animal Nutrition.** 5 hours winter. 5 ①
Nutritional research methods; energy concepts; protein metabolism; mineral and vitamin requirements; dietary deficiency disorders. Prerequisite: Ch 251; AnS 411, or their equivalents. Offered alternate years. Not offered 1963-64. HAAG.
- AnS 550,551,552. **Topics in Animal Nutrition.** 2 hours each term. 2 ①
Recent advances. Different topic each term. Prerequisite: AnS 411. OLDFIELD, CHURCH

- AnS 573. **Physiology of Reproduction in Domestic Animals.** 3 hours spring. 3 ①
Gonads, germ cells, and fertilization; inheritance, environment, hormones, nutrition, and management in reproduction. Prerequisite: AnS 476. Offered alternate years. Offered 1963-64. BOGART, ELLINGTON, OLDFIELD, WU.
- AnS 574. **Growth in Domestic Animals.** 3 hours fall. 3 ①
Endocrines and growth; bioenergetics and differentiation; genetic, bacterial, and nutritional aspects. Prerequisite: Ch 452; Z 533; AnS 411,578. Offered alternate years. Not offered 1963-64. BOGART, ELLINGTON, OLDFIELD.
- AnS 578. **Livestock Genetics.** 4 hours spring. 2 ① 2 ②
Inheritance of anatomical and physiological abnormalities; genetic significance of breeding methods; genetic, physiological interrelations. Prerequisite: Z 341. BOGART.

Range Management

(An interdepartmental program jointly administered through the Departments of Animal Science and Farm Crops)

Range for domestic livestock and game animals is one of Oregon's most important natural resources. Range management is a professional specialty concerned with the improvement and wise use of this resource. Since range management is practiced on lands yielding products of forage, timber, water, and recreation, concepts of multiple-use management and a familiarity with these allied fields are included in the program of training. A good balance among crop, soil, and animal science is also realized.

Specialized training in range management is offered at the bachelor's, master of science, and doctoral levels under this interdepartmental program. The range management curriculum is offered under the science option in the School of Agriculture.

Facilities of the Departments of Animal Science and Farm Crops are available to range management students. These include greenhouse, field plot, pasture, range, and animal facilities both on campus and at branch experiment stations.

Field trips in conjunction with specific courses, as well as employment with the Federal government as student trainees, provide abundant opportunity for practical experience on an earn-while-you-learn basis. Opportunities for employment always exceed the supply of available students.

COURSES IN RANGE MANAGEMENT

Upper Division Courses

- AnS or FC 341. **Range Management.** 3 hours fall or winter. 3 ①
Range and pasture management; land-use management. Prerequisite: junior standing.
- AnS or FC 342. **Range Improvement.** 3 hours winter. 2 ① 1 ②
Reseeding, improvement, and maintenance of range, cutover, overflow, marginal, and other grazing lands. Prerequisite: AnS or FC 341.
- AnS or FC 343. **Range Plants.** 3 hours spring. 3 ②
Occurrence, physiology, ecology, and nutritive value of important grass, forb, and browse plants on U. S. and Oregon ranges. Prerequisite: Bot 321; AnS or FC 341.
- AnS or FC 441. **Range Methods.** (g) 4 hours fall. 3 ① 1 ③
Evaluating ranges; forage utilization, range condition, trend and inventory; field problems; use of aerial photographs and sampling theory. Prerequisite: AnS or FC 341.
- AnS or FC 442. **Range Management Planning.** (G) 3 hours spring. 2 ① 1 ②
Administration and management of range lands; actual problems and plan execution. Prerequisite: AnS or FC 441.

- AnS or FC 443. **Range Management.** (G) 3 hours winter. 1 ① 2 ②
Current technical developments, both domestic and foreign. Prerequisite: AnS or FC 341.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G)
may be taken for graduate credit.

- AnS or FC 541. **Range Research Methods.** 3 hours winter. 3 ①
Problem analysis approach; integration of plant and animal research. Prerequisite: St 421,422; AnS 441. Offered alternate years. Offered 1963-64.
- AnS or FC 542. **Range Ecology.** 4 hours spring. 2 ① 2 ②
Range and related resource management problems; field trip. Prerequisite: systematic botany, Bot 441,442. Offered alternate years. Offered 1963-64.
- AnS or FC 543. **Range Management.** 3 hours winter. 1 ① 2 ②
Physiological, sociological, and nutritional problems. Land use philosophies on a world-wide basis. Offered alternate years. Not offered 1963-64.

Extension Methods

Instruction in extension methods provides training for positions as county extension agents in agriculture, as 4-H Club and home economics extension workers, as extension specialists, and as specialists in similar fields where extension methods are commonly used. It also gives students in other fields an understanding of how to take advantage of services of county extension agents.

An extension worker must know not only subject matter but also methods by which extension work succeeds. He must be able to give or know how to obtain authoritative advice for his community or county on problems related to his field of service. He must know the technique of platform speaking and demonstration, radio speaking, conducting discussions, and publicizing the extension program. Combining a major in agriculture or home economics with training in journalism, speech and dramatics, economics, sociology, and other departments, supplemented by work in extension methods, should materially assist in meeting the need for better trained extension workers.

Upper Division Courses

- EM 405. **Reading and Conference.** Terms and hours to be arranged.
- EM 411. **Extension Methods.** (G) 3 hours spring. 3 ①
Philosophy and organization of extension work; methods employed by extension specialists, county agricultural and home demonstration agents, 4-H Club leaders, etc.
- EM 412. **Extension Methods.** (G) 3 hours spring. 3 ①
Application of knowledge and skills gained in EM 411 and other college courses such as journalism, radio, etc., in the fields of agriculture and home economics extension. Offered alternate years. Offered 1963-64.
- EM 453. **Field Work in Home Economics Extension.** (G) Terms and hours to be arranged.
Field practice in county extension work under supervision of professor of extension methods and county extension agents. Prerequisite: EM 411.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G)
may be taken for graduate credit.

- EM 505. **Reading and Conference.** Terms and hours to be arranged.

Farm Crops

The work of the Department of Farm Crops is closely related to six important fields: (1) daily food supply for our human population; (2) feed requirements of all classes of farm animals; (3) growth of plants for textiles; (4) seed and special crops such as drug plants; (5) plant problems of soil conservation; (6) range and wildlife food crops.

Problems of production, improvement, marketing, manufacture, and use of each of the field crops produced for food, forage, textile, and special purposes are dealt with by this department. The primary purpose of the major curriculum is to teach students scientific, practical, and economical methods of crop production, marketing, and improvement. The courses make constant application of scientific principles from such fields of study as soils, physics, chemistry, microbiology, plant pathology, and plant physiology.

Curricula are available under the three options: Agricultural Science, Agricultural Business, and Agricultural Technology. All are designed to meet the student's interest in this major subject and provide considerable flexibility through the selection of electives. A student is further encouraged to develop his potential through independent study of subject matter problems.

Lower Division Course

- FC 211. **Crop Production.** 5 hours fall or spring. 3 ① 2 ②
Field crop production including seeding, establishment, tillage, rotations, culture, production hazards, improvement and quality of cereals, forage, and other field crops. Prerequisite: Bot 201.

Upper Division Courses

- FC 311. **Potato Growing.** 2 hours winter. 2 ①
Production; improvement; storage; cost; marketing; distribution; uses; experimental work; varietal studies; identification, judging, and scoring. Prerequisite: FC 211.
- FC 313. **Lawns and Turfs.** 2 hours fall. 1 ① 1 ②
Turf plants and seeds; seedbed preparation, seeding, fertilization management, weed and pest control for lawns, golf courses, grass nurseries, etc. Prerequisite: FC 211.
- FC 317. **Weed Control.** 4 hours spring. 3 ① 1 ②
Weed types; habits of growth; legislation; prevention, control, and eradication; noxious, persistent, perennial, and poisonous weeds of ranch and range. Prerequisite: FC 211.
- FC 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: FC 211.
- FC 324. **Forage Crops.** 3 hours spring. 2 ① 1 ②
Cultivated hay and pasture; grasses and legumes; pasture establishment and management; hay and silage production; forage crop improvement. Prerequisite: FC 211.
- FC 331. **Seed Testing Technique.** 3 hours spring. 1 ① 1 ④
Determining seed quality; use and care of laboratory equipment. Prerequisite: FC 211.
- FC 332. **Seed Identification.** 3 hours winter. 1 ① 2 ②
Seeds of field crops and weeds identified by external characteristics and internal structures. Prerequisite: FC 211; Bot 203 or 321.
- FC or AnS 341. **Range Management.** See page 149.
- FC or AnS 342. **Range Improvement.** See page 149.
- FC or AnS 343. **Range Plants.** See page 149.
- FC 401. **Research.** Terms and hours to be arranged.

- FC 403. **Thesis.** Terms and hours to be arranged.
- FC 405. **Reading and Conference.** Terms and hours to be arranged.
- FC 407. **Seminar.** 1 hour each term. 1 ①
- FC 411. **Crop Inspection.** (G) 4 hours winter. 2 ① 2 ②
Commodity grading and standardization with special emphasis on inspection, grading, and evaluation of cereals, hay, forage, potatoes, beans, seeds, etc. Prerequisite: FC 211, 322; Ch 251, or equivalent.
- FC 414. **Seed Production.** (G) 3 hours fall. 3 ①
Production, distribution, and use of seed crops; inspection, certification, and legislation. Prerequisite: FC 211; senior standing.
- FC 415. **Plant Breeding.** (g) 3 hours spring. 2 ① 1 ②
Improvement of field and horticultural plants. Consent of instructor required. Prerequisite: Z 341; senior standing.
- FC 419. **Industrial Crops.** (g) 3 hours winter. 3 ①
Production; emphasis on adaptation, agronomic practices, and special qualities. Prerequisite: FC 322.
- FC or AnS 441. **Range Methods.** (g) See page 149.
- FC or AnS 442. **Range Management Planning.** (G) See page 149.
- FC or AnS 443. **Range Management.** (G) See page 150.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- FC 501. **Research.** Terms and hours to be arranged.
- FC 503. **Thesis.** Terms and hours to be arranged.
- FC 505. **Reading and Conference.** Terms and hours to be arranged.
- FC 507. **Seminar.** 1 hour each term. 1 ①
- FC 515. **Plant Breeding.** 3 hours winter. 3 ①
Genetic and cytogenetic principles, methodologies, and theories in improvement of cereals and forage crops. Current literature. Prerequisite: Z 341; FC 517 or equivalent.
- FC 516. **Field-Plot Technique.** 3 hours spring. 2 ① 1 ②
Experimental procedures, methods, and techniques; application to field-crop research; interpretation of results. Prerequisite: St 421,422 or equivalent.
- FC 517. **Plant Genetics.** 3 hours fall. 2 ① 1 ②
Theories and principles. Prerequisite: Z 341 and consent of instructor.
- FC 518. **Herbicides and Plant Growth Regulators.** 3 hours fall. 3 ①
Chemicals for weed control and other agronomic purposes; growth regulators, defoliant and preharvest sprays and their physiological effects; research methods. Prerequisite: FC 317; Ch 252; Bot 331; senior standing. Offered alternate years. Not offered 1963-64.
- FC 519. **Crop Seed Physiology.** 4 hours winter. 2 ① 1 ③
Metabolic changes and affecting factors during stages of seed development, storage, and germination. Prerequisite: Bot 331,431; Ch 252.
- FC 520. **Conservation Cropping.** 2 hours fall. 2 ①
Crops and cropping systems which replenish and maintain soil organic matter and provide maximum protection against soil losses; plants for dike and streambank protection; sodded waterways, slope maintenance. Prerequisite: FC 211 and senior standing.
- FC 521. **Concepts of Crop Science.** 3 hours spring. 3 ①
History and current literature. Prerequisite: FC 317,322,324.

- FC or AnS 541. **Range Research Methods.** See page 150.
 FC or AnS 542. **Range Ecology.** See page 150.
 FC or AnS 543. **Range Management.** See page 150.

Fish and Game Management

Major students in this department are prepared mainly for professional careers in wildlife management and in fisheries as biologists, managers, and administrators with State and Federal agencies, land and water-using industries, and public health organizations. The curriculum in wildlife management emphasizes the ecological requirements of wild birds and mammals in relation to multiple-use principles of land and water management. The fishery science curriculum is designed for students planning to enter the research and management fields of commercial and game fisheries. Modifications in course requirements as outlined in the curriculum options (page 139) are made to allow for specialized instruction pertaining particularly to fishery and wildlife resources. The curricula include courses in botany, zoology, and veterinary medicine in addition to departmental courses. All undergraduate students in the department are required to complete the following: Wildlife Conservation, 6 hours; Economic Ichthyology, 3 hours; Management of Game Fish, 9 hours. Fisheries science majors take, in addition, 6 hours of Economic Ichthyology and 9 hours of Commercial Fisheries, whereas wildlife management students complete the following: Wildlife Management, 9 hours; Management of Game Birds, 9 hours; Management of Big Game, 6 hours; Management of Fur Bearers, 3 hours. Copies of the curricula may be obtained by writing to the Department of Fish and Game Management, Extension Hall 318.

Strategically located for the study of fish and game management, Oregon State University has within easy access state fish hatcheries, a game farm, refuges, the E. E. Wilson Game Management Area, a fish physiology and toxicity laboratory, an experimental stream, and a marine fishery station. Most forms of Oregon's varied wildlife are only a few hours' travel from Corvallis. Research by the Oregon State Game Commission conducted at OSU in cooperation with the Agricultural Experiment Station is of basic value to the instructional programs. Cooperative water-pollution investigations with the Fish Toxicology and Physiology Unit of the U. S. Public Health Service are important aspects of the graduate studies program.

Lower Division Courses

- FG 251,252. **Wildlife Conservation.** 3 hours each term, fall and winter. 3 ①
 Wildlife as a valuable economic and recreational resource; need for its conservation through scientific administration and manipulation; general problems of wildlife management; an introduction to important wild animal groups of birds, mammals, and fishes.
- FG 261. **Wildlife Technique.** 3 hours fall or spring. 3 ① 1 ②
 Harvesting the game and fish crop; shotguns and elementary ballistics; bait and fly casting; hunting dogs; dressing and caring for flesh of game and fish.
- FG 274,275,276. **Economic Ichthyology.** 3 hours each term. 3 ① 1 ②
 Classification and distribution; general consideration of orders and families with special attention to those of economic and recreational importance in North America and adjacent marine areas. Prerequisite: Z 203 or 200.
- FG 281,282,283. **Wildlife Management.** 3 hours each term. 2 ① 1 ②
 Principles; measurements of animal populations and productivity; refuge management, hunting and predator control, food and cover improvements, and other techniques used in controlling wild animal populations. Prerequisite: Z 203 or 200; FG 252.

Upper Division Courses

- FG 310,311,312. **Forest Wildlife Management.** 3 hours each term. 3 ①
Productivity; ecology; management principles; life histories; environmental improvements. *Fall term:* big game and fur animals. *Winter term:* waterfowl and forest birds. *Spring term:* game fishes.
- FG 319. **History and Literature of Wildlife Management.** 3 hours
winter. 3 ①
Brief history; literature and its sources; author information.
- FG 320. **Rodent Control Methods.** 3 hours spring. 2 ① 1 ②
Classifications, life histories, and control of rodents important in human disease transmission and in destruction of agricultural crops. Prerequisite: Z 372.
- FG 340. **Field Work.** 1 to 6 hours to be arranged.
Practical field work between sophomore and senior years carried on with public agencies and private concerns; written report based on an approved outline. Student registers in absentia. See page 30.
- FG 401. **Research.** Terms and hours to be arranged.
- FG 405. **Reading and Conference.** Terms and hours to be arranged.
- FG 407. **Seminar.** Terms and hours to be arranged.
- FG 440. **Field Studies.** (G) 1 to 6 hours to be arranged.
Meets specific needs of senior and graduate students assigned to field stations. Prerequisite: FG 283 or equivalent. 2 ① 1 ②
- FG 451,452,453. **Management of Game Birds.** 3 hours each term.
Identification, distribution, life histories, ecology, and management of important game bird species. Waterfowl and related forms, fall and winter terms; upland birds, spring term. Prerequisite: Z 371; FG 283. 2 ① 1 ②
- FG 454,455. **Management of Game Fish.** (G) 3 hours fall and winter.
Freshwater fishes of North America; trout, salmon, and spiny-rayed fishes; biologies of important species; identification; dams, fishladders, diversion ditches; farm fish ponds; hatchery methods and techniques. Prerequisite: FG 274. 2 ① 1 ②
- FG 456. **Fishery Limnology.** (G) 3 hours spring. 2 ① 1 ②
Concepts and techniques used in fishery biology; lake and stream survey methods; age and growth analysis; population estimation; pollution biology. Prerequisite: FG 455. 2 ① 1 ②
- FG 457,458. **Management of Big Game.** (G) 3 hours fall and spring.
Game mammals; habits, distribution, management under natural conditions; values; laws. Prerequisite: Z 372; FG 283.
- FG 460. **Management of Fur Bearers.** (G) 3 hours winter. 2 ① 1 ②
Wild fur-bearing mammals; identification, life histories, habits, distributions, economic importance, and management. Prerequisite: Z 372; FG 283.
- FG 464,465,466. **Commercial Fisheries.** 3 hours each term. 2 ① 1 ②
Important species; values; harvesting; regulating resources. Prerequisite: FG 276.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G)
may be taken for graduate credit.

- FG 501. **Research.** Terms and hours to be arranged.
- FG 503. **Thesis.** Terms and hours to be arranged.
- FG 505. **Reading and Conference.** Terms and hours to be arranged.
- FG 507. **Seminar.** Terms and hours to be arranged.

- FG 561,562. **Invertebrate Fisheries.** 3 hours winter and spring. 2 ① 1 ③
Classification, life histories, distribution, and cultivation methods of economic mollusca, crustaceans, and other important invertebrate groups.
- FG 567,568,569. **Research Methods.** 4 hours each term. 4 ①
Ecology of fish and game populations; physiological, behavioral, racial, and population approaches; dynamics and production of fish and game populations.
- FG 570. **Pollution Problems in Fisheries.** 3 hours winter. 2 ① 1 ②
Polluted waters; sources, measures, biological indices, and abatement of water pollution; water requirement and toxicology of fishes and associated aquatic organisms. Prerequisite: FG 456 or equivalent. DOUDOROFF.
- Z 571,572,573. **Ichthyology.** 3 hours each term. 2 ① 1 ③
For course description see ZOOLOGY.

Food Science and Technology

Food Technology is the application of the sciences and engineering to the manufacture, preservation, storage, transportation, and consumer use of food products.

Processing of the basic raw materials—milk, fruits, vegetables, seafoods, meats, and grains—into consumer products by canning, freezing, dehydrating, fermenting, and fabrication is taught with emphasis on basic chemical, microbiological, and physical principles rather than on specific procedures. Because of this, those who complete a major in this department have excellent opportunities in or associated with the largest industry in the world—the food industry. These opportunities include research and development in industry, government, colleges, and universities; regulation of food quality through government agencies and within companies; and management or operation of food products manufacturing plants.

The undergraduate four-year program leads to the *Bachelor of Science degree in Food Science and Technology* under the agricultural science option, and educates the student in respect to all the principal food commodity groups and all technologies used in processing them commercially. Students wishing to study a specific phase of foods should enroll for a fifth year leading to the Master of Science degree. Completing the undergraduate curriculum gives an excellent background for graduate studies as well as for employment.

By taking certain additional courses a second baccalaureate degree may be earned in the School of Business and Technology to provide special qualifications for employment in food company management.

Graduate programs leading to the *Master of Science or Doctor of Philosophy degrees in Food Science* permit intensified study in the subject areas of special interest. The food science program is concerned with pure science and basic research involving the chemical, physical, and biological aspects of foods; it usually relates to the processing, preservation, distribution, and utilization of foods. The Department of Food Science and Technology in cooperation with other departments, as well as with the Agricultural Experiment Station, affords excellent leadership and facilities for solving both fundamental and applied research problems relating to foods.

The Department is housed in two modern buildings designed to provide functional facilities for different types of food and dairy products manufacturing.

These facilities include well equipped laboratories and pilot plants for instruction and research. The Seafoods Laboratory located at Astoria, Oregon, is maintained as an integral part of the Department.

Lower Division Courses

- FST 111. **Food Grades and Standards.** 4 hours spring. 4 ②
Food inspection; standards and quality grading; detection, extraction, and identification of extraneous materials in foods.
- FST 221. **Food Processing Methods.** 3 hours. 2 ① 1 ③
Unit operations and unit processes applied to food manufacture and preservation.
- FST 222. **Food Processing Methods.** 4 hours winter. 3 ① 1 ③
Continuation of FST 221.
- FST 223. **Food Processing Methods.** 3 hours. 2 ① 1 ③
Prerequisite: FST 222.
- FST 271. **Food Grades and Standards.** 3 hours winter. 3 ②
Federal, State, and industrial inspection; quality grading; dairy products standards.

Upper Division Courses

- FST 310. **Market Milk.** 3 hours fall. 2 ① 1 ③
Producing and processing; sanitation; legal standards; milk and cream testing. Prerequisite: Mb 204.
- FST 318. **Judging Dairy Products.** 1 hour fall. 1 ②
Advanced judging of dairy products to qualify for intercollegiate contests and commercial and government grading work. Prerequisite: FST 271.
- FST 340. **Food Industry Survey.** 3 hours fall. 3 ①
Nature, extent, and economic significance of the food industry and its problems; manufactured food products. For students who will not have an opportunity to take any other FST course.
- FST 342,343. **Food Science.** 4 hours each term. 3 ① 1 ③
Physical, chemical, and microbiological principles governing manufacture, preservation, and deterioration of foods. Prerequisite: FST 223; Mb 204; Ch 350,353.
- FST 350. **Principles of Food Preservation.** 4 hours fall. 3 ① 1 ③
Food manufacture, preservation, and deterioration. For students in fields other than food science and technology. Prerequisite: Ch 103; Mb 204.
- FST 372. **Extraneous Materials in Foods.** 3 hours fall. 1 ① 2 ②
Detection, extraction, and identification of extraneous materials in foods. Maximum of eight students per laboratory section. Prerequisite: Mb 204. Offered alternate years. Offered 1963-64.
- FST 401. **Research.** Terms and hours to be arranged.
- FST 405. **Reading and Conference.** Terms and hours to be arranged.
- FST 407. **Seminar.** 1 hour each term. 1 ①
- FST 412. **Detergency and Waste Disposal.** (G) 3 hours fall. 2 ① 1 ③
Detergency and methods of evaluating detergents and chemical sterilizers; water conditioning; waste disposal. Prerequisite: Mb 411; Ch 227,234.
- FST 413. **Dairy Products Analysis.** (G) 3 hours spring. 2 ① 1 ③
Laboratory control of dairy products and processes; quality of dry milks, casein, dried whey, and other byproducts; methods of analysis. Prerequisite: Ch 457; Ch 234 recommended. Offered alternate years. Offered 1963-64.
- FST 417. **Dairy Foods.** 3 hours spring. 3 ①
Principles and procedures for processing major dairy foods. For students in fields other than dairy technology. Prerequisite: Mb 204.

- FST 421. **Federal and State Food Regulations.** (g) 2 hours spring. 2 ①
Laws and regulations dealing with the manufacture of foods; labeling, adulteration, misbranding, food standards, case problems. Prerequisite: senior standing.
- FST 423. **Food Analysis.** (g) 5 hours winter. 3 ① 2 ③
Systematic, chemical, and physical analysis. Prerequisite: FST 343; Ch 234,350,353.
- FST 424. **Quality Control Systems.** (G) 3 hours spring. 2 ① 1 ③
Principles, organization, and functioning in food processing plants. Objective tests and sampling plans. Prerequisite: FST 271, 423; St 315 or 422.
- FST 431. **Food Packaging.** (G) 3 hours winter. 2 ① 1 ③
Objectives, requirements, composition, characteristics, merits, selection, and adaptation of packaging materials and packages; chemical and physical properties; adhesives, lacquers, plasticizers, sizers, coating, laminates, and closures. Prerequisite: FST 223, 343, or 310; Ch 234.
- FST 441,442,443. **Dairy Products Processing.** (g) 5 hours each term. 3 ① 1 ⑤
Current industrial processing of butter, cheese and cheese products, frozen dairy products, concentrated milk products, and market milk products. Prerequisite: Ph 212; Ch 234,350; Mb 411. Offered alternate years. Not offered 1963-64.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- FST 501. **Research.** Terms and hours to be arranged.
- FST 503. **Thesis.** Terms and hours to be arranged.
- FST 505. **Reading and Conference.** Terms and hours to be arranged.
- FST 507. **Seminar.** Terms and hours to be arranged.
- FST 531. **Carbohydrates in Foods.** 3 hours fall. 2 ① 1 ③
Changes during processing and storage; significance of changes. Prerequisite: Ch 234, 351,353. Offered alternate years. Offered 1963-64.
- 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: Ch 427,428; St 422. Offered alternate years. Offered 1963-64.
- FST 533. **Lipids in Foods.** 3 hours spring. 2 ① 1 ③
Function, composition, preservation, deterioration, and analysis. Prerequisite: Ch 351, 353,428. Offered alternate years. Offered 1963-64.
- FST 551. **Food Preservation.** 4 hours fall. 3 ① 1 ③
Thermal process evaluation for canned foods; freezing, dehydration, freeze-drying, and other methods. Prerequisite: Mb 460; Mth 200; Ph 212. Offered alternate years. Offered 1963-64.
- FST 561. **Pigments and Color Evaluation.** 3 hours fall. 2 ① 1 ③
Detection and measurement of food pigments and synthetic food colors; effects of food processing; color perception and evaluation. Prerequisite: Ch 351,353. Offered alternate years. Not offered 1963-64.
- FST 562. **Proteins in Foods.** 3 hours winter. 2 ① 1 ③
Food protein systems; reactions with other food components; changes in proteins and how they affect the chemical and physical properties of foods. Prerequisite: Ch 351,353. Offered alternate years. Not offered 1963-64.
- FST 563. **Enzymes of Foods.** 3 hours spring. 2 ① 1 ③
Effect of modern food processing methods on enzymes of foods; use of enzymes in food processing. Prerequisite: Ch 451. Offered alternate years. Not offered 1963-64.

Horticulture

The Department of Horticulture offers courses of study which represent the major phases of Oregon's extensive and highly diversified horticultural industry and afford students a wide choice of vocations and careers.

Curricula in pomology, vegetable crops, floriculture, and nursery management cover the fields of production, marketing, and distribution of fruits, nuts, vegetable crops, flowers, and ornamental plants.

Students majoring in the Department of Horticulture may elect the School of Agriculture options of business, technology, or science with major emphasis in nursery management, vegetable crops, pomology, or floriculture. For horticulture majors specializing in landscape construction and maintenance, a separate curriculum is established.

In addition to the minimum requirements for Oregon State University and the School of Agriculture, the minimum requirements of all horticulture majors, with the exception of those majoring in landscape construction and maintenance, include the following courses:

	<i>Hours</i>
Basic Horticulture (Hrt 215,216)	6
Soils (Sls 210)	5
Economic Entomology (Ent 314)	4
Plant Physiology (Bot 331)	5
Plant Pathology (Bot 351)	5
Horticultural Plant Breeding (Hrt 413)	3

In addition, the *minimum requirements for each specialized subject matter area in horticulture*, irrespective of option, include the following courses:

Nursery Management		Vegetable Crops	
	<i>Hours</i>		<i>Hours</i>
Plant Propagation (Hrt 311)	3	Vegetable Production (Hrt 341)	4
Nursery Management (Hrt 361,362)	8	Commercial Veg Production (Hrt 342)	4
Pomology		Vegetable Handling and Dist (Hrt 441)	3
	<i>Hours</i>	Systematic Vegetable Crops (Hrt 443) ..	3
Plant Propagation (Hrt 311)	3	Floriculture	
Small Fruit Production (Hrt 332)	4		<i>Hours</i>
Fruit and Nut Production (Hrt 333)....	4	Plant Propagation (Hrt 311)	3
Fruit Handling and Distribution (Hrt 431)	4	Commercial Floriculture (Hrt 351, 352,353)	9

A two-year terminal curriculum in Nursery Management is also available. This curriculum provides instruction and training for those students interested in general nursery management work as nursery foremen, propagators, planting foremen, assistant nursery superintendents, and related positions.

Graduate programs leading to the M.S. and Ph.D. degrees are offered by the Department of Horticulture. Students whose undergraduate major follows the science option in horticulture have the best background for graduate training, although advanced degree programs are not limited solely to those students electing this option. Graduates of advanced degree programs find employment opportunities in Federal and State as well as private research agencies, in businesses serving horticulture industry, and in extension, teaching, and research in colleges and universities.

The curriculum in landscape construction and maintenance prepares for professional careers in the laying out, planting, care, and supervision of country and municipal homes, parks, playground areas, and highway landscape developments. Emphasis is laid on the practical application of landscape knowledge and on the fundamentals of ornamental plant culture.

The minimum requirements of the landscape construction and maintenance curriculum differ from the minimum requirements for other curricula in this department and are as follows:

	<i>Hours</i>		<i>Hours</i>
Agriculture	36	Business	6
Communications	9	Biological and physical science	36
Humanities and social science (includes landscape)	64	Engineering	6
		Physical education	6
		Electives	30

Lower Division Courses

- Hrt 111. **Elements of Horticulture.** 3 hours. 2 ① 1 ②
Introduction to field. Propagation, culture, and utilization of fruits, nuts, vegetables, and ornamental plants.
- Hrt 151. **General Floriculture.** 3 hours winter. 2 ① 1 ②
Acquaints student with the field, its developments, its branches, and opportunities it offers as a vocation. Offered alternate years. Not offered 1963-64.
- Hrt 215,216. **Basic Horticulture.** 3 hours fall and winter. 2 ① 1 ②
Culture of horticultural plants: soil, water, climate in relation to growth, yield, and quality; vegetative propagation and post-harvest physiology.
- Hrt 253. **Flower Arrangement.** 3 hours fall or spring. 2 ① 1 ②
Basic principles as applied to florist work.

Upper Division Courses

- Hrt 311. **Plant Propagation.** 3 hours winter. 1 ① 2 ②
Propagating or perpetuating plants by means of seeds, cuttings, layers, tubers, bulbs, budding, grafting; practice in greenhouse, nursery, field, and orchard.
- Hrt 313. **Greenhouse Construction and Management.** 3 hours spring. 2 ① 1 ②
Planning, layout, construction, and heating of modern greenhouses; factors involved in the efficient operation of a greenhouse range. Offered alternate years. Not offered 1963-64.
- Hrt 332. **Small Fruit Production.** 4 hours fall. 3 ① 1 ②
Production, economic and geographic distribution; temperature, water, light, and nutritional requirements and limitations; growth and development; cultural techniques; fruit and fruiting characteristics. Prerequisite: Hrt 216.
- Hrt 333. **Fruit and Nut Production.** 4 hours spring. 3 ① 1 ②
Geographic distribution of deciduous orchards; temperature, water, light, and nutritional requirements and limitations; soil management, pollination, thinning and pruning; native and applied auxins and growth regulators as related to fruit set and growth; influence of rootstocks on tree growth, productivity, and fruit quality; indices of fruit maturity and special problems of production. Prerequisite: Hrt 216. Offered alternate years. Not offered 1963-64.
- Hrt 341. **Vegetable Production.** 4 hours winter. 3 ① 1 ②
Seeding; plant production; varieties; soil and climatic influences; home vegetable gardens. Basic course for students specializing in vegetable production; adapted to vocational agriculture and extension studies.
- Hrt 342. **Commercial Vegetable Production.** 4 hours spring. 3 ① 1 ②
Problems; economic aspects; environmental effects; seed, plant production, irrigation, nutrition, and other aspects of major vegetable crop plants. Offered alternate years. Offered 1963-64.

- Hrt 351,352,353. **Commercial Floriculture.** 3 hours each term. 2 ① 1 ②
Cut flowers, pot plants, and forced bulbous crops; modern techniques and recent research findings. Offered alternate years. Offered 1963-64.
- Hrt 355. **Herbaceous Plant Materials.** 3 hours spring. 2 ① 1 ②
Annual, biennial, and perennial flowering plants; their use, arrangement, and culture in commercial and home-garden production. Offered alternate years. Offered 1963-64.
- Hrt 361,362. **Nursery Management.** 4 hours fall and winter. 3 ① 1 ②
Propagation, planting, culture, digging, packing, and storing of nursery stock; inspection, quarantine regulations; transportation and marketing. Prerequisite: Hrt 216.
- Hrt 401. **Research.** Terms and hours to be arranged.
- Hrt 403. **Thesis.** Terms and hours to be arranged.
- Hrt 405. **Reading and Conference.** Terms and hours to be arranged.
- Hrt 407. **Seminar.** Terms and hours to be arranged.
- Hrt 413. **Horticultural Plant Breeding.** 3 hours spring. 2 ① 1 ②
Improvement of horticultural varieties; breeding techniques, handling, storage, and viability of pollen; origin of horticultural strains, bud sports and chimeras; polyploidy, sterility and incompatibility phenomena in horticultural plants. Prerequisite: Hrt 216. Offered alternate years. Not offered 1963-64.
- Hrt 415. **Spraying, Dusting, and Fumigation.** (g) 3 hours fall. 2 ① 1 ②
Properties and uses of pesticides and related agricultural chemicals in relation to production of horticultural crops; application methods and equipment. 3 ① 1 ②
- Hrt 431. **Fruit Handling and Distribution I.** (g) 4 hours winter. 2 ① 2 ②
Problems of fruit handling; harvesting, grading, packing, inspection, storage, transportation, and marketing. Composition and physiology of fruits. Prerequisite: Hrt 216.
- Hrt 433. **Systematic Pomology.** (G) 4 hours fall. 2 ① 2 ②
Fruit groups, botanical relationships and taxonomy; variety description, nomenclature, identification and classification; variety adaptation and evaluation; origin and improvement of fruit varieties. Offered alternate years. Not offered 1963-64. 2 ① 1 ②
- Hrt 441. **Vegetable Handling and Distribution.** (G) 3 hours winter. 2 ① 1 ②
Harvesting; grading; packing; inspection; transportation; storage and distribution. Offered alternate years. Not offered 1963-64.
- Hrt 443. **Systematic Vegetable Crops.** (G) 3 hours fall. 1 ① 2 ②
Nomenclature and classification; nature and importance of horticultural characteristics; varietal differentiation and identification; origins and uses. Offered alternate years. Offered 1963-64.
- Hrt 451. **Flower Shop Operation.** 3 hours fall. 2 ① 1 ②
Efficient operation of florist shops; advanced work in design of floral pieces. Restricted to students majoring in floriculture and nursery management. Offered alternate years. Not offered 1963-64. 2 ① 1 ②
- Hrt 453. **Handling and Distribution of Florist Crops.** 3 hours winter. 2 ① 1 ②
Problems of precooling, packaging, storing, transporting, and distributing florist crops. Offered alternate years. Not offered 1963-64.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- Hrt 501. **Research.** Terms and hours to be arranged.
- Hrt 503. **Thesis.** Terms and hours to be arranged.
- Hrt 505. **Reading and Conference.** Terms and hours to be arranged.

- Hrt 507. **Seminar.** Terms and hours to be arranged.
- Hrt 511. **Horticultural Genetics Lectures.** 3 hours fall. 3 ①
Application of genetic theories and fundamental principles in development of horticultural plants. Inheritance studies; mutation phenomenon; polyploidy and interspecific hybridization. Prerequisite: Hrt 413; Z 341. Offered alternate years. Offered 1963-64.
- Hrt 512. **Horticultural Genetics Laboratory.** 2 hours fall. 2 ②
Reports; field and laboratory problems involving hybridization, artificial induction of mutations, data analyses, readings, and genetics and cytological techniques. Prerequisite: Hrt 413, 511; Z 341. Offered alternate years. Offered 1963-64.
- Hrt 513. **Horticultural Genetics Lectures.** 3 hours winter 3 ①
Continuation of Hrt 511. Offered alternate years. Offered 1963-64.
- Hrt 514. **Horticultural Genetics Laboratory.** 2 hours winter. 2 ②
Continuation of Hrt 512. Offered alternate years. Offered 1963-64.
- Hrt 515. **Methods of Research.** 3 hours winter. 3 ①
Horticultural investigative work; research problems; experimental design; statistics in horticultural research; weighing of experimental evidence; briefs and outlines; research publications. Prerequisite: St 422 or equivalent. Offered alternate years. Not offered 1963-64.
- Hrt 516. **Horticultural Plant Nutrition Problems.** 4 hours winter. 4 ①
Factors influencing nutrient absorption and composition of horticultural crops; criteria of essentiality and roles of elements; concepts of nutritional status; plant analysis; nutrient element interactions; growth, yield, and quality as affected by nutrient status. Current literature; problem sets. Prerequisite: Hrt 216; Bot 431. Offered alternate years. Not offered 1963-64. COMPTON.
- Hrt 531. **Fruit Handling and Distribution.** 4 hours spring. 4 ①
Fundamentals of fresh fruit handling. One period, other periods to be arranged. Prerequisite: Hrt 431 or equivalent. Offered alternate years. Offered 1963-64.
- Hrt 533. **Fruit and Nut Production.** 4 hours spring. 4 ①
One period, other periods to be arranged. Prerequisite: Hrt 333; Bot 331; Ch 251; or equivalents. Offered alternate years. Offered 1963-64.
- Hrt 541. **Vegetable Crop Problems.** 4 hours fall or winter. 4 ①
Lectures, current research, review and discussions of literature. Student has choice of two areas of study; (1) breeding, or (2) environment, nutrition, culture, in relation to growth, yield, quality. Consent of instructor required. Prerequisite: Hrt 216,342. Offered alternate years. Not offered 1963-64. FRAZIER, APPLE.

Poultry Science

With the rapid development of the poultry industry has come a demand for persons trained in Poultry Science. A well trained staff and excellent physical facilities enable the department to offer unusual educational opportunities to both undergraduate and graduate students. The department has two chicken farms and one turkey farm, flocks of popular breeds of chickens and turkeys, and various types of buildings and equipment including modern mammoth incubators and mechanical feeders and adequate laboratories for instruction and research.

Poultry Science majors may elect one of three options: Agricultural Science, Agricultural Business, or Agricultural Technology.

Poultry Science majors electing the Agricultural Science option are required to complete a minimum of 18 hours of Poultry Science Department courses; those electing the Agricultural Business or the Agricultural Technology options, 26 hours. Regardless of option elected, Poultry Science majors are required to complete a minimum of 6 hours of course work in the Department of Veterinary Medicine including 3 hours in VM 311, Anatomy and Physiology of

the Fowl, and 3 hours in Avian Diseases, both of which may be used to partially satisfy the biological and physical science requirements.

Lower Division Course

- P 121. **Poultry Production.** 3 hours any term. 2 ① 1 ②
Various phases of poultry industry; kinds of poultry; physiology, reproduction, feeding, housing, brooding, and management practices. PARKER, McCLUSKEY.

Upper Division Courses

- P 321. **The Chick Embryo.** 3 hours winter. 3 ①
Development and environmental requirements of embryos of the domestic fowl. Prerequisite: P 121. Offered alternate years. Not offered 1963-64. BERNIER.
- P 322. **Chick Embryo Laboratory.** 2 hours winter. 2 ②
Laboratory work to accompany P 321. Offered alternate years. Not offered 1963-64.
- P 323. **Brooding and Broiler Production.** 3 hours spring. 3 ①
Brooding requirements of chickens and turkey poults; types of brooding equipment; commercial broiler production. Prerequisite: P 121. McCLUSKEY.
- P 341. **Poultry Judging.** 3 hours winter. 2 ① 1 ②
Judging poultry for standard and production qualities. Prerequisite: P 121. Offered alternate years. Offered 1963-64. PARKER.
- P 351. **Turkey Management.** 3 hours fall. 2 ① 1 ②
Practical details in the breeding, feeding, rearing, and marketing of turkeys. Prerequisite: P 121. Offered alternate years. Not offered 1963-64. HARPER.
- P 403. **Thesis.** Terms and hours to be arranged.
- P 405. **Reading and Conference.** Terms and hours to be arranged.
- P 407. **Seminar.** 1 hour winter and spring. 1 ①
- P 411. **Poultry Feeding.** (g) 3 hours fall. 3 ①
Systems of feeding poultry, and nutritional requirements; formulation of rations; common nutritional deficiencies. Prerequisite: P 121. ARSCOTT.
- P 412. **Poultry Feeding Laboratory.** (g) 1 hour. 1 ②
Laboratory work to accompany P 411.
- P 413. **Poultry Nutrition.** (G) 3 hours spring. 3 ①
Proteins, minerals, energy, vitamins, antibiotics, other feed additives in chicken and turkey nutrition. Digestion and metabolism of these substances. Prerequisite: nutrition and organic or biochemistry. ARSCOTT.
- P 421. **Marketing Poultry Products.** (g) 3 hours fall. 2 ① 1 ②
Preparation of poultry and eggs for market. Commercial handling of poultry products. Prerequisite: P 121. Offered alternate years. Offered 1963-64. HARPER.
- P 431. **Poultry Plant Management.** (g) 3 hours spring. 3 ①
Location, layout, and arrangement of buildings and equipment. Management practices, visits to commercial poultry farms. Prerequisite: P 121 and one other poultry course. Offered alternate years. Not offered 1963-64. PARKER.
- P 441. **Poultry Breeding.** (g) 3 hours fall. 3 ①
Inheritance of egg and meat production in domestic fowls. Prerequisite: P 121. Offered alternate years. Offered 1963-64. BERNIER.
- P 442. **Population Genetics and Breeding Improvement.** (G) 3 hours spring. 3 ①
Population genetics and application to selection and mating for improvement of quantitative characters. Prerequisite: Z 341; St 421,422 or equivalent. BERNIER.
- P 451. **Commercial Practices.** (G) 3 hours winter. 3 ①
Operations and practices in commercial poultry production. Prerequisite: senior standing. PARKER and staff.

Graduate Courses

Courses numbered 400-499 and designated (G) or (G)
may be taken for graduate credit.

- P 501. **Research.** Terms and hours to be arranged.
- P 503. **Thesis.** Terms and hours to be arranged.
- P 505. **Reading and Conference.** Terms and hours to be arranged.
- P 507. **Seminar.** Terms and hours to be arranged.

Soils

Soil is one of the basic natural resources and also a highly complex and interesting natural phenomenon. Study of soils is based on knowledge of geology, chemistry, physics, biology, and mathematics. The curricula in soils lead to understanding of the phenomenon and to practical knowledge and skill in the use of the resource.

The objective of curricula for the soils major is to give students a scientific and practical understanding of soils and their management. To achieve this aim the student may elect to pursue any of the three curriculum options depending upon his interests and aptitude.

The Agricultural Science Option is designed for those students intending to prepare themselves for graduate work and probable subsequent careers in research or college and university teaching. Students interested in soil survey may also elect this option. Students electing this option shall obtain much of their formal training in the School of Science.

The Agricultural Business Option is intended for students who wish to prepare themselves for subsequent work in the chemical industries, other commercial organizations, and farming. Courses in business and economics are included as an important part of the agricultural business curriculum.

Students electing the **Agricultural Technology Option** may find subsequent employment in soil conservation planning, extension, land appraisal, as fieldmen for various industrial and commercial organizations, or in farming. Students electing the agricultural technology curriculum will be encouraged to take a considerable number of courses in a broad area of agriculture subjects.

In addition to the minimum requirements in the School of Agriculture all soils majors will be required to take 18 to 25 hours of soils and at least one course in quantitative analysis, plant physiology, general microbiology, and geology.

Graduate work is offered leading to the degrees of Master of Science and Doctor of Philosophy in soils. Students majoring in other departments may minor in soils. Soil fertility, soil physics, soil chemistry, irrigation, forest soils, or soil genesis, morphology, and classification may be emphasized in graduate programs.

Lower Division Courses

Sls 210. **Soils.** 5 hours fall or winter.

3 ① 2 ③

Origin, formation, classification; physical, chemical, and biological characteristics; effects of tillage, drainage, irrigation, and organic matter; plant nutrients and fertilizers; rotations. Prerequisite: Ch 203 or equivalent; Mth 101. DAWSON.

- Sls 214. **Forest Soils.** 4 hours spring. 3 ① 1 ③
 Origin, development, characteristics, and classification of forest soils, relation of soils to forest types, to rate of forest growth and methods of forest management, to vegetation, moisture reaction and fertility; soil management and conservation. Prerequisite: Ch 102. YOUNGBERG.

Upper Division Courses

- Sls 311. **Soil Water and Irrigation.** 3 hours fall. 2 ① 1 ③
 Basic soil-water-plant relationships; management of soil-water and crops for permanent irrigation agriculture. Prerequisite: Sls 210. EVANS.
- Sls. 314. **Soil Management and Conservation.** 4 hours spring. 3 ① 1 ③
 Identifying, analyzing, and solving soil management and conservation problems; maintaining and increasing soil productivity; conservation farming; climate, topography, vegetation, slope, soil; drainage, irrigation, erosion control, tillage, fertility, organic matter, crop rotation, salinity-alkalinity. Prerequisite: Sls 210. DAWSON.
- Sls 401. **Research.** Terms and hours to be arranged.
- Sls 405. **Reading and Conference.** Terms and hours to be arranged.
- 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 fall. 3 ①
 Important chemical phenomena in soils; basic structures and properties of main type of clays; exchange reactions; chemical phenomena of individual elements in soils. Prerequisite: Sls 210; Ch 234 or equivalent. HARWARD.
- Sls 421. **Soil Physics.** (G) 3 hours fall. 3 ①
 Physical properties of soil including structure, moisture, temperature, and aeration, and their measurement. Prerequisite: Sls 210; Mth 101. BOERSMA.
- Mb 421,422. **Soil Microbiology.** (G) 4 and 3 hours. 4 ①; 3 ①
 See MICROBIOLOGY for course description.
- Sls 422. **Soil Physics Laboratory.** (G) 2 hours winter. 2 ③
 Techniques for examining or evaluating various physical properties of soil. Prerequisite: Sls 421. BOERSMA.
- Sls 424. **Soil Fertility Lectures.** (g) 3 hours winter. 3 ①
 Chemical, physical, and biological properties of soils in relation to the availability of nutrient elements; soil amendments, fertilizers, manure and crop rotations in a fertility management program. Prerequisite: Sls 210. JACKSON.
- Sls 425. **Soil and Plant Analysis.** (g) 3 hours spring. 1 ① 2 ③
 Chemical methods, interpretation and correlation of analyses with crop response, current literature on methods. Prerequisite: Sls 424; Ch 234. ALBAN.
- Sls 432. **Soil Morphology and Survey.** (g) 4 hours. 3 ① 1 ③
 Soils in place; distribute patterns; morphology of major groups; soil survey techniques. Two all-day field trips required. Prerequisite: Sls 210 and course in geology. KNOX.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- Sls 501. **Research.** Terms and hours to be arranged.
- Sls 503. **Thesis.** Terms and hours to be arranged.
- Sls 505. **Reading and Conference.** Terms and hours to be arranged.
- Sls 507. **Seminar.** Terms and hours to be arranged.

- Sls 511. **Soil Genesis and Classification.** 3 hours winter. 3 ① 1 ③
Genetic features and their formation; principles of classification; classification systems. One all-day field trip required. Physical geography and rocks and minerals courses recommended. Offered alternate years. Not offered 1963-64. KNOX.
- Sls 512. **Soil Colloids.** 4 hours winter. 3 ① 1 ③
Clay minerals, methods of identification including X-ray diffraction, chemistry of weathering and formation, physical and colloidal chemistry of soils, hydration of soil colloids, electro-kinetic properties. Prerequisite: Sls 210,412; Ch 234, or equivalents. Ch 442 recommended. Offered alternate years. Offered 1963-64. HARWARD.
- Sls 513. **Soil Fertility.** 3 hours winter. 3 ①
Concepts and approaches; relations of soil chemistry, plant physiology, and crop sciences; current literature. Prerequisite: Sls 412; Sls 424; St 423. Offered alternate years. Not offered 1963-64. MOORE.
- Sls 514. **Forest Soils.** 3 hours winter. 3 ①
Forest growth; physical, chemical, and biological properties in occurrence and growth of forests. Prerequisite: consent of instructor. Soil survey and forest ecology courses recommended as preparation. Offered 1963-64. YOUNGBERG.
- Sls 521. **Soil Physics.** 3 hours spring. 3 ①
Theoretical and applied soil physics with special attention to flow problems. Prerequisite: Sls 421; calculus. Offered alternate years. Offered 1963-64. EVANS.
- Sls 522. **Soil Physical Conditions and Plant Growth.** 3 hours spring. 3 ①
Relations of soil moisture, temperature, air, and mechanical impedance to seed germination, shoot emergence, and plant growth. Prerequisite: Sls 421. Offered alternate years. Not offered 1963-64. EVANS.

Veterinary Medicine

The courses in veterinary medicine aim to fit the student for successful handling of livestock. Anatomy and physiology of domestic animals familiarize him with normal structures and functions of the animal body, thus laying a foundation for courses in judging, breeding, feeds and feeding, nutrition, and diseases of animals. The study of diseases is taken up from the standpoint of the livestock owner. The student learns to recognize disease, to care for sick animals, and to prevent disease through proper methods of sanitation and management. Importance of quarantine, different methods of control and eradication of disease, and role of stock owners in maintaining this work are considered. The department does not train men to enter the veterinary profession.

Upper Division Courses

- VM 311. **Anatomy and Physiology of the Fowl.** 3 hours winter. 2 ① 1 ②
Structure and physiology of body of fowl.
- VM 320,321. **Anatomy and Physiology of Domestic Animals.** 4 hours fall and winter. 1 ① 3 ②; 2 ① 2 ②
- VM 341. **Diseases of Livestock.** 4 hours fall. 4 ①
Elementary consideration of hygiene, sanitation, and other methods of livestock disease control for students not majoring in animal production.
- VM 441. **Animal Diseases and Control.** (g) 5 hours spring. 3 ① 2 ②
Predisposing and primary causes of disease, epizootology, and practical disease control. Prerequisite: VM 321.
- VM 451. **Avian Diseases.** (g) 3 hours spring. 3 ①
The pathology of avian diseases; program for control. Prerequisite: VM 311.
- VM 452. **Avian Diseases Laboratory.** (g) 2 hours spring. 2 ②
Laboratory studies to accompany VM 451. Prerequisite: VM 311.

- VM 461. **Parasitic Diseases of Domestic and Game Animals.** (G)
4 hours winter. 2 ① 2 ②
Principles of the parasite-host complex with special emphasis on etiology, immunity, and control. Prerequisite: Z 203 or VM 321 or equivalent.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G)
may be taken for graduate credit.

- VM 501. **Research.** Terms and hours to be arranged.
VM 503. **Thesis.** Terms and hours to be arranged.
VM 505. **Reading and Conference.** Terms and hours to be arranged.
VM 507. **Seminar.** Terms and hours to be arranged.

School of Business and Technology

Fully accredited by the American Association of Collegiate Schools of Business

Faculty

As of January 1963

CLIFFORD ELGES MASER, Ph.D., Dean of the School of Business and Technology.

LOUIS L. EDWARDS, M.E., Head Counselor and Placement Director.

Business Administration: Professors EASTON (department chairman), CAMPBELL, CRAIG, MASER, NEWTON,¹ PFANNER, SEATON; Associate Professors ALLAN,¹ MENGLER, STRICKLER, DAVIDSON;² Assistant Professors BACON, BOURQUE, DALBEY, EDWARDS, EICKELBERG, HOPEMAN, JOHNSON, JORDAN, KERBY, MAHER, MILLER, NELSON, O'ROURKE, RETTIG, SCHREIMA, SJOGREN, SNYDER; Instructors BLUESTEIN, CRECH, WHITE.

Business Education: Professors YERIAN (department head), LARSE, WINGER; Assistant Professor BARBER.

Secretarial Science: Professors YERIAN (department head), LARSE, WINGER; Associate Professor STUTZ (emeritus); Assistant Professors BARBER, JONES, ORNER; Instructors MARKSHEFFEL, SCHERICH, WIPER.

Statement of Objectives

THE OBJECTIVE of the Oregon State University School of Business and Technology is to help prepare those it serves to find self-fulfillment, to accept responsible membership and leadership in a free democratic society, and to function effectively in a free enterprise business community. This goal is approached through activities in resident instruction, services rendered to the business community, and through professional activity and scholarly research on the part of its faculty.

The School of Business and Technology offers: (1) major work in business administration in combination with a technology; (2) major work in secretarial science; (3) in conjunction with the School of Education, major work in business education for the preparation of teachers.

Educational Objective Defined

In working toward its objective the School of Business and Technology, as an undergraduate collegiate school of business, accepts its primary responsibility to be that of resident instruction. The most important means of accomplishment is through its professional curricula. These include the following approaches to the achievement of the School's stated aims:

1. To prepare those it serves for responsible entrepreneurial or professional management roles in the modern free enterprise business community. Courses offered by the Department of Business Administration in the basic principles and applications of business organization, management, and control are included in the curriculum to help achieve this objective. Functionally specialized courses are purposely held to a minimum in favor of the broadest possible liberal and professional education.

¹ Sabbatical leave 1962-63.

² Sabbatical leave spring and fall of 1963.

2. To prepare men and women for the teaching of business subjects in the secondary schools and for responsible secretarial or office management positions. Courses offered by the Departments of Business Education and Secretarial Science, in both principles and techniques, are designed to help achieve this objective.

3. To acquaint those it serves with a basic knowledge of the vocabulary, materials, methods, and techniques of industry to the end that, as prospective business managers, they may understand the technological aspects of the enterprise in which they may be engaged and may adequately communicate concerning them. Courses offered by the Schools of Agriculture, Engineering, Forestry, Home Economics, and Science are built, as technical minors, into the curriculum of each business administration student for the purpose.

4. To stimulate each individual it serves to: work at his intellectually creative best, keep his imagination free, measure his judgments against well considered value standards, and find articulate self-expression. Humanities courses in the curriculum help the student to reach this goal.

5. To bring to those it serves an awareness of the functions and problems of the human society so that they may live to appreciate its worth and contribute to the opportunities and freedom it provides. Social science courses are included in the curriculum to help achieve this objective.

6. To explain to those it serves the nature of the universe about them so that they may better understand some of the wonders of creation and the relationship of the human being to his physical environment. An integrated course in the biological and physical sciences is included in the curriculum to help achieve this objective.

7. To build the foundation for further, more highly specialized, business studies at the graduate level.

General Statement

High School Preparation. A student intending to major in the School of Business and Technology would do well to complete the following courses in high school: English, four years; algebra, two years; history and social studies, three years; typing, one year; natural science, two years.

Transfer Students. A student transferring into the School of Business and Technology should do so prior to or during the sophomore year. Experience indicates that the fulfillment of course requirements within the normal four-year period becomes progressively more difficult to accomplish with each term that is completed prior to transfer. Most transfers that take place as late as the third term of the sophomore year will almost unavoidably result in an added term or terms of work.

Counseling. Each student in the School of Business and Technology is assigned a faculty adviser immediately after registering in the school. The adviser stands ready at all times to assist the student in such matters as career requirements and opportunities, course and curricular requirements, and academic counseling. The student may exercise the prerogative of asking to be assigned to a different adviser if, after having become better acquainted with the staff, it seems preferable to make such a change.

Placement. The Placement Director of the School of Business and Technology operates through the office of the dean. His services are available to all students seeking information concerning placement opportunities, interviews with visiting firms, and general information concerning career objectives.

Double Degrees. Increasing numbers of students majoring in agriculture, engineering, forestry, home economics, and science have come to the conclusion that preparation in business administration, in addition to work in their original major field, will prove to be of great value. As a result, a significant number have been completing requirements for degrees in more than one field.

The requirements which a student would need to fulfill in order to qualify for two or more baccalaureate degrees are listed on page 25. Through a careful use of the elective courses available to a student in the original major field, the time necessary to fulfill the requirements for the second degree may be considerably reduced.

Graduate Degrees. Advanced degrees of Master of Arts or Master of Science in Business Education are offered. General regulations and requirements for all advanced degrees are printed under Graduate School.

Major Fields

Business Administration and Technology. The major curricula in business administration consist of a core of required courses. Introduction to Business, Accounting, Finance, Production, Marketing, Statistics, Business Law, Human Relations in Business, Government Relations in Business, and Business Policy. In addition, the student must complete, during his junior and senior years, 18 term hours of upper division business or related courses, selected in terms of his career objectives. These courses may be chosen with a view to gaining a broad general training in business, or may be selected from one of six areas of concentrated study: accounting, finance, production, marketing, personnel management, and agricultural business management.

Students majoring in Business Administration and Technology combine any one of the major business curricula with a technical minor of 27 term hours, over and above such prerequisite and related courses as mathematics, physics, and chemistry. Technical minors and their specific course requirements are listed on pages 175-180.

The School of Business Administration at the University of Oregon offers major work, both undergraduate and graduate, in all fields of business where the interests of a student do not demand that technical training be taken in combination with business administration.

Business Education. The Department of Business Education offers a four-year major curriculum designed to prepare high school business teachers. The fact that students completing this curriculum are prepared to enter both the teaching and the secretarial fields has made this program of study increasingly attractive. Both fields offer excellent opportunities to men and women.

For requirements for a State Teacher's Certificate, a list of teaching minors, and further information in regard to both undergraduate and graduate work in this department see SCHOOL OF EDUCATION.

Secretarial Science. Responsible secretarial and allied positions such as office manager, administrative assistant, and research assistant are going more and more to the college-trained person. Such positions require, in addition to the secretarial skills, background training in business administration, English and business correspondence, economics, psychology, and liberal arts. Students who come with previous training in typing and stenography are permitted to register

in advanced classes according to their abilities. Many high school graduates begin with second-year stenography. Special one- and two-year terminal programs are arranged for those who do not plan to be graduated.

Curriculum in Business Administration and Technology

B.S., B.A. Degrees

	Term hours		
	F	W	S
Freshman Year			
Introduction to Business (BA 101)	4	4	4
¹ Intermediate Algebra (Mth 100) .....	.....	.....	4
¹ College Algebra (Mth 101) .....	.....	.....	4
² English Composition (Wr 111,112,113).....	3	3	3
History of Western Civilization (Hst 101,102,103)	3	3	3
³ Natural science sequence	3	3	3
⁴ Defense education or electives	3	3	3
⁵ Physical education (PE 190,190,190)	1	1	1
	17	17	17
Sophomore Year			
Principles of Economics (Ec 201,202,203)	3	3	3
Principles of Accounting (BA 211,212,213)	3	3	3
Business Statistics (BA 311,312)	3	3	.....
Quantitative Business Methods (BA 313) .....	.....	.....	3
⁶ Technical minor	3	3	3
⁴ Defense education or electives	3	3	3
Physical education (PE 190,190,190)	1	1	1
	16	16	16
Junior Year			
Production (BA 201)	4	.....	.....
Marketing (BA 202) .....	.....	4	.....
Finance (BA 203) .....	.....	.....	4
Business Managerial Economics (BA 301)	3	.....	.....
Organization and Management Theory (BA 302) .....	.....	3	.....
Business Law (BA 411,412,413)	3	3	3
Technical minor	3	3	3
⁴ Electives	3	3	6
	16	16	16
Senior Year			
Human Relations in Business (BA 497)	3	.....	.....
Government Relations in Business (BA 498) .....	.....	3	.....
Business Policy (BA 499) .....	.....	.....	3
Business administration (concentration)	3	3	3
⁷ Business administration (concentration)	3	3	3
Technical minor	3	3	3
⁴ Electives	3	3	3
	15	15	15
⁸ Electives (optional)	(3)	(3)	(3)
	(18)	(18)	(18)

¹ All new students are required to take the mathematics placement test. Those placed in Elementary Algebra, Mth 10, must also complete Intermediate Algebra, Mth 100. Those originally placed in Intermediate Algebra, Mth 100, must also complete College Algebra, Mth 101.

² Students who do not earn a minimum rating in the English placement examination are advised to take extra work concurrently with Wr 111; students who show exceptional ability on this examination are placed in honors sections.

³ Natural science sequence may be completed in any of the sciences with the exception of mathematics and psychology.

⁴ At least 12 of the total elective credits must be in the social sciences, excluding SSc 101, 102, 103, and Psy 111.

⁵ General Hygiene (PE 150, 1 term hour, or PE 160, 2 term hours, for men; PE 160, 2 term hours, for women) is taken one term in place of physical education (PE 190).

⁶ Beginning with their sophomore year, students majoring in business administration and technology are required to select and register in a technical minor. See pages 175-180.

⁷ Students majoring in business administration and technology are required to choose an area of concentration at the beginning of their junior year. See pages 171-172.

⁸ It is strongly recommended to all students who have a grade-point average of 2.50 or above that they register for the maximum number of elective hours.

Areas of Concentration

Students in the Department of Business Administration must complete 18 term hours of upper division business administration or related courses in an area of concentration. This concentration of courses may be satisfied in either of two ways: I. General Business and Industry or II. In one of six functional areas of business administration.

I. GENERAL BUSINESS AND INDUSTRY CONCENTRATION [G]

The student in the General Business and Industry concentration will be expected to program his 18 hours of upper division business administration or related courses at the beginning of his junior year in terms of his career objectives, after consultation with and the approval of his faculty adviser.

A maximum of three approved upper division courses in economics may be accepted in lieu of approved business administration courses.

	Term hours		
	F	W	S
Junior year: Approved Business Administration courses	3	3	3
Senior year: Approved Business Administration courses	3	3	3

II. FUNCTIONAL AREAS OF BUSINESS CONCENTRATION

Some substitution of courses may be permitted for exceptionally well-qualified students or for students with unusual objectives.

Accounting and Cost Control [A]

	Term hours		
	F	W	S
Junior Year			
Advanced Accounting (BA 417,418,419)	3	3	3
Senior Year			
Cost Accounting (BA 421,422)	3	3	....
Auditing (BA 427,428)	3	3	....

RELATED COURSES

Cost Accounting (BA 423)	Case Problems in Controllership (BA 429)
Analysis of Financial Statements (BA 424)	Business Data Processing (BA 441,442)
Tax Accounting (BA 425)	Technical Report Writing (Wr 227)
Accounting Theory (BA 426)	

Financial Management [F]

	Term hours		
	F	W	S
Senior Year			
Financial Institutions (BA 441)	3	....	....
Investments (BA 443) .....	....	3	....
Related course.....	....	....	3
Financial Management (BA 447,448)	3	3	....
Case Problems in Financial Management (BA 449) .....	....	....	3

RELATED COURSES

Credit Management (BA 442)	Taxation and Business (BA 446)
Insurance and Risk Management (BA 444)	Economic Fluctuations (Ec 421)
Property Management (BA 445)	Money and Banking (Ec 436)

Production Management [P]

	Term hours		
	F	W	S
Senior Year			
Cost Accounting (BA 421)	3	....	....
Related courses .....	....	3	3
Production Management (BA 457,458)	3	3	....
Case Problems in Production Management (BA 459) .....	....	....	3

RELATED COURSES

Linear Programing in Business (BA 433)	Labor Economics (Ec 427)
Industrial Purchasing (BA 453)	Methods and Motion Study (PT 391)
Labor Problems (Ec 425)	Time Study (PT 392)
Labor Legislation (Ec 426)	Operations Research (St 471,472,473)

Marketing Management [M]

	Term hours		
	F	W	S
Senior Year			
Salesmanship (BA 472)	3	.....	.....
Related courses		3	3
Marketing Management (BA 477,478)	3	3	.....
Case Problems in Marketing Management (BA 479) .....	.....	.....	3

RELATED COURSES

Credit Management (BA 442)	Retail Management (BA 474)
Industrial Purchasing (BA 453)	Marketing Research (BA 475)
Advertising (BA 471)	International Business (BA 476)
Sales Management (BA 473)	

Personnel Management and Industrial Relations [Pe]

	Term hours		
	F	W	S
Senior Year			
Labor Problems (Ec 425)	3	.....	.....
Labor Legislation (Ec 426) .....	.....	3	.....
Labor Economics (Ec 427) .....	.....	.....	3
Personnel Management (BA 467,468)	3	3	.....
Case Problems in Personnel Management (BA 469) .....	.....	.....	3

RELATED COURSES

Courses in Psychology	Office Organization and Management
Courses in Sociology	(SS 422)
Courses in Industrial Engineering	

Agricultural Business Management [Ag]

	Term hours		
	F	W	S
Junior Year			
Food and Agriculture (AEc 331)	3	.....	.....
Principles of Agricultural Marketing (AEc 341) .....	.....	3	.....
Agricultural Cooperation (AEc 342) .....	.....	.....	3
Senior Year			
Agricultural Prices (AEc 451)	3	.....	.....
Agricultural Policy (AEc 411) .....	.....	.....	3
Agricultural Finance (AEc 431) .....	.....	.....	3

RELATED COURSES

Applied Agricultural Economics (AEc 312)	Marketing Dairy Products (AEc 444)
Consumers and the Market (AEc 412)	Agricultural Land Economics (AEc 462)
Marketing Efficiency Analysis (AEc 421)	Money and Banking (Ec 424)
Livestock Economics (AEc 440)	

Curriculum in Business Education

B.A., B.S., M.A., M.S., M.Ed. Degrees

	Freshman Year		
	F	W	S
¹ Typing (SS 121,122,123)	2	2	2
¹ Stenography (SS 111,112,113)	3	3	3
English Composition (Wr 111,112,113)	3	3	3
Introduction to Business (BA 101)	4	(4)	(4)
Group requirement in literature or science	3	3	3
Physical education	1	1	1
² Electives	3	3	3
	16	15	15
	Sophomore Year		
Field Experience (Ed 200)	2	(2)	(2)
Applied Stenography (SS 211,212,213)	3	3	3
Principles of Accounting (BA 211,212,213)	3	3	3
Principles of Economics (Ec 201,202,203)	3	3	3
General Psychology (Psy 201,202)	3	3	3
Business English (Wr 214)	3	(3)	(3)
³ Physical education	2	1	1
Extempore Speaking (Sp 111)	(3)	(3)	3
Electives	3	---	---
	16	16	16
	Junior Year		
Office Procedure (SS 311,312,313)	4	4	4
School in American Life (Ed 310)	3	(3)	(3)
Educational Psychology: Learning (Ed 312)	3	(3)	(3)
Methods in Reading (Ed 350)	(3)	3	(3)
Special Secondary Methods (Ed 408) (Nonskill and Bookkeeping)	(3)	---	---
Special Secondary Methods (Ed 408) (Typewriting)	---	3	(3)
Special Secondary Methods (Ed 408) (Shorthand)	(3)	(3)	3
Business Law (BA 411,412,413)	3	3	3
Human Development (Psy 311)	3	(3)	(3)
Electives	3	3	3
	16	16	16
	Senior Year		
⁴ Office Organization and Management (SS 421,422)	3	(3)	3
Seminar (SS 407)	1	(1)	(1)
Secretarial Problems (SS 411)	---	3	(3)
Production (BA 201)	4	(4)	(4)
Marketing (BA 202)	(4)	(4)	4
Finance (BA 203)	(4)	4	(4)
Business Statistics (BA 311)	3	(3)	(3)
Student Teaching: Secondary (Ed 416)	(9)	(9)	9
Seminar (BEd 407) (student teachers)	(1)	(1)	1
Electives in science or social science	3	3	---
⁵ Electives	3	6	---
	17	16	17

¹ Students who have had previous training in stenography and typing will be placed in classes commensurate with their abilities.

² The student should decide during the first year whether he desires the Bachelor of Science or the Bachelor of Arts degree. This decision will influence his choice of electives.

³ General Hygiene (PE 150, 1 term hour for men; PE 160, 2 term hours for women) is taken one term in place of physical education.

⁴ SS 421 offered fall and winter terms.

⁵ The student should select by the beginning of the sophomore year one of the teaching minors (excluding business administration) listed in SCHOOL OF EDUCATION section under "Teaching Majors and Minors in High School Fields," and "Additional Teaching Minors." The elective hours can be used toward the teaching minor.

Curriculum in Secretarial Science

B.A., B.S. Degrees

	Term hours		
	F	W	S
Freshman Year			
¹ Stenography (SS 111,112,113)	3	3	3
¹ Typing (SS 121,122,123)	2	2	2
Introduction to Business (BA 101)	4	(4)	.....
¹ Group Requirement in Literature or Science	3	3	3
English Composition (Wr 111,112,113)	3	3	3
Physical Education	1	1	1
Electives .....	.....	3	3
	16	15	15
Sophomore Year			
Applied Stenography (SS 211,212,213)	3	3	3
Principles of Economics (Ec 201,202,203)	3	3	3
Principles of Accounting (BA 211,212,213)	3	3	3
American Governments (PS 201)	3	(3)	(3)
History of American Civilization (Hst 226) .....	.....	3	3
Business English (Wr 214)	(3)	3	(3)
² Physical education	2	1	1
Electives	3	3	3
	17	16	16
Junior Year			
Office Procedure (SS 311,312,313)	4	4	4
Business Law (BA 411,412,413)	3	3	3
General Psychology (Psy 201,202)	3	3	.....
Applied Psychology (Psy 205) .....	.....	3	3
Science or social science electives	3	3	3
Electives .....	.....	3	3
	16	16	16
Senior Year			
Technical Reporting (SS 321) .....	.....	3	.....
Seminar (SS 407)	1	(1)	(1)
Secretarial Problems (SS 411) .....	.....	3	(3)
Secretarial Practice (SS 412)	(3)	(3)	3
³ Office Organization and Management (SS 421,422)	3	(3)	3
Business Statistics (BA 311)	3	(3)	(3)
Retail Management (BA 474)	3	(3)	(3)
Production (BA 201)	4	(4)	(4)
Marketing (BA 202)	(4)	(4)	4
Finance (BA 203)	(4)	4	(4)
Science or social science electives .....	.....	3	3
Electives	3	3	3
	17	16	16

¹ See notes 1 and 2 on previous page.

² General Hygiene (PE 150, 1 term hour for men; PE 160, 2 term hours for women) will be taken any term in place of physical education.

³ SS 421 offered fall and winter terms.

Technical Minors

Technical fields in which minors are authorized are: agriculture, applied mathematics, applied physics, engineering, forestry, home economics, industrial chemistry, mining or petroleum geology. In addition to the technical minors in these fields outlined below, similar technical minors within these authorized fields may be arranged where necessary to meet the objectives of individual students.

SCIENCE:

Applied Physics
Industrial Chemistry
Mining and Petroleum Geology

AGRICULTURE:

Animal Science and Farm Crops
Dairy Technology
Farm Crops
Floriculture
Food Technology
Horticulture
Mechanical Technology in Agriculture
Poultry Science

ENGINEERING:

Building Construction
Manufacturing (Metals Industries)
Manufacturing (Wood Industries)

FORESTRY:

General Forestry

HOME ECONOMICS:

Clothing and Textiles
Institution Management

NAVAL SCIENCE¹

Applied Mathematics

Professor EDWARD KAPLAN, Adviser

	Term hours		
	F	W	S
Sophomore year:			
College Algebra (Mth 101)	4	.....	.....
Trigonometry (Mth 102) .....	.....	4	.....
Calculus With Analytic Geometry (Mth 200) .....	.....	.....	4
Junior year:			
Calculus With Analytic Geometry (Mth 201,202,203)	4	4	4
Senior year:			
Approved upper division electives in mathematics or statistics	3-4	3-4	3-4

Applied Physics [AP]

Professor E. A. YUNKER, Adviser

Sophomore year:			
College Algebra (Mth 101)	4	.....	.....
Trigonometry (Mth 102) .....	.....	4	.....
Calculus with Analytic Geometry (Mth 200) .....	.....	.....	4
General Physics (Ph 201,202,203) or (Ph 207,208,209)	4	4	4
Junior year:			
Introductory Modern Physics (Ph 311,312,313)	3	3	3
Calculus with Analytic Geometry (Mth 201,202,203)	4	4	4
Senior year:			
Electricity and Magnetism (Ph 331,332) or Electronics and Radio (Ph 437,438,439) or Fundamentals of Radio (Ph 334) and Geometrical and Physical Optics (Ph 465,466) or Photography (Ph 361) and Commercial Photography (Ph 362,363) or Synoptic Meteorology (Ph 391,392,393)	3	3	3

Clothing and Textiles [CT]

(For men and women)

Professor ELAINE K. CARLSON, Adviser

Sophomore year:			
Color and Composition (AA 160)	3	(3)	(3)
Textiles (CT 250)	(3)	3	(3)
Men: Clothing Construction (CT 216)			
Women: Clothing Construction (CT 210 or 218)	(3)	(3)	3

¹ For naval science technical minor course requirements consult dean's office, School of Business and Technology.

Floriculture [Fl]

Professor STANLEY E. WADSWORTH, Adviser

NOTE: Floriculture courses usually offered alternate years—check with adviser.

	Term hours		
	F	W	S
Sophomore year:			
Elements of Horticulture (Hrt 111)	3	.....	.....
General Floriculture (Hrt 151) .....	.....	3	.....
Flower Arrangement (Hrt 253) .....	.....	.....	3
Junior year:			
Commercial Floriculture (Hrt 351,352,353) or Flower Shop Operation (Hrt 451) Plant Propagation (Hrt 311) Herbaceous Plant Materials (Hrt 355)	3	3	3
Senior year:			
Handling and Distribution of Florist Crops (Hrt 453)	3	.....	.....
Greenhouse Construction and Management (Hrt 313) or Basic Design (AA 295) .....	.....	3	.....
Reading and Conference (Hrt 405) .....	.....	.....	3

Food Technology [FT]

Professor C. E. SAMUELS, Adviser

Sophomore year:			
General Chemistry (Ch 101,102,103)	3	3	3
Junior year:			
Food Manufacturing Methods (FST 221,222,223)	3	3	3
Senior year:			
General Microbiology (Mb 204)	4	(4)	.....
Principles of Food Preservation (FST 350)	4	.....	.....
Food Grades and Standards (FST 271) .....	.....	3	.....
Federal and State Food Regulations (FST 421) .....	.....	.....	2
Related courses	(3)	(3)	3

RELATED COURSES

Meats (AnS 351)	Vegetable Handling and Distr (Hrt 441)
Dairy Foods (FST 417)	Food Manufacturing Plants and Equipment (FST 311)
Elements of Horticulture (Hrt 111)	Nutrition (FN 225)
Fruit Handling and Distribution I (Hrt 431)	

Forestry [Fo]

Professor W. I. WEST, Adviser

Sophomore year:			
Conservation of Natural Resources (F 260)	3	.....	.....
Trigonometry (Mth 102 B & T Section) .....	.....	4	.....
Tree Identification (F 153) .....	.....	.....	3
Junior year:			
Forest Engineering (FE 123)	3	.....	.....
Forest Mensuration (F 224) .....	.....	5	.....
Wood Technology (FP 210) .....	.....	.....	3
Senior year:			
Wood Utilization (FP 310)	3	(3)	.....
Logging Methods (FE 392) .....	.....	3	.....
Forest Economics (F 412)	3	(3)	.....

¹ Must precede all forestry courses except F 260. All other forestry subjects should be taken in order indicated; deviation may be permitted if prerequisites are met and upon consulting adviser.

Horticulture [Hrt]

Professor SPENCER B. APPLE, Adviser

	Term hours		
	F	W	S
Sophomore year:			
General Chemistry (Ch 101,102)	3	3	3
Elements of Horticulture (Hrt 111) .....	.....	.....	3
Junior year:			
Basic Horticulture (Hrt 315)	3	.....	.....
Plant Propagation (Hrt 311) .....	.....	3	.....
Soils (Sls 210)	5	.....	.....
Senior year:			
Systematic Pomology (Hrt 433) or Systematic Vegetable Crops (Hrt 443)	4-3	.....	.....
Fruit Handling and Distribution I (Hrt 431) .....	.....	4	.....
Small Fruit Production (Hrt 332) or Fruit and Nut Production (Hrt 333)	(4)	.....	4
Vegetable Production (HRT 341) or Commercial Vegetable Production (Hrt 342) .....	.....	(4)	4

Building Construction [BC]

Assistant Professor GEORGE B. LABAUN, Adviser

Sophomore year:			
House Planning and Architectural Drawing (AA 178,179,180)	3	3	3
Junior year:			
Building Construction Technology (PT 121)	4	.....	.....
Building Construction Methods (PT 322,323) or Construction (AA 219,220) .....	.....	3	(2)
Construction (AA 219,220) .....	.....	(2)	(2)
Senior year:			
Building Site Planning (PT 321)	3	.....	.....
Millwork: Machine Woodworking (PT 311) .....	.....	3	.....
Building Cost Estimating (AE 465) .....	.....	.....	3

RELATED COURSES

Landscape Design (LA 280)	Engineering Fundamentals (GE 104)
Elements of Interiors (AA 223)	Rural House Planning (AE 451)

Manufacturing (Metals Industries) [MMI]

Professor MILTON C. SHEELY, Adviser

Sophomore year:			
Graphics (GE 115,116)	3	3	.....
Junior year:			
Foundry Practices (PT 141)	4	.....	(4)
Forging and Welding (PT 151)	(4)	4	.....
Machine Tool Practices (PT 161) .....	.....	(4)	4
Senior year:			
Methods and Motion Study (PT 391)	3	.....	.....
Time Study (PT 392) .....	.....	3	.....
Materials Handling (PT 394) .....	.....	.....	3

RELATED COURSES

Abridged General Physics (Ph 211,212) or General Physics (Ph 201,202,203)	Welding Processes and Applications (PT 354) Mass Production Methods (PT 361)
Motor Vehicles (AE 312,313,314)	Sheet Metalwork (PT 380)
Casting Processes (PT 344)	Safety in Industry (PT 390)

Manufacturing (Wood Industries) [MWI]

(Furniture and Cabinet Construction: Millwork)

Assistant Professor WYMAN D. HOEYE, Adviser

	Term hours		
	F	W	S
Sophomore year:			
Graphics (GE 115,116)	3	3	.....
Industrial Arts Drawing & Design (AA 281) .....	.....	.....	3
Junior year:			
¹ Methods in Woodworking (PT 112,113)	3	3	.....
Millwork: Machine Woodwork (PT 311) .....	.....	.....	3
Senior year:			
Furniture Design and Construction (PT 312,313,314)	3	3	3

¹ Furniture Technology (PT 111) and Elements of Interiors (AA 223) may be substituted for Methods in Woodworking (PT 112,113).

RELATED COURSES

Industrial Arts Drawing and Design (AA 282,283)	Textiles (CT 250)
Home Furnishings (CT 231)	Carpentry and Building Construction (PT 333)

Industrial Chemistry [IC]

Professor BERT E. CHRISTENSEN, Adviser

Sophomore year:			
College Algebra (Mth 101)	.....	4	.....
¹ General Chemistry (Ch 201,202,203)	.....	3	3 3
Junior year:			
Organic Chemistry (Ch 226,227)	.....	5	5
Elementary Physical Chemistry (Ch 340)	.....	.....	3
Senior year:			
Biochemistry (Ch 350,351,352)	.....	3	3 3

Institution Management [IM]

Professor MIRIAM SCHOLL, Adviser

Sophomore year:			
Nutrition (FN 225)	.....	3	.....
² Food Preparation (FN 211,212)	.....	.....	3 3
Junior year:			
Quantity Cookery (IM 311)	.....	4	.....
General Microbiology (Mb 204)	.....	.....	4
Related course	.....	.....	3
Senior year:			
Institution Organization and Administration (IM 430)	.....	3	.....
Purchasing for Institutions (IM 440)	.....	.....	3
Institution Experience (IM 450)	.....	.....	4

RELATED COURSES

General Chemistry (Ch 102,103)	Food Grades and Standards (FST 271)
Principles of Food Preservation (FST 350)	Food Sanitation Microbiology (Mb 411)
Meats (AnS 351)	Quality Textile Purchasing (CT 351)
Wholesale and Retail Meat (AuS 352)	

Mechanical Technology in Agriculture [MTA]

Professor J. B. RODGERS, Adviser

Sophomore year:			
Graphics (GE 115)	.....	3	.....
Farm Mechanics (AE 221)	.....	.....	3
Agricultural Engineering Survey (AE 211)	.....	.....	3
Junior year:			
Farm Implements (AE 391)	.....	3	.....
² Abridged General Physics (Ph 211)	.....	.....	3
Mechanical Applications in Agriculture (AE 213)	.....	.....	3
Senior year:			
Engines and Tractors (AE 311) or Motor Vehicles (AE 312)	.....	3	.....
Farm Electricity (AE 331) or Motor Vehicles (AE 313)	.....	.....	3
Related courses	.....	.....	3

RELATED COURSES

Motor Vehicles (AE 314)	Farm Buildings (AE 361)
Land Drainage (AE 319)	Household Utilities (g) (AE 435)
Pumps and Irrigation Equipment (AE 321)	Rural House Planning (g) (AE 451)

¹ General Chemistry (Ch 101,102,103) plus Chemical Theory, Ch 241, may be substituted for General Chemistry (Ch 201,202,203). Chemical Theory, Ch 241, may be substituted for Biochemistry, Ch 352, where necessary.

² Prerequisite or parallel one year of biological or physical science.

³ With consent of the adviser, course may be waived and related source substituted, if student's background in the area is deemed adequate.

Mining or Petroleum Geology [MPG]

Professor W. D. WILKINSON, Adviser

	Term hours		
	F	W	S
Sophomore year:			
Geology (G 201,202,203)	3	3	3
Geology Laboratory (G 204,205,206)	1	1	1
Junior year:			
Mineralogy and Rock Study (G 315,316,317)	3	3	3
Senior year:			
Oil Geology (G 423)	3		
Mining Geology and Industrial Minerals (G 421,422)		3	3

Poultry Science [PS]

Professor W. H. McCLUSKEY, Adviser

Sophomore year:			
Poultry Production (P 121)	3		
The Chick Embryo (P 321)		3	
Brooding and Broiler Production (P 322)			3
Junior year:			
Poultry Feeding (P 411)	3		
Anatomy and Physiology of the Fowl (VM 311)		3	
Avian Diseases (VM 451)			4
Senior year:			
Marketing Poultry Products (P 421)	3		
Poultry Breeding (P 441)	3		
Poultry Plant Management (P 431)			3

RELATED COURSES

Poultry Judging (P 341)	Genetics (Z 341)
Turkey Management (P 351)	Reading and Conference (P 405)
Commercial Practices (P 451)	Seminar (P 407)

Business Administration

Courses in business administration are offered in the Department of Business Administration. The courses aim in the first two years to orient the student in the field and in the last two years to provide professional preparation. Courses offered in the Department of Economics supplement the work of the Department of Business Administration.

Courses numbered in the 400's are restricted to students with junior or senior standing.

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 him determine a field of major concentration.
- BA 102. **Survey of American Industry.** 3 hours. 3 ①
Structure and development of American industry, including the extractive, processing, assembling and construction, and service industries.
- BA 103. **Conceptual Foundations of Business.** 3 hours. 3 ①
Major institutions and ideas which form an important part of the business environment, such as freedom, competition, justice, values, and social responsibility.
- BA 201. **Production.** 4 hours. 4 ①
Operating techniques used in administration of manufacturing plants together with application to other areas of business management; organization, supervision problems, employee relations, wage payment, output standards, plant location, equipment layout, scientific management.
- BA 202. **Marketing.** 4 hours. 4 ①
Industrial and consumer markets and activities and enterprises involved in distributing goods to those markets. Objective to develop understanding of distribution processes, marketing problems and principles.

- BA 203. **Finance.** 4 hours. 4 ①
 Financial problems encountered in establishment and operation of business firms; forms of ownership organization, acquisition of capital, management of income; related financial institutions; financial adjustment to changing business conditions. Prerequisite: BA 211,212.
- BA 211,212,213. **Principles of Accounting.** 3 hours each term. 3 ①
First Term: Terminology, content, and form of financial statements for single proprietorships, partnerships, and corporations; data for use in preparing profit and loss statements and balance sheets.
Second Term: Detailed record-keeping procedures; internal control methods to protect cash resources; analysis and interpretation of financial statements.
Third Term: Recording and reporting incomes and expenses; functions and procedures of cost accounting for managerial use in controlling business operations; financial control through use of budgets.
- BA 214,215. **Fundamentals of Accounting.** 3 hours each term. 3 ①
 Similar to BA 211,212,213, but with increased attention to managerial uses of accounting data and less on detailed record keeping procedures. Primarily for engineering and forestry students.
- 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.

Upper Division Courses

- BA 301. **Business Managerial Economics.** 3 hours. 3 ①
 Business decision making under conditions primarily of uncertainty; sales, cost and profit forecasting; demand analysis, cost analysis, pricing concepts, and capital management concepts.
- BA 302. **Organization and Management Theory.** 3 hours. 3 ①
 Planning, organizing, staffing, directing, and controlling business enterprises; emphasis on decision making, establishment of policies and objectives, and business leadership.
- BA 311,312. **Business Statistics.** 3 hours each term. 3 ①
 Collecting and analyzing business data; statistical source materials; dealing statistically with problems of inspection, quality control, personnel testing, financial analysis, and market research; facility in use of business data in reports; appraisal of statistical "facts" and "proofs." Prerequisite: Mth 100.
- BA 313. **Quantitative Business Methods.** 3 hours. 3 ①
 Probability concepts; conditional and expected value and utility as a basis for decision making; game theory; electronic data processing; simulation; and basic principles of linear programming. Prerequisite: BA 311,312.
- 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 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.
- BA 411. **Business Law.** 3 hours. 3 ①
 Basic rules of law for conduct of business generally. Creates an awareness of proper legal practices, including the desirability of professional supervision. Requirements of formation, performance, and methods of discharge of contracts. Related treatment of quasi-contracts and torts.
- BA 412. **Business Law.** 3 hours. 3 ①
 Sales, bailments, chattel mortgages, and conditional sales; law of negotiable instruments including promissory notes, bills of exchange, and checks. Prerequisite: BA 411.
- BA 413. **Business Law.** 3 hours. 3 ①
 Individual proprietorship, agency, partnership, corporations, cooperative associations, and business trusts. Prerequisite: BA 411.

- 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. Prerequisite: junior standing.
- BA 417,418,419. **Advanced Accounting.** 3 hours each term. 3 ①
Basic accounting theory and conventional accounting procedures. More difficult problems encountered in accumulation and presentation of financial data; balance sheets and other financial reports, measuring costs and revenues, partnership accounting, installments, consignments, agency and branch accounting, consolidations and fiduciary accounting. Prerequisite: BA 211,212,213 or 214,215.
- BA 421,422,423. **Cost Accounting.** (g) 3 hours each term. 3 ①
First Term: Material, labor, and overhead costs; job order and process cost accounting systems.
Second Term: Estimated and standard costs; standard cost accounting systems; variances and their disposition.
Third Term: Distribution costs; analysis and use of break-even points, differential costs, and other cost data.
Prerequisite: BA 211,212,213 or BA 214,215.
- BA 424. **Analysis of Financial Statements.** (g) 3 hours. 3 ①
Preparation, analysis, and interpretation of balance sheets and operating reports for effective management and control of industrial and trading concerns. Prerequisite: BA 211,212,213 or BA 214,215.
- BA 425. **Tax Accounting.** (g) 3 hours. 3 ①
Federal and State income tax regulations, and court decisions applicable to individuals, partnerships, and corporations; differences between managerial and tax accounting and between Federal and State tax requirements; computing taxable income and preparing official returns.
- BA 426. **Accounting Theory.** (g) 3 hours. 3 ①
Economic factors, law, and administrative ruling; concepts and procedures for measuring income, cost, value, and results of price level change; accounting ethics. Prerequisite: BA 417,418,419.
- BA 427,428. **Auditing.** (g) 3 hours each term. 3 ①
Personal standards and verification procedures for auditors of business enterprises; surveying adequacy and effectiveness of accounting system and internal control; auditing procedures and preparation of working papers; certification of financial statement information. Prerequisite: BA 417,418,419.
- BA 429. **Case Problems in Controllorship.** (g) 3 hours. 3 ①
The controller and his organization; coordination and control of accounting, budgeting, and planning; controllorship's contribution to management and responsibilities for office organization and procedures. Prerequisite: BA 417,418,419.
- BA 431,432. **Business Data Processing.** 3 hours each term. 3 ①
Electronic computers and punched-card processing facilities; number systems; business data flow, basic computer programing, input, output, storage, control, and automatic processing equipment; business programing and processing procedures; systems design; and economic feasibility studies. Prerequisite: BA 311,312,313.
- BA 433. **Linear Programing in Business.** 3 hours. 3 ①
A management planning technique; business and industrial applications; transportation and simplex methods of linear programing; other programing methods; use of the computer in solving linear programing problems. Prerequisite: BA 431,432.
- BA 441. **Financial Institutions.** (g) 3 hours. 3 ①
Environment in which the financial manager functions; monetary conditions; the Federal Government; financial organizations; money and capital markets. Prerequisite: BA 203.
- BA 442. **Credit Management.** (g) 3 hours. 3 ①
Management functions performed by a credit department; relation to other functions of the business enterprise; consumer credit and mercantile credit, sources of credit information, evaluation of credit risks, and credit controls useful to business firms; credit policy determination.
- BA 443. **Investments.** (g) 3 hours. 3 ①
Objectives and risks; program planning; corporate securities and securities markets; government bonds, real estate, savings institutions; interest income and stock yields; security analysis.

- BA 444. **Insurance and Risk Management.** (g) 3 hours. 3 ①
The various insurance means at disposal of management for use in shifting, reducing, or eliminating risk; fire, casualty, workmen's compensation, fidelity and surety, marine, life, and other types of insurance.
- BA 445. **Business Property Management.** (g) 3 hours. 3 ①
Acquisition, management, and disposal of the real estate of a business firm. Location factors, legal concepts and procedures, financial considerations and arrangements, taxes and assessments, insurance, valuation and appraisal, characteristics of the real estate market, impact of the public interest.
- BA 446. **Taxation and Business.** (g) 3 hours. 3 ①
The roles of taxes in business decisions; tax system; taxation problems; tax incidence and burden theories. Tax implications in selection of legal business organizational form, plant location, depreciation, executive compensation, raising funds, the contemporary scene. Prerequisite: BA 211,212,213 or BA 214,215.
- BA 447,448. **Financial Management.** (g) 3 hours each term. 3 ①
Administration of an industrial enterprise; coordination of purchases, inventories, production, and sales; cash, receivables, inventories, investments, and working capital position; financial control of plant, equipment, leases, and industrial property. Prerequisite: BA 203. Either BA 447 or BA 448 may be taken separately.
- BA 449. **Case Problems in Financial Management.** (g) 3 hours. 3 ①
Actual situations drawn from current business scene. Written reports prepared by student for each case problem; emphasis on analysis of pertinent facts, weighing of alternate solutions. Prerequisite: BA 203.
- BA 453. **Industrial Purchasing.** (g) 3 hours. 3 ①
Purchase and control of materials for industrial use as they affect control of quality of products, maintenance of operating efficiency, and quotation of competitive prices.
- BA 457,458. **Production Management.** (g) 3 hours each term. 3 ①
Production, factory organization, and factory management from point of view of production manager. Prerequisite: BA 201. BA 457 or BA 458 may be taken separately.
- BA 459. **Case Problems in Production Management.** (g) 3 hours. 3 ①
To enable student to formulate an over-all picture of interrelationship of major aspects of production; actual cases drawn from industry. Prerequisite: BA 457,458.
- BA 467,468. **Personnel Management.** (g) 3 hours each term. 3 ①
First Term: Objectives, functions, and practices of personnel administration which contribute to effective achievement of aims of organization.
Second Term: Techniques, uses, and limitations of such personnel activities as job analysis, job evaluation, evaluation of employees, employee services, employee publications, and suggestion system.
- BA 469. **Case Problems in Personnel Management.** (g) 3 hours. 3 ①
Causes of personnel problems and working out plans for improving productivity of personnel. Opportunity given to use knowledge and experience in situational thinking. Prerequisite: BA 467.
- BA 471. **Advertising.** 3 hours. 3 ①
A tool of marketing management; preparation of advertisements; copy, illustration, and layout; use of media: newspapers, magazines, direct mail, radio, and television.
- BA 472. **Salesmanship.** 3 hours. 3 ①
Role of selling and promotion as marketing activities; concepts and practices involved in the several selling methods; special function(s) each method may have in the selling program. Emphasis on personal selling, display, demonstration, and publicity.
- BA 473. **Sales Management.** (g) 3 hours. 3 ①
Functions in marketing process: administrative and executive duties; analysis of market, policy formulation, recruiting, selecting, contracting, training, equipping, compensating, supervising, and evaluating salesmen.
- BA 474. **Retail Management.** (g) 3 hours. 3 ①
Organizing and operating retail institutions; store location, store layout, buying and selling, operating activities, personnel and control.

- BA 475. **Marketing Research Procedures.** (g) 3 hours. 3 ①
The role of marketing research in the management of marketing in consumer and industrial areas; a study of research methods and procedures; the application of research methods to the solution of typical marketing problems; and, the development of a research project by members of the class. Prerequisite: BA 202.
- BA 476. **International Business.** (g) 3 hours. 3 ①
Activities and procedures peculiar to exporting and importing; obtaining transportation services; packing requirements; custom requirements; financing methods; insurance. Prerequisite: BA 202.
- BA 477,478. **Marketing Management.** (g) 3 hours each term. 3 ①
Examination and study of principles, practices, and decision making processes involved in management of various elements of a marketing program. Included are: Product planning, market characteristics, channels of distribution, physical distribution, quantitative analysis of marketing data, organization, and pricing. Prerequisite: BA 202 for 477; BA 477 or consent of instructor for 478.
- BA 479. **Case Problems in Marketing Management.** (g) 3 hours. 3 ①
With the purpose of developing proficiency in solution of marketing problems representative cases are studied involving choice of distribution channels, product and price policies, distribution cost analysis, and sales programs. Consent of instructor required. Prerequisite: BA 202.
- BA 481. **Industrial Traffic Management.** 3 hours. 3 ①
Functions and procedures of traffic departments in industrial enterprises; use of tariffs; choice of agencies; control of transportation costs; government rate regulation procedures.
- BA 497. **Human Relations in Business.** (g) 3 hours. 3 ①
Relationships among managerial, supervisory, and other workers; actual cases used to help develop attitudes, frames of reference, and approaches which will be useful in solving human relations problems in business. Prerequisite: senior standing.
- 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 proper recognition of government aids and services to the business community. Prerequisite: senior standing.
- BA 499. **Business Policy.** (g) 3 hours. 1 ③
Advanced integrative course in analysis of top-management decisions, executive responsibilities, and company objectives. Policymaking is studied through business case histories, current business news, and field investigations of region. Prerequisite: senior standing.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

Business Education

Professional preparation for teachers of business subjects is provided in the Department of Business Education, a joint department in the School of Business and Technology and the School of Education. A student may major in either school, but before registering he must confer with the head of the Department of Business Education.

Baccalaureate Degrees. The undergraduate program for a baccalaureate degree is outlined in the curriculum on a previous page. Courses from business administration, business education, education, and secretarial science form the major background. A liberal number of elective hours permits the selection of a teaching minor. The requirements for a State High School Teacher's Certificate are listed under SCHOOL OF EDUCATION.

Advanced Degrees. Graduate study with a major in business education is available through the School of Education for all those who complete the undergraduate curriculum or its equivalent. Thirty of the required 45 term hours for the Master of Science or the Master of Arts degree are taken in business education (including the thesis). Other master's degree options are described under GRADUATE SCHOOL. A choice of graduate program can be made following a conference with the head of the Department of Business Education.

Upper Division Courses

- OA 401. **Research.** Terms and hours to be arranged.
 OA 403. **Thesis.** Terms and hours to be arranged.
 OA 405. **Reading and Conference.** Terms and hours to be arranged.
 OA 407. **Seminar.** Terms and hours to be arranged.
 Ed 408. **Special Secondary Methods.** 3 hours. (See EDUCATION.)

Graduate Courses

- OA 501. **Research.** Terms and hours to be arranged.
 OA 503. **Thesis.** Terms and hours to be arranged.
 OA 505. **Reading and Conference.** Terms and hours to be arranged.
 OA 507. **Seminar.** Terms and hours to be arranged.

PRACTICUM IN BUSINESS EDUCATION—The planning and development of practical and creative projects, group or individual, in the field of business education. Students will be urged to use actual school situations as nucleus for the term's work and to arrive at the best possible solutions.

- OA 508. **Workshop.** Terms and hours to be arranged.
 OA 536. **Problems and Research Techniques in Business Education.** 3 hours. 3 ①
 Trends in high school business curriculum; methods and available research studies. Prerequisite: Ed 408 or teaching experience in business subjects.
 OA 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; OA 536. Students who have not had Ed 408 must have had teaching experience in business subjects.
 OA 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; OA 536. Students who have not had Ed 408 must have had teaching experience in business subjects.
 OA 539. **Current Trends in Basic Business Subjects.** 3 hours. 3 ①
 OA 540. **Administration and Supervision of Business Education.** 3 hours. 3 ①
 OA 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. Students who have not had Ed 408 must have had teaching experience in typing.
 OA 542. **Current Practices in Shorthand.** 3 hours winter. 3 ①
 Correct writing habits; correlation of sound and symbol response; word and sentence-building and transcription technique. Prerequisite: Ed 408. Students who have not had Ed 408 must have had teaching experience in stenography.

Secretarial Science

The major in secretarial science prepares young men and women for top-level office positions, most common of which is that of secretary. A student may elect a minor in an industrial field in which he plans to work. Service courses in this department are available to all students.

Lower Division Courses

- SS 111,112,113. **Stenography.** 3 hours each term. 4 ①
 Gregg or Briefhand. Theory of shorthand; practical applications in sentence and paragraph dictation. SS 121,122,123 must be taken concurrently unless the student has had the equivalent. Students with one year of high school shorthand may receive credit for SS 111 only upon recommendation of instructor.
- SS 121,122,123. **Typing.** 2 hours each term. 5 ①
 Theory and practice; drills of all kinds; punctuation and mechanical arrangement of business correspondence. legal forms, tabulating, manuscripts, modern business forms; straight copy timings; training on both manual and electric typewriters. Students who have had one year of typing may receive credit for SS 121 only upon the recommendation of instructor.
- SS 124. **Typing.** 2 hours. 5 ①
 Speed, accuracy, figures, and techniques. Use of wide variety of special drills, electric typewriters, and tachistoscope. Prerequisite: consent of instructor.
- SS 211,212,213. **Applied Stenography.** 3 hours each term. 3 ②
 Advanced principles and phrases; dictation and transcripts covering vocabularies of representative businesses; legal forms; newspapers and magazine articles. Prerequisite: SS 113,123, or equivalent.
- SS 215. **Business Machines.** 2 hours. 5 ①
 Rotary and key-driven calculators, bookkeeping machines, adding machines, addressing machines, voice-writing machines, stencil and fluid-process duplicators, and electric typewriters.
- SS 216. **Business Machines.** 1 hour. 3 ①
 Same as SS 215 except that fewer equipment types are covered.

Upper Division Courses

- SS 311,312,313. **Office Procedure.** 4 hours each term. 2 ① 2 ②
 Most efficient stenographic methods and office practice; filing; advanced dictation; transcripts; reports; modern office appliances. Prerequisite: SS 213 or equivalent.
- SS 321,322. **Technical Reporting.** 3 hours winter and spring. 3 ②
 Advanced stenographic training in specialized business fields. Prerequisite: SS 123,213.
- SS 407. **Seminar.** 1 hour fall and winter. 1 ①
- SS 411. **Secretarial Problems.** 3 hours winter or spring. 3 ①
 Duties and problems of the secretary in business and professions; relation to employer and fellow employees; office supervision. Prerequisite: SS 421 or equivalent.
- SS 412. **Secretarial Practice.** 3 hours any term. 3 ①
 Practical office experience. Ninety hours laboratory work in campus offices. Prerequisite: senior standing.
- SS 421,422. **Office Organization and Management.** 3 hours each term. 3 ①
 SS 421, fall and winter, SS 422, spring. Scientific office management; organization; arrangement; operation; employment and training of office workers; efficiency problems; business ethics. Prerequisite: SS 313 or consent of instructor.

School of Education

Faculty

As of January 1963

FRANKLIN ROYALTON ZERAN, Ph.D., Dean of the School of Education.

KATHRYN SMITH, Teacher Placement Secretary.

Education: Professors ZERAN (department head), AINSWORTH, BERGSTROM, CLINTON, DIXON, GOODE, LANGTON, MARKSHEFFEL, MUNFORD, REICHART, SALSER (emeritus), SEEN, WILLIAMSON; Associate Professors ADOLF, BARON, FOX, HALL, LEELEND, MILLIKEN, PARKS; Assistant Professors BEALS, ILIKA, LEMON, LUMPKIN, REES, SEVEKIDE, SEYMOUR, E. SMITH, K. SMITH, WALLEN.

Agricultural Education: Professor TEN PAS (department head); State Supervisor and Teacher Trainer KUNZMAN; Assistant Professor DAVIS.

Business Education: Professors YERIAN (department head), LARSE, WINGER; Assistant Professor BARBER.

Home Economics Education: Professor DuBois (department head); State Supervisor and Teacher Educator KOHLHAGEN; Associate Professor McQUESTEN; Assistant Professor HENDRIX.

Industrial Education: Professor AINSWORTH (department head); State Director for Vocational Education PAULSON; State Supervisor and Teacher Trainer LOOMIS; Assistant Professor SMITH; Instructors BRO, STORM.

Science Education: Professors WILLIAMSON (department head), ANDERSON, FOSTER; Associate Professors FOX, KOSKI, MAYSHARK; Instructor CRAVEN.

General Statement

THE SCHOOL OF EDUCATION at Oregon State University offers undergraduate and graduate work in elementary and secondary education, graduate work in higher education, and instruction, principally at the graduate level, in guidance and personnel work.

Distinctive elements in the School of Education are its departments of Industrial Arts and Trade and Industrial Education and the departments of Agriculture, Business, Home Economics, and Science Education, which also are departments in their respective schools of subject specialization. Degrees in physical education are granted through the School of Education (see DIVISION OF PHYSICAL EDUCATION). The School does not offer a major in school administration but does offer the courses required for an elementary or secondary school principalship in Oregon.

Accreditation. The School of Education is accredited by the National Council for Accreditation of Teacher Education for the preparation of elementary and secondary teachers and school service personnel (guidance counselors) with the doctor's degree as the highest degree approved.

Teacher Education. Students desiring to teach must be admitted to the teacher education program at Oregon State University. They also undergo a program of continuous evaluation. Formal application for admission to a teaching credential program is made in the fifth quarter of the student's college work, or in the first term after admission to the School of Education for transfer students with six or more terms of completed work. Granting of permission to take professional courses leading to a teaching credential is based on evidence of speech clearance and other academic, professional, personal, and social qualities required. Admission to the teaching credential program is a prerequisite for the course Education 310, School in American Life. Further information and admission application forms may be obtained in the School of Education.

Elementary Education. To qualify for an Elementary Teacher's Certificate in Oregon a person must have graduated from a four-year program of elementary teacher education in a college or university approved by the State Board of Education for the preparation of elementary teachers. The curriculum must include at least 6 term hours of supervised teaching at elementary level. The curriculum includes both the courses required for graduation and those required for an Elementary Teacher's Certificate.

Secondary Education. The State Board of Education issues the following types of Secondary Teacher's Certificates:

Provisional Certificates. Until such time as secondary teachers have completed the five-year secondary teacher education program, they are issued a provisional certificate *A, B, C, D, or E*; each is issued for one year only and is *not renewable*. Applicants should apply for the provisional certificates in turn as they go through the schedule outlined below. When they are eligible for the regular five-year secondary certificate, they should make application for this credential. It is not mandatory that a teacher hold all five provisional certificates to qualify for the five-year certificate. Persons who have held the five-year secondary certificate are not eligible for further provisional certification.

Provisional Certificate A may be issued to those otherwise qualified applicants who present official evidence of the following:

1. A baccalaureate degree from a standard college, university, or teachers college.

2. 21 quarter hours in secondary school education, at least 9 quarter hours of which shall be high school supervised teaching—grades 9 through 12 in high school, or grades 7, 8, or 9 in a regularly organized junior high school.

Provisional Certificates B, C, D, and E may be issued to those persons who have met all requirements for and held the preceding provisional certificate and who have completed 9 quarter hours of upper division or graduate work in secondary teacher preparation applicable to the fifth-year program and over and beyond requirements for preceding provisional certificate.

The regular five-year State Secondary Certificate may be issued to those persons who have completed a five-year secondary teacher education program in a standard college, university, or teachers college approved by the State Board of Education for preparation of secondary teachers provided the five-year program includes:

1. A baccalaureate degree from a standard college, university, or teachers college.

2. A master's degree in secondary teacher preparation, or 45 quarter hours of secondary teacher preparation completed subsequent to baccalaureate degree. (Upper division or graduate credit in secondary teacher preparation in excess of that required for completion of requirements for the baccalaureate degree may be applied on the fifth year when marked on the official transcript or indicated by course number and title on an official report from the degree-granting institution as reserved for Oregon certification. The number of hours so applied may in no case exceed 12 quarter hours.)

3. Preparation subsequent to the baccalaureate degree distributed as follows: (a) 21 quarter hours in subjects taught in high school, at least 15 quarter hours of which shall be upper division or graduate, (b) 9 quarter hours in secondary education earned subsequent to baccalaureate degree and of upper division level or graduate level, (c) 15 quarter hours of upper division or graduate study as electives.

4. 36 quarter hours of secondary education of upper division or graduate level, at least 9 quarter hours of which shall be completed subsequent to baccalaureate degree as indicated in 3-b, and which shall include: (a) Educational Psychology, (b) Human Growth and Development, (c) School in American Life, (d) special methods in a subject taught in high school, (e) general high school methods or special methods in a second subject taught in high school, (f) high school supervised teaching, 9 quarter hours, (to be done in grades 9 through 12 in the high school, or in grades 7, 8, or 9 of a regularly organized junior high school), (g) preparation in any two of the following areas: curriculum and instruction, guidance and counseling, measurement and evaluation, social foundations of education, improvement of reading in high school.

The State Department of Public Instruction charges a fee of \$5 for each of the types of certificates or for renewal of a five-year certificate.

More detailed information concerning regulations governing certification and progression from provisional to regular certification may be obtained from the School of Education. Completion of either of the curricula listed on pages 191, 192 will fulfill requirements for a provisional certificate.

Higher Education. The School of Education cooperates with the major departments on the campus through the Graduate School in a graduate minor in college teaching which may be elected by candidates for advanced degrees, especially the doctorate. In addition, graduate students may elect courses in higher education and utilize special courses in preparation for positions in junior colleges, colleges, and universities.

Guidance and Personnel Work. Oregon State University offers a comprehensive program at the graduate level in guidance and personnel work. This program prepares students for work as counselors in schools and colleges, as deans of boys or girls or of men or women, and as directors of student personnel, counselor educators, and state supervisors of guidance.

An individual desiring to major at the master's level in guidance must elect Option B. The minor (15 hours) must be in psychology, at least 6 hours of which must be in psychological tests and testing. The candidate completes 45 term hours of graduate work but does not present a thesis or field studies. He takes written comprehensive examinations upon completion of the 45 hours.

The required courses in Option B (guidance) are as follows:

Principles and Practices of Guidance Services (Ed 485)

Occupational and Educational Information (Ed 486)

Counseling Techniques (Ed 487)

Diagnostic and Remedial Techniques in Reading (Ed 468)

Supervised Counseling Techniques (Ed 588)

Research Procedures in Education (Ed 512); or Measurement in Education (Ed 424); or Statistical Inference (St 421).

Four of the following courses selected with assistance of adviser: Counselor Training: Group Procedures (Ed 577); or Organization and Administration of Guidance Services (Ed 589); or The Maladjusted Child (Ed 463); or Education of the Exceptional Child (Ed 470); or Principles and Techniques of Speech Correction (Sp 493); or Psychology of Adolescence (Ed 461); or Psychology of Childhood (Ed 460); or The College Student (Ed 556); or Family Relationships (FL 422); or Parent Education (FL 423); or Social Psychology (Soc 474); or Community Organization (Soc 475); or Social Problems (Soc 411).

MINOR (PSYCHOLOGY)—15 hours. At least 6 of the 15 hours must be in Psychological Tests and Testing.

Required:

Psy 473	Individual Differences (Personality theory)	3 hours
Psy 478	Psychological Tests and Testing	3 hours
Psy 480	Psychological Tests and Testing (Group testing)	*3 hours
Psy 482	Practices in Psychological Services	3 hours

Option: (one of the following)

Psy 411	Mental Hygiene)
Psy 462	Behavior Deviations)
Psy 472	Individual Differences)
Psy 474	Individual Differences (Introduction to clinical methods) .....	) 3 hours
Psy 479	Psychological Tests and Testing (Individual testing))

Total 15 hours

* Normally Psy 480 will be taken prior to Psy 482 under the master's program.

Before a person may be admitted to candidacy for the Doctor of Education degree in guidance and personnel work he must have had at least two years' paid teaching experience at the elementary or secondary level and, in addition, two years of paid counseling experience in a school or college. For the Doctor of Philosophy in guidance and personnel work he must have had two years of paid counseling experience in a school or college. The teaching experience requirement varies with the ultimate goal of the candidate.

Enrollment as Freshman. High school graduates who plan to teach should enroll in the School of Education as freshmen. In this way requirements will be most easily and certainly met, an adviser will be available at all times, appropriate teaching fields will be chosen, and the most valuable supporting courses will be selected and worked into the student's program.

Psychology Requirement. General Psychology (Psy 201,202) is prerequisite to all upper division education courses. Psychology courses Psy 201 and 202 are the only psychology courses which may be counted as a part of the education major of 36 term hours.

Supervised Teaching. In their senior year, student teachers observe teaching by experienced instructors, work out lesson plans under the direction of the supervisors, and teach kindergarten, elementary, or high school classes under supervision. *In addition to other requirements, a student must be in full-time residence at Oregon State and taking courses in his teaching field, normally in the term immediately preceding the one in which he plans to do supervised teaching.* Senior and graduate transfer students must also be eligible to do student teaching at the institution from which they transferred.

Placement Bureau. The School of Education maintains a Teacher Placement Bureau to assist Oregon State University graduates and other teachers in obtaining teaching positions suited to their preparation and qualifications. Credentials are handled for kindergarten, elementary, junior high school, senior high school, and college placement. Qualified undergraduate students who are completing degree requirements are given initial placement service for 12 months without charge. All others who are qualified pay a \$5 initial registration fee which entitles them to service for a twelve-month period. Fee for reregistration or activation of papers after lapse of twelve months subsequent to initial registration will be \$5. Service for reregistration will be granted during a twelve-month period.

Graduate Study. Graduate work in education is offered through the Graduate School. Students may pursue graduate study for a master's or doctor's degree as preparation for junior or senior high school, junior college, or college teaching in fields allocated as majors at Oregon State, or for counseling, guidance, and personnel work in secondary schools or in colleges. Programs of graduate students are worked out for individuals according to their needs and objectives and regulations of the Graduate School. Specialized graduate work is offered in school administration and supervision.

For an M.A. or M.S. degree, the student must complete a graduate major in education and a graduate minor in a subject-matter field; for the M.A. degree a reading knowledge of a relevant foreign language is required.

The Ph.D. degree is offered with the major field in either education or guidance. For requirements see GRADUATE SCHOOL.

For the Ed.M. degree, the candidate must complete a graduate major and one graduate minor. For the Ph.D. and Ed.D. degrees the student must complete

a graduate major and two graduate minors, one of which must be in a field outside education. For the Ed.D. degree, the candidate must submit a record of successful paid teaching experience of at least two years at the elementary or secondary level. Since the doctoral candidate works closely with his adviser and committee and since the staff approved to advise doctoral candidates is small, the School of Education limits the number of students admitted to the Graduate School with a view to working on the doctorate. Transcript, four letters of recommendation, Graduate Record Examination results, completed doctoral applicant questionnaire, and application for admission to the Graduate School must be on file by March 14 of the year preceding the September in which the student desires to begin his doctoral program. Candidates are notified immediately after March 14 as to whether they are accepted.

Curricula¹

CURRICULUM IN ELEMENTARY EDUCATION

B.A., B.S., Ed.D., Ph.D. Degrees

Freshman Year		Hours	Sophomore Year		Hours
English Composition (Wr 111,112,113)	9		Literature	6	
Hist of Am Civ (Hst 224,225,226)	9		Field Experience (Ed 200)	2	
Mathematics for Elementary Teachers (Mth 111,112)	6		General Psychology (Psy 201,202)	6	
Introductory Geography (Geog 105,106)	6		Educ Psych: Learning (Ed 312)	3	
Speech	3		General Biology (GS 101,102)	8	
Physical education	3		Music for Elem Tchrs (Mus 371,373)	6	
Defense education or other elective	3-9		Physical education	3	
Electives	9-12		Defense education or other elective	3	
			Electives	11-14	
Junior Year		Hours	Senior Year		Hours
School in American Life (Ed 310)	3		Student Teaching: Elementary (Ed 415)	12	
Methods in Reading (Ed 350)	3		Psychology of Childhood (Ed 460)	3	
Methods & Materials: Soc Sci (Ed 369)	3		Elementary Physical Education (PE 420)	3	
Methods & Materials: Science & Math (Ed 368)	5		Children's Literature (Lib 388)	3	
Art in the Elementary Schools (AA 311,313)	6		Principles and Techniques of Speech Correction (Sp 493)	3	
Physical Science (GS 104,105)	8		Electives	24	
School Health Education (SEd 321)	3				
Methods and Materials: Language Arts (Ed 367)	3				
Electives	14				

CURRICULUM IN SECONDARY EDUCATION

B.A., B.S., M.A., M.S., Ed.M., Ed.D., Ph.D. Degrees

General Notes

a. The recommended electives for freshmen and sophomores are designed to broaden the experience and preparation of students. Early attention should be given to the fullest preparation in a teaching major and to one or two teaching minors. Some preparation in an additional field should be included, if possible, and also one or more extracurricular activities. The School of Education provides a large number of electives in each term of the four-year program for the bachelor's degree.

b. In the freshman year General Hygiene (PE 150, 1 term hour for men; PE 160, 2 term hours for women) is taken one term in place of physical education.

Freshman Year		Hours	Sophomore Year		Hours
English Composition (Wr 111,112,113)	9		Field Experience (Ed 200)	2	
Laboratory science or mathematics	9-15		General Psychology (Psy 201,202)	6	
Defense education or other elective	3-9		Literature	9	
Physical education	3		Speech	3	
Electives in teaching fields	9-15		Hist of Am Civ (Hst 224,225,226)	9	
Other electives	9-15		Defense education or other elective	3-9	
			Physical education	3	
			Electives in teaching fields	6-12	

¹ All students must have an area of concentration.

² Psychology plus laboratory is not acceptable as a substitute for a laboratory science.

Junior Year	Hours	Senior Year	Hours
School in American Life (Ed 310)	3	Psychology of Adolescence (Ed 461)	3
Educ Psych: Learning (Ed 312)	3	Special Secondary Methods (Ed 408).....	3
Methods in Reading (Ed 350)	3	Student Teaching: Secondary (Ed 416) 9-12	30
Outlines of Econ (Ec 212) or Econ Dev of U.S. (Ec 215)	3	Electives	30
American Governments (PS 201)	3		
Intro to Sociology (Soc 212)	3		
Electives in teaching fields	18		
Other electives	12		

Fifth Year

Fifth-year students desiring to meet certification requirements are not required to work for a master's degree. For most high school positions, however, a master's degree is desirable. Students preparing to enter counseling, guidance, and personnel work must qualify for a master's degree.

TEACHING MAJORS AND MINORS IN HIGH SCHOOL FIELDS

Under current regulations, both new teachers and those reassigned in a standard secondary school must be assigned to teach only those subjects in which they have completed adequate preparation in a standard college or university.

The courses which Oregon State University requires for minimum subject preparation in the several teaching fields satisfy the subject-preparation standards of the State Board of Education. In planning his program of study, however, a student should note that they satisfy *minimum* requirements only. Students must consult members of the faculty of the schools or departments in which they are taking subject-preparation courses concerning additional courses they should elect to strengthen their preparation. Certain courses not listed in either the major or minor requirements can be of great help to teachers.

A student preparing to teach in secondary schools must have a teaching major and at least one teaching minor. If he can supervise at least one co-curricular activity and has more than one teaching minor, he will find job opportunities better when he graduates. His teaching major must be in one of the fields in which Oregon State University offers student teaching: biology, health education, general science, humanities, mathematics, physical science, agriculture, business, home economics, industrial arts, social science, trade and industrial education, or physical education. The teaching minor may be in one of these same fields, if it is listed as a minor, or may be in one of the following: architecture, art, business administration, French, German, journalism, music, recreation, Russian, Spanish, or speech. Cocurricular activities which provide excellent training and experience for prospective teachers include intercollegiate and intramural sports, journalism, art, dramatics, debating, oratory, orchestra, band, glee club, writing and producing radio programs, and participating in student self-government.

Science Education

Junior High School Science

	Term Hours
Requirements for basic (four-year) norm SECOND teaching field: General Biology (GS 101,102,103); General Chemistry (Ch 201,202,203); General Physics (Ph 201,202,203); and Geology of Oregon (G 352).	
Total for SECOND teaching field:.....	36
Required to accompany SECOND teaching field: mathematics (8-12 hours), Special Secondary Methods (Ed 408b or Ed 408g).	
Additional requirements for FIRST teaching field: earth science (OC 331, Ph 390); Advanced Physical Science (GS 321,322,323) or Natural History (Z 374,375,376).....	15-16
Total for FIRST teaching field:.....	51-52
Recommended SECOND teaching field: mathematics	

Biological Science: General Biology

*Term
Hours*

Requirements for basic (four-year) norm **SECOND** teaching field:
 General Zoology (Z 201,202,203); General Botany (Bot 201,202,203); Physiology (Z 331,332); Genetics (Z 341); Evolution (Z 345); Elementary Human Anatomy (Z 321); and Natural History of Oregon (Z 374).
 Total for **SECOND** teaching field: 36
 Required to accompany **SECOND** teaching fields: chemistry (9-15 hours), Special Secondary Methods (Biological) (Ed 408b).
 Additional requirements for **FIRST** teaching field: Natural History of Oregon (Z 375,376); General Microbiology (Mb 204); Elementary Human Anatomy (Z 322); Plant Ecology (Bot 341); or Plant Physiology (Bot 331) 16
 Total for **FIRST** teaching field: 52
 Recommended to accompany **FIRST** teaching field: organic chemistry (5-10 hours), physics (6-12 hours), mathematics (8-12 hours).
 Recommended **SECOND** teaching field: chemistry.

Biological Science: Health Education

Requirements for **MAJOR**:
 Elementary Human Anatomy (Z 321,322), Physiology (Z 331,332), Nutrition (FN 225), Community Health Problems (Mb 424,425), Safety Education (Ed 360), Family Relationships (FL 422), General Hygiene (PE 170), First Aid (PE 358), School Health Education (SEd 321), School Health Services (SEd 322).
ABOVE COURSES CONSTITUTE THE MINOR 39
 Additional requirements for **MAJOR**: Introduction to Health Education (SEd 123), Community Health Problems (Mb 424 or 425,426), Driver Education and Training (PE 480) 12
 Total requirements for teaching **MAJOR** 51
 Requirements for **MINOR**: Courses constituting minor listed above 42

Mathematics

Requirements for basic (four-year) norm **SECOND** teaching field:
 College algebra (Mth 101); Trigonometry (Mth 102); Calculus and Analytical Geometry (Mth 200,201,202,203); Linear Algebra (Mth 341); Theory of Equations (Mth 342); Theory of Numbers (Mth 343); Probability (Mth 361).
 Total for **SECOND** teaching field: 36
 Required to accompany **SECOND** teaching field: Special Secondary Methods (Ed 408f).
 Additional Requirements for **FIRST** teaching field: Finite Differences (Mth 362); Mathematics for High School Teachers (Mth 491,492,493); Mathematics Elective (3 hours) 15
 Total for **FIRST** teaching field: 51

Physical Science

Chemistry

Requirements for basic (four-year) norm **SECOND** teaching field:
 General Chemistry (Ch 204,205,206); Organic Chemistry (Ch 334,335,336); Physical Chemistry (Ch 440,441,442).
 Total for **SECOND** teaching field: 36
 Required to accompany second teaching field: Mathematics (through 202); Special Methods (Ed 408g).
 Additional requirements for **FIRST** teaching field: General Physics (Ph 201,202, 203); Radioactive Tracer Methods (Ch 419) 16
 Recommended second teaching field: physics or mathematics.
 Total for **FIRST** teaching field: 52

Physics

Requirements for basic (four-year) norm **SECOND** teaching field:
 General Physics (Ph 201,202,203); Introductory Modern Physics (Ph 311,312,313); advanced general physics: optics, mechanics, electricity and magnetism; Basic Meteorology (Ph 390).
 Total for **SECOND** teaching field: 36
 Required to accompany **SECOND** teaching field: Mathematics (through 203); Special Methods (Ed 408g).
 Additional requirements for **FIRST** teaching field: General Chemistry (Ch 204, 205,206); Electronics (Ph 430) 18
 Total for **FIRST** teaching field: 54

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Agriculture

Requirement for MAJOR:

Introduction to Agricultural Economics (AEc 111); Farm Business Management (AEc 211); Marketing Farm Products (AEc 341); Agricultural Policy (AEc 411); Agricultural Engineering Survey (AE 211); Farm Mechanics (AE 221,222); Farm Skills (AE 381,382,383); Farm Implements (AE 391); Animal Science (AnS 121); Poultry Production (P 121); Animal Nutrition (AnS 311 or 411); Range Management (AnS 341); Crop Production (FC 211); Elements of Horticulture (Hrt 111); Soils (Sls 210).

A B.S. degree in agriculture is required of all majors in agricultural education. *Eighty hours of technical agricultural subject matter* is required for teacher preparation.

Business Education

Term
Hours

Requirements for MAJOR:

Stenography (SS 111,112,113); Typing (SS-121) or equivalent and the following: Office Procedure (SS 311,312); Office Organization and Management (SS 421); Typing (SS 122,123); Applied Stenography (SS 211,212,213); Introduction to Business (BA 101); Principles of Accounting (BA 211,212,213); Business Law (BA 411,412).

ABOVE COURSES CONSTITUTE THE MINOR.....

43

Additional requirements for MAJOR: Office Procedure (SS 313); Secretarial Problems (SS 411); Retail Management (BA 474); Principles of Economics (Ec 201, 202,203)

19

Total requirements for teaching MAJOR

62

Special secondary methods courses in bookkeeping and non-skill, shorthand, and typing are to be taken by the student majoring in business education. Students who minor will take two of the three methods courses.

Requirements for MINOR:

Courses constituting Minor listed above

43

Home Economics

Requirements for MAJOR:

Child Development (FL 225,311); The Nursery School Child (FL 425); Clothing, Textiles, and Related Arts (CT 210,211,212,250); Family Living (FL 223) or Marriage (FL 222) or Family Relationships (FL 422), Nutrition (FN 225), Foods (FN 211,212), or for students having chemistry, (FN 220,221); Meal Management (FN 313); Management in Family Living (HAd 240).

ABOVE COURSES CONSTITUTE THE MINOR.....

37

Additional requirements for MAJOR: Courses selected from the following groups to make at least 8 term hours in each of the following areas: (A) child development; (B) clothing, textiles, and related arts; (C) housing, home furnishings and equipment; and (F) home management and family economics

14

Total requirements for teaching MAJOR

51

Humanities¹

Requirements for Major:

Survey of English Literature (Eng 101,102,103); World Literature Eng 107,108, 109); Speech (including Sp 247); Shakespeare (Eng 201, or 202 or 203); Survey of American Literature (Eng 253,254,255); Development of the English Language (Eng 490); Developmental Reading; English Composition for Teachers (Wr 411); Literary Criticism (Eng 414,415,416).

ABOVE COURSES CONSTITUTE THE MINOR

54

Additional Requirements for MAJOR: Journalism (J 111); Literature for Teachers (Eng 488); Advanced Expository Writing (Wr 316 or 317)

9

Total requirements for teaching MAJOR.....

63

Requirements for Minor: Courses constituting minor listed above.

54

¹ For humanities or social science teaching major where teaching minor is not general biology, general science, physical science, or mathematics, an individual must *also* take a science-technical minor.

Social Science¹Term
Hours

Requirements for MAJOR: Hist of Western Civ (Hst 101,102,103); Introductory Geography (Geog 105,106, 107); Hist of Am Civ (Hst 224,225,226); Principles of Economics (Ec 201,202, 203); American Governments (PS 201,202,203); General Sociology (Soc 204,205, 206).	
ABOVE COURSES CONSTITUTE THE MINOR	54
Additional requirements for MAJOR: Upper division history, social science seminar (SSc 407)	21
Total requirements for teaching MAJOR	75
Requirements for MINOR: Courses constituting minor listed above.....	54

Industrial Arts

For a major in Industrial Arts see PROFESSIONAL CURRICULUM IN INDUSTRIAL ARTS EDUCATION, page 198.

Physical Education

Requirements for MAJOR: Elementary Human Anatomy (Z 321,322); Physiology (Z 331,332); Principles of Physical Education (PE 447); School Programs and Organization (PE 442); Pro- fessional Activities (PE 194,294,394, 7 terms).	
ABOVE COURSES CONSTITUTE THE MINOR	35
Since most Oregon secondary schools combine physical education and health educa- tion classes, it is recommended that all physical education teachers complete health courses sufficient to meet the norm established for health education teachers.	
Additional requirements for MAJOR: See DIVISION OF PHYSICAL EDUCATION.	
Requirements for MINOR: Courses constituting minor listed above.....	35

Health Education

See BIOLOGICAL SCIENCE: HEALTH EDUCATION, page 193.

Recreation

Requirements for MINOR: Introduction to Recreation (Ed 121); Recreation Leader- ship (PE 240); Recreational Use of Art Crafts (AA 250); Recreational Use of Music (Mus 241); Recreational Use of Drama (Sp 242); Field Work (Ed 347, 348, or 349); Camping (Ed 263,364,365 or 366); Recreation Programs (Ed 422); and Youth Agencies (Ed 425), or Community Recreation (Ed 426)	29
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Camp Education

Requirements for MINOR: Camp Counseling (Ed 263); Laboratory Practice in Camping Skills (Ed 364); Camp Management (Ed 365); Group Dynamics (Psy 361); Public School Camping (Ed 366); electives approved by Camp Education Minor adviser, representing areas of arts, natural sciences, and physical education....	27
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Dance

Requirements for MINOR: Introduction to Dance Education (PE 253); Physical Education Technique (PE 333,334,345); Professional Activities (PE 194, 3 terms); electives approved by Dance Minor adviser selected from music, speech or dramati- cs, arts and crafts, and recreation	27
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ADDITIONAL TEACHING MINORS**Architecture**

For industrial arts education majors only.

Architecture and Construction

Requirements for MINOR: Graphics I (AA 111,112); Graphics (AA 211,212,213); House Planning and Architectural Drawing (AA 178); Construction (AA 218, 219,220); Basic Design (AA 295); Lower Division Architectural Design (AA 297) 27-33
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¹ For humanities or social science teaching major where teaching minor is not general biology, general science, physical science, or mathematics, an individual must also take a science-technical minor.

Agricultural Engineering

For Agricultural education majors only

Term
Hours

Requirement for MINOR:

College Algebra (Mth 101); Agricultural Engineering Survey (AE 211); Farm Mechanics (AE 221,222); Farm Skills (AE 381,382,383); Farm Implements (AE 391); Projects (AE 406); Special Secondary Methods in Shop Skills (Ed 408a, Section 2); Electives, 3 hours.....

28

Architecture and Allied Arts

Requirements for MINOR: House Planning and Architectural Drawing (AA 178, 179,180); Elements of Interior Design (AA 223); Survey of Visual Arts (AA 203); Lower Division Architectural Design (AA 297); Rural House Planning (AE 451); 6 hours of electives in architecture and allied arts.....

30

Art

Requirements for MINOR: Basic Design (AA 295); History of Art (AA 363,364, 365); 21 hours total from the following courses, with a minimum of 3 hours in each: drawing, painting, sculpture, crafts.....

36

Business Administration

(May not be offered as a teaching minor by business education teaching majors.)

Requirements for MINOR: Principles of Accounting (BA 211,212,213); Production (BA 201); Finance (BA 203); Marketing (BA 202); Business Law (BA 411, 412,413).....

30

Economics

For Business Education majors only.

Requirements for MINOR: Principles of Economics (Ec 201,202,203); Economic Development of the U. S. (Ec 215); Labor Problems (Ec 425); Comparative Economic Systems (Ec 450); Economic History of Modern Europe (Ec 454); History of Economic Thought (Ec 470).....

25

Journalism

Requirements for MINOR: Journalism (J 111,112); Journalism Laboratory (J 121); Copyediting (J 214); Editorial Writing (J 223); Photo-Journalism (J 334); Special Feature Articles (J 317); Public Information Methods (J 318); 8 hours of approved electives.....

30

Suggested electives: Technical Writing (J 319); Journalism Projects (J 351,352, 353); Creative Writing (Wr 218); English Composition for Teachers (Wr 411); Advertising (BA 471); Photography (Ph 361).

Music

Basic four-year Norm

Vocal

Requirements for MINOR: *Music Theory I (Mus 112,113); Music Theory II (Mus 211,212,213); **History of Music (Mus 360,361); Conducting (Mus 323); Choral Conducting (Mus 324); Vocal Music in the High School (Mus 350); †Applied Music (Mus 190,490) or Class Lessons—12 hours as directed.....

42

Instrumental

Requirements for MINOR: *Music Theory I (Mus 112,113); Music Theory II (Mus 211,213); **History of Music (Mus 360,361); Conducting (Mus 323); Instrumental Conducting (Mus 326); Instrumental Music in the High School (Mus 335); †Applied Music (Mus 190,490) or Class Lessons—12 hours as directed.....

42

Fifth-Year Courses

(Standard Norm)

Requirements for the MINOR, plus 18 hours selected from the following: Composition and Arranging (Mus 437,438,439); Advanced Conducting (Mus 441, 442,443). Maximum of 6 hours from the following: Vocal Music Literature (Mus 411); Choral Literature for Public Schools (Mus 444); String Literature for Public Schools (Mus 445); Wind Instrument Literature for Public Schools (Mus 446); Keyboard Literature (Mus 448).

* Rudiments of Music (Mus 111) or qualifying examination prerequisite.

** Introduction to Music Literature (Mus 221) prerequisite.

† The subject for applied music (voice, piano, or other) will be determined by the student with the guidance of his adviser in the music department.

Modern Languages

Students wishing to qualify for a teaching minor in modern languages (French, German, Russian, or Spanish) will be required, if they begin their language training at the university level, to complete 45 term hours in any one of the four language areas offered. Students who have had two years of foreign language training in high school (or equivalent training) and who qualify to continue their language study at our second-year level are required to complete 36 term hours for a teaching minor. Students who qualify to enter the university language program at the third-year level, having had three or four years of high school instruction in a given language (or the equivalent), will apply to the Department of Modern Languages to establish the individual requirements for a teaching minor.

French

Term Hours

Requirements for MINOR: First-Year French (RL 50,51,52); Second-Year French (RL 101,102,103); French Conversation (RL 114,115,116); Survey of French Literature (RL 311,312,313).....	36
Plus 9 hours elected from the following: Directed Reading in French (RL 211, 212,213); Twentieth-Century French Literature (RL 423,424,425).....	9
Total requirements for MINOR	45

German

Requirements for MINOR: First-Year German (GL 50,51,52); Second-Year German (GL 101,102,103); German Conversation (GL 111,112,113); Survey of German Literature (GL 343,344,345).....	36
Plus 9 hours elected from the following: Directed Reading in German (GL 211, 212,213); Twentieth-Century German Literature (GL 421,422,423)	9
Total requirements for MINOR	45

Russian

Requirements for MINOR: First-Year Russian (SL 50,51,52); Second-Year Russian (SL 101,102,103); Russian Conversation (SL 111,112,113); Readings in Russian Literature (SL 311,312,313).....	36
Plus 9 hours elected from the following: Directed Reading in Russian (SL 211, 212,213); Scientific Russian (SL 320,321,322); Survey of Russian Culture (Hum 327,328,329)	9
Total requirements for MINOR	45

Spanish

Requirements for MINOR: First-Year Spanish (RL 60,61,62); Second-Year Spanish (RL 107,108,109); Spanish Conversation (RL 117,118,119); Survey of Spanish Literature (RL 341,342,343)	36
Plus 9 hours elected from the following: Directed Reading in Spanish (RL 214, 215,216); Spanish-American Literature (RL 444,445,446)	9
Total requirements for MINOR	45

Speech

General Speech

Requirements for MINOR: Extempore Speaking (Sp 111); Voice and Diction (Sp 120); Interpretation (Sp 121,122); Fundamentals of Acting (Sp 248); Fundamentals of Play Direction (Sp 354); Radio Speaking (Sp 361); either Speech Science (Sp 480) or Principles and Techniques of Speech Correction (Sp 493); and 9 hours from the following courses: Extempore Speaking (Sp 112,113); Parliamentary Procedure (Sp 231); Group Discussion (Sp 232); Argumentation (Sp 237), or Persuasion (Sp 238); 3 hours of approved electives	36
Participation in both forensic and dramatic activities is expected for the equivalent of at least one year in each.	

Public Speaking

Requirements for MINOR: Extempore Speaking (Sp 111); Voice and Diction (Sp 120); Interpretation (Sp 121,122); either Stagecraft and Lighting (Sp 244), Stage Makeup (Sp 247), Fundamentals of Acting (Sp 248), Advanced Interpretation (Sp 311), or Radio Speaking (Sp 362); Radio Speaking (Sp 361); either Speech Science (Sp 480) or Principles and Techniques of Speech Correction (Sp 493); and 12 hours from the following courses: Extempore Speaking (Sp 112,113); Parliamentary Procedure (Sp 231); Group Discussion (Sp 232); Argumentation (Sp 237); or Persuasion (Sp 238); 3 hours of approved electives	36
Participation in forensic activities is expected for the equivalent of at least two years.	

DramaticsTerm
Hours

Requirements for MINOR: Extempore Speaking (Sp 111); Voice and Diction (Sp 120); Interpretation (Sp 121,122); Fundamentals of Acting (Sp 248); Fundamentals of Play Direction (Sp 354); Stagecraft and Lighting (Sp 244); Stage Makeup (Sp 247); either Speech Science (Sp 480) or Principles and Techniques of Speech Correction (Sp 493); and 6 hours from the following courses: Extempore Speaking (Sp 112); Parliamentary Procedure (Sp 231); Group Discussion (Sp 232); Argumentation (Sp 237); Persuasion (Sp 238); or Radio Speaking (Sp 361); 3 hours of approved electives 36

Participation in dramatic activities for the equivalent of at least two years.

Radio and Television

Requirements for MINOR: Extempore Speaking (Sp 111); Interpretation (Sp 121); Voice and Diction (Sp 120); Speech Science (Sp 480); Radio Speaking (Sp 361, 362,363); Basic Television (Sp 367); Television Programing (Sp 368) 27

Speech Correction

Requirements for MINOR: Voice and Diction (Sp 120); Extempore Speaking (Sp 111,112); Interpretation (Sp 121); Speech Science (Sp 480); Principles and Techniques of Speech Correction (Sp 493) (G); Clinic Procedures (Sp 494) (G); Electives in Speech 27

CURRICULUM IN INDUSTRIAL ARTS EDUCATION*B.S. Degree***General Notes**

a. All students following the professional curriculum for industrial arts will report directly to the head of the department for counseling on objectives, program planning, and occupational opportunities.

b. General Hygiene, PE 150, 1 term hour for men or PE 160, 2 term hours for men and women, is taken one term in place of physical education.

c. Technical electives must be related directly to the student's major field and are selected with the approval of the major adviser. This is to provide additional depth in a specific area of the major as determined by the student and adviser. (Technical subjects and electives are available in the Departments of Production Technology, General Engineering, Agricultural Engineering, Physics, and Art.)

Freshman Year		Hours	Sophomore Year		Hours
Methods in Woodworking (PT 112,113)	6		Industrial Arts Drawing and Design (AA 281,282)	6	
Machine Tool Maintenance: Wood Shop (PT 225)	2		House Plan and Arch Drawing (AA 178,179)	6	
Forging and Welding (PT 150)	3		Carpentry and Building Construction (PT 333)	3	
Machine Tool Practices (PT 160)	3		Wood Turning (PT 220)	3	
Engineering Graphics (GE 115,116,117)	9		Foundry Practice (PT 340)	3	
English Composition (Wr 111,112,113)	9		Field Experience (Ed 200)	2	
Intermediate Algebra (Mth 100)	4		General Psychology (Psy 201,202)	6	
College Algebra (Mth 101)	4		General Physics (Ph 211,212)	6	
Math or science elective	4		General Chemistry (Chem 101)	3	
Physical education and general hygiene (see note b, above)	3		Speech (Sp 111)	3	
Defense education or other electives	3		Social science elective	3	
	50		Physical education	3	
			Defense education or other electives	3	
				50	
Junior Year		Hours	Senior Year		Hours
Millwork: Machine Woodwork (PT 311)	3		Sheet Metal Work (PT 380)	3	
Wood & Metal Finishing (PT 316)	3		Metalcrafts (PT 387)	3	
Machine Tool Practice (PT 360)	3		Applied Electricity (PT 370)	3	
Furniture Design & Construction (PT 312,313)	6		Electives (PT)	6	
Forging and Welding (PT 350)	3		Special Secondary Methods (Ed 408e)	3	
School in American Life (Ed 310)	3		Industrial Arts Organization (1Ed 420)	3	
Educational Psych: Learning (Ed 312)	3		Student Teaching: Secondary (Ed 416)	12	
Methods in Reading (Ed 350)	3		Seminar (Ed 407)	2	
Hist of American Civilization (Hst 224,225,226)	9		Psychology of Adolescence (Ed 461)	3	
Social science electives	6		Hist of P Northwest (Hst 478) or elective	3	
Teaching minor electives	9			41	
	51				

Education

The Department of Education offers courses in principles and techniques of teaching at the elementary, secondary, and college levels, special methods in teaching the various major subjects in which Oregon State University gives teacher training, the history and philosophy of education, guidance, counseling, and personnel work.

Lower Division Course

- Ed 49. **Methods of Study.** No credit.
Specific methods applied to various subject-matter fields; note taking; study schedule; fixing study habits; the various broad fields of human learning. Laboratory work also scheduled.
- Ed 121. **Introduction to Recreation.** 3 hours. 3 ①
Community recreation; public recreation movement; types of recreation; organized recreation in the present social order.
- Ed 200. **Field Experience.** 2 hours. 2 ①
To help prospective teachers bridge gap between classroom theory and student teaching. Observation of and participation in school and community organizations and programs. Prerequisite to or concurrent with Ed 310.
- Ed 263. **Camp Counseling.** 3 hours. 3 ①
Counselor training; responsibility in camp; camper problems; camp relationships. Three-day practical camping field trip.
- Ed 296. **Leadership Training.** 2 hours. 2 ①
Interpretation of leadership, understanding functions of group, possible methods involved; leadership in campus life used as laboratory experience. Prerequisite: an actual leadership position. If students have not held such position, consent of instructor required.

Upper Division Courses

- 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, and admission to the teaching credential program.
- Ed 312. **Educational Psychology: Learning.** 3 hours. 3 ①
Laws of learning and application to classroom; motivation; transfer of training; memory; forgetting; psychology of school subjects. Prerequisite: Psy 201,202.
- Ed 347,348,349. **Field Work.** 2 hours each term. 2 ①
Planning, operation, and administration of wide variety of functioning recreation or youth organization programs under direction and supervision of trained leaders. Prerequisite: junior standing.
- Ed 350. **Methods in Reading.** 3 hours. 3 ①
Prerequisite: Ed 310.
- Ed 360. **Safety Education.** 3 hours. 3 ①
All phases of safety; home, fire, industrial, water, rural, school, and traffic safety; elementary, secondary, and adult. Prerequisite: Ed 310,312,408.
- Ed 364. **Laboratory Practice in Camping Skills.** 3 hours. 3 ①
Practical experience and development of skills in a variety of camping activities.
- Ed 365. **Camp Management.** 3 hours. 3 ①
Directed toward preparation for camp administration. Prerequisite: Ed 263 or camp counseling experience.
- Ed 366. **Public School Camping.** 3 hours. 3 ①
Role in education; study of school camp, its organization, administration, and leadership. Prerequisite: Ed 365.
- Ed 367. **Methods and Materials: Language Arts.** 3 hours. 3 ①
Method course designed to help prepare elementary school teachers to present language skill as a tool of communication, especially to set up developmental program stressing skills of listening, observing, speaking, reading, and writing. Prerequisite: Ed 310.

- Ed 368. **Methods and Materials: Science and Mathematics.** 5 hours. 5 ①
Problems, methods, and techniques in selecting and organizing content and experiences in elementary school science and mathematics; goals in teaching; multisensory and resource aids available for classroom use. Prerequisite: Ed 310.
- Ed 369. **Methods and Materials: Social Science.** 3 hours. 3 ①
Aims, evaluation, and procedures in presenting social studies at various levels in elementary schools. Prerequisite: Ed 310.
- Ed 401. **Research.** Terms and hours to be arranged.
- Ed 405. **Reading and Conference.** Terms and hours to be arranged.
- Ed 407. **Seminar.** 1, 2, or 3 hours any term. 1, 2, 3 ①
Prerequisite: Ed 310,312,350,408. If students have not had prerequisite, they must have consent of instructor.
- Ed 408. **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) home economics, (e) industrial arts, (f) mathematics, (g) physical science, (h) physical education, (i) health education, (j) humanities, (k) social science, (t) trade and industrial education. Prerequisite: Ed 310,312,350. (6 hours maximum allowed toward certification.)
- Ed 414. **Student Teaching: Kindergarten.** 3 hours.
Open only to students in Elementary Education. Prerequisite: Ed 415 (Elementary) minimum of 6 quarter hours; Ed 450, Kindergarten Education; and consent of adviser. Arrangements to do student teaching must be made during registration for winter term of junior year.
- Ed 415. **Student Teaching: Elementary.** 9 to 15 hours.
Open only to students in Elementary Education. Senior standing in Elementary Education and consent of instructor required. Student must not be on probation.
- Ed 416. **Student Teaching: Secondary.** 9 to 15 hours.
Experience in classroom procedures in fields of student's preparation and interests: (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) humanities, (k) social science, (t) trade and industrial education. Arrangements to do student teaching must be made during registration for winter term of junior year. Prerequisite: Ed 310,312,350,408 and consent of director of teacher training. *Student must have grade-point average of 2.50 in his teaching major at the beginning of the term in which he does student teaching and must not be on probation. He must also have a teaching minor.*
- Ed 421. **Principles and Philosophy of Recreation.** (g) 3 hours. 3 ①
Leisure and recreation in American culture; present status and principles basic to field. Prerequisite: Ed 349.
- Ed 422. **Recreation Programs.** (g) 3 hours. 3 ①
Principles of program planning, consent, trends, and problems in field of recreation programing. Prerequisite: Ed 421.
- Ed 423. **Organization and Administration of Recreation.** (g) 3 hours. 3 ①
Organizing, administering, and conducting recreation programs; problems in recreation. Prerequisite: Ed 349.
- Ed 424. **Measurement in Education.** (G) 3 hours. 3 ①
Standard tests and scales; statistical method. Prerequisite: senior standing.
- Ed 425. **Youth Agencies.** (G) 3 hours. 3 ①
Youth-serving organizations; organization and leadership of school and community clubs. Prerequisite: senior or graduate standing. Students who do not have senior or graduate standing must have consent of instructor.
- Ed 426. **Community Recreation.** (G) 3 hours. 3 ①
The developing philosophy of recreation; current trends and problems in interrelationships of community agencies offering recreation programs. Prerequisite: Ed 423.

- Ed 430. **The Junior High School.** (G) 3 hours. 3 ①
Development and program as it relates to total educational system and to social and educational needs of adolescent youth. Emphasis given to changing patterns of junior high school in terms of cultural needs and developments. Prerequisite: Ed 310,312.
- Ed 431. **Junior High School Curriculum.** (G) 3 hours. 3 ①
Curriculum needs of junior high school pupil; scheduling core program, instructional materials in relation to ability and maturity of pupil. Prerequisite: Ed 310,312.
- Ed 432. **Junior High School Guidance.** (G) 3 hours. 3 ①
The individual pupil; his abilities, interests, and aptitudes. Organization and administration of program; role of teachers and auxiliary-service staff. Prerequisite: Ed 310,312.
- Ed 435. **Audio-Visual Aids.** (G) 3 hours. 1 ① 2 ②
Film, slide, chart, and other visual materials; operation of projectors and other equipment. Prerequisite: senior standing. Students who do not have senior standing must have consent of instructor.
- Ed 436. **Preparation of Audio-Visual Aids.** (G) 3 hours. 1 ① 2 ②
Aids for more efficient teaching in large and diversified classes; charts, graphs, illustrated materials, flat and three-dimensional materials for display or projection; audio-teaching aids. Prerequisite: senior standing. Students who do not have senior standing must have consent of instructor.
- 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 310,312,367,368. Limited to students enrolled in or having a degree in elementary education.
- 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. Emphasis on personal and social adjustment. Prerequisite: senior standing.
- Ed 463. **The Maladjusted Child.** (G) 3 hours. 3 ①
Discovery and treatment; home, school, and community in relation to child's mental health. Prerequisite: Ed 310,312.
- Ed 465. **Diagnostic and Corrective Techniques in the Basic Skills.** (G) 3 hours. 3 ①
Diagnostic, remedial, and corrective techniques; application to actual cases. Prerequisite: Ed 310,312.
- Ed 468. **Diagnostic and Remedial Techniques in Reading.** (G) 3 hours. 3 ①
Reading process, reading readiness, reading skills; causes of retardation; diagnosing difficulties and evaluating progress; and procedures and materials for the development of reading abilities. Prerequisite: Ed 310,312,350.
- 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.
- Ed 476. **School Law and Organization.** (G) 2 hours. 2 ①
Oregon school system and laws; problems of Oregon schools; plans for solution; course of study; trends in educational development. Prerequisite: junior standing.
- Ed 479. **Corrective Reading Laboratory.** (G) 3 hours each term, 3 terms. 3 ①
Diagnostic tests; remedial techniques in reading; diagnosis; corrective procedures. Consent of instructor required. Prerequisite: Ed 468.
- Ed 480. **The Psychology of Reading Instruction.** (G) 3 hours. 3 ①
Psychological and physiological aspects and their application to classroom procedure.

- Ed 484. **The Junior High School.** (G) 3 hours. 3 ①
Development; purpose and objectives; general organization; courses of study; present practices in leading representative junior high schools; classroom activities; provision for individual differences; pupil personnel. Prerequisite: Ed 310,312.
- Ed 485. **Principles and Practices of Guidance Services.** (G) 3 hours. 3 ①
Beginning course in guidance. Overview of guidance and personnel work; vocational, educational, health, social, personality, recreational, and individual development; participation of teachers, counselors, administrators, parents, and community organizations in guidance program. For teachers and administrators. Prerequisite: senior standing.
- Ed 486. **Occupational and Educational Information.** (G) 3 hours. 3 ①
Materials available; present trends; value and usefulness for high school and college students. Prerequisite: senior standing.
- Ed 487. **Counseling Techniques.** (G) 3 hours. 3 ①
Mental, achievement, trade, and other tests; administration of such tests; classification, educational, and vocational counseling. Prerequisite: Ed 485.
- Ed 494. **Principles and Objectives of Vocational Education.** (G) 3 hours. 3 ①
Basic principles and development; history and legislation; vocational schools and vocational programs in relationship to the total educational program. Consent of instructor required.
- Ed 495. **Organization and Administration of Vocational Education.** (G) 3 hours. 3 ①
Federal vocational education acts; state boards; local boards; laws, regulations, policies; problems and principles as related to organization, administration, cooperating personnel, agencies, finances, budgets, and committees. Consent of instructor required.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- Ed 501. **Research.** Terms and hours to be arranged.
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.
Problems in Curriculum and Instruction—WILLIAMSON.
Problems in Educational Psychology—REICHART.
Problems in Guidance—ZERAN.
Problems in Higher Education—GOODE and MUNFORD.
Problems in History or Philosophy of Education—REICHART.
Problems in Measurements—BARON.
- Ed 503. **Thesis.** Terms and hours to be arranged.
- Ed 505. **Reading and Conference.** Terms and hours to be arranged.
- Ed 507. **Seminar.** Terms and hours to be arranged.
- Ed 508. **Workshop.** Terms and hours to be arranged.
COUNSELOR TRAINING—Each student concentrates on special problem in guidance; training and assistance to teachers, counselors, deans, and administrative officers. Prerequisite: 9 hours in education and teaching experience.
CURRICULUM—Planning curricula for specific situations. Conducted on an individual basis or (preferably) by a staff group working cooperatively in developing or revising plans and programs.
- 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 reports.

- Ed 522. **Secondary School Curriculum.** 3 hours. 3 ①
For experienced teachers. Schools in the community; guidance activities; extra class activities; school in contemporary society; teacher in local community. Prerequisite: graduate standing in education.
- Ed 524. **Construction and Use of Objective Examinations.** 3 hours. 3 ①
Selection of test items; types of examinations; validity; reliability; administering, scoring, grouping results. Prerequisite: graduate standing.
- Ed 527. **Secondary School Administration and Supervision.** 3 hours. 3 ①
Principalship; principles, staff relationships, public relations, professional growth; business administration; guidance services, curriculum, activities; evaluation of secondary schools. Prerequisite: secondary certificate, one year secondary teaching experience.
- Ed 532. **Tests and Measurements.** 3 hours. 3 ①
Selected tests and measurements applicable in a particular subject or department. Prerequisite: Ed 424 and other courses specified by department.
- Ed 533. **Psychological 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 developments with special reference to education. Prerequisite: graduate standing in education.
- Ed 546. **Philosophy of Education.** 3 hours. 3 ①
Fundamental problems with some attempt at their solution; meaning of philosophy; value for teacher and administrator. Prerequisite: graduate standing in education.
- Ed 550. **The Junior College.** 3 hours. 3 ①
Early junior colleges; junior college movement; aims and functions; curriculum; organization and operation; relation to secondary and higher education. Consent of instructor required.
- 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 experience.
- Ed 554. **Elementary School Supervision and Administration.** 4 hours. 4 ①
Role duties, needs, problems; evaluation and improvement of teaching-learning. Prerequisite: elementary certification, one year of elementary teaching experience.
- Ed 555. **Student Personnel Work in Higher Education.** 3 hours. 3 ①
Student personnel services in colleges and universities; philosophy, organization, administration of personnel program at this level; specific services provided. Opportunity to visit and study college personnel programs. Prerequisite: graduate standing.
- Ed 556. **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 maturation; learning as nurture; motivation and direction of college student's learning. Prerequisite: graduate standing.
- Ed 557. **College and University Teaching.** 3 hours. 3 ①
Evaluation, aims, procedures, and outcomes in college and university teaching; professional relationships and interests; individual studies according to student's field. Prerequisite: graduate standing.
- Ed 558. **American Higher Education.** 3 hours. 3 ①
The American college and university; the old liberal arts college; influence of German university; rise of American university; structure and curriculum; international higher education.
- Ed 561. **Advanced Educational Psychology.** 3 hours. 3 ①
Experimental material that seems most useful and relevant to educational psychology. Prerequisite: graduate standing in education.

- 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. Prerequisite: 24 hours of upper division credit in education including student teaching.
- Ed 574. **School Supervision.** 3 hours. 3 ①
Purpose of and plans for supervision; use of tests, diagnosis of pupil difficulty. Prerequisite: elementary or secondary certification, one year of teaching experience.
- Ed 575. **School Finance.** 3 hours. 3 ①
School finance and business administration; sources of school income; State financial structure; budgeting and accounting. Prerequisite: elementary or secondary certification, one year of teaching experience.
- Ed 576. **School Buildings.** 3 hours. 3 ①
Problems involved in planning, financing, and construction; care and maintenance; problems of equipment. Includes analysis of problems of a specific district. Prerequisite: elementary or secondary certification and one year of teaching experience.
- Ed 577. **Counselor Training: Group Procedures.** 3 hours. 3 ①
Principles underlying behavior and methods for modifying individual's 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: Ed 485,487.
- Ed 581,582. **Counselor Training.** 3 hours each term. 3 ①
Through cooperation of department stores and industries in Portland, students gain experience in both customer-contact and nonselling departments, or move from job to job in industry to obtain both production-line experience and contact with top management; conferences, lectures, and discussions by executives, faculty members, leaders in labor relations, and others. Extramural or Summer Session. Prerequisite: Ed 485,487.
- Ed 588. **Supervised Counseling Techniques.** 3 hours each term, two terms. 3 ①
Provides actual counseling experience in counseling laboratory. Interviewing; administering, scoring, and interpreting psychological tests; writing case studies. Consent of instructor required. Prerequisite: Ed 485,487; Psy 478,479,480.
- Ed 589. **Organization and Administration of Guidance Services.** 3 hours. 3 ①
Criteria for evaluating present personnel services, setting up guidance committees, selection of personnel, responsibilities and duties of staff, development of program of services, and in-service training program. Prerequisite: Ed 485,487.

Agricultural Education

The Department of Agricultural Education, a joint department within the Schools of Agriculture and Education, trains teachers and supervisors of agriculture for secondary schools and for schools and classes of adult farmers and young men not enrolled in regular day schools. The strong demand for teachers of vocational agriculture in Oregon, in the Pacific Region, including Hawaii, and throughout the United States, is expected to continue indefinitely. Special consideration is given to George-Barden Act and to Smith-Hughes Act. Field activities, followup for new teachers, and preparation of instructional material for agricultural instructors are handled by this department in cooperation with the staff of the School of Agriculture.

Requirements for Teaching Agriculture. The prospective vocational agriculture teacher should confer early with the department head. Discussion will center on attainment of certain fundamental qualifications and knowledge as well as the high level of practical ability necessary for admission to this field.

Requirements in Agriculture:

- Graduation from a college of agriculture of standard rank.
- 80 term hours or equivalent, or special work in agriculture. Courses depend somewhat on previous training and experience and recommendations of department head.

Requirements in Education and for Certification:

● Course requirements in education: A minimum of 37 term hours in the curriculum, including courses in special secondary methods and supervised teaching.

● Vocational Teaching Certificate: The curriculum in agricultural education is designed to fulfill requirements for a vocational teaching certificate. The State Director of Vocational Education will issue this certificate after determining applicant's qualifications for teaching vocational agriculture and after applicant has been placed in a teaching position.

● It is expected that persons who have been employed to teach vocational agriculture, after receiving the vocational certificate and completing the curriculum, will continue systematic work in education and agriculture as needed, through summer courses and otherwise during their period of employment in full-time teaching. Such work may carry college credit leading to a master's degree.

Graduate Study. For those wishing to continue studies beyond a bachelor's degree, a program of experience and graduate study leading to a master's degree will be developed to meet individual needs.

Upper Division Courses

- AEd 401. **Research.** Terms and hours to be arranged.
- AEd 405. **Reading and Conference.** Terms and hours to be arranged.
- AEd 407. **Seminar.** Terms and hours to be arranged.
- Ed 408. **Special Secondary Methods.** 3 hours. (See page 197.)
Section 1: Supervised Farming, FFA. Section 2: Shop and Manipulative Skills.
- AEd 411. **Program Report Analysis.** 2 hours fall or spring. 2 ①
 Federal, State, and local reports and records prepared by the Vocational Agriculture Teacher.
- 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 312,416. TEN PAS.
- AEd 418. **Adult Education in Agriculture.** (G) 3 hours. 3 ①
 Programs for young and adult farmer groups; classes for young farmers, for older farmers, and for farm veterans and special classes of veterans. Prerequisite: AEd 417. DAVIS.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- AEd 501. **Research.** Terms and hours to be arranged.
- AEd 503. **Thesis.** Terms and hours to be arranged.
- AEd 505. **Reading and Conference.** Terms and hours to be arranged.
- AEd 507. **Seminar.** Terms and hours to be arranged.
- AEd 516. **Extension Course in Teacher Training.** Hours to be arranged.
 Enables present and prospective teachers of agriculture to continue professional improvement; conference, followup instruction, supervision, correspondence, reports. Prerequisite: Ed 310,312.
- AEd 533. **Rural Survey Methods.** 3 hours. 1 ③
 Technique; analyzing, interpreting, and using results in evaluating and formulating programs; field studies. Prerequisite: Ed 310,312; 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 408a; teaching experience.

Business Education

Professional preparation for teachers of business subjects is provided in the Department of Business Education, a joint department in the School of Business and Technology and the School of Education. A student may major in either school, but before registering he must confer with the head of the Department of Business Education.

Baccalaureate Degrees. The program for undergraduates for a baccalaureate degree is outlined in the curriculum on a previous page. Courses from business administration, business education, education, and secretarial science form the major background. A liberal number of elective hours permits the selection of a teaching minor. The requirements for a State High School Teacher's Certificate are listed on page 188.

Advanced Degrees. Graduate study with a major in business education is available through the School of Education for all those who complete the undergraduate curriculum or its equivalent. Of the 45 term hours required for the Master of Science or the Master of Arts degree, 30 are taken in business education (including the thesis). Other Master's degree options are described under GRADUATE SCHOOL. A choice of graduate program can be made following a conference with the head of the Department of Business Education.

For description of courses see SCHOOL OF BUSINESS AND TECHNOLOGY, p. 185.

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 Education or School of Home Economics may meet certification requirements. Before registering for teacher preparation courses, every student should receive permission for registering and guidance for selection of courses from the home economics education staff. Home economics students who have taken FL 225 and 311 may substitute FL 413 for Psy 311.

Lower Division Course

Ed 200. **Field Experience.** 2 hours. (See SCHOOL OF EDUCATION.)

Upper Division Courses

HEd 401. **Research.** Terms and hours to be arranged.

HEd 403. **Thesis.** Terms and hours to be arranged.

HEd 405. **Reading and Conference.** Terms and hours to be arranged.

HEd 407. **Seminar.** Terms and hours to be arranged.

PLANNED HOME EXPERIENCES.
PROBLEMS OF BEGINNING TEACHERS.

Ed 408. **Special Secondary Methods.** 3 hours. (See page 197.)

HEd 422. **Organization and Administration of Homemaking Education.**
(G) 3 hours. 3 ①

Organization of homemaking departments with special emphasis on the unique aspects of secondary homemaking. Prerequisite: Ed 408d.

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 408d.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

HEd 501. Research. Terms and hours to be arranged.**HEd 503. Thesis.** Terms and hours to be arranged.**HEd 505. Reading and Conference.** Terms and hours to be arranged.**HEd 507. Seminar.** Terms and hours to be arranged.

HOME AND COMMUNITY EXPERIENCES.
AUDIO-VISUAL AIDS FOR TEACHING HOMEMAKING.
EVALUATION OF HOMEMAKING INSTRUCTION.
STUDIES IN HOME ECONOMICS EDUCATION.

HEd 511. Current Methods in Teaching Homemaking. 3 hours. 3 ①
Current trends in education applied to homemaking education. Prerequisite: Ed 408d.

HEd 512. Supervision of Home Economics Education. 3 hours. 3 ①
Inservice and preservice home economics supervision. Prerequisite: Ed 408d and teaching experience.

HEd 554. Community Programs in Homemaking. 3 hours. 3 ①
Planning, organizing, cooperating, directing, and appraising total community programs in family life education; emphasis on adult education. Prerequisite: HEd 440.

Industrial Education

The Department of Industrial Education prepares teachers and supervisors in industrial arts education and in trade and industrial education (Smith-Hughes vocational). The department is organized as a part of the School of Education and as such offers no technical courses on the undergraduate level. The industrial arts curriculum is made up of technical courses selected from several departments and schools that serve its needs. A large number of courses are provided by the School of Engineering, specifically the Departments of General Engineering and Production Technology. The Department of Industrial Education is responsible for the professional curriculum and for teacher education courses and applied teaching methods. Trade and industrial education is provided jointly by resident staff and the State Department of Vocational Education in Salem.

Undergraduate Curriculum for Industrial Arts Education. The four-year professional program, leading to the degree of Bachelor of Science, meets certification requirements of all states except those requiring graduate study as a prerequisite to certification. In all cases it furnishes an excellent foundation for graduate study which may be obtained at Oregon State University or elsewhere.

Undergraduate Curriculum for Trade and Industrial Education. The four-year professional program leading to the bachelor's degree in trade and industrial education provides opportunity for candidates to receive some credit based on trade or industrial experience, but they must fulfill the regular institutional requirements listed under DEGREES AND CERTIFICATES. In order to be admitted to this program, a candidate must present evidence of three years above

the standard learning experience or acceptable trade or industrial experience, or he must present credentials indicating that he is qualified to teach or supervise reimbursed Smith-Hughes classes in his state. He must be engaged in teaching (or about to be so engaged), or be employed as a vocational supervisor. He must also present a letter from Mr. William Loomis, State Supervisor of Trade and Industrial Education, Salem, Oregon, accepting him into the program.

Graduate Study in Industrial Education. Many school systems, and some state departments of education, now require all teachers to present graduate study or a master's degree as a principal prerequisite to a teaching credential for secondary schools. Since demands upon teachers the country over are becoming increasingly exacting each year, graduate work in industrial education brings its proportional rewards and is usually necessary for those who desire to enter the field of supervision, administration, or teacher education. Programs of study leading to the degree of Master of Science or Master of Education are outlined by this department for both *industrial arts* and *trade-industrial* students and teachers with approved graduate standing.

Courses in Industrial Arts Education

See also courses in the Department of Education including Ed 408e, and Ed 416, and courses in technical subject matter appropriate to the industrial teacher education program in production technology, general engineering (School of Engineering), architecture, and art.

Upper Division Courses

- IEd 311,312. **Elementary School Industrial Arts.** 3 hours each term. 3 ①
Objectives, methods, techniques of *expressional* industrial arts in elementary schools. *First term:* Objectives and techniques; group projects in home room; creative expression. *Second term:* Individual projects for special displays; tools and material for special-subjects room. Prerequisite: Ed 310 or junior standing.
- IEd 401. **Research.** Terms and hours to be arranged.
- IEd 403. **Thesis.** Terms and hours to be arranged.
- IEd 405. **Reading and Conference.** Terms and hours to be arranged.
- IEd 407. **Seminar.** Terms and hours to be arranged.
- IEd 420. **Industrial Arts Organization.** (g) 3 hours. 3 ①
Diversified programs for smaller high schools; jobs, projects, and class problems; appropriate teaching aids; professional relationships. Prerequisite: Ed 408e and senior standing.
- IEd 470. **History of Manual and Industrial Education.** (G) 3 hours. 3 ①
Historical development and present-day aims of industrial arts and vocational-industrial education. Prerequisite: senior standing.
- IEd 472. **Occupational Analysis.** (G) 3 hours. 3 ①
Analysis of an occupation, trade, or job into its component subdivisions, blocks, operations, and teaching units; occupational analysis in teaching procedure. Prerequisite: Ed 408, and technical background.
- IEd 473. **The General Shop and Its Problems.** (G) 3 hours. 3 ①
Type of organization; advantages and limitations; probable future; content, organization, and presentation of subject matter; class control. Prerequisite: Ed 408e.
- IEd 475. **Project Selection and Analysis.** (G) 3 hours. 3 ①
Projects for use in teaching industrial arts based on objectives, processes, and function. Prerequisite: IEd 472 or equivalent.
- IEd 476. **Supervision of Industrial Arts.** (G) 2 hours. 2 ①
Functions, techniques of supervisor; supervision principles from teacher's viewpoint; teacher-supervisor relationships. Problems of supervisor in large and small school systems. Prerequisite: graduate standing and teaching experience in industrial arts.

Graduate Courses

(For both industrial arts and trade education students)
 Courses numbered 400-499 and designated (g) or (G)
 may be taken for graduate credit.

- IEd 501. **Research.** Terms and hours to be arranged.
- IEd 503. **Thesis.** Terms and hours to be arranged.
- IEd 505. **Reading and Conference.** Terms and hours to be arranged.
- IEd 507. **Seminar.** Terms and hours to be arranged.
- IA 508. **Workshop.** Terms and hours to be arranged.
- IA 511. **Shop Planning and Organization.** 3 hours. 3 ①
 Different types of school shops; school-shop layout for effective teaching; drafting equipment required. Students who bring floor plans of their shops and equipment may use them as laboratory problems for possible improvement. Graduate standing and teaching experience in industrial arts required.

Undergraduate Curriculum for Trade and Industrial Education

Required Professional Courses. General Psychology (Psy 201,202), Human Development (Psy 311), School in American Life (Ed 310), Educational Psychology: Learning (Ed 312), Methods in Reading (Ed 350), Special Secondary Methods (trade and industrial education) (Ed 408t), and the following trade and industrial education courses: IEd 381,382,480, 481,482, and 491. The student's program must also include 16 hours of approved electives in trade and industrial education to make a total of 48 hours of required professional courses.

Recommended Professional Electives. Principles and Objectives of Vocational Education (Ed 494), Organization and Administration of Vocational Education (Ed 495), and the following Trade and Industrial Education courses: IEd 383,483,484,485,486,487,488,490,407.

Credit through Examination. Students with three or more years above the standard learning period of trade or industrial experience may be granted a maximum of 48 term hours of credit for such experience. This credit is granted upon the candidate's successful performance on a special examination.

Required courses (general)

English Composition (Wr 111,112,113)	9 hours
Literature	9 hours
Speech	3 hours
Science (may include mathematics) and social science	45 hours
A minimum of 9 hours must be in a laboratory science or mathematics.	
Social science courses must include: U. S. history (9); sociology (3); political science (3); economics (3)	
Total	66 hours

A year's trade or industrial experience is defined as 48 weeks as a wage earner. Experience in the employment of school boards or in the armed services will not be accepted. The minimum period of experience acceptable under one employer is three months. In those trades or occupations where assignment to short time jobs is made through a union hiring hall, the assigning union may be considered as the employer. Experience in scattered fields is not acceptable.

Summary:

Required courses (general)	66 term hours
Required courses (professional)	54 term hours
Credit through examination (maximum)	48 term hours
General electives	24 term hours

Total required for bachelor's degree.....192 term hours

Additional information in regard to provision for obtaining credit for experience through examination may be obtained from the School of Education. Courses listed below are offered only infrequently, extramurally, or in summer session in cooperation with the Department of Vocational Education.

Courses for Trade and Industrial Education Students

Upper Division Courses

- IEd 381. **Introduction to Industrial Education.** 2 hours. 2 ①
 Vocational education emphasizing trade and industrial aspects; organizing materials, planning lessons, and developing teaching techniques. Prerequisite: three years of practical trade experience.

- IEd 382. **Analysis and Course Construction.** 3 hours. 3 ①
Trade analysis: type of jobs that require skills and knowledge discovered through analysis, arranged in sequence of difficulty within each division of the trade. Prerequisite: Ed 408; IEd 381 or equivalent.
- IEd 383. **Educational Psychology for Trade and Industrial Teachers.** 3 hours. 3 ①
Acquisition of manipulative skills and related technical information; the learning process, factors in emotional control, development of attitudes, abilities, and evaluations. Prerequisite: IEd 381 or experience as a vocation instructor.
- IEd 480. **Shop Organization and Management.** (g) 3 hours. 3 ①
Shop instruction, handling supplies, maintaining equipment and tools, purchasing materials, keeping records, making inventories, and meeting other problems of setting up and operating vocational shop courses; shop plans and layout. Prerequisite: IEd 381; Ed 408; IEd 382 or equivalent.
- IEd 481. **Development and Use of Audio-Visual Aids.** (g) 3 hours. 3 ①
Instructional aids and their evaluation, preparation, and use; operation of audio-visual equipment in vocational classes. Prerequisite: IEd 382 or teaching experience.
- IEd 482. **Development, Organization, and Use of Instructional Materials.** (g) 2 hours. 2 ①
Instruction sheets and reference materials. Instructional materials in shop and related classes. Prerequisite: IEd 382 or equivalent.
- IEd 483. **Coordination of Diversified Occupations Programs.** (G) 2 hours. 2 ①
Principles and practices; problems involved in organizing, conducting, and reporting a diversified occupations program. Prerequisite: IEd 381 or coordination experience.
- IEd 484. **Coordination of Trade and Industrial Classes.** (G) 2 hours. 2 ①
Principles, practices of coordination between trade and industrial education and industry; coordinator in unit trade, trade extension, and cooperative programs; relationships between coordinator, supervisor, and administrator; placement and followup problems. Prerequisite: IEd 483 or coordination experience.
- IEd 485. **Supervision of Trade and Industrial Education.** (G) 2 hours. 2 ①
Local and State-level programs. Supervisory needs for individual situations; planning supervisory programs. Prerequisite: IEd 382, IEd 484, or equivalent.
- IEd 486. **Vocational Guidance for Trade and Industrial Teachers.** (G) 2 hours. 2 ①
Principles and problems of guidance; number of workers in trade, working conditions, rates of compensation, special laws, opportunities for advancement, and necessary preparation for promotion and success in different phases. Prerequisite: IEd 382 or equivalent.
- IEd 487. **Industrial and Public Relations for Trade and Industrial 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.
- IEd 488. **Educational Personnel Relations: Supervisory Development.** (G) 2 hours. 2 ①
Designed to aid school administrators, supervisors, coordinators, and teachers; methods of handling individual and group relations. Prerequisite: IEd 484 or IEd 485 or equivalent.
- IEd 490. **Shop Design and Layout for Trade and Industrial Teachers.** (G) 2 hours. 2 ①
Applied to vocational or trade school; vocational-type shops. Prerequisite: IEd 480 or equivalent.
- IEd 491. **Testing for Trade and Industrial Teachers.** (g) 3 hours. 3 ①
Tests to measure effectiveness of trade teacher and advancement of pupils; types of tests; construction and administration; possibilities and limitations; reliability and validity. Prerequisite: IEd 382, 482, or equivalent.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit. See also IEd 501-507, page 209.

Physical Education

The Division of Physical Education offers professional courses in physical education leading to baccalaureate degrees through the School of Education. The major provides professional preparation for physical education and coaching. It may be combined with health education, camp education, or recreation to meet needs in many public schools or communities. Graduates are prepared for positions in YMCA or YWCA, city recreation, industrial recreation, camping, and various youth-serving organizations. The major in Physical Education provides a foundation for students preparing to enter the field of physiotherapy and other closely related fields. The program is flexible so that varied needs may be met.

Many opportunities exist for combining a physical education major with courses in the Schools of Science, Agriculture, Engineering, and Home Economics. These schools offer work closely related to the offerings in health and physical education.

See the DIVISION OF PHYSICAL EDUCATION for outline of a suggested student's basic program for a major in physical education.

Science Education

Professional preparation for prospective teachers of biological and physical science and mathematics is offered by the Department of Science Education, a joint department within the School of Science and the School of Education. Students preparing to teach science in secondary schools may major in one of the sciences, or in general science, according to the degree of emphasis on subject matter or professional preparation. Combination of subjects to be taught and scope of preparation desired influence the choice of major school.

The requirements for the State High School Teacher's Certificate and list of approved teaching majors and minors in science on page 192 may be supplemented by additional courses in the several fields. Teaching majors in general biology, general science, mathematics, and physical science provide electives that permit flexibility in selection of courses. The major in health education is made up of required courses and may well be augmented by additional courses in biology and related fields. A wide range of health education courses is available in the Schools of Science, Education, Agriculture, Engineering, and Home Economics, and the Division of Physical Education. Both undergraduate and graduate majors in hygiene and sanitation are offered in the Department of Microbiology and Hygiene.

Lower Division Course

SEd 123. **Introduction to Health Education.** 3 hours spring. 3 ①
Background and philosophy; statistical facts that indicate need; modern practices; organizations; opportunities for professional work in field.

Upper Division Courses

SEd 321. **School Health Education.** 3 hours. 3 ①
Developing ability of public school student to understand and guide his own health and to contribute to health of community. Prerequisite: SEd 123 or junior standing.

- SEd 322. **School Health Services.** 3 hours. 3 ①
Development, maintenance, and protection of health of student; services, examinations, screening, special services, communicable disease control, emergency care, school environment, forms and records. Prerequisite: SEd 123 or junior standing.
- SEd 401. **Research.** Terms and hours to be arranged.
- SEd 403. **Thesis.** Terms and hours to be arranged.
- SEd 405. **Reading and Conference.** Terms and hours to be arranged.
- SEd 407. **Seminar.** Terms and hours to be arranged.
- Ed 408. **Special Secondary Methods.** 3 hours.
(b) Biological science. (f) Mathematics. (g) Physical science. See Ed 408 under SCHOOL OF EDUCATION.
- SEd 431,432,433. **School Health Problems.** (G) 3 hours each term. 3 ①
Health of school children; communicable diseases; school sanitation; planning of school buildings; health of school child; hygiene instruction. Prerequisite: Ed 310,312, and one year of upper division biology. LANGTON.
- SEd 441,442,443. **Health Education.** (G) 3 hours each term. 3 ①
Philosophy and principles; coordination of school health activities with various resources. First term major emphasis placed on health services and healthful school living; second term, on elementary school health instruction; third term, on secondary school health instruction. Prerequisite: one year of upper division biological science and SEd 321 and 322, or equivalent.
- SEd 481. **Alcohol Studies in School Curriculum.** (G) 3 hours. 3 ①
Scientific information about alcohol; physiological, psychological, sociological, and legal aspects of alcoholism. Prerequisite: 24 hours of upper division education.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- SEd 501. **Research.** Terms and hours to be arranged.
- SEd 503. **Thesis.** Terms and hours to be arranged.
- SEd 505. **Reading and Conference.** Terms and hours to be arranged.
- SEd 507. **Seminar.** Terms and hours to be arranged.
- SEd 591. **Practicum in Biological Science.** 3 hours. 2 ① 1 ②
Laboratory and demonstrative skills, program planning, maintaining and designing laboratory materials. Prerequisite: Ed 408b, Ed 416, and teaching major in biological science. WILLIAMSON.
- SEd 592. **Practicum in Physical Science.** 3 hours. 2 ① 1 ②
Laboratory and demonstration skills, program planning, maintaining and designing laboratory materials. Prerequisite: Ed 408g, Ed 416, and teaching major or minor in physical science. FOX.
- 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: Ed 408b, 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. Prerequisite: 24 hours of upper division education including Ed 416. WILLIAMSON.

School of Engineering

Faculty

As of January 1963

GEORGE WALTER GLEESON, Ch.E., Dean of the School of Engineering.

JAMES GEORGE KNUDSEN, Ph.D., Assistant Dean.

FREDRICK JOSEPH BURGESS, M.S., Assistant to the Dean.

MARVIN REYNOLDS HAITH, B.S., Personnel and Placement Officer.

Agricultural Engineering: Professors RODGERS (department head), CROFSEY, LUNDE, SINARD; Associate Professors KIRK, LONG, PAGE, WOLFE; Assistant Professors BOOSTER, CHRISTENSEN; Instructor WATTS.

Chemical Engineering: Professors WALTON (department head), Associate Professors RATCLIFF, WICKS; Assistant Professors JOST, MEREDITH, MRAZEK; Instructor MEYER.¹

Civil Engineering: Professors HOLCOMB (department head), BEHLKE, BURGESS, COOPEY, MCCLELLAN, MERRYFIELD; Associate Professors BEECROFT, BELL, KOFOLD, NORTHCRAFT, PAN; Assistant Professors PHILLIPS, PRITCHETT, SCHULTZ, SLOTTA; Instructors MATTHIAS, SEADERS.

Electrical Engineering: Professors L. N. STONE (department head), ALBERT, COCKERLINE (emeritus), FEIKERT, P. C. MAGNUSON; Associate Professors ENGLE, MICHAEL, OORTHUYS, WEBER; Assistant Professors ALEXANDER, AMORT, JENSEN, LOONEY, S. A. STONE; Instructors DUNLAP, EWING, LEABO, W. G. MAGNUSON.

Engineering Physics: Professor E. A. YUNKER (department head).

General Engineering: Professors RICHARDSON (department head), WILLEY (emeritus); Associate Professors CAMPBELL, GRAY, JARVI; Assistant Professors BUCY, CROFF, GARRARD, JENSEN, PARKINSON (emeritus), STATON.

Mechanical and Industrial Engineering: Professors SLEGEL (department head), ENGESSER, GRAF (emeritus), HEATH, HUGHES, MARTIN (emeritus), PAASCHE, PAUL, PHILLIPS (emeritus), THOMAS (emeritus); Associate Professors DALY, LARSON, OLLEMAN, RIGGS, C. E. SMITH, W. W. SMITH, THORNBURGH, WELTY, WILSON; Assistant Professors BOUBEL,¹ GELLER, JOHNSON, McCLURE, MINGLE, ZAWORSKI; Instructor EDELMAN.

Production Technology: Professors SHEELY (department head), COX (emeritus); Associate Professors FRAZIER, MEYER (emeritus), ROBLEY, WILLIAMSON;¹ Assistant Professors HOEYE, JOHNSON (emeritus), LABAUN, RIESLAND, WILSON; Instructors COLE, LOVE.

General Statement

ENGINEERS APPLY SCIENCE. They apply scientific knowledge and principles to the design and operation of machines, to the selection of materials, and to the use of men, money, and energy. Engineering, therefore, is known as "applied science."

Men and women trained in engineering have numerous job opportunities since a continuing demand exists for personnel trained in design, research, and development. Companies search constantly for men and women capable of assuming important positions in production, operation, and construction and there are opportunities in consulting, maintenance, sales, service, and administrative work. Salaries and rate of advancement compare favorably with other recognized professions. Personal characteristics of initiative, patience, thoroughness, orderliness, accuracy, persistence, and reliability are unusually well rewarded.

A young man or woman who plans to enter the profession of engineering must have a comprehensive knowledge of the basic sciences, particularly mathematics, physics, and chemistry. A student should begin mastery of this knowledge in high school by taking the maximum number of courses available in these subjects.

To succeed in the study of engineering in college, students should be from the upper two-thirds of their high school graduating classes. They should have

¹ On leave 1962-63.

demonstrated proficiency in mathematics, the physical sciences, and English. They should also have an interest in material things and a patient, sustained enthusiasm for working hard at difficult tasks.

Because engineering is a job of *heads* rather than *hands*, a person taking engineering must develop habits of problem solving which result in some final plan or design, or procedure, or method. Many professions other than engineering involve problem solving. An engineering education, therefore, serves purposes other than those of the professional engineer. The educational pattern is strong and rigorous, compatible with the technical aspects of modern society, providing sound preparation for many pursuits other than engineering.

Professional engineering practice is regulated by state laws. A professional engineer must have a license from the state in which he practices. To obtain such a license he must show that he has had satisfactory engineering education and practical experience. The Engineers' Council for Professional Development periodically inspects and evaluates college courses in engineering to make sure that they meet the standards of the profession. Once a curriculum of a school of engineering passes this inspection it becomes "accredited"; it keeps this rating as long as it maintains high standards. Satisfactory completion of such an accredited curriculum—that is, graduation from an accredited school of engineering—is almost everywhere a requisite for a state license or a civil service appointment.

Departments and Options. The School of Engineering is divided into several departments. With the exception of production technology students, all freshmen are enrolled in a common freshman year, but in the department of their choice as a major. Selection is made from among the several curricula of agricultural, chemical, civil, electrical, general, industrial, or mechanical engineering, or engineering physics. In many of the departments, various options are available which provide opportunity for specialization in secondary areas during the senior year. Four or more years, including the freshman year, are necessary to complete the requirements for a first (B.S.) degree.

Careful examination of the curricula of all departments will show core patterns comprised of basic science, engineering science, and humanities and social science subjects. The major difference between curricula is the departmental subject matter of the junior-senior years which approximates one-fourth of the total credits. Accordingly, undergraduate studies are essentially basic or fundamental in nature. Specialization is largely reserved for graduate programs at the M.S., Ph.D., or professional degree levels.

Associated with engineering, but not an engineering curriculum, is a course of study, production technology, in which only the B.S. degree is offered. In this curriculum a student has a choice of one of two options: building construction, or manufacturing. This training leads to positions in the manufacturing industries associated with mass-production procedures or light or medium construction. Freshman students who elect production technology as a major report directly to the Department.

Advisement. Each student in the School is assigned to a faculty adviser. Details of procedure, registration, course selection, professional opportunities, personal requirements, academic regulations, and so forth, should be discussed with the adviser. Entering students whose backgrounds are weak, particularly in mathematics and English, will be advised to enroll in refresher work prior to attempting a regular course pattern. Transfer students from nonaccredited institutions may be required to complete an examination in the field of their major to establish their ability to engage in courses at the level indicated by

their prior academic record. The School of Engineering relies upon prior advisement at the secondary school level and, in the case of transfer students, at the college level for basic preparation rather than upon the stipulation of specific course requirements for admission.

Because of the technical and professional requirements of engineering curricula patterns, and in instances above the minimum requirements of the University, the Administration of the School of Engineering reserves the right of final judgment and decision in matters of admission, retention, reinstatement, placement, and transfer of students. A listing of policies as related to professional curricula may be obtained from the office of the Dean of Engineering.

Double Degrees. Many students wish to major in more than one area. It is possible to meet the requirements for more than one degree, either within or outside of the School. The additional degree generally involves extension of time beyond four years. Persons interested in second degrees are referred to section on DEGREES AND CERTIFICATES, particularly the section *Requirements for Bachelor's Degree*, in the GENERAL INFORMATION section.

Requirements for Advanced Degrees. Advanced degrees of Master of Science, Master of Arts, and Doctor of Philosophy are offered in the several departments. Programs for advanced degrees are developed to satisfy the interests and objectives of the individual candidate. General regulations and requirements for all advanced degrees, including professional degrees, are printed under GRADUATE SCHOOL.

Placement. The School of Engineering maintains an organized, central placement office under the immediate direction of the dean of the school. The service of the placement office is available to industrial organizations, undergraduate and graduate students, and alumni. Services are not restricted to engineering, but are available to all associated fields including chemistry, mathematics, physics, and business and technology.

Curricula in Engineering and Production Technology

*B.A., B.S., M.A., M.Bioeng., M.Eng., M.Mat.Sc., M.S.,
A.E., Ch.E., C.E., E.E., I.E., M.E., Min.E., Ph.D. Degrees*

*agricultural engineering
chemical engineering
civil engineering*

*electrical engineering
engineering physics
general engineering*

*industrial engineering
mechanical engineering
production technology*

Freshman Year

Common to agricultural, chemical, civil, electrical, general, and mechanical and industrial engineering, and engineering physics.

	Term hours		
	F	W	S
¹ Engineering Orientation (GE 101,102,103).....	2	2	2
Algebra and Trigonometry (Mth 104)	4	.....	.....
Calculus (Mth 200,201) .....	.....	4	4
General Physics (Ph 207,208,209)	4	4	4
General Chemistry (Ch 201,202,203)	3	3	3
English Composition (Wr 111,112,113)	3	3	3
Defense education or other elective.....	1-3	1-3	1-3
Physical education and general hygiene	1	1	1

Sophomore Year Norm

Calculus (Mth 202,203)	4	4	.....
Applied Differential Equations (Mth 321) .....	.....	.....	3
Defense education or other elective.....	1-3	1-3	1-3
Physical education	1	1	1

¹ GE 101,102,103 will be taught in each department. Students will register in the proper section corresponding to their major.

Agricultural Engineering*E.C.P.D. Accredited*

Sophomore Year		Senior Year	
	Hours		Hours
Sophomore year norm	17	Thermodynamics (GE 311,312,313).....	9
Mechanics of Solids (GE 211,212,213)....	9	Power Farming Machinery (AE 491).....	3
Electrical Fundamentals (GE 201,202,203).....	9	Rural Electrification (AE 431).....	3
Farm Mechanics (AE 221).....	3	Farm Structures (AE 461).....	3
Humanities and social science	9	Soil and Water Conservation (AE 471)..	3
General Botany (Bot 201).....	3	Seminar (AE 407).....	21
		¹ Restricted electives	21
		² Unrestricted electives	9
Junior Year			
	Hours		
Mechanics of Fluids (GE 301,302).....	6		
Engines and Tractors (AE 311).....	3		
¹ Restricted electives	21		
Seminar (AE 407).....	1		
Soils (Sls 210).....	5		
Physical Geology (G 200).....	3		
² Unrestricted electives	9		

¹Restricted electives by departmental advisement of subjects necessary to complete either the power and machinery or soil and water options.

²Nine term hours of social science must be completed within the unrestricted electives.

Chemical Engineering*E.C.P.D. Accredited*

Sophomore Year		Senior Year	
	Hours		Hours
Sophomore year norm	17	Unit Operations (ChE 411,412).....	6
Organic Chemistry (Ch 334,335,336,337,338,339).....	15	Chemical Engineering Laboratory (ChE 414,415).....	6
Mechanics of Solids (GE 211,212,213)....	9	Chemical Engineering Calculations (ChE 425,426).....	6
Stoichiometry and Thermodynamics (ChE 211,212,213).....	6	Instrumental Analysis (Ch 421).....	4
Electives	9	Thermodynamics and Stage Processes (ChE 461).....	3
		Chemical Engineering Economics (ChE 442).....	2
		Chemical Process Kinetics (ChE 443)....	2
		Chemical Plant Design (ChE 432).....	3
		¹ Unrestricted electives	9
		² Restricted electives	7
		Field trip	0
Junior Year			
	Hours		
Chemical Engineering Problems (ChE 325,326,327).....	3		
Electrical Fundamentals (GE 201,202,203).....	9		
Thermodynamics (GE 311,312,313).....	9		
Transfer and Rate Processes (GE 331,332,333).....	9		
Physical Chemistry (Ch 440,441,442)....	9		
¹ Unrestricted electives	9		
Field trip	0		

¹Nine term hours of social science must be completed within the unrestricted electives.

²Restricted elective subject matter upon advisement with departmental faculty.

Civil Engineering*E.C.P.D. Accredited*

Sophomore Year		Senior Year	
	Hours		Hours
Sophomore year norm	17	Hydrology (CE 411).....	3
Plane Surveying (CE 221,223).....	6	Hydraulics (CE 412).....	3
Civil Engineering Drawing (CE 231)....	3	Highway Engineering (CE 421).....	3
Electrical Fundamentals (GE 201,202,203).....	9	Sanitary Engineering (CE 451,452).....	6
Mechanics of Solids (GE 211,212,213)....	9	Foundations (CE 472).....	3
Social science or humanities.....	9	Structural Engineering (CE 481,482,483)	9
		Indeterminate Structures (CE 485).....	3
		¹ Unrestricted electives	9
		² Restricted electives	12
		Seminar (CE 407).....	1
Junior Year			
	Hours		
Soil Mechanics (CE 372).....	3		
Structural Theory (CE 381,382,383)....	9		
Reinforced Concrete (CE 384).....	3		
Mechanics of Fluids (GE 301,302).....	6		
Thermodynamics (GE 311,312,313).....	9		
Modern physics	3		
¹ Unrestricted electives	12		

¹Nine term hours of social science or humanities must be completed within the unrestricted electives.

²Restricted elective subject matter upon advisement with departmental faculty.

Electrical Engineering

E.C.P.D. Accredited

Sophomore Year		Senior Year	
	Hours		Hours
Sophomore year norm	17	Electrical Engineering Economy (EE 411)	3
Electrical Fundamentals (GE 201,202, 203)	9	Transmission Systems (EE 421,422)	6
¹ General engineering elective	9	Seminar (EE 407)	3
Physical science elective	9	² Departmental electives	9
Humanities or social science elective.....	9	¹ General engineering elective	9
		Humanities or social science elective.....	9
		² Unrestricted elective	9
		Field trip	0
Junior Year			
	Hours		
Fields and Energy Conversion (EE 311,312,313)	12	¹ Elected upon advisement with departmental faculty from Mechanics of Solids, Mechanics of Fluids, Thermodynamics, Nature and Behavior of Materials, and Transfer and Rate Processes.	
Circuits and Electronics (EE 321,322, 323)	12	² Nine term hours of social science must be included, if not previously completed.	
¹ General engineering elective	9	³ Electives from communications, control, or power engineering.	
Seminar (EE 407)	1		
Mathematics (Mth 322,323)	6		
² Unrestricted electives	12		

Engineering Physics

Students electing the curriculum in engineering physics register as sophomores under the School of Engineering in the Department of Physics by cooperative arrangement.

Sophomore Year		Senior Year	
	Hours		Hours
Sophomore year norm	17	Atomic and Nuclear Physics (Ph 474, 475,476)	9
Introductory Modern Physics (Ph 311,312,313)	9	Introduction to Field Theory (Ph 477, 478,479)	9
Electrical Fundamentals (GE 201,202, 203)	9	Nature and Behavior of Materials (GE 321,322,323)	9
Humanities or social science	9	¹ Restricted electives	12
¹ Restricted electives	10	² Unrestricted electives	9
Junior Year			
	Hours		
Geometrical and Physical Optics (Ph 465,466)	6	¹ Restricted elective subject matter upon advisement of departmental faculty.	
² Electronics (Ph 430)	3	² May be omitted if Ph 437,438,439 is taken as an elective.	
Thermodynamics (GE 311,312,313)	9	³ Nine term hours of social science must be completed within the unrestricted electives if not previously completed.	
Mechanics of Solids (GE 211,212,213)	9		
Mathematics (Mth 322,323)	6		
Elementary Physical Chemistry (Ch 340)	3		
³ Unrestricted electives	12		

General Engineering

Sophomore Year		Senior Year	
	Hours		Hours
Sophomore year norm	17	Analysis and Design (GE 411,412,413) ..	9
Mechanics of Solids (GE 211,212,213) ..	9	³ General engineering elective	9
Electrical Fundamentals (GE 201,202, 203)	9	Seminar (GE 407)	1
Introductory Modern Physics (Ph 311,312,313)	9	Humanities and social sciences	9
¹ Restricted electives	9	¹ Restricted electives	11
		² Unrestricted electives	9
Junior Year			
	Hours		
Thermodynamics (GE 311,312,313)	9	¹ Restricted elective subject matter by advisement with departmental faculty. A consistent program with a specific objective must be established at the sophomore year level and consistently followed through the junior and senior years in a total of 48 term hours.	
³ General engineering elective	9	² Nine term hours of social science must be completed within the unrestricted electives unless previously completed.	
¹ Restricted electives	21	³ Either Nature and Behavior of Materials or Transfer and Rate Processes or Fluid Mechanics.	
² Unrestricted electives	9		

Mechanical and Industrial Engineering

Mechanical Engineering
E.C.P.D. Accredited

Sophomore Year		Senior Year	
	Hours		Hours
Sophomore year norm	17	Mechanical Analysis and Design (ME 411,412,413)	9
Mechanics of Solids (GE 211,212,213)	9	Mechanical Laboratory (ME 437)	3
Electr Fundamentals (GE 201,202,203)	9	Mechanical Engineering Economy (ME 460)	3
Manufacturing Processes (PT 262)	3	Seminar (ME 407)	1
Modern Physics (Ph 213)	3	² Restricted electives	21
Elective in science or mathematics	3	³ Unrestricted electives	9
Humanities and social science	9		
Junior Year			
	Hours		
Mechanical Laboratory (ME 351)	3		
Engineering Analysis (ME 371)	3		
Engineering Mechanics (ME 301,302)	6		
Thermodynamics (GE 311,312,313)	9		
Nature and Behavior of Materials (GE 321,322,323)	9		
Transfer and Rate Processes (GE 331, 332)	6		
¹ Restricted electives	6		
³ Unrestricted electives	9		

¹Restricted elective subject matter upon advisement with departmental faculty.

²Not less than nine term hours to be in one of the following areas: general mechanical engineering, automotive, aeronautical, or nuclear engineering, metallurgy, or applied mechanics.

³Nine term hours of social science must be completed within the unrestricted electives.

Industrial Engineering
E.C.P.D. Accredited

Sophomore Year		Senior Year	
	Hours		Hours
Sophomore year norm	17	Analysis and Design (IE 497,498,499) ..	9
Mechanics of Solids (GE 211,212,213) ..	9	Nature and Behavior of Materials (GE 321,322,323)	9
Electr Fundamentals (GE 201,202,203) ..	9	¹ Restricted electives	18
Manufacturing Processes (PT 262)	3	² Unrestricted electives	9
Computer Coding (Mth 351)	3	Field trip	0
Humanities and social science	9		
Junior Year			
	Hours		
Systems Analysis (IE 371,372,373)	9		
³ Mass Production Methods (PT 361)	4		
Engineering Economy (IE 391,392)	6		
Mathematics (Mth 341,361,362,363)	12		
Operations Research (St 471,472,473)	9		
Transfer and Rate Processes (GE 331, 332)	6		
³ Unrestricted electives	9		
Field trip	0		

¹Restricted elective subjects upon advisement with departmental faculty.

²Nine social science term hours must be completed within the unrestricted electives if not previously completed.

Production Technology

Basic Curriculum

Freshman Year	Hours	Sophomore Year	Hours
Furniture Technology (PT 111)	4	Engineering Graphics (GE 115,116,117) ..	9
Building Construction Technology (PT 121)	4	General Chemistry (Ch 101)	3
Foundry Practices (PT 141)	4	General Physics (Ph 201,202)	8
Forging and Welding (PT 151)	4	Outlines of Economics (Ec 212)	3
Machine Tool Practices (PT 161)	4	Economic Development of the United States (Ec 215)	3
Engineering Fundamentals (GE 104)	4	American Governments (PS 201)	3
Intermediate Algebra (Mth 100)	4	Extempore Speaking (Sp 111)	3
Mathematics (Mth 101,102)	8	Business English (Wr 214)	3
English Composition (Wr 111,112,113) ..	9	Tech Report Writing (Wr 227)	3
PE and general hygiene	3	¹ Restricted electives	7
Defense education or electives	3	Physical education	3
		Defense education or electives	3

¹ Restricted elective subject matter upon advisement with departmental faculty.

Junior Year		Senior Year	
	Hours		Hours
Work Simplification (PT 395)	4	Industrial Supervision Principles (PT 490)	4
Value Analysis (PT 396)	4	Field trip	0
Production Planning and Control (PT 397)	4	Business Law (BA 411, 412, or 413)	6
Field trip	0	Practical Psychology (Psy 212)	3
Fundamentals of Accounting (BA 214, 215)	6	Money and Banking (Ec 424)	4
Cost Accounting (BA 421)	3	Labor Problems (Ec 425)	4
¹ Restricted electives	21	¹ Restricted electives	21
Defense education or other electives	9	Defense education or other electives	9

Agricultural Engineering

The curriculum in agricultural engineering is planned to prepare students for positions in the major fields of agricultural engineering: power and machinery, rural electrification, farm structures, soil and water control and conservation, and crop processing. The curriculum is planned also to give the student general training in agriculture since a sympathetic understanding of the problems of agriculture is essential to anyone going into agricultural engineering. The Department of Agricultural Engineering is a joint department within the School of Engineering and the School of Agriculture.

Facilities are provided in the Agricultural Engineering Building for teaching and experimental work in the major fields. Modern equipment and demonstration materials are loaned to the institution by leading manufacturers and distributors for study and operation by the student. The power and motor vehicle laboratories are well equipped with modern tools and testing equipment including an engine-testing dynamometer. Well lighted drafting rooms with modern equipment are available to students studying farm structures. Numerous samples of building materials, models, modern farm buildings, farm water systems, centrifugal and turbine pumps, and sprinkler irrigation equipment are available for instruction purposes.

Lower Division Course

AE 221. Farm Mechanics. 3 hours. 1 ① 2 ③
 Hand and power tools for wood and metal working, arc and acetylene welding; construction of wood and metal farm appliances; concrete work.

Upper Division Courses

AE 311. Engines and Tractors. 3 hours any term. 2 ① 1 ③
 The internal combustion engine as used in agriculture. Gasoline and diesel engine principles, construction; parts, accessories, lubrication, and fuels. Tractor design and construction. Prerequisite: Ch 103 and Ph 212. Cannot be taken for credit if student has had AE 312. (See AGRICULTURE.)

AE 313. Motor Vehicles. 3 hours any term. 1 ① 2 ③
 Preventive maintenance procedures for automotive equipment. Maintenance schedules, lubrication, adjustments, engine tuneup, carburetion, brake service, chassis and accessory unit repairs. Prerequisite: AE 311 or 312.

AE 314. Motor Vehicles. 3 hours spring. 2 ① 1 ③
 Precision diagnostic, test, and repair equipment and tools for automotive vehicle maintenance. Engine and other major unit rebuilding procedures; electrical systems. Prerequisite: AE 313.

AE 401. Research. Terms and hours to be arranged.

AE 405. Reading and Conference. Terms and hours to be arranged.

¹ Restricted electives upon advisement with department faculty.

- AE 406. **Projects.** Terms and hours to be arranged.
- AE 407. **Seminar.** Terms and hours to be arranged.
- AE 431. **Rural Electrification.** (g) 3 hours winter. 2 ① 1 ③
Electrical codes, electric motors and motor controls. Application of electricity to agricultural loads. Prerequisite: GE 203 or equivalent.
- 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: GE 213 and GE 312.
- AE 465. **Building Cost Estimating.** (g) 3 hours spring. 2 ① 1 ②
Complete and approximate estimates; establishing unit prices; quantity surveying; overhead costs and profit estimates; specifications interpretations; estimates for separate contracts and subcontracts. Prerequisite: AA 179 or AE 361 or AE 461.
- AE 471. **Soil and Water Conservation.** (g) 3 hours fall. 3 ①
Irrigation, drainage, and erosion control, including fluid flow in saturated soil; evaporation and consumptive use; soil erosion; water control structures and channels. Prerequisite: GE 302.
- AE 472. **Drainage Engineering.** (g) 3 hours winter. 2 ① 1 ③
Surface and subsurface farm drainage systems; investigating drainage problems; erosion control structures; small earth dams. Prerequisite: AE 471.
- 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; selection and testing of pumping equipment. Prerequisite: AE 471.
- AE 491. **Power Farming Machinery.** (g) 3 hours fall. 2 ① 1 ③
Modern power farming equipment; operation, maintenance, and adjustment. Prerequisite: AE 311; GE 213.
- AE 492,493. **Agricultural Machine Design.** (g) 3 hours winter and spring. 1 ① 2 ③
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.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G)
may be taken for graduate credit.

- AE 501. **Research.** Terms and hours to be arranged.
- AE 503. **Thesis.** Terms and hours to be arranged.
- AE 505. **Reading and Conference.** Terms and hours to be arranged.
- AE 506. **Projects.** Terms and hours to be arranged.
- AE 507. **Seminar.** Terms and hours to be arranged.
- AE 508. **Workshop.** Terms and hours to be arranged.
- AE 515. **Agricultural Machine Applications and Methods.** 3 hours winter 2 ① 1 ③
Application of machines to changing agricultural methods; mechanization and labor economy; labor-saving equipment and applications; hydraulic control systems; specialty crop machines. Offered alternate years. Not offered 1963-64.
- AE 520. **Ground Water.** 3 hours spring. 3 ①
Occurrence, development, and conservative use for irrigation; permeability; flow of water into wells; ground water hydrology. Prerequisite: Mth 322; AE 471. Students who do not have prerequisite must have consent of instructor. Offered alternate years. Offered 1963-64.

- AE 525. **Processing Equipment for Agricultural Products.** 3 hours fall. 2 ① 1 ③
 Fundamental theory and applications of various methods and equipment. Offered alternate years. Offered 1963-64.
- 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. Offered alternate years. Not offered 1963-64.

Chemical Engineering

The chemical engineering curriculum provides both the undergraduate and graduate student a background of fundamental, scientific knowledge which will prepare him for any job in his profession. These positions include research and development, design, technical service, plant operation, technical sales, or graduate work beyond the bachelor's degree. Petroleum and petrochemicals, plastics, heavy chemicals, aircraft, missiles, fuels, and many other industries require chemical engineers in laboratory research and administrative positions.

In the four-year curriculum, the important elective social and humanistic subjects are interspersed with science and engineering courses. Courses in English composition are required and other open electives are selected by the student according to his individual preferences. Mathematics, including use of computers, is an important part of engineering training and the student will be expected to complete the equivalent of one full year of mathematics beyond calculus during his four years.

It is becoming increasingly important that those students who plan to work in industrial research laboratories or to enter the teaching profession should continue with graduate work beyond the bachelor's degree. To this end the department has an active graduate program permitting outstanding students to continue work toward the M.S. and Ph.D. degrees. Thesis data are frequently correlated and analyzed using the Oregon State computers.

Courses in Chemical Engineering

Lower Division Courses

- ChE 211,212,213. **Stoichiometry and Thermodynamics.** 2 hours each term. 1 ① 1 ②
 Heat and material balances. Basic thermodynamic relationships; energy balances, and thermo-physical calculations.

Upper Division Courses

- ChE 325,326,327. **Chemical Engineering Problems.** 1 hour each term. 1 ②
 Mass, heat, momentum, and electrical energy transfer phenomena; equilibrium and non-equilibrium systems.
- Met 331,332,333. **Metallurgy.** 3 hours each term. 1 ① 2 ②
 Physical and extractive metallurgy; behavior and production of metals; metallurgical calculations. Prerequisite: Mth 203.
- ChE 401. **Research.** Terms and project to be arranged.
- ChE 403. **Thesis.** Terms and hours to be arranged.
- ChE 405. **Reading and Conference.** Terms, hours, and subject to be arranged.

- ChE 406. **Projects.** Terms and hours to be arranged.
- ChE 407. **Seminar.** 1 hour any term. 1 ①
- ChE 411,412. **Unit Operations.** (g) 3 hours fall and winter. 1 ① 2 ②
Mass. momentum, and heat transfer operations; basic transport equations.
- 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 or parallel: ChE 411.
- ChE 425,426,427. **Chemical Engineering Calculations** (G) 3 hours each term. 3 ①
Mathematical analysis; setting up differential equations; special methods of solving problems. Prerequisite: ChE 327.
- ChE 432. **Chemical Plant Design.** (g) 3 hours. 2 ① 1 ②
Design of plants and chemical engineering equipment. Reports required. Prerequisite or parallel: ChE 412.
- ChE 442. **Chemical Engineering Economics.** (g) 2 hours. 1 ① 1 ②
Chemical processing; optimization of operations; depreciation and replacement policy; payout time on plant investment; operating costs and profit margins.
- ChE 443. **Chemical Process Kinetics.** (g) 2 hours. 1 ① 1 ②
Reaction rate; competing reactions; batch and continuous systems; reactor design; catalysis.
- ChE 450. **Principles of Nuclear Engineering.** (g) 3 hours. 2 ① 1 ③
Nuclear reactions and radiations: reactor technology and design, fuels and by-products, waste handling, and nuclear instrumentation. Laboratory experiments show principles, operation, and application of particles with engineering materials, and operation, characteristics, and application of a nuclear critical reactor. Prerequisite: GE 313; modern physics.
- ChE 452,453. **Nuclear Processes.** (g) 3 hours each term. 2 ① 1 ②
Their effect on engineering materials; chemical processing of radioactive material; interaction of nuclear radiation with materials used in chemical process industries and in construction.
- ChE 461. **Thermodynamics and Stage Processes.** (g) 3 hours. 3 ①
Duhem, Redlick-Kister, Van Laar, and other thermodynamic expressions related to distillation, absorption, adsorption, and other processes involving mass transfer.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- ChE 501. **Research.** Terms and hours to be arranged.
- ChE 503. **Thesis.** Terms and hours to be arranged.
- ChE 505. **Reading and Conference.** Terms and hours to be arranged.
- ChE 506. **Projects.** Terms and hours to be arranged.
- ChE 507. **Seminar.** Terms and hours to be arranged.
- ChE 512. **Economic Balance.** 3 hours. 3 ①
Typical chemical engineering and applied chemistry problems from the standpoint of economic considerations; design and operation.
- ChE 514. **Fluid Flow.** 3 hours. 2 ① 1 ②
Momentum transfer and related theory; special attention to recent literature.
- ChE 520,521. **Diffusional Operations.** 3 hours fall and spring. 2 ① 1 ②
Mass transfer at an advanced level; treatment of multicomponent mixtures and azeotropes.

- ChE 522. **Heat Transmission.** 3 hours. 2 ① 1 ②
Mechanisms of transference of heat energy; transport theory.
- ChE 531,532,533. **Electrochemical Engineering.** 3 hours each term. 2 ① 1 ②
Fuel cells; electro-organic reactions; electro-dialysis and electro-winning; mass transfer and polarization; fused salt electrolysis; cell analogies; theory of electrolytic conduction; electrochemistry in non-aqueous solvents; current distribution.
- ChE 537,538. **Chemical Engineering Thermodynamics.** 3 hours each term. 2 ① 1 ②
Theory and laws governing energy transformations, phase equilibria, nonideal systems, and activities of electrolytes.
- ChE 539. **Thermodynamics of Irreversible Processes.** 3 hours. 3 ①
Non-equilibrium systems with finite potential differences but restricted to time invariance; entropy production in such systems.
- ChE 540. **Applied Reaction Kinetics.** 3 hours. 2 ① 1 ②
Fundamental theories of reaction kinetics and catalysis; design of reaction vessels.

Civil Engineering

The curriculum in civil engineering is organized to train young men in those principles of engineering science and technology that are basic and common to the fields of geodesy and surveying, highways, railroads, irrigation and drainage, river and harbor improvements, structures, hydraulics, sanitation, water supply, and municipal engineering, and to permit latitude of choice in the four general fields of structures, hydraulics, sanitation, and highways. The curriculum is planned to prepare graduates for advancement to responsible positions.

Lower Division Courses

- CE 221,223. **Plane Surveying.** 3 hours each term. 1 ① 2 ③
Fall: Engineer's survey instruments, errors of measurement. *Spring:* Stadia plane table, land surveys, field astronomy. Prerequisite: Mth 104.
- CE 224,225. **Surveying for Landscape Architecture Students.** 3 hours each term. 1 ① 2 ③
Use of engineer's level, tape, and transit in planning and layout of projects; topographic mapping; use of engineer's transit and telescopic alidade in making stadia surveys; plane table; making and using topographic data.
- CE 226. **Plane Surveying.** 3 hours. 1 ① 2 ③
Use of engineer's transit, tape, and level; surveying methods applied to problems in construction and area survey. Prerequisite: Mth 102.
- CE 231. **Civil Engineering Drawing.** 3 hours. 1 ① 2 ③
Graphic language and descriptive geometry.

Upper Division Courses

- CE 311. **Highway Location and Geometric Design.** 3 hours. 2 ① 1 ③
Traffic routes and facilities. Design and layout of horizontal and vertical alignment, route cross sections and intersections. Prerequisite: CE 223.
- CE 312,313. **Photogrammetric and Control Surveying.** 3 hours each term. 2 ① 1 ③
Winter: Principles, theory, and applications of photogrammetry to civil engineering projects. *Spring:* Control surveys, map projections, and coordinate systems. Prerequisite: CE 222.
- CE 322. **Elementary Hydraulics.** 3 hours. 2 ① 1 ③
Pressure and flow of water; laboratory measurements. For students in Mechanical Technology in Agriculture. Prerequisite: Mth 200.

- CE 362. **Modern Construction Methods.** 2 hours. 1 ① 1 ③
Equipment and performance factors, plant selection, productivity, and costs.
- CE 372,373. **Soil Mechanics.** 3 hours each term. 2 ① 1 ③
Settlement, analysis, slope stability, lateral pressure, composition, and stabilization. Prerequisite: CE 213,312.
- CE 381,382,383. **Structural Theory.** 3 hours each term. 2 ① 1 ③
Fall: Beam deflection, redundant structures, combined stress, and columns. *Winter and Spring:* Structural members and frames. Prerequisite: Mth 203; GE 212.
- CE 384. **Reinforced Concrete.** 3 hours. 2 ① 1 ③
Theory and design of reinforced concrete elements. Prerequisite: CE 382.
- CE 401. **Research.** Terms and hours to be arranged.
- CE 403. **Thesis.** Terms and hours to be arranged.
- CE 405. **Reading and Conference.** Terms and hours to be arranged.
- CE 406. **Projects.** Terms and hours to be arranged.
- CE 407. **Seminar.** 1 hour. 1 ①
- CE 411. **Hydrology.** 3 hours. 1 ① 2 ②
Precipitation, storage, and runoff; field studies in standard methods of measurement. Prerequisite: GE 302.
- CE 412. **Hydraulics.** 3 hours. 1 ① 2 ②
Reservoirs, dams, spillways and outlet works, open channels, water hammer, pipe networks, hydraulic machinery, economic aspects of hydraulic projects, water law. Prerequisite: GE 302.
- CE 414. **Sanitary Water Measurements.** (g) 3 hours. 1 ① 2 ③
Sanitary quality and quantity of domestic wastes and of streams. Primarily for biology students, particularly those majoring in fisheries. Prerequisite: Ch 103; Bac 204; FG 276.
- CE 421,422. **Highway Engineering.** (g) 3 hours each term. 2 ① 1 ③
Highway and street design; theory of pavement design, subgrade treatments, drainage design, highway planning, traffic surveys, highway economics and finance. Prerequisite: senior standing.
- CE 424. **Highway Materials.** (g) 3 hours. 1 ① 2 ③
Characteristics and behavior, typical pavement mixtures. Prerequisite: CE 372.
- CE 425. **Pavement Structures.** (G) 3 hours. 2 ① 1 ③
Design for streets, highways, and airports. Prerequisite: CE 372,384.
- CE 433. **Hydraulic Machinery.** 3 hours. 1 ① 2 ②
Theory, operation, characteristics, efficiency, design, and installation of pumps and turbines; laboratory studies. Prerequisite: GE 302.
- CE 451,452,453. **Sanitary Engineering.** (g) 3 hours each term. 2 ① 1 ③
Domestic and industrial water supply and waste disposal collection, storage, pumping, and treatment facilities. Prerequisite: GE 302.
- CE 460. **Civil Engineering Economy.** 3 hours. 3 ①
Time value of money; economic study techniques of construction, retirement, and replacement of civil engineering structures. Prerequisite: senior standing.
- CE 463. **Estimating and Contracts.** (g) 4 hours. 3 ① 1 ③
Quantity surveying; unit prices, subcontracts, overhead costs, profits; principles and laws of contracts applied to engineering. Prerequisite: 421,451,481.
- CE 472. **Foundations.** (g) 3 hours. 2 ① 1 ③
Foundations for engineering structures. Prerequisite: CE 372,384.
- CE 481,482,483. **Structural Engineering.** (g) 3 hours each term. 2 ① 1 ③
Steel, timber, and concrete structures; elastic and plastic design, and detail problems. Prerequisite: CE 383,384.

CE 485,486. **Indeterminate Structures.** (g) 3 hours each term. 2 ① 1 ③
Elastic deflections and stress analysis. Prerequisite: CE 383.

CE 489. **Building Design.** (g) 3 hours. 1 ① 2 ③
Building elements constructed of steel, reinforced concrete, timber, and miscellaneous building materials; fabrication and construction. Prerequisite: CE 472,481.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

CE 501. **Research.** Terms and hours to be arranged.

CE 503. **Thesis.** Terms and hours to be arranged.

CE 505. **Reading and Conference.** Terms and hours to be arranged.

CE 506. **Projects.** Terms and hours to be arranged.

CE 507. **Seminar.** Terms and hours to be arranged.

CE 517,518,519. **Soil Mechanics.** 3 hours each term. 3 ①
Fall: Basic soil mechanics; permeability; seepage and seepage forces; consolidation and one dimensional settlement. *Winter and Spring:* Stress in soil systems; shear strength; stability of slopes and retaining wall; active and passive lateral pressures.

CE 520. **Measurement of Water.** 3 hours. 3 ①
Measurement of flowing water by means of weirs, orifices, venturi meters, pitot tubes, current meters, bends, salt-velocity, and Parshall flumes.

CE 521,522,523. **Fluid Mechanics.** 3 hours each term. 3 ①
Dimensional analysis; principles of energy, continuity and momentum; boundary layer theory; unsteady flow in pipes.

CE 525. **River Control and Utilization.** 3 hours. 3 ①
Controlling flood flow in streams; design of dikes, shore protection facilities, retarding and impounding basins; laws of similitude; hydraulic models. Prerequisite: CE 522.

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 521.

CE 527,528. **Hydrology.** 3 hours each term. 3 ①
CE 527: Weather, climate, precipitation, evaporation, transpiration, stream flow, basin analysis, overland flow, sedimentation, ground water. *CE 528:* Statistical methods, runoff relations, runoff distribution, waves and flood routing, frequency analysis, design problems, project operations, flood forecasting. Prerequisite: CE 411.

CE 529. **Seepage and Ground Water.** 3 hours. 3 ①
Solution of problems covering theory of ground-water flow; graphical solution by flow net analysis; flow through dams and levees; flow toward wells and wellpoint systems; base course drainage. Prerequisite: CE 521.

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 531,532,533. **Analysis and Design of Engineering Structures.** 3 hours each term. 3 ①
Fall: Stress analysis of statically indeterminate frameworks. *Winter and Spring:* Analysis and design of steel and concrete structures. Prerequisite: CE 483,485.

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. Prerequisite: CE 313,485.

CE 535. **Prestressed Concrete.** 3 hours. 3 ①
Analysis and design of structural elements; systems of prestressing, material specifications, stress analysis, linear and circular prestressing, economics. Prerequisite: CE 384.

- 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. Prerequisite: CE 483,485.
- CE 538. **Plate and Shell Structures.** 3 hours. 3 ①
Deflection and stress analysis; analysis, design and construction. Prerequisite: CE 534.
- CE 540,541,542. **Sanitary Engineering Design.** 3 hours each term. 3 ①
Fall: Unit operations. *Winter:* Water and waste water systems. *Spring:* Water and waste water treatment plants.
- CE 543. **Stream Purification.** 3 hours. 3 ①
Study of stream pollution, oxygen sag, reaeration, and their effects. 1 ① 2 ③
- CE 544,545,546. **Sanitary Engineering Analysis.** 3 hours each term. 3 ①
Fall: Analysis of water and waste water. *Winter:* Biological processes applied. *Spring:* Design of water and waste water treatment processes.
- CE 550. **Municipal Engineering and City Planning.** 3 hours. 3 ①
Modern city streets, boulevards, transportation systems; drainage and sanitation; water supply; lighting.
- CE 551,552,553. **Transportation Engineering.** 3 hours each term. 3 ①
Engineering factors; the organization, administration, and finance of highway systems and control of traffic for ultimate efficiency.
- CE 560. **Coastal Engineering.** 3 hours. 3 ①
Deep and shallow water waves, shoaling effects, littoral drift, coastal structures, coastal pollution problems. Prerequisite: GE 302.

Electrical Engineering

The curriculum is designed to provide a professional education in electrical engineering. Into it are integrated courses in physics, chemistry, mathematics, engineering science, and social science. The Electrical Engineering Department provides the additional electrical science and engineering courses in analysis and synthesis of systems required for the professional curriculum.

An experienced professional staff and adequate facilities provide competent instruction in the following major areas: communications, computers, control, electronics, electromagnetic radiation, high voltage, illumination, instrumentation, power, and servomechanisms. Laboratories and equipment are available for undergraduate, graduate, and staff research. Those in specialized study are accommodated by the reading and conference and projects courses.

Important areas of advanced study are available in the graduate program. Electives in the junior and senior years may be used for additional mathematics, physics, chemistry, or languages either as a preparation for graduate work or as part of a broader undergraduate program.

Upper Division Courses

- EE 311,312,313. **Fields and Energy Conversion.** 4 hours each term. 3 ① 1 ③
Electromagnetics through Maxwell's Equations, basic energy conversion principles, and energy converters, including treatment of steady state and transient conditions. Prerequisite: GE 203; Mth 321.
- EE 321,322,323. **Circuits and Electronics.** 4 hours each term. 3 ① 1 ③
Electronics, emission, conduction in solids, vacuum, and gases; vacuum, gas, and vapor tubes, solid state electronic devices and their associated circuits; circuits using the Laplace transformation and the complex plane. Prerequisite: GE 203; Mth 321.
- EE 401. **Research.** Terms and hours to be arranged.

- EE 403. **Thesis.** 3 hours each term.
- EE 405. **Reading and Conference.** Terms and hours to be arranged.
- EE 406. **Projects.** Terms and hours to be arranged.
- EE 407. **Seminar.** 1 hour each term, 3 terms. 1 ②
Material pertinent to the professional aspects of electrical engineering and industry.
- EE 411. **Electrical Engineering Economy.** (g) 3 hours. 3 ①
Plant investment, operation, regulation, and public relations problems; engineering management, labor relations, taxation, feasibility studies, specifications, and contracts. Prerequisite: EE 313.
- EE 414,415,416. **Instrumentation.** (g) 3 hours each term. 2 ① 1 ③
Measurements, electrical instruments and transducers; electrical and nonelectrical quantities, data processing, transmission, and display. Prerequisite: EE 313,323.
- EE 421,422. **Transmission Systems.** (g) 3 hours each term. 2 ① 1 ②
Transmission lines, networks, and waveguides. Prerequisite: EE 313.
- EE 431,432,433. **Power Engineering.** (g) 3 hours each term. 2 ① 1 ③
Generation, transmission, and conversion of electric energy. Electronic, electromagnetic, and solid state high energy transformation devices. Computer solution to system problems. Prerequisite: EE 313,323. 2 ① 1 ③
- EE 461,462,463. **Communication Engineering.** (g) 3 hours each term.
Telegraphy, telephony, radio, and television. Prerequisite: EE 313,323.
- EE 481,482,483. **Communication Design.** (g) 1 hour each term. 1 ②
Particularly for radio and television systems. Prerequisite: EE 313,323.
- EE 491,492,493. **Control Engineering.** (g) 3 hours each term. 2 ① 1 ③
Servomechanisms, analog computers, and digital computers; application to control systems; steady-state and transit analysis of feedback. Prerequisite: EE 313,323.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G)
may be taken for graduate credit.

Courses at the graduate level are given when warranted by demand.

- EE 501. **Research.** Terms and hours to be arranged.
- EE 503. **Thesis.** Terms and hours to be arranged.
- EE 505. **Reading and Conference.** Terms and hours to be arranged.
- EE 506. **Projects.** Terms and hours to be arranged.
- EE 507. **Seminar.** Terms and hours to be arranged.
- EE 507. **Seminar.** No credit. (Required of all graduate students.)
- EE 511,512,513. **Electron Devices.** 3 hours each term. 2 ① 1 ③
Fall: Electronic conduction and emission; photo-, thermo-, magneto-electric effects. *Winter:* Semiconductor device operation and associated circuits. *Spring:* Microwave devices including masers, klystrons, and traveling-wave tubes.
- EE 525,526,527. **Computer Systems.** 3 hours each term. 2 ① 1 ③
Fall: Logic systems and computer components. *Winter:* Digital systems. *Spring:* Analog and special computers.
- EE 531. **Materials.** 3 hours. 2 ① 1 ③
Electrical conductors and insulators and dielectric and magnetic materials.
- EE 535,536,537. **Circuits and Fields.** 3 hours each term. 3 ①
Mathematical analysis. *Fall:* Wave propagation. *Winter:* Radiation and antennas. *Spring:* Matrix analysis of networks.

- EE 541,542,543. **Power Systems.** 3 hours each term. 2 ① 1 ③
Fall: Energy conversion devices in systems. *Winter:* Electrical energy transmission systems. *Spring:* Stability of systems.
- EE 554,555,556. **Control Systems.** 3 hours each term. 2 ① 1 ③
Fall: Stochastic processes. *Winter:* Adaptive and sampled-data systems. *Spring:* Non-linear control systems.
- EE 561,562,563. **Communication Systems.** 3 hours each term. 2 ① 1 ③
Fall: Switching systems. *Winter:* Communication and noise. *Spring:* Signal transmission.
- EE 571,572,573. **Pulse Circuits.** 3 hours each term. 2 ① 1 ③
Fall: Diode and transistor logic circuits, wave-shaping circuits, and device models. *Winter:* Pulse generation, multivibrators, blocking oscillators, and negative resistance devices. *Spring:* Switching and memory circuits using magnetic and dielectric devices.
- EE 581,582,583. **Design.** 3 hours each term. 2 ① 1 ③
Fall and Winter: Driving point and transfer impedance using network theory. *Spring:* Reliable electronic equipment using probability and statistical theory.

General Engineering

A curriculum common or applicable to all divisions of engineering is offered through the Department of General Engineering. This curriculum is designed to serve two basic areas: engineering courses that are applicable to all divisions of engineering and serve as a transition between science and engineering, and service courses for other areas of study such as business and technology, forestry, industrial arts education, and production technology, which desire fundamental technical work relating to engineering.

The program for a degree in general engineering affords the participant a more diversified scholastic background than can be provided in the more specialized fields of engineering. It is divided into three areas of concentration: Physical science including chemistry, mathematics, and physics; general engineering courses including analysis and design*; an area of concentration elected by the student in business, education, humanities and social science, biological or physical science, etc. The planning of the elected area of concentration is done by the student with critical supervision by departmental staff. Before any elected program receives departmental approval, the student must prove that it has merit and objective.

Lower Division Courses

- GE 101,102,103. **Engineering Orientation.** 2 hours each term. 1 ① 1 ②
 Departmental engineering orientation. Prerequisite: Mth 104 previously or concurrently.
- GE 104. **Engineering Fundamentals.** 4 hours spring. 2 ① 2 ③
 Basic concepts and principles of physical science; elementary technical problems, algebraic composition; training in use of slide rule. For production technology students.
- GE 111,112,113. **Engineering Graphics.** 2 hours each term. 2 ②
 The graphical language of engineering for production technology.
- GE 115,116,117. **Graphics.** 3 hours each term. 3 ②
 Fundamental principles of the language.
- GE 121,122,123. **Engineering Graphics.** 1 hour each term. 1 ②
 Graphics in communication, analysis, and solution of problems.
- GE 201,202,203. **Electrical Fundamentals.** 3 hours each term. 2 ① 1 ②
 Vector, electric, and magnetic fields and response of electric circuits to generalized forcing functions of time. Prerequisite: Mth 201; Ph 209.

* Sometimes designated Engineering Sciences courses.

- GE 211,212,213. **Mechanics of Solids.** 3 hours each term. 2 ① 1 ②
Principles of mechanics: particles, systems of discrete particles, rigid bodies, and deformable bodies. Prerequisite: Ph 208; Mth 201.

Upper Division Courses

- GE 301,302. **Mechanics of Fluids.** 3 hours each term. 2 ① 1 ②
Incompressible and compressible fluids; effects of fluid properties upon pressure distribution and flow patterns; similitude relationships. Prerequisite: Ph 208; Mth 203.
- GE 309. **Applied Mechanisms.** 3 hours spring. 2 ① 1 ②
Theory, application, and selection as applied to product design and production tooling.
- GE 311,312,313. **Thermodynamics.** 3 hours each term. 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 321; Ph 209; Ch 203.
- GE 321,322,323. **Nature and Behavior of Materials.** 3 hours each term. 2 ① 1 ②
Solid state; materials response to external influences; physical and mechanical properties; control of properties. Prerequisite: junior standing in engineering.
- GE 331,332,333. **Transfer and Rate Processes.** 3 hours each term. 2 ① 1 ②
Concepts, principles, and definitions involved; conductive and convective mechanisms; microscopic and macroscopic mass and energy balances; prediction of transport properties. Prerequisite: Mth 321.
- GE 407. **Seminar.** Terms and hours to be arranged.
Material pertinent to senior student area of concentration.
- GE 411,412,413. **Analysis and Design.** 3 hours each term. 2 ① 1 ③
Problems having no unique solutions. Student initiative and ingenuity in problem analysis and synthesis in more than one area. Prerequisite: senior standing in engineering.
- GE 461. **Historical Development of Engineering.** (g) 3 hours. 3 ①
Historical development of engineering processes and thought. Class investigations and case studies. Prerequisite: senior standing.

Mechanical and Industrial Engineering

The Curriculum in Mechanical Engineering is planned to prepare young men for useful and responsible positions in power plants, various manufacturing enterprises, oil refineries, the metal industries, heating and ventilating, refrigerating, air conditioning, and in the aeronautical and automotive industries. Opportunity is provided for specialization in metallurgy, applied mechanics, heating and air conditioning, power, nuclear engineering, automotive engineering, aeronautical engineering, or design.

The Department has drafting and computing rooms supplied with the necessary desks, boards, and lockers. The laboratories are equipped for tests and demonstrations in steam, gas, and aeronautical engineering, and in engineering materials. This equipment is located in the engineering laboratory, Mines Building, and in the aeronautical engines laboratory. The steam laboratory contains representative turbines, engines, and boilers all of which are set up for testing. Also available are domestic heating, air conditioning, and refrigeration units which may be used for testing or research. The internal combustion engines laboratory contains gasoline and diesel engines connected to generators and dynamometers. Included are ASTM-CFR fuel research engines for both gasoline and diesel oil. All of these engines are fully equipped with accessories and instruments. The power laboratory is also equipped with a gas turbine completely instrumented for testing, as well as jet engines for demonstra-

tion. The aeronautical laboratory contains a small wind tunnel, a smoke tunnel, miscellaneous aircraft parts and instruments, and a variety of aircraft engines. Engineering laboratories include facilities and machines for testing and research on metallic and nonmetallic structural materials, and fuels and lubricants. Equipment and instruments, such as balancing machines, vibrometers, photoelasticity apparatus, and shaking table, are available for instruction and advanced studies in applied mechanics. An analog computer is available for instructional purposes. A completely operative nuclear reactor and a wide range of detecting and counting instruments are available.

The Industrial Engineering Curriculum provides training for engineering, production, and technological-administrative departments of industry. Industrial Engineering, the youngest branch of the engineering profession, is represented on the Joint Engineering Council by the American Institute of Industrial Engineers, which body suggests that:

Industrial Engineering is concerned with the design, improvement, and installation of integrated systems of men, materials and equipment; drawing upon specialized knowledge and skill in the mathematical, physical, and social sciences together with the principles and methods of engineering analysis and design, to specify, predict, and evaluate the results to be obtained from such systems.

The curriculum at Oregon State University is fully accredited by the Engineering Council for Professional Development. Provision is made in Oregon, as in most other states, for the professional registration of industrial engineers. At Oregon State, particular emphasis is placed on engineering and industrial management as applied to operations research, operation analysis, labor problems, work simplification, plant layout, and production planning and control. The goal of the professional industrial engineer is to produce a superior product or service at the minimum cost consistent with fair employer-employee relationships. After satisfactory experience in engineering practice, graduates should be qualified for the highest executive positions.

Courses in Mechanical Engineering

Upper Division Courses

- ME 301,302,303. **Engineering Mechanics.** 3 hours each term. 2 ① 1 ②
ME 301: Determination of stresses, deflections, and stability of deformable bodies.
ME 302: Particle dynamics; vibration of single degree of freedom systems; dynamics of rigid bodies. *ME 303:* Fluids; stress and pressure distributions; flow analyses; fluids and fluid flows. Prerequisite: GE 213.
- ME 335. **Refrigeration and Cold Storage.** 3 hours. 2 ① 1 ②
 Principles and practice. For students in dairy manufacturing, horticulture, food industries, etc. Prerequisite: algebra and elementary physics.
- ME 337. **Heat Engines.** 3 hours. 2 ① 1 ②
 Construction, operation, and performance with emphasis on diesel types; fuels, combustion, and lubrication; boilers and auxiliaries. Prerequisite: elementary physics and chemistry. Service course for forest engineering students.
- 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: GE 311.
- ME 371. **Engineering Analysis.** 3 hours. 2 ① 1 ②
 Use of previous course work in making judicious analyses leading to synthesis and design. Prerequisite: Mth 321; GE 203,213.

- ME 381. **Preliminary Design Problems.** 1 hour. 1 ③
Widely varied projects emphasizing the determination and organization of design project requirements and criteria and their use in generating preliminary designs. Student is assigned one project at beginning of each three-hour period and submits proposed preliminary design at end of period. Prerequisite: junior standing.
- ME 391. **Space Technology.** 3 hours. 3 ①
Flight dynamics, propulsion systems, and environment of space vehicles. Prerequisite: GE 213,311.
- ME 401. **Research.** Terms and hours to be arranged.
- ME 403. **Thesis.** 3 hours any term.
- ME 405. **Reading and Conference.** Terms and hours to be arranged.
- ME 406. **Projects.** Terms and hours to be arranged.
- ME 407. **Seminar.** Terms and hours to be arranged.
- ME 411,412,413. **Mechanical Analysis and Design.** (g) 3 hours each term. 1 ① 2 ②
Systems involving mechanical, thermal, hydraulic, and electrical principles. Prerequisite: GE 313,323; ME 303,371.
- ME 414. **Cement and Concrete Laboratory.** (g) 3 hours. 1 ① 1 ④
Portland cement concrete and asphaltic concrete; specifications and test procedures for cements, concretes, and mineral aggregates; entrained air and other admixtures.
- ME 416,417,418. **Stress Analysis.** (g) 3 hours each term. 2 ① 1 ②
Theory of elasticity and its application to engineering problems which cannot be adequately analyzed by means of elementary strength of materials; discussion and demonstration of various methods. Prerequisite: ME 301, ME 371.
- ME 419. **Vibrations.** (g) 3 hours. 2 ① 1 ③
Systems of one degree of freedom and of systems of several degrees of freedom; torsional vibrations; shaft critical speeds; vibration measuring instruments; vibration isolation and absorption; machine balancing; Rayleigh's (energy) method. Prerequisite: ME 371.
- ME 421,422. **Heating and Air Conditioning.** (g) 3 hours each term. 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: GE 313.
- 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: GE 313.
- ME 424. **Heat Transfer.** 3 hours. 3 ①
Conduction problems, convection and comparison with nondimensional correlations of experimentally determined results, radiant exchange, heat exchanger design and analysis. Prerequisite: ME 303; GE 313.
- ME 425. **Fuels and Lubricants.** (g) 3 hours. 2 ① 1 ③
Heating value and calorimetry; solid, liquid, and gaseous fuels; rocket and nuclear fuels; theory and properties; laboratory tests and specifications. Prerequisite: GE 313; ME 351.
- ME 426. **Combustion.** (g) 3 hours. 2 ① 1 ③
Solid, liquid, and gaseous fuels; chemistry of combustion; laboratory tests for physical properties and combustion tests with various fuels. Prerequisite: GE 313; ME 351.
- ME 429,430. **Nuclear Reactor Analysis.** (g) 3 hours winter and spring. 2 ① 1 ③
Steady state and transient operation; elementary reactor theory; shielding; heat transfer and fluid flow problems. Prerequisite: ME 450 or ChE 450.

- ME 431,432. **Power Plant Engineering.** (g) 3 hours each term. 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: GE 313.
- ME 434. **Gas Turbines and Jet Engines.** (g) 3 hours. 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: GE 313.
- ME 437,438. **Mechanical Laboratory.** (g) 3 hours each term. 1 ① 2 ③
 Testing basic types of equipment, including test procedures, test data, heat balances, and engineering reports. Prerequisite: GE 313; ME 351.
- ME 441. **Rocket and Space Propulsion.** 3 hours. 2 ① 1 ②
 Terms and parameters utilized in the field; mission requirements; structural design, physical chemistry, and heat transfer with emphasis on application in space technology. Prerequisite: Mth 321; GE 313,323,332.
- ME 447,448,449. **Theory of Structures.** (g) 3 hours each term. 2 ① 1 ②
 Structural analysis of mechanical and aeronautical components, including energy methods and treatment of elastic stability. Prerequisite: ME 303,371.
- ME 450. **Principles of Nuclear Engineering.** (g) 3 hours. 2 ① 1 ③
 Application to engineering problems: reactor technology and design, reactor fuels and by-products, waste handling, and nuclear instrumentation. Laboratory experiments will show the principles, operation, and application of particle counting equipment, interaction of particles with engineering materials, and the operation, characteristics, and application of a nuclear critical reactor. Prerequisite: GE 313.
- ME 454. **Perfect Fluid Flow.** (g) 3 hours. 2 ① 1 ②
 Scalar and vector fields, the equations of conservation of mass. Newton's second law and the second law of thermodynamics for a fluid element, vortex filaments, the law of Biot-Savart, infinite and finite thin wing theory. Prerequisite: GE 331.
- ME 455. **Compressible Flow.** (g) 3 hours. 2 ① 1 ②
 The energy equation, thermally and calorically perfect and imperfect gas flows. Prandtl-Meyer expansion waves, normal and oblique shock waves. Linearized subsonic and supersonic flow. Subsonic and hypersonic similarity parameters. Prerequisite: ME 454.
- ME 456. **Viscous Flow.** (g) 3 hours. 2 ① 1 ②
 The Navier-Stokes equations and boundary layer equations; Blasius's solution, the integral relations, turbulent flow; Reynolds' stresses and introduction to the compressible boundary layer. Prerequisite: ME 455.
- ME 457. **Aircraft Performance.** (g) 3 hours. 2 ① 1 ②
 Maximum speed, rate of climb, range, endurance, landing, take-off, and maneuverability; missiles and VTOL-STOL aircraft. Prerequisite: GE 313, GE 331.
- ME 458. **Aircraft Stability and Control.** (g) 3 hours. 2 ① 1 ②
 Complete development of the theory of static aircraft stability and control and an introduction to dynamic stability and response to controls. Prerequisite: ME 457.
- ME 460. **Mechanical Engineering Economy.** (g) 3 hours. 3 ①
 The time value of money as it affects alternative engineering proposals; financial aspects of common investments. Prerequisite: senior standing.
- ME 474. **Analog Computers.** (g) 3 hours. 2 ① 1 ④
 Electronic operational analog equipment used in the solution of mathematical equations common to engineering; network analyzers, digital computers, and membrane and conducting sheet analogies. Prerequisite: Mth 321; Ph 209.
- ME 476. **Industrial Instrumentation.** (G) 3 hours. 2 ① 1 ②
 Process instrumentation and system analysis in automatic process control; applications to the analysis and design of pneumatic, hydraulic, electric, and electronic control devices. Prerequisite: ME 351.
- ME 480. **Metallurgy.** 3 hours. 2 ① 1 ②
 Metallurgy and properties of ferrous products and nonferrous alloys; metallographic and other inspection techniques; heat treatment and machining and forming operations. Service course for production technology students only. Prerequisite: junior standing

- ME 482,483,484. **Metallography.** (g) 3 hours each term. 2 ① 1 ②
Internal structure, constitution, heat treatment, physical and mechanical properties of ferrous and nonferrous metals and alloys; metallographic specimens; metallographical microscope; photomicrography. Prerequisite: GE 323.
- ME 485. **Materials of Nuclear Technology.** (g) 3 hours. 3 ①
Role in a reactor; fuel, moderator, reflector, shielding, coolant, control, and structural; nuclear properties; radiation effects on metallic and nonmetallic materials; metallurgy of uranium, thorium, and plutonium. Prerequisite: GE 323; ME 450.
- ME 491,492,493. **Automotive Engineering.** (g) 3 hours each term. 2 ① 1 ②
Internal combustion engines; design parameters which affect performance; Poston engine testing; automobile chassis and drive line components as their design relates to performance; vehicle tractive resistance, fuel consumption, octane requirement; motor fleet operation. Prerequisite: GE 313.

Graduate Courses

Courses numbered 400-499 and designated (p) or (G) may be taken for graduate credit.

- ME 501. **Research.** Terms and hours to be arranged.
- ME 503. **Thesis.** Terms and hours to be arranged.
- ME 505. **Reading and Conference.** Terms and hours to be arranged.
- ME 506. **Projects.** Terms and hours to be arranged.
- ME 507. **Seminar.** Terms and hours to be arranged.
- ME 511,512,513. **Engineering Materials.** 3 hours each term. 1 ① 2 ②
Specifications and testing procedures. Recent developments and applications in the fields. *Fall:* Ferrous metals and alloys. *Winter:* Nonferrous metals and alloys. *Spring:* Nonmetallic materials. Prerequisite: GE 323.
- ME 514,515. **Mechanical Design.** 3 hours each term. 1 ① 2 ②
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. Prerequisite: ME 413 or equivalent.
- ME 516,517,518. **Elasticity.** 3 hours each term. 3 ①; 2 ① 1 ②; 2 ① 1 ③
Mathematical theory; solution of problems in elasticity by means of photoelastic method; use of various types of strain gages, and mathematical analysis.
- ME 519. **Vibrations.** 3 hours. 3 ①
Systems having more than one degree of freedom; torsional vibration; geared systems; vibration of elastic structures; harmonic analysis; vibration of frames, plates, casings, turbine disks, rotors; nonlinear systems. Prerequisite: ME 419 or equivalent.
- ME 520. **Limit Analysis and Design.** 3 hours. 3 ①
Conditions under which a plastic analysis is justified. Structures treated include beams, frames, slabs with cutouts and plates. Prerequisite: ME 416 or 447 or 516.
- ME 521. **Theory of Plasticity.** 3 hours. 3 ①
Stress-strain relations; perfectly plastic materials; strain hardening materials. Metal forming processes. Prerequisite: ME 417 or 516.
- ME 522. **Air Conditioning Design.** 3 hours. 3 ①
Commercial air conditioning systems including cost estimation, writing of specifications, and selection of controls; economics of fuels, equipment selection, and specialized systems; air purification and odor control and relation to public health. Prerequisite: ME 421.
- ME 524. **Gas Dynamics.** 3 hours. 3 ①
Dynamics and thermodynamics applied to the flow of gases; treatment of one- and two-dimensional reacting and nonreacting gas flows. Prerequisite: GE 332,313.
- ME 525,526. **Thermodynamics.** 3 hours each term. 3 ①
Classical thermodynamics, properties of imperfect gases, availability functions and equilibrium constants. Prerequisite: GE 313.

- ME 527,528. **Heat Transfer.** 3 hours each term. 3 ①
Analytical and dimensional analysis methods for solution of transient and steady state heat transfer problems. Prerequisite: GE 332.
- ME 530. **Heat Transfer Laboratory.** 3 hours. 1 ③
Problems in heat transmission; heat transfer systems. Prerequisite: ME 527.
- ME 532. **Fuel Technology.** 3 hours. 2 ① 1 ③
Production, manufacture, distribution, and application of fuels, including natural gas; liquefied petroleum gas; gasoline; jet; diesel; heavy burner fuels; and high energy, rocket-engine fuels. Laboratory test methods for manufacturing control and prediction of performance. Prerequisite: ME 425.
- ME 534. **Gas Turbine Design.** 3 hours. 2 ① 1 ③
Fields of application; design of compressors, combustion chambers, turbines, heat exchangers, ducts, and nozzles; design of gas turbine unit for a specific application, including auxiliary equipment; components tested in laboratory. Prerequisite: ME 434.
- ME 540,541. **Advanced Nuclear Reactor Analysis.** 3 hours each term. 3 ①
Mathematical study of behavior based on certain approximate physical models; steady-state homogeneous and heterogeneous reactors, reactor kinetics, and control rod theory. Prerequisite: ME 430; Mth 321.
- ME 546,547,548. **Aerodynamics.** 3 hours each term. 3 ①
Flow of perfect, viscous, and compressible fluids; wings of finite and infinite spans.
- ME 550. **Incompressible Fluid Mechanics.** 3 hours. 3 ①
Generalized fluid mechanics; principle 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 nonviscous fluids; Eulerian equation, potential motion, two-dimensional potential motion, vortex motion, energy and momentum theorems. Prerequisite: ME 303 or GE 331; Mth 321 or ME 371.
- ME 551. **Dynamics.** 3 hours. 3 ①
Newtonian dynamics: Hamilton's Principle and Lagrange's Equations; central force motion; rigid body dynamics; oscillatory motion. Prerequisite: ME 302; Mth 321 or ME 371.
- ME 561,562. **Principles and Applications of Naval Architecture.** 3 hours each term. 3 ①
Stability determination and considerations; oscillations-rolling, pitching, and heaving; resistance and propulsions; directional stability and steering; propeller design; model testing; strength requirements. Prerequisite: ME 303 or equivalent.
- ME 570,571,572. **Mechanical Engineering Analysis.** 3 hours each term. 3 ①
Problems solved by use of advanced mathematical methods. Prerequisite: ME 371.
- ME 574. **Operational Analog Computer.** 3 hours. 1 ① 2 ③
Solution of problems not readily solved by analytical methods. Emphasis on solution accuracy. Prerequisite: ME 474.
- ME 581. **Theoretical Structural Metallurgy.** 3 hours. 3 ①
Structure of the atom; structure of metal crystals; electron theory of metals; rate processes; kinetics of phase changes; shear processes. Prerequisite: GE 323.
- ME 582,583. **X-Ray Metallography.** 3 hours each term. 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: ME 581.

Courses in Industrial Engineering

Upper Division Courses

- IE 371,372,373. **Systems Analysis.** 3 hours each term. 1 ① 2 ②
Appraisal and improvement of work systems for existing, modified, and newly designed operations; motion-economy principles, work count, schematic and mathematical models, cost-analysis charts, quality control, paperwork-controls, production and project planning techniques. Prerequisite: Mth 203; concurrent enrollment in St 471,472,473.

- IE 391,392. **Engineering Economy.** 3 hours each term. 3 ①
Quantitative analysis and economic optimum selection of machines, equipment, and labor; quantitative control in inverse relationships, least-cost combination in purchasing quantities and in seasonal production. Prerequisite: IE 371.
- IE 405. **Reading and Conference.** Terms and hours to be arranged.
Prerequisite: senior standing.
- IE 406. **Projects.** Terms and hours to be arranged.
Prerequisite: junior standing.
- IE 407. **Seminar.** Terms and hours to be arranged.
Prerequisite: senior standing.
- IE 497,498,499. **Analysis and Design.** 3 hours each term. 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.
- Graduate Courses**
Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.
- IE 501. **Research.** Terms and hours to be arranged.
- IE 503. **Thesis.** Terms and hours to be arranged.
- IE 505. **Reading and Conference.** Terms and hours to be arranged.
- IE 506. **Projects.** Terms and hours to be arranged.
- IE 507. **Seminar.** Terms and hours to be arranged.
- IE 591. **Operation Analysis.** 3 hours. 3 ①
Current techniques; application of work-study techniques to advanced problems. Prerequisite: IE 371,372,373.
- IE 592. **Timing Techniques.** 3 hours. 3 ①
Modern time-study methods; allowances, skill levels, and other advanced problems. Prerequisite: IE 371,372,373.
- IE 594. **Plant Layout.** 3 hours. 3 ①
Selection of site; plant layout; planning building for economic production. Prerequisite: IE 371,372,373.

Production Technology

The Production Technology Department offers a four-year curriculum intended to prepare men for positions of responsibility in the control and management of: (1) the manufacturing of consumer products; (2) the construction of dwelling, industrial, and public buildings.

The production technology curriculum allows the student to specialize in one or more of the following fields of study: metals industries, wood industries, furniture manufacturing, cast metals, tool design, welding fabrication, and residential-industrial-public building construction. Each student, with the approval of his adviser, may elect to follow a course of study best suited to his particular interest and aptitude. The program is designed to meet the demand in industry and construction for men with the understanding of basic skills and the technical knowledge needed for the effective use of modern materials and processes. Courses in scientific management and business administration are included so the student will know how to apply the accepted principles and practices that govern systems of production, construction, and quality control.

Production technology provides technical and business training applicable to the needs of industrial and business enterprises, either on the individual enterprise basis, or in the employ of large or small organizations. Extensive laboratory facilities permit the student to participate in actual manufacturing and construction operations, and make possible numerous other experiences related to the use of materials and equipment.

The Department offers service courses for other fields such as business and technology, industrial arts education, mechanical and industrial engineering, and general engineering. It is also responsible for technical courses offered industrial arts teachers in the summer session program.

Lower Division Courses

- PT 111. **Furniture Technology.** 4 hours fall. 2 ① 2 ②
Furniture construction; equipment and processes; woodworking with special reference to hardwoods; use of nonwood materials in the furniture industry.
- *PT 112,113. **Methods in Woodworking.** 3 hours each term. 1 ① 2 ③
Tool techniques, applied design, and craftsmanship in group and individual projects. PT 112 prerequisite for PT 113.
- PT 121. **Building Construction Technology.** 4 hours. 2 ① 2 ②
Materials used in building construction; construction technology; nature and scope of the industry.
- *PT 140. **Foundry Practices.** 3 hours. 2 ① 1 ③
Constitution, properties, and design limitations of casting in gray iron, malleable iron, and steel; methods used in the production of castings.
- PT 141. **Foundry Practices.** 4 hours. 3 ① 1 ③
Properties and design limitations of casting in gray iron, malleable iron, and steel; the production of castings. For production technology students.
- *PT 150. **Forging and Welding.** 3 hours. 2 ① 1 ③
Forging, forming, and heat-treating of steel, followed by gas and electric-arc welding, flame cutting, brazing, and resistance-welding operations.
- PT 151. **Forging and Welding.** 4 hours. 3 ① 1 ③
Forging, forming, and heat treatment of steel, gas, and electric arc welding; flame cutting; brazing; and resistance welding practices. For production technology students only.
- *PT 160. **Machine Tool Practices.** 3 hours. 2 ① 1 ③
Prescribed projects representative of industrial operations. Prerequisite: Mth 10.
- PT 161. **Machine Tool Practices.** 4 hours. 3 ① 1 ③
Metalworking projects representative of industrial operations and methods. Prerequisite: Mth 10. For production technology students.
- PT 220. **Woodturning and Patternmaking.** 3 hours. 1 ① 2 ③
Wood turning techniques and project development. Principles related to pattern design and materials. For industrial arts teachers. Prerequisite: PT 111 or PT 112 or PT 121.
- PT 225. **Machine and Tool Maintenance: Wood Shop.** 3 hours. 2 ① 1 ③
Maintaining woodworking tools, machines, and supplementary equipment. Prerequisite: PT 111 or PT 112 or PT 121.
- PT 262. **Manufacturing Processes.** 3 hours. 2 ① 1 ③
Metal casting, welding and brazing, machining, and the plastic flow of metals and non-metals. Quality control and production economy. Prerequisite: sophomore standing in engineering.
- PT 265. **Machine and Tool Maintenance: Metals.** 3 hours. 2 ① 1 ③
Maintaining metalworking and mechanical equipment; tool and cutter sharpening; lubrication and power transmission. Prerequisite: PT 160 or PT 161 or PT 262.

* In courses designated by asterisks, in addition to the regularly scheduled meetings, the student may be required to attend three general lectures during the term.

PT 270. **General Metals Laboratory.** 3 hours. 1 ① 2 ③
 Forging, heat-treating, welding, nonferrous metal casting, and machine tool work. For industrial arts teachers.

Upper Division Courses

PT 311. **Millwork: Machine Woodwork.** 3 hours. 1 ① 2 ③
 A production course in machine woodworking. Prerequisite: PT 112,113.

PT 312,313,314. **Furniture Design and Construction.** 3 hours each term. 1 ① 2 ③
 Furniture and cabinet work related to current practices and material. Methods and processes involving wood and other materials. Prerequisite: GE 115,116; AA 281, 282,283; and PT 311. PT 311 may be taken concurrently with PT 312.

PT 316. **Wood and Metal Finishing.** 3 hours. 1 ① 2 ③
 Application of modern finishes to both old and new work on both wood and metal surfaces; brush and spray application of finishing materials. Prerequisite: PT 111 or PT 112 or PT 121.

PT 320. **Boat Design and Construction.** 3 hours. 1 ① 2 ③
 With reference to safety, high utility, performance, and stability. Typical plans and actual construction under practical conditions. For industrial arts teachers. Prerequisite: PT 112,333.

PT 321. **Building Site Planning.** 3 hours. 1 ① 2 ②
 Preliminary planning, instrumentation, and site development with reference to both urban and city subdivisions, utilities, and structures. Prerequisite: AA 179; junior standing.

PT 322,323. **Building Construction Methods.** 3 hours each term. 2 ① 1 ②
 Emphasis on nature and characteristics as applied to current design problems; materials of construction; methods in general; wood frame construction, conventional and contemporary. Prerequisite: PT 321.

PT 332. **Pattern Making.** 2 hours. 2 ① 1 ③
 Machine parts, mass patterns; factors influencing production costs. Prerequisite: PT 111 or PT 121; sophomore standing.

PT 333. **Carpentry and Building Construction.** 3 hours. 1 ① 2 ③
 Actual construction in miniature from architect's plans; laboratory work in framing of rafters and selected architectural sections with fullsize lumber. Prerequisite: PT 112.

PT 340. **Foundry Practices.** 3 hours. 2 ① 1 ④
 Ferrous and nonferrous; equipment, materials, projects, and processes suitable for school or small shops. For industrial arts teachers.

PT 344,345. **Casting Processes.** 4 hours each term. 3 ① 1 ③
 Techniques applied to ferrous, nonferrous, and reactive metals; foundry raw materials and controls; quality control as influenced by design; melting and sand practices; special molding methods; gating, risering, and solidification. Prerequisite: PT 140 or 141 or 262.

PT 350. **Forging and Welding.** 3 hours. 2 ① 1 ③
 Techniques; heat treating, general fabrication, equipment selection, and maintenance problems oriented to instruction in school and small shops. For industrial arts teachers. Prerequisite: PT 150 or PT 151 or PT 262.

PT 354,355. **Welding Processes and Applications.** 4 hours each term. 3 ① 1 ③
 Techniques applied to ferrous and nonferrous metals; typical production welding jobs; design and use of production welding devices—jigs, fixtures, forming, and handling equipment; welded product design and construction, including the engineering and economic problems involved. Prerequisite: PT 150 or PT 151 or PT 262.

PT 360. **Machine Shop Practices.** 3 hours. 2 ① 1 ③
 Individual and group projects. For industrial arts education majors. Prerequisite: PT 160 or PT 161 or PT 262.

PT 361,362. **Mass Production Methods.** 4 hours each term. 3 ① 1 ③
 Selection, setup, and operation of production machines; construction, use, and application of jigs and fixtures; job shop problems; group projects and quality control. Prerequisite: PT 160, PT 161 or PT 262.

- PT 365. **Materials Technology.** 4 hours. 3 ① 1 ②
Elements of product design; determination of strength of tooling elements used in manufacturing processes. Prerequisite: Mth 102; junior standing in production technology.
- PT 370. **Electricity Technology.** 3 hours. 1 ① 2 ③
Practical electricity; electrical circuits and controls with applications in fields of light and power wiring, stagecraft and lighting, communication. Intended primarily for prospective industrial arts teachers. Prerequisite: junior standing.
- PT 380. **Sheet Metalwork.** 3 hours. 1 ① 2 ③
Projects in sheet metalwork and pattern drafting involving the fundamental machine and hand-tool operations. Prerequisite: GE 112 or GE 116 or GE 122.
- PT 387. **Metal Crafts.** 3 hours. 1 ① 2 ③
Diversified metal crafts; metal spinning and craft work in iron, copper, and Britannia metal. For industrial arts teachers. Prerequisite: PT 350 or PT 380.
- PT 388. **Lapidary Techniques and Processes.** 2 hours. 1 ① 1 ④
Gem materials and methods used to process the rough material into display specimens or mounted jewelry pieces. For industrial arts teachers. Prerequisite: AA 281; PT 387.
- PT 390. **Safety in Industry.** 2 hours. 2 ①
History; legislation, organization, services, and training; accident costs and causes; safe practice, safety and health standards, and records. Prerequisite: junior standing.
- PT 391. **Methods and Motion Study.** 3 hours. 1 ① 2 ②
Theory and application; types of methods studies; operation and analysis sheets; principles of motion practice; micromotion studies; standardization and process charts. Prerequisite: junior standing.
- PT 392. **Time Study.** 3 hours. 1 ① 2 ②
Theory and application; job analysis and standardization; standard data and formula applications; time standards; wage payment systems and merit rating. Prerequisite: junior standing.
- PT 394. **Materials Handling.** 3 hours. 2 ① 1 ②
Selection of equipment, its application, coordination; effect on plant layout in industrial situations. Prerequisite: junior standing.
- PT 395. **Work Simplification.** 4 hours. 2 ① 2 ②
Philosophy and application of tools; method and motion studies, systematic operations analysis steps; scope and limitations of projects in teams. Prerequisite: junior standing.
- PT 396. **Value Analysis.** 4 hours. 2 ① 2 ②
Philosophy and application of tools; time study techniques, systematic product and materials analysis steps, scope and limitation of projects in teams. Prerequisite: junior standing.
- PT 397. **Production Planning and Control.** 4 hours. 2 ① 2 ②
Departmental organization and types of techniques; codification and symbolization; forecasting, materials control, routing, scheduling, dispatching, and inspecting. Prerequisite: junior standing.
- PT 405. **Reading and Conference.** Terms and hours to be arranged.
- PT 406. **Projects.** Terms and hours to be arranged.
- PT 407. **Seminar.** Terms and hours to be arranged.
- PT 421. **Design Problems and Specifications.** 3 hours. 1 ① 2 ②
Construction technology through applied design problems and appropriate specifications. Prerequisite: PT 323,365.
- PT 422. **Building Construction Estimating.** 3 hours. 1 ① 2 ②
Methods of estimating costs; quantity surveys by approximate and individual component methods; materials, labor, and operational costs relevant to residential and light-commercial buildings. Prerequisite: PT 397, PT 421.

- PT 464,465,466. **Tool Engineering.** 3 hours each term. 1 ① 2 ③
Tools, jigs, fixtures, and die design; operation sequence, dimensional and quality control. Power press applications on the plastic working of metals and nonmetals. Prerequisite: senior standing.
- PT 490. **Industrial Supervision Principles.** (G) 4 hours. 4 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. Prerequisite: PT 395,396,397.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit. Graduate courses in Industrial Education are listed under SCHOOL OF EDUCATION.

- PT 506. **Projects.** Terms and hours to be arranged.
- PT 525. **Recreational Handicrafts.** 3 hours. 1 ① 2 ③
Materials, projects, and procedures in developing a program in secondary schools, on an extracurricular or curricular basis, and in evening adult classes; laboratory applications. For industrial arts teachers. Prerequisite: Ed 408 and courses in woodwork and metalwork equivalent to PT 220,313, and 380.
- PT 587. **Metalcraft Problems.** 3 hours. 1 ① 2 ③
Semiprecious metals in school and home shop work; metal spinning and craft work in copper, brass, and Britannia metal; processes applied to projects of practical value and artistic merit. For industrial arts teachers. Prerequisite: Ed 408; AA 281,282,283; and PT 387.

School of Forestry

Faculty

As of January 1963

- WALTER FRASER McCULLOCH, Ed.D., Dean of the School of Forestry; Associate Director of Forest Research Division, Agricultural Experiment Station; Professor of Forest Management.
- GEORGE HECTOR BARNES, Ph.D., Assistant Director of Forest Research Division, Agricultural Experiment Station; Professor of Forest Management.
- CHARLES WESLEY DANE, M.S., Assistant to the Dean.
- WILLIAM PERRY WHEELER, M.F., Personnel Director, School of Forestry; Associate Professor of Forest Management.
- Forest Engineering: Professors DAVIES (department head), PATTERSON (emeritus); Associate Professors O'LEARY, WILSON.
- Forest Management: Professors DILWORTH (department head), JEFFERS (emeritus), KENISTON, ROBINSON; Associate Professors FERRELL, JAENICKE, NETTLETON, RANDALL, WHEELER, YODER; Assistant Professors BELL, IRGENS-MOLLER, KRYGIER, PAINE, SUTHERLAND; Instructor NEWTON.
- Forest Products: Professor WEST (department head); Associate Professor McKIMMY; Assistant Professor VAN VLIET.
- Forest Properties: Professor DAVIES, Forest Supervisor.
- Forest Extension: Extension Forestry Specialists ROSS, SANDER.
- Forest Research Laboratory: Professor KALLANDER (Administrator), Assistant Director of Forest Research Division, Agricultural Experiment Station.
- Forest Management:* Professors BEVER (department head), BERG, WRIGHT; Associate Professor CHING; Assistant Professors BLACK, HERMANN, HOOVEN, KANGUR, KUDRJAVCEV, LAVENDER, LOWRY; Assistants in Forest Research CARMICHAEL, HALBER; Research Assistant MacMILLAN.
- Forest Products:* Professors ESPENAS (department head), GLENNIE, SNODGRASS; Associate Professors ATHERTON, GRAHAM; Assistant Professors AFT, CORDER, CURRIER, JOHNSON, KRAHMER, MILLER, OVERHOLSER, SAMUELS; Instructors KOZLIK, KUNESH, LEHMANN, MILLER, MOTHERSHEAD; Research Assistants HIGHLEY, LYMAN.

General Statement

THE GENERAL AIM of the School of Forestry is to assure its students quality education, both liberal and professional. A specific School aim is the best possible development of students as individuals, citizens, and professional men—in that order. Forestry graduates must be competent and they must be respected.

Opportunity. Forestry, by far the greatest industry in Oregon, is important nationally and is of major significance in other western states. There is a strong, continuing demand for foresters in this region. Oregon State foresters are well equipped for future responsible positions in managing the basic forest values, water, wood, wildlife, recreation, and forage. They are employed in establishing, maintaining, and harvesting forest crops; in product development, processing, and marketing; in teaching; and in research. Since the School stresses administrative management, graduates who prepare themselves adequately have excellent opportunities for advancement to administrative positions. The School arranges seasonal employment and operates a graduate placement service. Opportunities for good men in forestry are excellent, and the School intends that its graduates shall be good men. Forestry is a highly satisfying occupation with expanding possibilities.

Curricula. The Bachelor of Science or Bachelor of Forestry degree is offered in three curricula, Forest Engineering, Forest Management, and Forest Products. In all three, general forestry concepts are strengthened by reference to specific western forestry practices, but the program is sufficiently broad to serve the needs of students from other states and countries. There is a forest science option for students who are research oriented. A combined engineering-management option leads to degrees in both departments; there is also a five-year bachelor's degree curriculum in cooperation with the Civil Engineering Department. Through the Graduate School the three departments offer the Master of Science and Master of Forestry degrees. The Forest Management Department also grants the Doctor of Philosophy degree.

Entrance. The prospective student must complete all University requirements for entrance. The statement on admission to professional programs and schools on page 20 applies to the School of Forestry. Placement tests are required of forestry freshmen and transfers (see page 22) and all deficiencies in mathematics and English revealed in these tests must be corrected by remedial courses. Records of entering students for many years have shown that those who make low scores in these tests have difficulty in meeting the requirements of a professional forestry curriculum. Transfer students should plan to enter Oregon State as soon as possible, preferably not later than the end of the freshman year; otherwise, more than a total of four years will be required to complete the normal four-year professional forestry program. General forestry is the only forestry course considered for transfer from junior colleges except under special circumstances. A student entering with substantial technical knowledge gained through employment in forestry may request a special examination to substitute for a course covering the same subject. Approval of the School's Curriculum Planning Committee is required. Vocational forestry courses are not credited at universities.

Graduation. Academic requirements. Minimum requirements for the bachelor's degree include: Oregon State University stipulations listed on page 24; 204 term hours of university-level courses, plus any additional hours needed to complete remedial work; a minimum of 80 term hours of professional and allied courses approved by the School; and at least six months of forestry employment satisfactory to the employer and to the School.

Professional and personal requirements: The School's personnel program provides assistance and incentive, but success is still dependent on the individual. He must prove himself on the campus and during summer employment. Work performance and personal conduct both are thoroughly appraised by the School. Forestry is highly regarded for its ethical and its academic standards. Students are required to abide by the Code of Ethics of the Society of American Foresters to conduct themselves as befits professional foresters, and to observe the Honor Code of the School in its entirety. Departure from these ethical requirements may be reason for terminating a student.

Advantages. The first and most obvious advantage to the student is the prestige value of graduation from a highly respected School, the second largest in America in point of staff and facilities. The School is accredited by the Society of American Foresters and intends to maintain this high standard.

There is also advantage to the student in attending a School which places strong emphasis on the moral values in resource management.

Corvallis is one of the largest forest research centers in America. An aggressive research program is conducted by the University Forest Research Lab-

oratory, chiefly financed by the industry; by the Forest Science Department and cooperating campus departments; and by the U. S. Forest Service Forestry Sciences Laboratory. They offer splendid educational and employment opportunities for superior students.

The School is closely associated with industry and public forestry agencies and makes good use of their facilities for student benefit. During each school year, many trips are made to woods and plants to give classes a firsthand knowledge of engineering, management, and utilization processes.

No summer camp is required. A truck fleet takes students daily to nearby School forests for field-instruction. There are more than 11,000 acres in the adjacent McDonald and Dunn Forests and Peavy Arboretum. The School owns other properties in Benton and Columbia counties. All are available for research and demonstration as well as instruction.

A great advantage to the student is the School's emphasis on the development of men. The intention is to aid every graduate to become capable of solving forestry problems; capable of competing successfully with other foresters; and capable of serving society well in this nationally vital area of resource management.

Curricula in Forestry

B.S., B.F., M.S., M.F., Ph.D. Degrees

Forest Engineering

Forest Management

Forest Products

Freshman Year¹ Common to all programs

	<i>Hours</i>
Botany (Bot 201,202)	6
Mathematics (Mth 101,102,200)	12
Chemistry (Ch 101,102,103, or Ch 201,202,203)	9
English Composition (Wr 111,112,113)	9
Engineering Graphics (GE 115)	3
General Forestry (F 111)	3
Forest Engineering (FE 123)	3
² Forest Orientation (F 40)	0
Physical education, general hygiene	3
Defense education or other elective	3
	51

Forest Engineering

Accredited Society of American Foresters

Four-Year Curriculum			
Sophomore Year	<i>Hours</i>	Junior Year	<i>Hours</i>
Forest Engineering (FE 223)	4	Forest Engineering (FK 323)	3
Tree Identification (F 153)	3	Logging Roads (FE 361)	3
Mensuration (F 224)	5	Logging Methods (FE 392)	3
Forest Protection (F 231)	3	Aerial Photointerpretation (F 320)	3
Wood Technology (FP 210)	3	Forest Valuation (F 324)	3
Calculus with Anal Geom (Mth 201)	4	Silvicultural Practices (F 342)	4
General Physics (Ph 201,202,203)	12	Timber Mechanics (FP 321)	4
Extempore Speaking (SP 111)	3	Fundamentals of Accounting (BA 214, 215)	6
Technical Report Writing (Wr 227)	3	Principles of Economics (Ec 201,202)	6
American Governments (PS 201)	3	Heat Engines (ME 337)	3
Basic Geology (G 210)	3	Humanities or social science elective	3
Physical education	3	Electives	9
Defense education or other elective	3		
	52		50

¹ All students receiving credit for the English sequence who fail to pass a comprehensive examination given upon completion of the sequence will be required to take additional English courses.

² Noncredit course required of all freshmen.

Senior Year

	<i>Hours</i>
Logging Plans (FE 461)	5
Logging Transportation (FE 462)	5
Logging Costs (FE 463)	5
Seminar (FE 407)	1
Forest Economics (F 412)	3
Forest Administration (F 415)	3
Forest Management (F 425)	5
Fire Control (F 431)	4
Business Law (BA 411)	3
Humanities or social science electives ..	6
Electives	11
	51

Forest Engineering

Accredited Society of American Foresters

Five-Year Curriculum

Second Year		Third Year	
	<i>Hours</i>		<i>Hours</i>
Forest Engineering (FE 223)	3	Forest Engineering (FE 323)	3
Tree Identification (F 153)	3	Silvicultural Practices (F 342)	4
Mensuration (F 224)	5	Mechanics of Solids (GE 211,212,213) ..	9
Forest Protection (F 231)	3	Extempore Speaking (SP 111)	3
Wood Technology (FP 210)	3	Fundamentals of Accounting (BA 214, 215)	6
General Physics (Ph 207,208,209)	12	Basic Geology (G 210)	3
Calculus with Anal Geom (Mth 201, 202,203)	12	Technical Report Writing (Wr 227)	3
Physical education	3	Applied Differential Equations (Mth 321)	3
Defense education or other elective	3	Principles of Economics (Ec 201,202) ..	6
	48	Humanities or social science electives	9
			49

Fourth Year

	<i>Hours</i>
Logging Roads (FE 361)	3
Logging Methods (FE 392)	3
Aerial Photointerpretation (F 320)	3
Forest Valuation (F 324)	3
Mechanics of Fluids (GE 301,302)	6
Structural Theory (CE 381,382,383)	9
Reinforced Concrete (CE 384)	3
Heat Engines (ME 337)	3
American Government (PS 201)	3
Business Law (BA 411)	3
Electives	9
	48

Fifth Year

	<i>Hours</i>
Logging Plans (FE 461)	5
Logging Transportation (FE 462)	5
Logging Costs (FE 463)	5
Seminar (FE 407)	1
Forest Economics (F 412)	3
Forest Administration (F 415)	3
Fire Control (F 431)	4
Forest Management (F 425)	5
Soil Mechanics (CE 372)	3
Structural Engineering (CE 482)	3
Hydrology (CE 411)	3
Electives	9
	49

Forest Management

Accredited Society of American Foresters

Sophomore Year

	<i>Hours</i>
Dendrology (F 254)	4
Mensuration (F 224)	5
¹ Forest Protection (F 231)	3
Forest Engineering (FE 223)	4
Wood Technology (FP 210)	3
Extempore Speaking (Sp 111)	3
Principles of Economics (Ec 201,202).....	6
Forest Soils (Sls 214)	4
Basic Geology (G 210)	3
² Plant physiology	3-5
Technical Report Writing (Wr 227)	3
Physical education	3
Electives	5-7
	50-51

Junior Year

	<i>Hours</i>
Aerial Photointerpretation (F 320)	3
Mensuration (F 327)	5
Forest Valuation (F 324)	3
Forest Ecology (F 341)	4
Silvicultural Practices (F 342)	4
Forestation (F 343)	3
Forest Recreation Planning (F 365)	3
Forest Engineering (FE 323)	3
Logging Methods (FE 392)	3
Abridged General Physics (Ph 211,212) ..	6
³ Basic Accounting (BA 217)	3
American Governments (PS 201)	3
Electives	9
	52

¹ Forest science option requires Bot 415 and Ent 321 in lieu of F 231. Substitutions optional for others.² Forest science option requires Bot 331, 5 hours.³ BA 214,215 may be substituted.

Senior Year

	<i>Hours</i>
Seminar (F 407)	1
Forest Economics (F 412)	3
Forest Administration (F 415)	3
Watershed Management (F 424)	3
Forest Management (F 425)	5
Fire Control (F 431)	4
Forest Engineering (FE 423)	4
Range Management (AnS or FC 341)....	3
Wood Utilization (FP 310)	3
Business Law (BA 411 or 414)	3
Humanities or social science electives ...	9
Electives	10
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Forest Management

Accredited Society of American Foresters

Forest Science Option

Sophomore Year—Same as forest management program (with minor changes as noted)

Junior Year

	<i>Hours</i>
Forest Ecology (F 341)	4
Silvicultural Practices (F 342)	4
Forestation (F 343)	3
Forest Valuation (F 324)	3
General Physics (Ph 201,202,203)	12
American Governments (PS 201)	3
Humanities or social science electives ...	9
Approved science electives	4
Electives	9
	<hr/> 51

Senior Year

	<i>Hours</i>
Seminar (F 407)	1
Forest Economics (F 412)	3
Forest Administration (F 415)	3
Forest Management (F 425)	5
Statistics	3
Foreign language sequence	12
Approved science electives	15
Electives	9
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Forest Products

Sophomore Year

	<i>Hours</i>
Tree Identification (F 153)	3
Mensuration (F 224)	5
¹ Forest Protection (F 231)	3
Wood Identification (FP 311)	3
Fundamentals of Accounting (BA 214, 215)	6
General Physics (Ph 201,202,203)	12
Extempore Speaking (Sp 111)	3
Technical Report Writing (Wr 227)	3
American Governments (PS 201)	3
Humanities or social science elective	3
Physical education	3
Defense education or other elective	3
	<hr/> 50

Junior Year

	<i>Hours</i>
Logging Methods (FE 392)	3
Wood Properties (FP 314)	4
Timber Mechanics (FP 321,322)	8
Wood Utilization (FP 310)	3
Principles of Economics (Ec 201,202) ..	6
Humanities or social science electives ...	6
² Electives	22
	<hr/> 52

Senior Year

	<i>Hours</i>
Forest Economics (F 412)	3
Forest Administration (F 415)	3
Seminar (FP 407)	1
Lumber Plant (FP 451)	3
Wood Industry Problems (FP 452)	3
Forest Products Merchandising (FP 453)	3
Ply and Laminated Products (FP 464) ..	3
Wood Seasoning (FP 465)	3
Wood Preservation (FP 466)	3
² Electives	26
	<hr/> 51

¹ May substitute Ent 321 or Bot 415.² See paragraph under Forest Products, page 250.

Forest Engineering

Courses in forest engineering are designed to prepare men to deal with the woods problems peculiar to the forest industry of the Pacific Northwest. Emphasis is placed on the preparation of logging plans and the transportation of timber from the woods to the mills.

Lower Division Courses

- FE 123. **Forest Engineering.** 3 hours. 2 ① 1 ④
Measurement of distance, direction, and elevation. Prerequisite: Mth 102.
- FE 223. **Forest Engineering.** 4 hours. 2 ① 1 ⑥
Topographic surveying; direct and indirect leveling; computing and plotting of field data. Prerequisite: FE 123; engineering drawing.

Upper Division Courses

- FE 323. **Forest Engineering.** 3 hours. 2 ① 1 ④
Public land survey; stadia; plane table; polar and solar observation; triangulation; drafting of field data. Prerequisite: FE 223.
- FE 360. **Northwest Logging.** 4 hours. 2 ① 1 ⑥
A basic course in logging methods and equipment with particular application to the Pacific Northwest. Prerequisite: Mth 200; F 224; FE 223.
- FE 361. **Logging Roads.** 3 hours. 2 ① 1 ③
Design of logging roads. Prerequisite: Ph 201; FE 223; F 320; and basic geology.
- FE 392. **Logging Methods.** 3 hours. 2 ① 1 ③
Relation between logging and forest production; felling and bucking; skidding, loading, hauling; relative merits of various methods. Prerequisite: FE 123; FE 224.
- FE 401. **Research.** Terms and hours to be arranged.
- FE 403. **Thesis.** Terms and hours to be arranged.
- FE 405. **Reading and Conference.** Terms and hours to be arranged.
- FE 406. **Projects.** Terms and hours to be arranged.
- FE 407. **Seminar.** Terms and hours to be arranged.
- FE 423. **Forest Engineering.** (g) 4 hours. 3 ① 1 ④
Basic logging plans and route surveys. Prerequisite: FE 323,392.
- FE 461. **Logging Plans.** (g) 5 hours. 2 ① 1 ③ 1 ⑥
Basic logging plans; analysis of timbered areas for development of logging operations; preliminary transportation plans. Prerequisite: FE 323,361,392.
- FE 462. **Logging Transportation.** (g) 5 hours. 2 ① 1 ③ 1 ⑥
Working plans from data obtained in FE 461; development of transportation systems. Prerequisite: FE 461; FP 321.
- FE 463. **Logging Costs.** (g) 5 hours. 2 ① 1 ③ 1 ⑥
Management control; economic theory of location and construction; costs of surveys, construction, operation, and maintenance. Prerequisite: FE 462.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G)
may be taken for graduate credit.

- FE 501. **Research.** Terms and hours to be arranged.
- FE 503. **Thesis.** Terms and hours to be arranged.
- FE 505. **Reading and Conference.** Terms and hours to be arranged.

- FE 506. **Projects.** Terms and hours to be arranged.
- FE 507. **Seminar.** Terms and hours to be arranged.
Subject matter as required by graduate programs.
- FE 525. **Forest Engineering.** 3 hours. 2 ① 1 ④
Advanced logging plans and route surveys. Not open to forest engineering majors.
- FE 560. **Logging Methods.** 4 hours. 2 ① 1 ⑥
Studies of current developments in logging methods and equipment.
- FE 561,562,563. **Logging Engineering.** 5 hours each term. 2 ① 1 ③ 1 ⑥
Logging plans and timber transportation systems.
- FE 581. **Timber Bridge Design.** 3 hours. 1 ① 1 ⑥
Location, design, and construction of timber bridges in logging transportation systems.

Forest Management

The courses in forest management afford basic training for the practice of forestry, particularly in the Pacific Northwest. Emphasis is placed upon the technical and administrative measures necessary to produce the greatest values from all forest resources.

Lower Division Courses

- F 40. **Forest Orientation.** No credit. 1 ①
Personal orientation of the student to Oregon State University and to the profession.
- F 111. **General Forestry.** 3 hours. 3 ①
Survey of the entire field of forestry including the development of the conservation movement in the United States; fields of specialization; professional opportunities. Restricted to forestry students.
- F 153. **Tree Identification.** 3 hours. 1 ① 2 ②
Principal Pacific Coast timber trees; range, occurrence, size, growth, form; climate, soil, moisture requirements, value; wildlife uses.
- F 224. **Mensuration.** 5 hours. 3 ① 1 ⑥
Measurement of standing and felled timber and timber products. Prerequisite: FE 123; F 153 or F 154.
- F 231. **Forest Protection.** 3 hours. 2 ① 1 ③
Major causes of forest damage, including insects, disease, and fire, and their influence on forest management; recognition of damage, methods of salvage, preventive measures, control of damage. Prerequisite: F 153 or F 154.
- F 254. **Dendrology.** 4 hours. 1 ① 3 ②
Principal timber trees of the United States with special emphasis on Western species; characteristics, classification, identification. Prerequisite: Bot 201.
- F 260. **Conservation of Natural Resources.** 3 hours. 3 ①
Nature, extent, and importance of natural resources of United States and operation of various forest agencies in conserving them; forest, forage, recreation, wildlife, soil, and water aspects. Not open to forestry majors.

Upper Division Courses

- F 320. **Aerial Photointerpretation.** 3 hours. 2 ① 1 ③
Techniques and principles of forest photointerpretation; forest type mapping; volume estimation from aerial photographs. Prerequisite: F 224.
- F 324. **Forest Valuation.** 3 hours. 2 ① 1 ③
Valuation as a tool of management in forest enterprise; methods of valuing various types of assets, including land, stumpage, capital equipment, and the going operation.

- F 327. **Mensuration: Timber Growth.** 5 hours. 3 ① 2 ③
Even-aged stands, many-aged stands, and individual trees. Prerequisite: F 224.
- F 341. **Forest Ecology.** 4 hours. 3 ① 1 ③
Influence of environmental factors on the development, distribution, and succession of forest vegetation. Prerequisite: F 231; SIs 214; G 210; plant physiology.
- F 342. **Silvicultural Practices.** 4 hours. 3 ① 1 ③
Treatment of stands to insure perpetuation of forest resources. Prerequisite: F 341 (for forest management majors).
- F 343. **Forestation.** 3 hours. 2 ① 1 ③
Forest land examination and classification; reproduction surveys; planting plans; establishment and maintenance of plantations; nursery practices. Prerequisite: F 341.
- F 344. **Farm Forestry.** 3 hours. 2 ① 1 ③
Relation of forest resources and forestry to agriculture, with emphasis on techniques of farm-woodland management and utilization of farm forest products. Designed especially for agricultural students. Offered alternate years. Not offered 1963-64.
- F 364,365. **Forest Recreation Planning.** 3 hours each term. 2 ① 1 ③
Policies, practices, problems of forest recreation in multiple-use management. F 364 not prerequisite to F 365.
- F 370. **Field Work.** 1 to 6 hours.
Practical field work between the sophomore and junior years or the junior and senior years carried on with private concerns or public agencies; report based on an approved outline. (See section on ACADEMIC REGULATIONS regarding work done in absentia.)
- F 401. **Research.** Terms and hours to be arranged.
- F 403. **Thesis.** Terms and hours to be arranged.
- F 405. **Reading and Conference.** Terms and hours to be arranged.
- F 406. **Projects.** Terms and hours to be arranged.
- F 407. **Seminar.** Terms and hours to be arranged.
- F 412. **Forest Economics.** (g) 3 hours. 3 ①
Management and utilization; forest credit, taxation, and marketing. Prerequisite: Ec 202; for forest management majors, F 324 and 327.
- F 415. **Forest Administration.** (g) 3 hours. 3 ①
Administrative organization and personnel work of public and private forest agencies. Prerequisite: senior standing.
- F 424. **Watershed Management.** (g) 3 hours. 2 ① 1 ③
Forest management applied to integrated use of all forest resources for the production of water. Prerequisite: F 342; senior standing.
- F 425. **Forest Management.** (g) 5 hours. 4 ① 1 ③
Achieving and maintaining sustained yield. Resource inventories, planning and plans, for both industrial and public ownership. Prerequisite: F 324; senior standing; for forest management majors, F 327.
- F 427. **Industrial Forestry.** (G) 3 hours. 3 ①
Operation of industrial forest properties in the Northwest. Prerequisite: senior standing.
- F 431. **Fire Control.** (g) 4 hours. 3 ① 1 ③
Basis for fire control. Fire-control planning and administration. Prerequisite: F 231.
- F 442. **Pine Forest Practices.** (G) 2 hours spring. 2 ①
Silvicultural problems and treatment of pine forest types in western United States. Prerequisite: F 342; senior standing.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- F 501. **Research.** Terms and hours to be arranged.
- F 503. **Thesis.** Terms and hours to be arranged.
- F 505. **Reading and Conference.** Terms and hours to be arranged.
- F 506. **Projects.** Terms and hours to be arranged.
- F 507. **Seminar.** Terms and hours to be arranged.
Subject matter as required by graduate programs.
- F 511. **Economics of Private Forestry.** 3 hours. 3 ①
Economic and financial problems including insurance, forest credit, cost analysis, and practical problems in forest finance. Prerequisite: F 412.
- F 512. **Economics of the Forest Resource.** 3 hours. 3 ①
Place of forests in national and regional economy; forest industries; forest ownership, taxation, and public policy. Prerequisite: F 412.
- F 513. **Economics of Forest Utilization.** 3 hours. 3 ①
Factors affecting costs and returns in forest industries. Prerequisite: F 412.
- F 514. **Forest Land Use.** 3 hours. 3 ①
Economic planning applied to problem of coordinating forest land uses with one another and with other forms of land use. Prerequisite: F 412.
- F 515. **Forest Administration.** 3 hours. 3 ①
Organization, administration, operating problems of public and private forestry agencies.
- F 519. **Photogrammetry.** 3 hours. 1 ② 2 ③
Use of multiplex and Balplex plotters in topographic mapping and road location. Prerequisite: F 320; FE 323; and consent of instructor.
- F 520. **Aerial Photo Mensuration.** 3 hours. 1 ① 2 ③
Use of aerial photographs in forest inventory; photomensurational techniques in preparation of stand and tree volume tables; planning large scale photomensurational projects.
- F 521. **Research Methods.** 3 hours. 3 ①
Research project analyses and working plans, investigative procedures, principles and practices in scientific writing.
- F 522. **Multiple-Use Management.** 3 hours. 2 ① 1 ③
Forest regulation, continuous forest inventory, and multiple-use management planning. Prerequisite: F 425.
- F 523. **Forest Management Problems.** 3 hours. 2 ① 1 ③
Special problems relative to forest land management. Prerequisite: F 412,425.
- F 524. **Forest Mensuration.** 3 hours. 2 ① 1 ③
Growth determination; mensurational aspects of level of growing stock; variable plot sampling; current forest inventories. Prerequisite: F 327; St 421.
- F 531. **Fire Control.** 3 hours. 2 ① 1 ③
Forest-fire plans, their preparation and execution.
- F 534. **Watershed Management.** 3 hours. 2 ① 1 ③
Interception, transpiration, evaporation, and sedimentation with emphasis on aspects dealing with forest practice as related to stream flow. Prerequisite: F 424.
- F 541,542,543. **Silviculture.** 3 hours each term. 3 ①; 3 ①; 2 ① 1 ③
Advanced forest ecology, silvicultural practices, and forest regeneration.
- F 544. **Forest Genetics.** 3 hours winter. 2 ① 1 ③
Plant genetics principles applied to silvicultural practices. Prerequisite: F 341 or Bot 341; Z 341.

Forest Products

The curriculum is intended to prepare men for careers in the diversified forest products and allied industries. It is designed to give a broad education in principles fundamental to the science of wood, its adaptability to processes, and wise use of products. The curriculum is equally applicable in preparation for production, sales, research and product development, technical services, and utilization areas of employment. In meeting student objectives in these areas an opportunity is provided through electives to arrange programs, under staff guidance, to include courses offered in architecture, humanities, social sciences, business, sciences (particularly wood chemistry, pulp and paper chemistry), engineering, forest management, and forest engineering. Early planning in the use of elective credits provided has permitted a number of forest products majors to receive a second bachelor's degree in chemistry or business and technology by meeting requirements for concurrent degrees indicated on page 25.

Lower Division Course

- FP 210. **Wood Technology.** 3 hours. 2 ① 1 ②
 Wood structure, properties, seasoning, grading, and treatment; wood identification with the hand lens. Abbreviated course for students not majoring in forest products. Prerequisite: F 111 or F 260; F 153 or 154.

Upper Division Courses

- FP 310. **Wood Utilization.** 3 hours. 3 ①
 Principal wood-using industries; economics, species used, manufacturing processes, and products; special emphasis on Pacific Coast industries. Prerequisite: FP 210 or 311.
- FP 311. **Wood Identification.** 3 hours. 1 ① 2 ③
 Commercial woods identified with a hand lens; their microscopic structure. Prerequisite: F 153; Bot 201.
- FP 314. **Wood Properties.** 4 hours. 3 ① 1 ③
 Anatomy of wood; physical and chemical characteristics; modified woods. Prerequisite: FP 311.
- FP 321. **Timber Mechanics.** 4 hours. 2 ① 2 ③
 Simple structures and structural elements of wood; stress, strain, strength, and elastic characteristics of wood; design and selection of structural elements. Prerequisite: Mth 200; FP 210 or 314; Ph 201.
- FP 322. **Timber Mechanics.** 4 hours. 2 ① 2 ③
 Timber testing; strength of wood; mechanical properties data; timber fastenings and fabrication; design problems. Prerequisite: FP 321.
- FP 401. **Research.** Terms and hours to be arranged.
- FP 403. **Thesis.** Terms and hours to be arranged.
- FP 405. **Reading and Conference.** Terms and hours to be arranged.
- FP 406. **Projects.** Terms and hours to be arranged.
- FP 407. **Seminar.** Terms and hours to be arranged.
- FP 451. **The Lumber Plant.** (g) 3 hours. 2 ① 1 ③
 Grading principles; manufacturing plants, equipment selection, layout; production practices; plant visits. Prerequisite: FP 310.
- FP 452. **Wood Industry Problems.** (g) 3 hours. 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 451.

- FP 453. **Forest Products Merchandising.** (g) 3 hours. 3 ①
Trade practices and customs pertaining to distribution of forest products, wholesale and retail. Prerequisite: FP 310; for forest products majors, FP 451.
- FP 464. **Ply and Laminated Products.** (g) 3 hours. 2 ① 1 ③
Gluing of wood; production and properties of glues, veneers, ply and laminated products; gluing techniques and commercial practices; equipment used; plant visits. Prerequisite: senior standing in forest products.
- FP 465. **Wood Seasoning.** (g) 3 hours. 2 ① 1 ③
Wood drying; types, operation, and maintenance of drying facilities; lumber, veneer, and particles; plant visits. Prerequisite: FP 314.
- FP 466. **Wood Preservation.** (g) 3 hours. 2 ① 1 ③
Deterioration; good building practices; preservatives, processes, and treating equipment; properties of treated materials; economic aspects, plant visits. Prerequisite: FP 314.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G)
may be taken for graduate credit.

- FP 501. **Research.** Terms and hours to be arranged.
- FP 503. **Thesis.** Terms and hours to be arranged.
- FP 505. **Reading and Conference.** Terms and hours to be arranged.
- FP 506. **Projects.** Terms and hours to be arranged.
- FP 507. **Seminar.** Terms and hours to be arranged.
Subject matter as required by graduate program.
- FP 516. **Wood Microtechnique.** 3 hours. 3 ③
Preparation, sectioning or maceration, staining, and mounting of slides of wood and wood-base materials for microscopic study. Prerequisite: FP 314.
- FP 517. **Wood Anatomy.** 3 hours. 1 ① 2 ③
Intensive anatomical studies; techniques; literature survey. Prerequisite: FP 314.
- FP 518. **Wood Properties.** 3 hours. 2 ① 1 ③
Advanced specialized, analytical, and experimental investigations of mechanical or other physical properties of wood; relation to specific uses. Prerequisite: FP 314.
- FP 551,552,553. **Wood Industry Problems.** 3 hours each term.
Plant layout planning; production studies; production control; residue utilization; management; merchandising.
- FP 555. **Forest Products Photographic Techniques.** 3 hours. 3 ③
Application of macro and micro photography to wood technology problems. Prerequisite: FP 314.
- FP 564. **Ply and Laminated Products.** 3 hours. 2 ① 1 ③
Special gluing problems; testing adhesives used in ply and laminated construction; physical properties of wood related to bonding problems; study of technical literature.
- FP 565. **Wood Seasoning.** 3 hours. 2 ① 1 ③
Special problems in drying of wood; procedures and equipment; design of schedules.
- FP 566. **Wood Preservation.** 3 hours. 2 ① 1 ③
Advanced work in wood preservation designed to meet needs of individual students, with special attention to theoretical consideration and factors that control efficiency of treating processes.

School of Home Economics

Faculty

As of January 1963

MIRIAM G. SCHOLL, Ed.D., Dean of the School of Home Economics.

WINNIFRED KEIL FULMER, M.S., Head Counselor.

AVA MILAM CLARK, M.A., Professor Emeritus of Home Economics. (Dean and Director School of Home Economics 1917-1950.)

VERA BRANDON, Ph.D., Professor Emeritus of Home Economics. (Acting Dean School of Home Economics 1950-1954, Associate Dean 1954-1955.)

Clothing, Textiles, and Related Arts: Professors INGALLS (acting department chairman), EDABURN,¹ FRITCHOFF (emeritus), GATTON (emeritus), PATTERSON, STRICKLAND (emeritus); Associate Professors CREEKMORE,² DIEDESCH, LEDBETTER, MOSER; Assistant Professors CARLSON, GRANT, WELLS; Instructor BUBL; Teaching Assistants BORROR, FRESCURA, RINEHART.

Family Life and Home Administration: Professors READ (department head),³ BRANDON (emeritus), KIRKENDALL, PRENTISS (emeritus), VAN HORN; Associate Professors PLONK, SCHALOCK (acting department chairman), Assistant Professors AIKIN, LOUGHLIN, STATION;⁴ Instructors ARNOLD,⁵ GRAVATT, MERRELL, OLESON, PLANTS, SIMMONS, SINNARD,² ULLOCK; Teaching Assistants FAGG, FURNISS, SANDERCOCK, SMALLEY.

Foods and Nutrition: Professors FINCKE (department head), CHARLEY, HAWTHORNE,⁶ MACKAY, STORVICK, WILLIAMS (emeritus); Associate Professor TANK; Assistant Professors BARTE,⁷ BUSSARD, GARRISON (emeritus), WALLACE; Instructors EAST, PHILLIPS, WATTS; Teaching Assistant URY.

Home Economics Education: Professor DUBOIS (department head); Director and Teacher Educator KOHLHAGEN; Associate Professor MCQUESTEN; Assistant Professor HENDRIX.

Home Economics Research: Professors STORVICK (chairman), CHARLEY, HAWTHORNE,⁶ MACKAY, WILSON (emeritus); Associate Professors SCHALOCK, TANK; Assistant Professor CARLSON; Instructors BENSON, BUBL, EDWARDS, JOINER; Assistant in Nutrition WOODRING; Assistant in Foods POHL; Assistant in Clothing and Textiles ROHDE; Research Assistant PETERS.

Institution Management: Associate Professor CLEAVELAND (manager, residence halls food service); Assistant Professor HOLMAN,⁸ Instructors FULLER,⁸ PAASCHE.⁸

Home Economics Extension: Professors MACK (assistant director, Federal Cooperative Extension Service), TASKERUD (coordinator, home economics extension programs), SCALES (State agent); Associate Professors ABBOTT (State agent), FRASIER (family life specialist), FUNK (State agent), MALLALIEU (recreation specialist), MILLER (home management specialist), REIGLE (consumer marketing specialist), STRAWN (equipment specialist), WEISER (nutrition specialist); Assistant Professors BRASHER (State agent, 4-H Clubs), MILLER (information specialist), REDMAN (State 4-H agent).

General Statement

THE SCHOOL OF HOME ECONOMICS at Oregon State University has a long and distinguished history. It was the first program to be established in the West having received its start in 1889 when Home Economics was in its infancy in this country. Since then tremendous changes in living have taken place, and a vast amount of knowledge is now available which Home Economics applies toward the improvement of the many and varied aspects of the home and family living. This school has supplied home economists around the world for many years, attracting students from many countries for both graduate and undergraduate programs in clothing, textiles, and related arts; foods and nutrition; child development and family relations; institution management; home management; housing; and home furnishings and equipment. Oregon State University home economics graduates are sought for positions in business, extension, teach-

¹ On sabbatical leave, spring term only.

² Spring term only.

³ On sabbatical leave 1962-63.

⁴ Fall and spring terms only.

⁵ Winter and spring terms only.

⁶ On sabbatical leave, winter term only.

⁷ On leave of absence 1962-63.

⁸ Fall term only.

ing, dietetics, research, supervision, and administration. There are more positions available than graduates to fill them.

The major objectives of the School are (1) to provide preparation for professional careers in the various areas of home economics and (2) to assist students in fitting themselves for their varied roles as individuals, family members, and citizens.

All home economics students take some work in each of the basic areas: clothing, textiles, and related arts; foods and nutrition; and family life and home administration. They also take work in humanities, social sciences, and science.

Excellent facilities for all phases of home economics work are provided in the Home Economics Building, the home management houses, the nursery schools, and the residence halls and dining services.

Curriculum. All students fulfill requirements of one core curriculum for graduation from the School of Home Economics. The core includes the following requirements:

Home Economics:

- 12 hours in clothing, textiles, and home furnishings: CT 210, 211, 250, 331.
- 12 hours in foods and nutrition: FN 225; 211, 212 or 220, 221; 313.
- 9 hours in child development and family life: FL 225, 311, 422.
- 12 hours in household equipment, home management, and finance: HAD 240, 330, 341, 450.
- 1 hour in home economics orientation: HEc 101.
- ¹9 hours of upper division electives in home economics subjects.

Science and Social Science:

- ¹15 hours in science, of which 9-12 are a laboratory sequence (not a survey)
- 24 hours in social science to include:
 - 6 hours in general psychology
 - 9 hours in a history sequence
 - 3 hours each in economics, political science, and sociology.
- ¹6 hours of electives in science or social science.

Other combinations of social science courses for students with special needs may be taken with specific approval of the dean.

Humanities:

- 9 hours of English composition
- 9 hours of literature (or literature in a foreign language) or 6 hours of literature and 3 hours of speech
- 3 hours of art: Color and Composition
- 3 hours of art or music
- 3 hours of architecture: House Planning and Architectural Drawing.

Other requirements:

Mathematics 10 or exempt by a minimum score of 400 on the Intermediate Mathematics Achievement Test.

Physical Education: five terms in activity courses and one term in general hygiene. Also required for senior standing.

Additional courses chosen from AREAS OF CONCENTRATION on pages 256-261 to meet graduation requirements.

Students wishing to be identified as majors in a specific area may do so with the approval of the head of the department concerned and the dean. Six

¹For recommended and required courses for the various earning fields, see AREAS OF CONCENTRATION, pages 256-261.

hours of approved home economics courses in the core requirements (only three from any one department) may be replaced with courses that have been approved for the major.

Transfer students who have taken some of their home economics courses elsewhere are required to take at least one course in each of the basic home economics subject matter areas at Oregon State University to qualify for graduation. They will be required to take the Intermediate Mathematics Achievement Test unless they have satisfactorily completed a college course in algebra.

One-year and two-year students who are interested in home economics but who are not candidates for degrees may plan, with the help of their advisers, special programs to meet individual needs, capabilities, and interests. In such special programs students may elect a variety of courses in other schools and departments on the campus.

Graduate Study and Research. Through the Graduate School, all departments of the School of Home Economics offer work leading to the master's degree (M.A., M.S., M.H.Ec.). The Master of Home Economics degree may also be completed with a major in general home economics. The Doctor of Philosophy degree is offered in foods and nutrition and in child development and family relations.

The School of Home Economics cooperates with the Agricultural Experiment Station in research programs and undertakes studies supported by Federal, State, private, and general research funds.

Correspondence Study. Home economics courses are also offered by correspondence through the General Extension Division of the Oregon State System of Higher Education.

The Merrill-Palmer School. The School of Home Economics carries an affiliation with the Merrill-Palmer School in Detroit. Students interested in any phase of child development, family relations, or social service work may apply and be selected to study at the Merrill-Palmer School during one term of their junior or senior years. For information about applications, see the dean of the School of Home Economics.

Curriculum in Home Economics

B.A., B.S. Degrees¹

Freshman Year		Sophomore Year	
	Hours		Hours
Color and Composition (AA 160)	3	Foods (FN 211,212) or (220,221)	6
Art or Music	3	² Science	3-6
³ Science sequence with laboratory (not a survey)	9-12	Child Development (FL 225)	3
³ Mathematics 10 or exempt	(0-4)	Management in Family Living (HAD 240)	2
English Composition (Wr 111,112,113) ..	9	House Planning and Architectural Drawing (AA 178)	3
Intro to Home Economics (HEc 101) ...	1	General Psychology (Psy 201,202)	6
Nutrition (FN 225)	3	History of Western Civilization (Hst 101,102,103)	9
Clothing Construction (CT 210 or 216) 3		Literature or literature in a foreign language	6
Clothing Selection (CT 211)	3	Physical education	3-4
Textiles (CT 250)	3	Electives or courses in area of concentration or major	2-7
Speech or literature	3		
Physical education	3-4		
Electives or courses in area of concentration or major	0-6		

¹ See DEGREES AND CERTIFICATES, page 23.

² For recommended and required courses for the various earning fields, see AREAS OF CONCENTRATION, pages 256-261.

³ Does not count in hours for graduation.

Junior Year	Hours	Senior Year	Hours
Family Finance Mgt (HAD 341)	2	Family Relationships (FL 422)	3
Child Development (FL 311)	3	Home Management House (HAD 450) ..	5
Household Equipment (HAD 330)	3	² Upper division electives in home eco-	9
Meal Planning and Service (FN 313)	3	nomics	9
¹ Outlines of Economics (Ec 212)	3	Electives or courses in area of concen-	34
¹ General Sociology (Soc 212)	3	tration or major	34
Political science	3		
Home Furnishing (CT 331)	3		
Electives or courses in area of concen-	19		
tration or major	19		
² Electives in science or social science	6		

AREAS OF CONCENTRATION AND MINORS

The following areas of concentration and minors have been set up to help direct students in their professional interests in home economics. Students need to consult staff members as early as possible in their college careers to plan their total programs for personal and professional preparation as well as to meet graduation requirements. The areas of concentration and minors list recommended courses and are not requirements for graduation.

Students interested in areas other than those listed may plan special programs with their advisers.

Clothing, Textiles, and Related Arts

Clothing and Textiles in Business

Students in this area may prepare for merchandising, promotional, and fashion careers in textiles and clothing.

Recommended Basic Courses:

Clothing Construction (CT 212)
 Consumer Buying in Clothing and Textiles (CT 350)
 Textile Processing (CT 355)
 The Clothing Buyer (CT 470)
 Extempore Speaking (Sp 111)
 Business English (Wr 214)
 Marketing (BA 313)
 Retail Merchandising (BA 463)

Other Suggested Electives:

Upper division courses in clothing, textiles, and related arts

Journalism, radio speaking, and basic tele-
 vision

Principles of Accounting (BA 211)
 Advertising (BA 464)
 Salesmanship (BA 465)
 Human Rels in Bus (BA 497)
 Prin of Econ (Ec 201,202,203 or 213,214)
 French
 Survey of Visual Arts (AA 201,202,203)
 Drawing (AA 291)
 Basic Design (AA 295)
 Advertising Design (AA 296)
 History of Art (AA 363,364,365)

Home Furnishing and Interior Design

Students interested in these fields may take courses to gain a background for further training, for apprenticeship or other positions in merchandising, or because of general interest. Experience and further education are required to become a professional interior designer. Students may enter the field of interior design either from Schools of Home Economics or from Schools of Architecture and Allied Arts.

Recommended Basic Courses:

Graphics (AA 111,112)
 Color and Composition (AA 161)
 Design Studio (AA 187)
 House Planning and Arch Draw (AA 180)
 Survey of Visual Arts (AA 201,202,203)
 Graphics (AA 211,212,213)
 Elements of Interior Design (AA 223)
 Art Craft (AA 259)
 Architectural Design (AA 287)
 Interior Design (AA 288)
 Basic Design (AA 295)
 Advertising Design (AA 296)
 Clothing Construction (CT 212)
 Home Furnishing Laboratory (CT 332)
 Applied Home Furnishing (CT 333)
 Textile Design (CT 335)
 Consumer Buying in Clothing and Textiles (CT 350)
 Quantity Textile Purchasing (CT 351)
 Textile Processing (CT 355)

Home Furnishing (CT 431)
 Historic Textiles (CT 460)
 Org and Use of House Space (HAD 335)
 House Plan in Rel to Function (HAD 435)
 Functional Design of Dwellings (HAD 436)
 Family Housing (HAD 439)
 Utilities in the Home (AE 435)
 Home Ground Planning (LA 279)

Other Suggested Electives:

Hist of Amer Civ (Hst 224,225,226)
 Amer Thought and Cult (Hst 460,461,462)
 Creative Epochs in Western Thought (Hum 311,312,313)
 House Plan and Arch Draw (AA 179)
 Construction Materials (AA 121)
 Building Cost Estimating (AE 465)
 Courses in speech, journalism, radio speaking, and television
 Courses in business administration

¹ Course may also be first term of a sequence if the sequence is to be completed.

² See corresponding footnote on previous page.

College Teaching and Research in Clothing, Textiles, and Related Arts

Students may enter this area to prepare for graduate work leading to college teaching or because of general interest in this field.

Recommended Basic Courses:

General chemistry (Ch 101,102,103 or
Ch 201,202,203)
Principles of Economics (Ec 201,202,203) or
Sociology (Soc 204,205,206)
Clothing Construction (CT 212)
Historic Costume (CT 309)
Flat Pattern and Draping (CT 310)
Textile Design (CT 335)
Consumer Buying in Clothing and Textiles
(CT 350)
Survey of Visual Arts (AA 201,202,203)

Other Electives:

Upper division courses in clothing, textiles,
and related arts
Upper division courses in home admin
(housing)

Concentrated work in one or more of the areas listed below:

Art and architecture	Microbiology
Chemistry	Modern languages
Economics	Physics
History	Psychology
Mathematics	Sociology

Textile Research

Students in this area may prepare for graduate work leading to research or college teaching of textiles. Chemistry is essential for this field.

Recommended Basic Courses:

General chemistry (Ch 101,102,103,241, or
201,202,203)
Intermediate Algebra (Mth 100)
College Algebra (Mth 101)
General Microbiology (Mb 204)
Organic Chemistry (Ch 221,222 or Ch 226,
227)
Abridged General Physics (Ph 211,212) or
General Physics (Ph 201,202,203)
Technical Report Writing (Wr 227)
Consumer Buying in Cloth & Text (CT 350)
Textile Processing (CT 355)

Other Suggested Electives:

Trigonometry (Mth 102)
Calculus with Anal Geom (Mth 200,201,202,
203)
Clothing Construction (CT 212)
Quantity Textile Purchasing (CT 351)
Textiles (CT 450)
Chemical Theory (Ch 241)
Quantitative Analysis (Ch 234)
Elementary Physical Chemistry (Ch 340) or
Physical Chemistry (Ch 440,441,442)
French or German

Child Development and Family Relations

Nursery School Teaching

Students taking courses in this area prepare for nursery school teaching.

Recommended Basic Courses:

General Biology (GS 101,102,103)
Child Development (FL 413)
Parent Education (FL 423)
The Nursery School Child (FL 425)
The Nursery School Child Laboratory (FL
426)
Nursery School Children (FL 427)
Curriculum Enrichment for Young Children
(FL 428)
Supervised Nursery School Experience (FL
429)
Understanding Child Behavior (FL 430)

Other Suggested Electives:

Physical Science (GS 104,105,106—one or
more terms)
Children's Literature (Lib 388)
Group Dynamics (Psy 361)
Management in Family Living (HAD 440)
Clothing for Children (CT 320)
Family Nutrition (FN 325)
Art courses
Music courses
Additional courses in psychology and sociology
Courses in education are required for teach-
ing credential

College Teaching and Research in Child Development and Family Relations

Students may prepare for graduate work leading to college teaching and research in the areas of child development and family relations.

Recommended Basic Courses:

General Zoology (Z 201,202,203)
Physiology (Z 331,332)
Intermediate Algebra (Mth 100)
Psychology Laboratory (Psy 208,209)
Child Development (FL 312)
Statistical Techniques (St 314,315)
Genetics (Z 341)
Group Dynamics (Psy 361)

The Nursery School Child (FL 425)
Economics of the Family (HAD 441)
Management Problems in Home-Community
Relations (HAD 445)

Other Suggested Electives:

Individual programs for students in each of
the above areas are arranged from offerings
in home economics, social sciences, humani-
ties, education, and other fields.

Home Administration

Home Management and Family Economics

Students may prepare for graduate work leading to college teaching or for positions in business or social agencies in these areas.

Recommended Basic Courses:

Principles of Economics (Ec 201,202,203)
 Statistical Techniques (St 314,315)
 Consumer Buying in Clothing and Textiles (CT 350)
 Family Food Buying (FN 411)
 Family Housing (HAd 439)
 Management in Family Living (HAd 440)

Economics of the Family (HAd 441)
 Management Problems in Home-Community Relations (HAd 445)
 Organization and Use of House Space (HAd 335)
 Food Management (FN 412)
 Seminars in home management

Household Equipment in Business

Students may prepare for work with utility and equipment companies.

Recommended Basic Courses:

General Physics (Ph 201,202,203) or
 Abridged General Physics (Ph 211,212)
 General Chemistry (Ch 101,102,103 or Ch 201,202,203)
 Physiology (Z 331,332)
 Courses in journalism, speech, radio speaking, and television
 Food Demonstrations (FN 410)
 Org and Use of House Space (HAd 335)
 Human Rel in Bus (BA 497)

Other Suggested Electives:

Business English (Wr 214)
 Consumer Buying in Clothing and Textiles (CT 350)
 Family Food Buying (FN 411)
 Economics of the Family (HAd 441)
 Utilities in the Home (AE 435)
 Management Problems in Home-Community Relations (HAd 445)
 Textiles (CT 450)
 Seminars in home management

Housing

For students preparing for positions or graduate work in the field of housing.

Recommended Basic Courses:

General Physics (Ph 201,202,203) or
 Abridged General Physics (Ph 211,212)
 Intermediate Algebra (Mth 100)
 College Algebra (Mth 101)
 Construction Materials (AA 121)
 Rural House Planning (AE 451)
 Organization and Use of House Space (HAd 335)

House Planning in Relation to Function (HAd 435)
 Functional Design of Dwellings (HAd 436)

Other Suggested Electives:

Family Housing (HAd 439)
 Economics of the Family (HAd 441)
 For additional course suggestions, see HOME FURNISHING AND INTERIOR DESIGN, page 256.

Foods and Nutrition

Foods and Nutrition in Business

Students in this area may prepare for positions in test kitchens and in consumer service work with food, equipment, and utility companies. See also home economics communications and food research areas.

Recommended Basic Courses:

General chemistry (Ch 101,102,103,241, or 201,202,203)
 Organic Chemistry (Ch 221,222)
 General Microbiology (Mb 204)
 Foods (FN 220,221)
 Extempore Speaking (Sp 111)
 Radio Speaking (Sp 361,362,363)
 Basic Television (Sp 367)
 Journalism (J 111)
 Food Demonstrations (FN 410)

Other Suggested Electives:

Family Nutrition (FN 325), or Nutrition (FN 381)
 Family Food Buying (FN 411)
 Food Management (FN 412)
 Experimental Food Studies (FN 435)
 Technical Writing (J 319)
 Advertising (BA 464)
 Human Rel in Bus (BA 497)
 Home Food Preservation (FN 414)
 Science of Foods (FN 335)

College Teaching and Research in Foods and Nutrition

Students in this area may prepare for graduate study leading to college teaching and to research positions in foods or nutrition in colleges, government, or industry. A sound basis in chemistry is essential.

Recommended Basic Courses:

General chemistry (Ch 101,102,103,241, or 201,202,203)
Organic Chemistry (Ch 226,227)
General Microbiology (Mb 204)
Foods (FN 220,221)
Quantitative Analysis (Ch 234)
Biochemistry (Ch 350)
Intermediate Algebra (Mth 100)
Physiology (Z 331,332)
Nutrition (FN 381)

Other Suggested Electives:

General Microbiology (Mb 205)
College Algebra (Mth 101)
Trigonometry (Mth 102)
Calculus with Analytical Geometry (Mth 200)
Experimental Food Studies (FN 435)
Science of Foods (FN 335)
Readings in Nutrition (FN 521)
Child Nutrition (FN 421)
Nutrition in Disease (FN 420)
Family Food Buying (FN 411)
Home Food Preservation (FN 414)
Modern language one to two years
General Physics (Ph 201,202,203) or
Abridged General Physics (Ph 211,212)

Public Health Nutrition

Graduate work in public health nutrition is required for positions as nutritionists in public health or other community agencies. Programs to help meet entrance requirements of graduate schools of public health can be arranged.

Institution Management and Dietetics

Students in this area may prepare for positions as dietitians or as executive housekeepers in hospitals, school and college housing, and food service, as well as in business, industry, and government agencies. An approved one-year internship¹ following the four-year course is recommended for students entering these professions.

Clinic, College, Hospital or Industrial Internships¹

Required courses:

Chemistry (Ch 101,102,103,241, or 201,202, 203 and 221,222)
Microbiology (Mb 204)
Foods and Nutrition (FN 220,221,313)
Physiology (Z 331,332)
Institution management courses (IM 311, 430,440,450)
Basic Accounting & Fin Analysis (BA 217)
Personnel Management (BA 451)
Educational Psychology (Ed 312)

Additional required courses, 18 to 22 hours from the following group, depending on the emphasis and concentration selected:

Business administration course (BA 411,412, 413,451, or 497)
Educational Psychology (Ed 312)
Foods and nutrition courses (FN 335,412, 420,421,425,435,521)
Biochemistry (Ch 350)
Institution management seminar (IM 407)
Labor Problems (Ec 425)
Industrial Psychology (Psy 431)

Restaurant Management and Commercial Food Service¹

Interested students, both men and women, may plan with an adviser a special program for preparation in this field.

Executive Housekeeper Internship¹

Courses required for this internship are available and a program may be planned for such preparation.

Home Economics Communications

Students interested in fields of journalism, radio, and television may combine their home economics preparation with the following recommended elective courses in one or more types of communications.

Journalism

Recommended Basic Courses:

Journalism (J 111,112)
Copyediting (J 214)
Public Information Methods (J 318)

Special Feature Articles (J 317)
Technical Writing (J 319)
Photo-Journalism (J 334)
Journalism Projects (J 351,352,353)

¹ Offered by American Dietetic Association, National Restaurant Association, National Executive Housekeeper Association.

Radio and Television*Recommended Basic Courses:*

Extempore Speaking (Sp 111)
 Voice and Diction (Sp 120)
 Interpretation (Sp 121)

Other Suggested Electives for Communication Fields:

Food Demonstrations (FN 410)
 Family Food Buying (FN 411)
 Food Management (FN 412)
 Clothing Construction (CT 212)
 Historic Costume (CT 309)

Radio Speaking (Sp 361,362,363)
 Basic Television (Sp 367)
 Television Programming (Sp 368)
 Audio-Visual Aids in Radio-Tel (Sp 451)

Consumer Buying in Cloth and Tex (CT 350)
 Home Furnishing Laboratory (CT 332)
 Org and Use of House Space (HAD 335)
 Economics of the Family (HAD 441)

Home Economics Education

Students interested in preparing to teach home economics in junior or senior high school are expected to have strong home economics preparation as well as to be working towards a teaching minor in a second high school subject. In this way they may meet both vocational and provisional certification requirements for Oregon as well as certification for other states.

Required courses to be included in home economics education which are not listed specifically in core curriculum:

Physiology (Z 331,332)
 Art (Color and Composition, AA 161) for 3 hours in art or music
 Clothing Construction (CT 212)
 Child Development (FL 413)
 The Nursery School Child (FL 425)

Courses in a Teaching Minor:

(See SCHOOL OF EDUCATION teaching majors and minors, page 192.)

Courses in Education to prepare for high school teaching:

School in American Life (Ed 310)
 Educational Psychology: Learning (Ed 312)
 Methods in Reading (Ed 350)
 Special Sec Methods (Home Ec) (Ed 408d)
 Student Teaching: Secondary (Ed 416)
 Seminar: Student Teaching (Ed 407)
 Seminar: Prob of Beg Teachers (HEd 407)
 Organization and Administration of Home-making Education (HEd 422)
 Homemaking Education in the Community High School (HEd 440) (Optional)
 Psychology of Adolescence (Ed 461)

Home Economics Extension

Students interested in the field of extension as county agents, 4-H Club agents, or similar types of work may combine their home economics preparation with elective courses in home economics extension.

Recommended Basic Courses:

General Chemistry (Ch 101,102,103)
 General Microbiology (Mb 204)
 Physiology (Z 331,332)
 Courses in journalism, speech, radio speaking, and television
 Personality and Development (Psy 111)
 Business English (Wr 214)
 Clothing Construction (CT 212)
 Flat Pattern and Draping (CT 310)
 Consumer Buying in Clothing and Textiles (CT 350)
 Home Furnishing Laboratory (CT 332)
 Applied Home Furnishing (CT 333)
 Child Development (FL 413)
 Family Nutrition (FN 325)
 Home Food Preservation (FN 414)
 Group Dynamics (Psy 361)

Mental Hygiene (Psy 411)
 Educational Psychology: Learning (Ed 312)
 Extension Methods (EM 411)
 Field Work in Home Economics Extension (EM 453)
 The Nursery School Child (FL 425)

Other Suggested Electives:

Tailoring (CT 312)
 Clothing for Children (CT 320)
 Home Furnishing (CT 431)
 Parent Education (FL 423)
 Community Organization (Soc 475)
 Home Ground Planning (LA 279)
 Leadership Training (Ed 296)
 Recreation Leadership (PE 240)
 Management in Family Living (HAD 440)
 Economics of the Family (HAD 441)

Positions With Social Welfare Agencies

Students may prepare for positions as beginning caseworker in public welfare and other social agencies, or for graduate work in schools of social work. (Graduate work is required for positions in specialized fields such as child welfare, family economics, and management.) Programs are planned individually with students depending on their interests. Also see PUBLIC HEALTH NUTRITION.

Recommended Basic Courses:

General Biology (GS 101,102,103)
 General Sociology (Soc 204,205,206)
 Descriptive Statistics (St 311)
 Child Development (FL 312)
 The Nursery School Child (FL 425)
 Child Development (FL 413)
 Economics of the Family (HAD 441)

Family Housing (HAD 439)
 Mgt Prob in Home-County Rel (HAD 445)

Other Suggested Electives:

Seminars in family life and home management
 Courses in sociology, psychology, economics, history, political science, philosophy, foods and nutrition

Minor in Business and Technology

If a student or instructor is interested, a program that is a correlated whole may be arranged by consulting the School of Business and Technology.

	<i>Hours</i>		<i>Hours</i>
Principles of Accounting (BA 211).....	3	Personnel Management (BA 451)	3
Finance (BA 312)	4	Retail Merchandising (BA 463)	3
Business Law (BA 411)	3	Advertising (BA 464)	3
Real Estate Law (BA 414)	3	Salesmanship (BA 465)	3
Income Tax Procedure (BA 434)	3	Sales Management (BA 466)	3
General Insurance (BA 435)	3	Human Relations in Business (BA 497)	3
Investments (BA 436)	3		

See also SCHOOL OF BUSINESS AND TECHNOLOGY for technical minors in clothing and textiles and institution management.

Minors in Other Areas

Students in home economics may take minors in:

Humanities

Biological science

Physical education, recreation, or camping education

Physical science

Secretarial science

Social science

A minor ordinarily totals at least 27 hours, and in most cases includes at least 9 hours of upper division course work. Descriptions of courses available will be found in the department sections under the SCHOOL OF SCIENCE, SCHOOL OF BUSINESS AND TECHNOLOGY, SCHOOL OF EDUCATION, SCHOOL OF HUMANITIES AND SOCIAL SCIENCES, AND DIVISION OF PHYSICAL EDUCATION. Students should consult their advisers.

Clothing, Textiles, and Related Arts

The Department of Clothing, Textiles, and Related Arts offers instruction in the basic principles of clothing construction, fabric analysis and identification, and selection of clothing. Advanced courses are offered in clothing construction, textiles, consumer education, home furnishing, and applied arts. Students in business and technology and in humanities and social sciences may minor in the area of clothing and textiles. Service courses are open to students not enrolled in home economics.

Students planning to register for clothing construction courses should keep in mind, when planning their wardrobes for the college year, that these courses require construction of garments.

Lower Division Courses

- CT 210. **Clothing Construction.** 3 hours. 3 ②
Principles of selection, construction, and fitting; management problems.
- CT 211. **Clothing Selection.** 3 hours. 3 ①
Artistic, economic, and psychological factors affecting the selection of adult clothing. For majors and nonmajors.
- CT 212. **Clothing Construction.** 3 hours. 3 ②
Principles of pattern alteration and fitting. Emphasis on organization, management, and creativity in construction, techniques, and design.
- CT 216. **Clothing Construction (Men).** 3 hours. 3 ②
Principles in the construction of men's, women's, and children's garments.
- CT 218,219. **Clothing Construction.** 3 hours each term. 3 ②
CT 218: Selection, construction, and management applied in making a cotton dress and a wool skirt. Elective for students not in home economics degree curriculum. CT 219: Selection and construction of two dresses (an afternoon dress and a speed project) and a child's dress. Prerequisite for CT 219: CT 210 or 218.

- CT 231. **Home Furnishing.** 3 hours. 2 ① 1 ②
Emphasis on appreciation of beauty in the home and suitability of its furnishings.
- CT 235. **Textile Design and Weaving.** 3 hours. 3 ②
Decorative art involving line, texture, and color as applied to problems in weaving.
- CT 250. **Textiles.** 3 hours. 2 ① 1 ②
Properties, identification, selection, use, and care of textile fibers and fabrics.

Upper Division Courses

- CT 309. **Historic Costume.** 3 hours. 3 ①
Its relation to modern dress. Prerequisite: CT 250; junior standing. History recommended. DIEDESCH.
- CT 310. **Flat Pattern and Draping.** 3 hours. 3 ②
Flat pattern and draping on half-size dress forms; practical applications of principles to construction of afternoon and evening garments. Prerequisite: CT 212,250. EDABURN.
- CT 311. **Costume Design.** 1 hour. 1 ②
Designing fashionable and appropriate ensembles for various occasions and figure types. Prerequisite: AA 161 or 291; CT 210,250. DIEDESCH.
- CT 312. **Tailoring.** 4 hours. 2 ④
Principles of tailoring applied to the construction of a coat or suit. Prerequisite: CT 212,250. LEDBETTER.
- CT 320. **Clothing for Children.** 3 hours. 3 ②
Selection and construction of garments with emphasis on child development, good design, and the saving of time, money, and energy. Prerequisite: CT 212,250. INGALLS.
- CT 331. **Home Furnishing.** 3 hours. 1 ① 2 ②
Furnishing a small home from standpoint of comfort, beauty, convenience, and economy; influence of historic design. Prerequisite: CT 250; AA 160,178. PATTERSON.
- CT 332. **Home Furnishing Laboratory.** 3 hours. 2 ③
Design and principles of construction; draperies, slipcovers, and simple upholstered furniture; wood finishing applied to new and old furniture. Prerequisite: CT 231 or 331. PATTERSON, MOSER.
- CT 333. **Applied Home Furnishing.** 3 hours. 1 ① 2 ②
Home furnishing and decoration. Students work with actual home interiors and with dealers. Prerequisite: CT 331,332. PATTERSON.
- CT 335. **Textile Design.** 3 hours. 3 ②
Line, texture, and color; contemporary weaving techniques. Prerequisite: AA 160; CT 250 and 210 or 218. PATTERSON.
- CT 350. **Consumer Buying in Clothing and Textiles.** 3 hours. 3 ①
Problems and aids in purchasing clothing and textiles from consumer's point of view. Prerequisite: CT 210 or 216; CT 211, 250; Ec 212. DIEDESCH.
- CT 351. **Quantity Textile Purchasing.** 3 hours. 3 ①
Selection, purchase, and care of textiles by manufacturers, wholesalers, retailers, and institutions; use of specifications. Prerequisite or parallel: CT 350. GRANT.
- CT 355. **Textile Processing.** 3 hours. 3 ①
Processing and manufacturing of fibers, yarns, and fabrics. Prerequisite: CT 250. GRANT.
- CT 401. **Research.** Terms and hours to be arranged.
- CT 403. **Thesis.** Terms and hours to be arranged.
- CT 405. **Reading and Conference.** Terms and hours to be arranged.
- CT 407. **Seminar.** Terms and hours to be arranged.
- CT 408. **Workshop.** Terms and hours to be arranged.

- CT 410. **Flat Pattern and Draping.** (G) 3 hours. 2 ③
Flat pattern designing and draping in varied textures; practical application to afternoon and evening garments. Each student may make a dress form. Prerequisite: CT 310 (CT 309 and 311 recommended). EDABURN.
- CT 411. **Costume Design.** (G) 3 hours. 3 ②
Creative designing of clothing and accessories for women. Prerequisite: CT 212,309, 311. DIEDESCH.
- CT 431. **Home Furnishing.** (G) 3 hours. 3 ②
Contemporary designers, materials, prices, and manufacturers of fabrics, furniture, rugs, and accessories. Prerequisite: CT 331. PATTERSON.
- CT 435. **Textile Design.** (G) 3 hours. 2 ③
Advanced textile design as applied to rugs, upholstery, drapery and suiting fabrics. Prerequisite: CT 335. PATTERSON.
- CT 450. **Textiles.** (G) 3 hours. 1 ① 2 ②
Investigations of physical properties of yarns and fabrics; evaluation of data in relation to serviceability. Prerequisite: CT 250 and senior standing. CARLSON.
- CT 460,461. **Historic Textiles.** (G) 3 hours each term. 3 ①
CT 460: Textiles from ancient times to present from an appreciative and historical point of view. CT 461: National fabrics of past and present from each continent; special textiles; tapestries, rugs, laces, embroideries, painted and printed fabrics. Prerequisite for both courses: CT 250 and senior standing. CARLSON.
- CT 470. **The Clothing Buyer.** 3 hours. 1 ① 1 ②
Buying ready-to-wear clothing for retail markets; merchandise selection and fashion trends. Management and personnel responsibilities of buyer. Prerequisite: CT 350. GRANT.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- CT 501. **Research.** Terms and hours to be arranged.
- CT 503. **Thesis.** Terms and hours to be arranged.
- CT 505. **Reading and Conference.** Terms and hours to be arranged.
- CT 507. **Seminar.** Terms and hours to be arranged.
- CT 508. **Workshop.** Terms and hours to be arranged.
- CT 551. **Textile Fibers.** 3 hours. 2 ① 1 ②
Composition and chemical properties; relation to certain structural and physical characteristics. Prerequisite: 12 term hours in clothing and textiles including CT 250; one year of chemistry.
- CT 552. **Textile Analysis.** 4 hours. 1 ① 2 ③
Identification of textile fibers by chemical methods and quantitative analysis for moisture content, total nonfibrous materials, fiber content. Prerequisite or parallel: CT 551.

Family Life and Home Administration

The Department of Family Life and Home Administration offers instruction in general areas of family living—marriage and family relationships, child development, home management, family economics, household equipment, and housing. Advanced courses prepare students for nursery school teaching and work in social service agencies, youth organizations, housing, equipment, and family economics. Laboratories for instruction include two home management houses and two nursery schools on campus, and housing and equipment laboratories in the Home Economics Building.

Courses in marriage, family living, child development, home management, family finance, and equipment and housing are offered for men and women in other schools who wish some preparation for homemaking.

Courses in Child Development and Family Relations

Lower Division Courses

- FL 222. **Marriage.** 2 hours. 2 ①
Open to men and women. Courtship period, factors in a successful marriage. KIRKEN-DALL, SCHALOCK.
- FL 223. **Family Living.** 2 hours. 2 ①
Open to men and women. Marriage and relationships in the beginning family. KIRKEN-DALL, SCHALOCK.
- FL 225. **Child Development.** 3 hours. 3 ① 1 ①
Development of the infant and young child; observations in nursery school. AIKIN.

Upper Division Courses

- FL 311. **Child Development.** 3 hours. 3 ① 1 ①
Behavior and development of preschool children. Observation and participation in nursery school. Prerequisite: Psy 202; FL 225. AIKIN, OLESON.
- FL 312. **Studies in Child Development.** 3 hours. 3 ①
Theory and basic research in the area of child development. Prerequisite: FL 311. AIKIN.
- FL 401. **Research.** Terms and hours to be arranged.
- FL 403. **Thesis.** Terms and hours to be arranged.
- FL 405. **Reading and Conference.** Terms and hours to be arranged.
- FL 407. **Seminar.** Terms and hours to be arranged.
- FL 408. **Workshop.** Terms and hours to be arranged.
- FL 413. **Child Development.** (G) 3 hours. 3 ①
Growth and development in middle and late childhood and early adolescence. Prerequisite: FL 311. AIKIN.
- FL 421. **Behavior of Young Children.** 2 hours. 2 ①
For men. Understanding development problems of young children; observation in nursery school. Prerequisite: senior standing or consent of instructor. READ.
- FL 422. **Family Relationships.** (g) 3 hours. 3 ①
Stages and adjustments in the family cycle; the family and the community. Prerequisite: FL 311. KIRKENDALL.
- FL 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: FL 425. STATON.
- FL 425. **The Nursery School Child.** (g) 3 hours. 2 ① 1 ④
Developing insight into child behavior and child-adult relations through participation in the nursery school program. Prerequisite: FL 311. OLESON.
- FL 426. **The Nursery School Child Laboratory.** (G) 1 hour. 1 ③
May only be taken parallel to FL 425 or FL 427. It may parallel both.
- FL 427. **Nursery School Children.** (G) 3 hours. 2 ① 1 ④
Program planning for preschool children, home-school relations, studies of individual children. Prerequisite: FL 425. AIKIN, PLANTS.

- FL 428. **Curriculum Enrichment for Young Children.** (G) 2 hours
spring. 2 ①
Relating literature, art, music, and science activities to child interests; projects for nursery school. Prerequisite or parallel: FL 425. OLESON.
- FL 429. **Supervised Nursery School Experience.** (G) 5 hours.
Full participation in a nursery school program and its administration; field experiences arranged. Consent of instructor required. Prerequisite: FL 425. AIKIN, PLANTS.
- FL 430. **Understanding Child Behavior.** (G) 3 hours. 3 ①
Observation of young children as a basis for developing insight into human behavior. Consent of instructor required. Prerequisite: FL 425.
- FL 481. **Selected Topics in Family Life.** (G) 3 hours. 3 ①
Current literature on child development and family relations. Prerequisite: FL 311. SCHALOCK.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- FL 501. **Research.** Terms and hours to be arranged.
- FL 503. **Thesis.** Terms and hours to be arranged.
- FL 505. **Reading and Conference.** Terms and hours to be arranged.
- FL 507. **Seminar.** Terms and hours to be arranged.
BASIC CONCEPTS IN HUMAN DEVELOPMENT. SCHALOCK.
INTERPERSONAL RELATIONS IN FAMILY LIVING. KIRKENDALL.
PHILOSOPHY AND METHODS OF BEHAVIOR RESEARCH. SCHALOCK.
WOMAN'S ROLE IN TODAY'S WORLD. STATON.
PSYCHO-SEXUAL ADJUSTMENTS AND THE FAMILY CYCLE. KIRKENDALL.
DIRECTIONS IN THEORY AND RESEARCH IN HUMAN DEVELOPMENT. SCHALOCK.
- FL 508. **Workshop.** Terms and hours to be arranged.
- FL 520. **Nursery School Philosophy.** 3 hours fall. 3 ①
Philosophy underlying procedures in nursery education; role of nursery school teacher. Prerequisite: FL 425 or equivalent and consent of instructor. AIKIN.

Courses in Home Administration

Lower Division Course

- HAd 240. **Management in Family Living.** 2 hours. 2 ①
Management as decision making. Emphasis on time problems.

Upper Division Courses

- HAd 330. **Household Equipment.** 3 hours. 2 ① 1 ②
Selection, placement, use, and care. PLONK.
- HAd 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; house plans and family needs. Prerequisite: AA 178.
- HAd 341. **Family Finance Management.** 2 hours. 2 ①
Open to men and women. Income, expenditures, credit, savings, insurance, Social Security, and taxes.
- HAd 401. **Research.** Terms and hours to be arranged.
- HAd 403. **Thesis.** Terms and hours to be arranged.
- HAd 405. **Reading and Conference.** Terms and hours to be arranged.

- HAd 407. **Seminar.** Terms and hours to be arranged. (See titles listed under HAd 507.)
- HAd 408. **Workshop.** Terms and hours to be arranged. 2 ① 1 ②
- HAd 435. **House Planning in Relation to Function.** (G) 3 hours.
Functional design applied to various types of family dwellings and their surroundings. Prerequisite: HAd 335.
- HAd 436. **Functional Design of Dwellings.** (G) Terms and hours to be arranged.
Storage space; arrangement of equipment; floor plans for small dwellings; illustrative material for house planning classes. Prerequisite: HAd 435.
- HAd 439. **Family Housing.** (G) 3 hours. 3 ①
Socio-economic aspects in relation to family living. Prerequisite: Ec 212; Soc 212; senior or graduate standing.
- HAd 440. **Management in Family Living.** (G) 3 hours. 3 ①
Decision making throughout the family life cycle; case studies. Prerequisite: HAd 240, 341; Psy 202.
- HAd 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: senior or graduate standing.
- HAd 445. **Management Problems in Home-Community Relations.** (G) 3 hours. 3 ①
Relation of family to society in civic, business, and other formal and informal associations. Prerequisite: HAd 240; Soc 212.
- HAd 450. **Home Management House.** 5 hours.
Applying homemaking courses in a family-size group and in a family-type house. One-half term residence. Prerequisite: FN 313; FL 311; HAd 240. PLONK.
- HAd 460. **Management in the Home.** 3 hours. 1 ① 1 ②
Supervised experience with student's home used as laboratory. Open to married students only. Students who are married and living at home may substitute HAd 460 and an FL or HAd course beyond the core for HAd 450. Prerequisite: FN 313; FL 311; HAd 240. PLONK.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- HAd 501. **Research.** Terms and hours to be arranged.
- HAd 503. **Thesis.** Terms and hours to be arranged.
- HAd 505. **Reading and Conference.** Terms and hours to be arranged.
- HAd 507. **Seminar.** Terms and hours to be arranged.
THE FAMILY AND ECONOMIC CHANGE.
HOME MANAGEMENT HOUSE SUPERVISION. Fall—PLONK.
WORK SIMPLIFICATION. PLONK.
CASE STUDIES IN FAMILY DECISION MAKING.
CONSUMER BUYING DECISIONS.
- HAd 508. **Workshop.** Terms and hours to be arranged.

Foods and Nutrition

The Foods and Nutrition Department in its first nutrition course aims to teach the student the relation of nutrition to health and ways of meeting the nutritive allowances by good food selection. In courses in foods, applications of scientific principles are taught. The student is then able to plan and prepare meals which will be adequate nutritionally, attractive in taste and appearance, and economical of both money and time. Advanced courses prepare the student for the professional fields of high school teaching, hospital dietetics, school lunch administration, foods and nutrition in business, and for graduate work leading to research, public health nutrition, and college teaching. A service course is offered for the nonmajor in home economics or for home economics students not working for a degree. Students majoring in humanities and social sciences may minor in foods and nutrition.

Laboratories are provided for instruction in foods and meal service, animal nutrition work, and chemical studies related to foods and nutrition.

Lower Division Courses

- FN 211,212. **Foods.** 3 hours each term. 1 ① 1 ② 1 ③
Principles; standards for judging quality. Prerequisite: FN 225. Prerequisite or parallel: one year of biological or physical science.
- FN 218. **Food Preparation.** 3 hours. 1 ① 2 ②
For men and women not majoring in home economics. Basic principles of food preparation, menu making, and meal service.
- FN 220,221. **Foods.** 3 hours each term. 1 ① 1 ② 1 ③
Chemical and physical principles applied to the study of foods. Prerequisite: FN 225. Prerequisite or parallel: Ch 221,222.
- FN 225. **Nutrition.** 3 hours. 3 ①
Newer scientific investigations; optimal diet for health; present day problems.

Upper Division Courses

- FN 313. **Meal Management.** 3 hours. 1 ① 1 ② 1 ③
Principles of foods and nutrition applied to meal planning, preparation, and service; economic, aesthetic, nutritional, and managerial aspects.
- FN 325. **Family Nutrition.** 2 hours. 2 ①
Principles; maternal nutrition, nutrition of the infant and child through growth period; geriatric nutrition. Prerequisite: FN 212,225; FN 313 prerequisite or parallel.
- FN 335. **Science of Foods.** 3 hours spring. 3 ①
Scientific study emphasizing common basic principles. Readings from a selective bibliography. Prerequisite: Ch 103; FN 212 or 221. CHARLEY.
- FN 381. **Nutrition.** 4 hours fall. 3 ① 1 ②
Fundamentals; application of biochemistry and physiology to nutrition of the individual and family; animal experimentation. Prerequisite: FN 225; Ch 222; Z 331. Prerequisite or parallel; Ch 350; Z 332. HAWTHORNE.
- FN 401. **Research.** Terms and hours to be arranged.
- FN 403. **Thesis.** Terms and hours to be arranged.
- FN 405. **Reading and Conference.** Terms and hours to be arranged.
- FN 407. **Seminar.** Terms and hours to be arranged.
- FN 408. **Workshop.** Terms and hours to be arranged.

¹ Home practice in food preparation is recommended for students who have completed FN 313. This practice should be completed before an advanced course in foods is taken.

- ¹FN 410. **Food Demonstrations.** 3 hours winter or spring. 1 ① 1 ② 1 ③
Principles and techniques of classroom, extension, and commercial demonstrations. Experience before audiences. Prerequisite: FN 313; Sp 111 or Ed 416, or equivalent. FN 411 or FN 412 is recommended but not required.
- ¹FN 411. **Family Food Buying.** (g) 3 hours fall or spring. 1 ① 1 ② 1 ③
Principles of economics applied to buying food for home; evaluating current information; cost factors, food laws, quality standards. Prerequisite: FN 313; Ec 212. BUSSARD.
- ¹FN 412. **Food Management.** 3 hours fall or winter. 1 ① 1 ② 1 ③
Special problems in foods with emphasis on time, energy, and money management. Prerequisite: FN 313.
- ¹FN 414. **Home Food Preservation.** (g) 3 hours spring. 1 ① 1 ② 1 ③
Methods, including freezing, canning, curing, pickling, and preserving with sugar. Prerequisite: FN 212 or 221; Mb 204. Offered alternate years. Offered 1963-64. CHARLEY.
- FN 420. **Nutrition in Disease.** (G) 3 hours spring. 2 ① 1 ②
Dietary adjustments for abnormal conditions. For students who plan to become hospital dietitians or nutrition specialists or who desire to broaden their training in nutrition. Prerequisite: FN 381. STORVICK.
- FN 421. **Child Nutrition.** (G) 3 hours winter. 3 ①
Nutritional needs from prenatal life through childhood; maternal dietary requirements. Prerequisite: FN 381. FINCKE.
- FN 425. **Recent Advances in Foods.** (G) 3 hours fall. 2 ① 1 ②
Consideration of major areas in the field with emphasis on underlying chemical and physical principles involved; review of literature and some experimentation. Prerequisite: FN 221,335. CHARLEY.
- FN 435. **Experimental Food Studies.** (G) 3 hours winter. 1 ① 1 ② 1 ③
Semi-independent studies using the experimental approach; literature in the field. Prerequisite: FN 221. CHARLEY.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- FN 501. **Research.** Terms and hours to be arranged.
- FN 503. **Thesis.** Terms and hours to be arranged.
- FN 505. **Reading and Conference.** Terms and hours to be arranged.
- FN 507. **Seminar.** Terms and hours to be arranged.
- FN 508. **Workshop.** Terms and hours to be arranged.
- FN 521. **Readings in Nutrition.** 3 hours fall. 3 ①
Research studies reviewed; interpretations and significance. Prerequisite: FN 381; Ch 350. FINCKE.
- FN 522,523. **Methods in Nutrition Research.** 3 hours each term. 2 ③
Introduction to methods and special techniques in nutrition research, emphasizing those methods used in human nutritional studies; blood studies; vitamin and/or mineral analyses; balance methods; special problems. Prerequisite: FN 381; Ch 234. Students may register for one or two terms. HAWTHORNE, STORVICK.
- FN 531,532. **Food Preparation Investigation.** 3 or 5 hours each term. 2 ③
Independent investigations. Prerequisite: FN 435. Offered alternate years. Offered 1963-64. MACKEY.
- FN 535. **Selected Topics in Foods.** 3 hours. 3 ①
Prerequisite: FN 221; Ch 222 or 227; FN 425 or FN 435. Offered alternate years. Not offered 1963-64. CHARLEY.
- FN 551. **Selected Topics in Nutrition.** 3 hours. 3 ①
Prerequisite: FN 521. Offered alternate years. Offered 1963-64. FINCKE.

¹Home practice in food preparation is recommended for students who have completed FN 313. This practice should be completed before an advanced course in foods is taken.

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 Education or the School of Home Economics may meet certification requirements. Before registering for teacher preparation courses, every student should receive permission for registering and guidance for selection of courses from the home economics education staff. Home economics students who have taken FL 225 and FL 311 may take FL 413 to substitute for Psy 311. (For requirements for the State Teachers' Certificates and listing of courses see SCHOOL OF EDUCATION.)

Home Economics Extension

Professional preparation for positions as Home Economics Extension Agents or 4-H Club Agents is offered by the School of Home Economics. Course work provided by the extension staff includes information in extension methods, as well as practical experience in the field. Students are advised to combine their home economics and extension preparation with course work in journalism, speech, sociology, and psychology. A graduate program provides advanced courses for further preparation for supervisory and specialist positions. See also page 150.

Upper Division Courses

- EM 405. **Reading and Conference.** Terms and hours to be arranged.
- EM 411,412. **Extension Methods.** (G) 3 hours each, spring. 3 ①
EM 412 offered alternate years. For course description see page 150.
- EM 453. **Field Work in Home Economics Extension.** (G) Terms and hours to be arranged.
Field practice with county extension agents. Arrangements must be made one or more terms in advance of registration. Prerequisite: EM 411. TASKERUD.
- EM 505. **Reading and Conference.** Terms and hours to be arranged.

Institution Management

The curriculum in institution management is planned to provide professional preparation for positions in school lunch, college, hospital, industrial, or other types of service and as executive housekeepers in hotels and hospitals. This department has laboratories and facilities in large group housing and food service adequate for undergraduate and graduate work. *Students (women and men) entering this field may wish to take an internship to fulfill requirements of the professional organizations such as the American Dietetic Association and the National Executive Housekeepers Association.*

Upper Division Courses

- IM 311. **Quantity Cookery.** 4 hours fall. 2 ① 2 ②
Standardized formulae and procedure; equipment; menu planning; preparation and service of foods in quantity. Prerequisite: FN 313 or consent of instructor.
- IM 320. **Cafeteria Management.** 3 hours. 3 ①
For prospective managers of school cafeterias. Menu study; cafeteria plans; accounting.
- IM 401. **Research.** Terms and hours to be arranged.

- IM 403. **Thesis.** Terms and hours to be arranged.
- IM 405. **Reading and Conference.** Terms and hours to be arranged.
- IM 407. **Seminar.** Terms and hours to be arranged.
- IM 408. **Workshop.** Terms and hours to be arranged.
- IM 430. **Institution Organization and Administration.** (g) 3 hours fall. 3 ①
Principles applied to various types of institutions; employment problems and training, labor laws, office records. Prerequisite: IM 311 or permission of instructor.
- IM 440. **Purchasing for Institutions.** (g) 3 hours winter. 3 ①
Selection, design, and materials, cost and arrangement of equipment; sources, standards of quality, grades, methods of purchase, care and storage of food. Prerequisite: IM 311 and IM 430 or consent of instructor. CLEVELAND.
- IM 450. **Institution Experience.** (G) 4 hours spring. 1 ① 3 ②
Practice in residence halls including daily food production and service, business office procedure, catering, and banquet service. Prerequisite: IM 311, 430, 440.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- IM 501. **Research.** Terms and hours to be arranged.
- IM 503. **Thesis.** Terms and hours to be arranged.
- IM 505. **Reading and Conference.** Terms and hours to be arranged.
- IM 507. **Seminar.** Terms and hours to be arranged.
- IM 508. **Workshop.** Terms and hours to be arranged.

Home Economics (General)

Lower Division Course

- HEc 101. **Introduction to Home Economics.** 1 hour fall. 2 ①
Orientation of beginning students in home economics. FULMER.

Upper Division Courses

- HEc 407. **Seminar.** Terms and hours to be arranged.

The following courses are available normally only in summer session.

- HEc 408. **Workshop.** Terms and hours to be arranged.
- HEc 508. **Workshop.** Terms and hours to be arranged.

School of Pharmacy

Faculty

As of January 1963

CHARLES O. WILSON,* Ph.D., Dean of the School of Pharmacy and Professor of Pharmaceutical Chemistry.

HERMAN C. FORSLUND,* M.S., Head Counselor.

H. WAYNE SCHULTZ,* Ph.D., State Analyst for the Board of Pharmacy.

ADOLPH ZIEFLE,* Ph.D., Professor Emeritus of Pharmacy. Dean of the School of Pharmacy 1914-45.

Pharmaceutical Science: Professor SAGER (department head);* Assistant Professors SISSON,* KNOTT;* Instructor HERMANN;* Teaching Assistants LEE,* BENNETT.

Pharmacy Administration: Professor FORSLUND (department head);* Instructor HARRISON.*

Pharmaceutical Chemistry: Professors DOERGE (department head),* WILSON;* Assistant Professor SCHULTZ,* Instructor FAKOUHI; Teaching Assistant CONSTANTINE.

Pharmacology: Professor McCUTCHEON (department head);* Assistant Professor DOST; Instructors LONGMIRE,* GRIFFIN.*

Pharmacognosy: Professor SCIUCHETTI (department head);* Assistant Professor CATALFOMO.*

General Statement

PHARMACY WAS FIRST ESTABLISHED as a separate department of the State College in 1898 on petition of the pharmacists of Oregon. From its inception the department grew steadily, and in 1917 it was raised to the rank of a school. Since 1925 the school has occupied the Pharmacy Building, which was designed and constructed specifically for pharmaceutical education. The School of Pharmacy is a member of the American Association of Colleges of Pharmacy and is fully accredited by the American Council on Pharmaceutical Education. Its objective is to contribute to improvement of public health and welfare through dissemination, expansion, and application of knowledge.

Applicants for admission as undergraduate students must meet the general admission requirements. See page 19.

The curriculum for the School of Pharmacy is designed to give the student a sound general education as well as to train him for all positions in the profession of pharmacy. It aims to provide a background for both pharmaceutical competence and cultured, responsible citizenship. The student is provided opportunity for selection of electives which will best qualify him for responsible citizenship and practice in the pharmacy specialty of his choice. The arrangement of the curriculum allows a student to complete one year of prepharmacy work at other accredited colleges or universities.

Students should register for a regular sequence of work as outlined in the five-year curriculum below. The proper sequence of both the professional and non-professional required courses in the curriculum must be maintained. A student may register for only those courses for which he has the stated prerequisites. Each student is assigned a faculty adviser according to his class standing. Together with his adviser, he reviews his career objectives and programs the courses to be taken. The student must have his proposed schedule approved by the adviser each term before proceeding with final registration. When planning a schedule he should keep his future plans in mind. If he is planning to enter Graduate School, he should select his electives accordingly. Too frequently the

* Registered pharmacist.

graduate student spends his first year in Graduate School taking courses he could have taken as an undergraduate.

Each year upperclassmen make several field trips. Annually the fifth-year students tour several pharmaceutical plants in the mid-west with transportation their only expense. As guests of the pharmaceutical houses, they are provided with lodging and meals. Visits to hospitals, wholesale houses, and manufacturers in Oregon acquaint them with the scope of pharmacy.

Completion of the prescribed curriculum and satisfaction of all institutional requirements are prerequisite to the granting of the baccalaureate degree. The undergraduate program is designed to lead to the Bachelor of Science degree, but the Bachelor of Arts may also be taken by those who meet the requirements in humanities, social sciences, and foreign language. Also available is a combined premedical and pharmacy curriculum that has been accepted by the Admissions Office of the University of Oregon Medical School.

Graduate work leading to the degrees of Master of Science and Doctor of Philosophy is offered in the Departments of Pharmaceutical Chemistry, Pharmaceutical Science, Pharmacognosy, and Pharmacology. The Master of Science degree is offered in pharmacy administration and hospital pharmacy. A new Master of Pharmacy degree with a major in hospital pharmacy is being offered in the Departments of Pharmaceutical Science and Pharmacy Administration. Candidates for admission to study at the graduate level must hold a bachelor's degree in pharmacy from Oregon State or its equivalent from another accredited institution. In addition, they must have attained a creditable scholastic average in their undergraduate work and have determined a definite objective to be attained through the advanced study. All advanced degrees are granted through, and in accordance with, the regulations of the Graduate School.

Students of ability and promise may have part of their college expenses paid through one of the scholarship funds available in the School of Pharmacy in addition to several general scholarships which are awarded to worthy undergraduate students. See page 39 for SCHOLARSHIPS and page 45 for AWARDS.

Awards not listed elsewhere include:

- OREGON STATE PHARMACEUTICAL ASSOCIATION CONTINUING SCHOLARSHIPS:** \$50 a year for five years for two Oregon high school graduates enrolled in pharmacy at OSU. Based on excellent grades, leadership, and need.
- PORTLAND RETAIL DRUGGISTS' ASSOCIATION PLAQUE:** Awarded each year to the graduating senior in pharmacy who attains the highest scholastic rank in his class.
- REXALL TROPHY:** Engraved bronze mortar awarded annually to graduating senior in pharmacy with most outstanding record of service to school while maintaining a high scholastic average.
- OREGON BRANCH, AMERICAN PHARMACEUTICAL ASSOCIATION AWARDS:** One year's membership in the Association and a scholarship certificate to each of two outstanding seniors in pharmacy.
- JOHNSON AND JOHNSON AWARD:** A Revolutionary War mortar and pestle for the student who submits best paper in pharmacy administration.

In order to broaden the preparation for professional activities and civic responsibilities, students are encouraged to join professional organizations. At Oregon State you may choose among the following:

- OREGON-AMERICAN PHARMACEUTICAL ASSOCIATION:** This organization, which is open to all students in the School of Pharmacy, includes the student branches of both the American Pharmaceutical Association and the Oregon State Pharmaceutical Association.
- 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 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 in pharmacy who meet the scholastic requirements.

Under the provisions of public health laws, it is required that the pharmacist be licensed before he is permitted to compound and dispense drugs and medicines on the prescriptions of doctors, dentists, and veterinarians. In order to become licensed in Oregon a person must be a citizen of the United States, not less than 21 years of age, and of good moral character, a graduate of a school or college of pharmacy that is recognized by the Board of Pharmacy, and must successfully pass an examination given by the Board.

One calendar year of service and experience in the various areas of pharmacy under the supervision of a registered pharmacist is also a basic requirement. A student who interns in a pharmacy concurrently with school attendance can not have the time count. No experience may count until after the student has finished the freshman year in pharmacy at OSU. All experience may be gained after graduation if desired.

In order to function properly as a pharmacist it is necessary to acquire some competence in operating a typewriter. The ability to type 35 words or more per minute must be proved before registration as a fourth-year senior (third professional year) is permitted.

Graduates of this school are privileged to become licensed either by examination or reciprocity in all states. New York, California, Florida, and Hawaii permit licensure by examination only.

Curriculum in Pharmacy

B.A., B.S., M.A., M.S., M. Phar., Ph.D. Degrees

Prepharmacy Year

(May be taken at any accredited college or university)

	F		W		S	
	Lecture	Lab	Lecture	Lab	Lecture	Lab
English Comp (Wr 111,112,113).....	3	-----	3	-----	3	-----
Algebra (Mth 100,101).....	4	-----	4	-----	3	-----
General Zoology (Z 201,202,203).....	2	1(3)	2	1(3)	2	1(3)
¹ Intro to Pharmacy (PSc 201).....	-----	-----	-----	-----	3	-----
General Chemistry (Ch 204,205,206).....	3	2(3)	3	2(3)	3	2(3)
Pharmacy Lecture (PSc 21—no credit).....	-----	-----	-----	-----	-----	-----
Physical education.....	1	-----	1	-----	1	-----
Defense education or other elective.....	1	-----	1	-----	1	-----
Total.....	17		17		16	

Professional Curriculum

First Professional Year

(Must be taken at Oregon State University)

	F		W		S	
	Lecture	Lab	Lecture	Lab	Lecture	Lab
Pharmaceutical Calculations (PSc 212).....	3	-----	-----	-----	-----	-----
Quantitative Analysis (Ch 234).....	2	3(3)	-----	-----	-----	-----
Organic Chemistry (Ch 226,227).....	-----	-----	3	2(3)	3	2(3)
Physics (Ph 211,212—abridged course).....	-----	-----	1	2(2)	1	2(2)
Inorganic Pharmaceutical Chemistry (PCh 311,312).....	-----	-----	2	1(3)	2	-----
Extempore Speaking (Sp 111).....	3	-----	-----	-----	-----	-----
Outlines of Economics (Ec 212).....	-----	-----	3	-----	-----	-----
² Elective.....	3	-----	-----	-----	3	-----
Pharmacy Lecture (PSc 21—no credit).....	-----	-----	-----	-----	-----	-----
Physical education.....	1	-----	1	-----	1	-----
Defense education or other elective.....	1	-----	1	-----	1	-----
Total.....	16		16		15	

¹ Students not attending Oregon State should take Sp 111 or Ec 212.

² Transfer students must take PSc 201.

Second Professional Year

	F		W		S	
	Lecture	Lab	Lecture	Lab	Lecture	Lab
Pharmacognosy (Pcg 330,331,332).....	2	1(3)	2	1(3)	2	1(3)
Org Pharmaceutical Chem (PCh 322,323)....	3	1(3)	3	1(3)	..	..
Pharmaceutical Analytical Chem (PCh 331)	..	..	..	..	2	1(3)
Physiology (Z 331,332).....	..	..	2	1(3)	2	1(3)
General Microbiology (Mb 204)	2	2(2)	..	..	..	..
Physical Pharmacy (PSc 318) .....	..	..	..	..	3	..
First Aid (PE 358)	2	1(2)	..	..	..	..
Introduction to Pharmacy (PSc 202) .....	..	..	3	..	..	..
² Electives	3	..	3	..	3	..
Pharmacy Lecture (PSc 21—no credit) .....	..	..	..	..	..	..
Pharmacy Field Trip (PSc 20—no credit)....	..	..	..	..	..	..
Total	17		16		15	

Third Professional Year¹

¹ Pharmacy Principles (PSc 319,320)	2	1(3)	2	1(3)	..	..
Prescription Accessories (PSc 323) .....	..	..	..	..	2	1(3)
Pharmacology (Phc 391,392,393)	3	1(3)	3	1(3)	3	1(3)
Biochemistry (Ch 350,351,352)	3	..	3	..	3	..
Organic Pharmaceutical Chem (PCh 324,325)	2	..	2	..	..	..
Pharmacognosy (Pcg 333) .....	..	..	..	..	3	..
² Electives	3	..	3	..	3	..
Pharmacy Lecture (PSc 21—no credit) .....	..	..	..	..	..	..
Pharmacy Field Trip (PSc 20—no credit)....	..	..	..	..	..	..
Total	15		15		16	

Fourth Professional Year

Prescriptions (PSc 454,455,456)	2	2(3)	2	2(3)	2	2(3)
Seminar (PAd 407)	1	..	1	..	1	..
Biological Products (Pcg 495)	3	..	..	..	..	..
Pharmacy Law (PAd 450,451) .....	..	..	3	..	3	..
Pharmacy Administration (PAd 447,448,449)	3	..	3	..	3	..
² Electives	6	..	6	..	6	..
Pharmacy Lecture (PSc 21—no credit) .....	..	..	..	..	..	..
Pharmacy Field Trip (PSc 20—no credit)....	..	..	..	..	..	..
Total	17		17		17	

Pharmaceutical Chemistry

The Department of Pharmaceutical Chemistry offers courses concerning the chemistry of inorganic and organic therapeutic and pharmaceutical agents used in current medical practice. It also provides courses in qualitative and quantitative drug analysis.

Upper Division Courses

PCh 311,312. **Inorganic Pharmaceutical Chemistry.** 3 hours winter; 2 hours spring. 2 ① 1 ③; 2 ①

Inorganic chemicals and their preparations used in pharmacy and medicine with emphasis on those in the U.S.P. and N.F. Prerequisite: Ch 206; PSc 212. DOERGE, SCHULTZ.

PCh 322,323. **Organic Pharmaceutical Chemistry.** 4 hours fall and winter. 3 ① 1 ③

Organic chemicals and their preparations used in pharmacy and medicine; correlation between chemical and physical properties and physiological action. Prerequisite: PCh 312; Ch 227. DOERGE, SCHULTZ.

¹ The ability to type 35 words or more per minute must be proved before registration is permitted.

² Electives must include 9 term hours of foreign language or 9 term hours of social science or 9 term hours of literature.

- PCh 324,325. **Organic Pharmaceutical Chemistry.** 2 hours fall and winter. 2 ①
Organic chemicals and their preparations used in pharmacy and medicine; correlation between chemical and physical properties and physiological action. Prerequisite: PCh 323. DOERGE.
- PCh 331. **Pharmaceutical Analytical Chemistry.** 3 hours spring. 2 ① 1 ③
Emphasis on U.S.P. and N.F. methods as applied to raw materials and dosage forms. Introduction to instrumental methods. Prerequisite: PCh 323; Ch 234. SCHULTZ.
- PCh 401. **Research.** Terms and hours to be arranged.
- PCh 403. **Thesis.** Terms and hours to be arranged.
- PCh 405. **Reading and Conference.** Terms and hours to be arranged.
- PCh 407. **Seminar.** Terms and hours to be arranged.
Conducted jointly with 407 in PSc, PAd, Pcg, and Phc. FORSLUND.
- PCh 440,441,442. **Selected Topics.** (g) 3 hours each term. 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, etc. Not all topics covered each year. May be taken in any order. Prerequisite: PCh 325. DOERGE, SCHULTZ.
- PCh 443. **Toxicology.** 3 hours winter. 2 ① 1 ③
Detection of common inorganic and organic poisons; emphasis on alkaloids and synthetics. Prerequisite: Phc 393.
- PCh 461,462,463. **Special Analytical Methods.** (g) 3 hours each term. 1 ① 2 ③
Advanced quantitative methods, both chemical and physical, as applied to drugs and their dosage forms. Prerequisite: PCh 331. Offered 1963-64. SCHULTZ.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- PCh 501. **Research.** Terms and hours to be arranged.
- PCh 503. **Thesis.** Terms and hours to be arranged.
- PCh 505. **Reading and Conference.** Terms and hours to be arranged.
- PCh 507. **Seminar.** Terms and hours to be arranged.
Conducted jointly with 507 in PSc, Pcg, Phc, and PAd. DOERGE.
- PCh 530,531,532. **Pharmaceutical Chemistry.** 5 hours each term. 3 ① 2 ③
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. Offered alternate years. Offered 1963-64. DOERGE, SCHULTZ.
- PCh 533,534,535. **Phytopharmaceutical Chemistry.** 5 hours each term. 3 ① 2 ③
Nomenclature, chemistry, stability and relationship of structures to pharmacological and toxicological activity of steroids, alkaloids, glycosides, terpenes, and other related compounds of medicinal and pharmaceutical interest. Prerequisite: PCh 325; Phc 393. Offered alternate years. Not offered 1963-64.

Pharmaceutical Science

The Department of Pharmaceutical Science offers basic and advanced courses in physical pharmacy, hospital pharmacy, pharmaceutical processes, manufacturing pharmacy, and prescriptions.

Lower Division Courses

- PSc 20. **Pharmacy Field Trip.** No credit.
Approximately two field trips each year. Required each term of juniors and seniors in pharmacy. FORSLUND.

- PSc 21. **Pharmacy Lecture.** No credit.
One hour meeting for talks, class meetings, and all-pharmacy assemblies. Required of pharmacy students each term.
- PSc 201,202. **Introduction to Pharmacy.** 3 hours winter and spring. 3 ①
Profession from remote times to present; opportunities in pharmacy; relation of curriculum to practice. SAGER.
- PSc 212. **Pharmaceutical Calculations.** 3 hours fall. 3 ①
Systems of weights and measures; dilution and concentration of solutions; calculations of dosages; thermometry. Prerequisite: Mth 101. SCHULTZ.

Upper Division Courses

- PSc 318. **Physical Pharmacy.** 3 hours spring. 3 ①
Physico-chemical principles and laws applied to pharmaceutical systems. Prerequisite: Ph 212; PCh 323. SCHULTZ.
- PSc 319,320. **Pharmacy Principles.** 3 hours fall and winter. 2 ① 1 ③
Processes and preparations of the U. S. Pharmacopeia and National Formulary. Prerequisite: Ph 212; PCh 323; ability to type 35 words per minute.
- PSc 323. **Prescription Accessories.** 3 hours spring. 2 ① 1 ③
Purpose, construction, and utilization of supplies, appliances, and equipment used in sickness and in health; types available and features of various products. Prerequisite: PCh 320. Sisson.
- PSc 401. **Research.** Terms and hours to be arranged.
- PSc 403. **Thesis.** Terms and hours to be arranged.
- PSc 405. **Reading and Conference.** Terms and hours to be arranged.
- PSc 407. **Seminar.** Terms and hours to be arranged.
Conducted jointly with 407 in PAD, PCh, Peg, and Phc. FORSLUND.
- PSc 412. **Literature of Pharmacy.** (G) 2 hours. 1 ① 1 ③
Literature search, pharmaceutical and related references, special bibliographical assignments. Prerequisite: fifth-year standing.
- PSc 454,455,456. **Prescriptions.** 4 hours each term. 2 ① 2 ③
Supervised compounding and dispensing of a wide variety of prescriptions selected from current files of practicing pharmacists. Prerequisite: Phc 393. SAGER.
- PSc 460. **Hospital Pharmacy.** 3 hours spring. 3 ①
Concepts and principles. Prerequisite: PCh 323. SCHULTZ.
- PSc 464,465. **Manufacturing Pharmacy.** (G) 3 hours winter and spring. 1 ① 2 ③
Development, organization, and operation of the drug industry; tablets, ointments, emulsions, other dosage forms; skin physiology and therapeutics; cosmetic formulations, medicated cosmetics, hypo-allergenic cosmetics. Prerequisite: fifth-year standing.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- PSc 501. **Research.** Terms and hours to be arranged.
- PSc 503. **Thesis.** Terms and hours to be arranged.
- PSc 505. **Reading and Conference.** Terms and hours to be arranged.
- PSc 507. **Seminar.** Terms and hours to be arranged.
Conducted jointly with 507 in Phc, PCh, Peg, and PAD. DOERGE.
- PSc 510. **Physical Pharmacy.** 3 hours fall. 2 ① 1 ③
Physico-chemical properties of pharmaceutical systems. Prerequisite: PSc 422. SCHULTZ.

- PSc 512,513. **Manufacturing Pharmacy.** 3 hours winter and spring. 1 ① 2 ③
 Unit operations in manufacture of pharmaceuticals. Fifth-year standing required. Offered alternate years. Not offered 1963-64.
- PSc 520. **Hospital Pharmacy.** 2 hours fall. 1 ① 1 ③
 Organization, administration, and operation of hospital pharmacy. Prerequisite: PSc 460.
- PSc 521. **Sterile Products.** 3 hours fall. 2 ① 1 ③
 Sterile pharmaceutical products with special reference to hospitals. Offered alternate years. Offered 1963-64.
- PSc 554,555,556. **Product Development.** 3 hours each term. 1 ① 2 ③
 Current and novel dosage forms; product stability; therapeutic designs. Prerequisite: PSc 513. Offered alternate years. Not offered 1963-64.

Pharmacognosy

Courses in the Department of Pharmacognosy deal with drugs of biological origin. Both basic and advanced courses are offered.

Upper Division Courses

- Pcg 330,331,332. **Pharmacognosy.** 3 hours each term. 2 ① 1 ③; 2 ① 1 ③; 2 ① 1 ③
 Official and important nonofficial drugs of biological origin; macroscopic, microscopic, and micro-chemical identifications. Prerequisite: Ch 227; Z 203. SCIUCHETTI, CATALFOMO.
- Pcg 333. **Pharmacognosy.** 3 hours spring. 3 ①
 The pharmaceutical aspects of antibiotics, hormones, vitamins, and enzymes. Prerequisite: Pcg 332. SCIUCHETTI, CATALFOMO.
- Pcg 401. **Research.** Terms and hours to be arranged.
- Pcg 403. **Thesis.** Terms and hours to be arranged.
- Pcg 405. **Reading and Conference.** Terms and hours to be arranged.
- Pcg 407. **Seminar.** Terms and hours to be arranged.
 Conducted jointly with 407 in PSc, PAd, PCh, and Phc. FORSLUND.
- Pcg 454,455. **Pharmacognosy.** (g) 3 hours winter and spring. 1 ① 2 ③
 Drug plant isolation, extraction, and estimation of active components. Prerequisite: Pcg 332. SCIUCHETTI, CATALFOMO.
- Pcg 470. **Production of Medicinal Plants.** (G) 3 hours fall. 3 ①
 Commercial production of drugs obtained from plants with special attention to those that might be economically feasible in the Pacific Northwest. Prerequisite: Pcg 333. Offered alternate years. Not offered 1963-64.
- Pcg 471. **Microscopic Techniques.** (G) 3 hours fall. 1 ① 2 ③
 Various techniques for microscopic investigation of medicinal plants. Prerequisite: Pcg 333.
- Pcg 472. **Chromatographic Methods.** (G) 3 hours winter. 2 ① 1 ③
 Purification of active components of natural products. Prerequisite: Pcg 333. SCIUCHETTI.
- Pcg 495. **Biological Products.** 3 hours fall. 3 ①
 Official vaccines, serums, antitoxins, hormones, endocrine products, and other materials of biological origin. Prerequisite: Mb 204; Phc 393.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- Pcg 501. **Research.** Terms and hours to be arranged.
- Pcg 503. **Thesis.** Terms and hours to be arranged.
- Pcg 505. **Reading and Conference.** Terms and hours to be arranged.
- Pcg 507. **Seminar.** Terms and hours to be arranged.
Conducted jointly with 507 in PSc, PAd, PCh, and Phc. DOERGE.
- Pcg 540,541,542. **Natural Products.** 3 hours each term. 1 ① 2 ③
Laboratory work concerned with isolation, purification, and estimation of active components of medicinal plants: Pcg 540: glycosides; Pcg 541: alkaloids; Pcg 542: volatile oils, resins, related compounds. Prerequisite: Pcg 333. Offered alternate years. Offered 1963-64. SCIUCHETTI.
- Pcg 544. **Biological Products.** 3 hours. 1 ① 2 ③
Problems involved in preparation and standardization. Prerequisite: Pcg 495; Mb 432. Offered alternate years. Not offered 1963-64.
- Pcg 545. **Economic Pharmacognosy.** 3 hours fall. 3 ①
Production, commerce, cultivation, preparation, market conditions, and economics of drugs of biological origin. Prerequisite: Pcg 455,470. Offered alternate years. Offered 1963-64.
- Pcg 550,551,552. **Biogenesis of Medicinal Plants.** 3 hours each term. 3 ①
Pcg. 550: *Glycosides*. Possible metabolic pathways. Pcg 551: *Alkaloids*. Nitrogen metabolism within plants and formation of alkaloids. Pcg 552: *Lipids, Resins, and related compounds*. Formation within living plant. Prerequisite: Pcg 455,540,541,542. Offered alternate years. Not offered 1963-64. SCIUCHETTI.

Pharmacology

Courses in the Department of Pharmacology deal with all drugs in common use in America today. Emphasis is on therapeutic use, physiological response, and mode of action. Attention is given to the relation of chemical structure to function, to the standardization of drugs, and to drug and chemical poisoning and appropriate treatment.

Upper Division Courses

- Phc 315. **Safety in Use of Drugs.** 2 hours winter and spring. 2 ①
Origin and development of drugs, their purpose, uses and shortcomings, dangers and misuse. Prerequisite: sophomore standing, nonpharmacy major. McCUTCHEON.
- Phc 391,392,393. **Pharmacology.** 4 hours each term. 3 ① 1 ③
Pharmacological action of drugs on human organisms; toxicological aspects of poisonous drugs. Prerequisite: Z 332; PCh 323. McCUTCHEON.
- Phc 401. **Research.** Terms and hours to be arranged.
- Phc 403. **Thesis.** Terms and hours to be arranged.
- Phc 405. **Reading and Conference.** Terms and hours to be arranged.
- Phc 407. **Seminar.**
Conducted jointly with 407 in PSc, PAd, PCh, and Pcg. FORSLUND.
- Phc 425. **Veterinary Therapeutics.** 3 hours winter. 3 ①
Drugs commercially available to veterinarian; pharmacological properties and therapeutic application. Prerequisite: Phc 393.
- Phc 454. **Commercial Poisons.** (G) 3 hours fall. 3 ①
Substances and materials used; their composition, characteristics, and toxicities. Prerequisite: Phc 393. McCUTCHEON.

- Phc 466. **Health Science Terminology.** 2 hours. 2 ①
Nomenclature, terminology, and expressions commonly encountered. Fourth or fifth-year standing required. SCHULTZ.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- Phc 501. **Research.** Terms and hours to be arranged.
- Phc 503. **Thesis.** Terms and hours to be arranged.
- Phc 505. **Reading and Conference.** Terms and hours to be arranged.
- Phc 507. **Seminar.** Terms and hours to be arranged.
Conducted jointly with 507 in PSc, PAD, PCh, and Pcg. DOERGE.
- Phc 520,521,522. **Advanced Pharmacology.** 3 hours each term. 2 ① 1 ③
Pharmacological screening in development of new drugs; dose levels, tolerance, and safety determined by animal experimentation. Phc 520: Anesthetics. Phc 521: Sedatives, analgesics, hypnotics, convulsants, anticonvulsants. Phc 522: Drugs affecting autonomic nervous system. Prerequisite: Phc 393; Ch 352, or equivalent. McCUTCHEON.
- Phc 525. **Pharmacological Standardization.** 4 hours spring. 2 ① 2 ③
Biological standardization of drugs by methods representative of latest techniques; statistical methods applied to evaluation of experimental results. Prerequisite: Phc 393.
- Phc 530,531. **Advanced Toxicology.** 3 hours fall and winter. 1 ① 2 ③
Classification of poisons; symptoms of poisoning; organs most commonly involved in poisonings, and separation of poisons from organs; chemical and pharmacological methods of testing for poisons. Prerequisite: PCh 441; Phc 393. McCUTCHEON.

Pharmacy Administration

The Department of Pharmacy Administration is concerned with the business aspects of pharmacy and the laws pertaining to the profession.

Upper Division Courses

- PAd 401. **Research.** Terms and hours to be arranged.
- PAd 403. **Thesis.** Terms and hours to be arranged.
- PAd 405. **Reading and Conference.** Terms and hours to be arranged.
- PAd 407. **Seminar.** Terms and hours to be arranged.
Conducted jointly with 407 in PSc, PCh, Pcg, and Phc. FORSLUND.
- PAd 447,448,449. **Pharmacy Administration.** 3 hours each term. 2 ① 1 ③
Distribution of pharmaceutical consumer goods through various channels with emphasis given to marketing functions and institutions: retailer in the marketing structure; retail pharmacy management and merchandising practices including location, financing, buying, stock control, pricing, and sales promotion. Prerequisite: fifth-year senior standing. HARRISON.
- PAd 450,451. **Pharmacy Law.** 3 hours winter and spring. 3 ①
Federal Caustic Poison Act; Food, Drug, and Cosmetic Act; Harrison Narcotic Act; viruses, serums, and toxins; patent and proprietary medicines; alcohol and alcoholic products; criminal and tort laws concerning prescription compounding; copyrights, patents, trademarks; Durham-Humphrey amendment to Federal Law. Prerequisite: fifth-year senior standing. FORSLUND.
- PAd 488. **Pharmacy Promotion and Selling Methods.** (G) 3 hours spring. 3 ①
Function of detail man or medical service representative in distribution and marketing of drugs and pharmaceuticals. Fifth-year senior standing required. FORSLUND.

Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- PAd 501. **Research.** Terms and hours to be arranged.
- PAd 503. **Thesis.** Terms and hours to be arranged.
- PAd 505. **Reading and Conference.** Terms and hours to be arranged.
- PAd 507. **Seminar.** Terms and hours to be arranged.
Conducted jointly with 507 in PSc, PCh, Pcg, and Phc. DOERGE.
- PAd 587. **Pharmaceutical Market Analysis.** 3 hours fall. 3 ①
Activities involved in flow of goods from manufacturer to retailer, excluding those activities that change form of goods during this time. Prerequisite: PAd 449. FORSLUND.
- PAd 589. **Pharmacy Finance.** 3 hours winter. 3 ①
Costs, margins, and net profits as related to group averages and to individual averages of pharmaceutical manufacturers, wholesalers, and retailers; income and expense statements. Prerequisite: PAd 449. Offered alternate years. Offered 1963-64. FORSLUND.
- PAd 599. **Regulations of Pharmacy Practices.** 3 hours winter. 3 ①
Local, State, and Federal regulations and laws; Fair Trade and other methods of price maintenance, loss leaders, FTC regulations, postal regulations, regulations of selling methods and advertising. Prerequisite: PAd 449. Offered alternate years. Not offered 1963-64. FORSLUND.

Defense Education

Reserve Officers Training Corps

Air Science

Military Science

Naval Science

General Statement

INSTRUCTION IN MILITARY TACTICS began at Oregon State University about 1872 in conformity with a requirement of the Federal Morrill Act of 1862 establishing the land-grant universities. Cadets trained in the early years saw service in the Spanish-American War. Another Act of Congress passed on June 3, 1916, brought about the reorganization, in 1917, of the Cadet Regiment into a Reserve Officers Training Corps unit. In World War I, World War II, and the Korean conflict, the number of former students who served with distinction in our armed forces gave proof of the high quality of their preparation and the value to the Nation of such military instruction.

Oregon State is one of the 233 colleges and universities offering ROTC (Army), one of 53 offering NROTC (Navy and Marine Corps), and one of 175 offering AFROTC (Air Force). It is one of the 33 which offer all three. The Department of Military Science trains officers for four branches of the Army: Infantry, Field Artillery, Corps of Engineers, and Signal Corps. The Department of Naval Science, which was commissioned on September 17, 1945, includes a program of training for Marine Corps as well as Naval officers. The Department of Air Science activated on July 1, 1949, was one of the first Air Force ROTC units established; its program leads to flight training in a commissioned status or to a commission as a nonrated officer in the Air Force.

Mission and Objectives. The ROTC seeks to select and prepare young men, through a permanent program of instruction in civilian institutions, 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 the student a capacity for leadership, to develop him morally, mentally, and physically, and to provide a basic knowledge of the military professions.

Enrollment in ROTC does not preclude registering under the Universal Military Training and Service Act of 1951. All students enrolled and of age must register with their draft board.

Uniforms, Allowances, and Summer Camps. Students in all three of the units receive uniforms to be worn at certain drill periods and on special occasions. In the third and fourth years, cadets in the Army and Air Force units and those in Naval Science called "contract students" receive in addition an allowance of approximately 90¢ a day for a period not to exceed 595 days. Between the third and fourth years, these students attend a summer camp or take a summer cruise of approximately six weeks' duration. During this period they are messed and quartered at government expense and are paid at the rate of approximately \$78 per month. They also receive a travel allowance of 5¢ a mile to and from camp. "Regular students" in Naval Science receive additional allowances described on a later page. Basic students who are members of the band drill with the band rather than with the squadrons or companies.

Air Science

(Personnel detailed from United States Air Force)
As of January 1963

Professor **BOYD** (Colonel, United States Air Force) Commander.

Associate Professors: Majors **DENNIS**, **PAIGE**, **RUPPERSBURG**; Captain **PAUL**.

Instructors: Master Sergeant **SIMMONS**; Technical Sergeants **FEARON**, **KOZOWSKI**; Staff Sergeant **BENTON**; Airman First Class **SHAW**.

Students in Air Science pursue the Basic Course the first two years and receive 1 term hour of credit each term. Those who go on into the Advanced Course (the third and fourth years) receive 3 term hours of credit each term and 6 term hours for attending summer training at an Air Force base. In all, the student on graduation will have a total of 30 term hours of credit in air science, 24 hours of which will be upper division. He may include SS 441,442, 443 to provide a comajor in air science with whatever other major he submits for a baccalaureate degree.

Enrollment in Advanced Course. Each student enrolled in the advanced course of the senior Air Force ROTC must:

1. Be selected by the professor of Air Science and the President of Oregon State University.
2. Be eligible for commissioning prior to his 28th birthday.
3. Successfully complete such survey and general screening tests as may be prescribed.
4. Have completed the Basic Course or received credit in lieu thereof for having had previous honorable active service in the Army, Navy, Marine Corps, Coast Guard, or Air Force.
5. Be a citizen of the United States.
6. Be physically qualified under standards prescribed by the Department of the Air Force. Due allowance will be made for those defects that are correctable before the student becomes eligible for appointment as a commissioned officer.
7. Be accepted by Oregon State University as a regularly enrolled student.
8. Execute a written agreement with the government to complete the advanced course, contingent upon remaining in college, and to attend the summer training unit at the time specified.
9. If physically qualified, agree to apply for flying training unless otherwise specifically exempt. Quotas for those applying are quite limited.

Commissions. A student must be 21 through 27 years of age, complete the Advanced Course Air Force ROTC, and receive a baccalaureate degree to be recommended for a commission as an officer in the Air Force.

Outstanding advanced course cadets are designated Distinguished Air Force ROTC Cadets. Distinguished Air Force ROTC Graduates are selected from these Distinguished Cadets. Distinguished Air Force ROTC Graduates are given the opportunity to apply for commission as a regular officer of the Air Force.

Flight Training. Eligible seniors are given flight training. Qualified cadets who complete this flight training, the Advanced Course in Air Force, and are awarded a commission in the Air Force are eligible to participate in the Air Force pilot flight training program as commissioned officers. Students determined eligible for other than pilot training will receive navigation or other training in the Air Force as commissioned officers.

Lower Division Courses

AS 111,112,113. **Air Science I.** 1 hour each term. 1 ①; 1 ①; 3 ①
Foundations of Aerospace Power. Factors of aerospace power; requirements for military forces in being; development and traditions of military profession; role of professional officer; organization of armed forces for national security; role of United States Air Force.

- AS 211,212,213. **Air Science II.** 1 hour each term. 3 ①; 3 ①; 1 ①
Fundamentals of Aerospace Weapon Systems. Aerospace missiles and craft with propulsion and guidance systems; target intelligence and electronic warfare; nuclear, chemical, and biological warhead agents; defensive, strategic, and tactical operations; space operations; contemporary military thought.

Upper Division Courses

- AS 311,312,313. **Air Science III.** 3 hours each term. 5 ①
Air Force Officer Development. Staff organization and functions; basic psychological and sociological principles of leadership; military justice.
- AS 314. **Summer Camp.** 6 hours summer.
Junior Officer Training. Emphasis on military discipline, air crew and aircraft indoctrination, a career in the Air Force, organization and functions of an Air Force base, physical training, and weapons familiarization.
- AS 411,412,413. **Air Science IV.** 3 hours each term. 5 ①
Global Relations. Global relations of special concern to the Air Force officer; international relations and geography, weather and navigation, and briefing for commissioned service.

Military Science

(Personnel detailed from United States Army)
As of January 1963

Professor LONDON (Colonel, Infantry) Commandant.

Associate Professors: Lieutenant Colonels ALLISON (Corps of Engineers), BUCKLEY (Infantry), CONNOLLY (Signal Corps), HANCOCK (Infantry), Major STEVENS (Corps of Engineers).

Assistant Professors: Captains DAVIS (Signal Corps), MANN (Artillery), REDMOND (Infantry).

Instructors: Master Sergeants BARTCHER, BUNDY, CARLSON, MOREHEAD, HADSTROM; Sergeants First Class HAMMIT, NADELL, SMITH; Sergeant LOWE.

The first two years of military instruction requiring two hours a week in the freshman year and three hours a week in the sophomore year constitute the Basic Course. The student is also required to complete 3 credit hours of general academic work in effective communications, science comprehension, general psychology, or political development and political institutions while in the Basic Course. Students in the Advanced Course (third and fourth years) receive 3 hours of credit per term and 6 for summer camp. In all, students completing the course will have received 30 hours of credit in Military Science, 24 hours of which will be upper division. By including SSc 441, 442, and 443, a student may submit military science as a comajor for a baccalaureate degree.

ROTC students may be granted an ROTC deferment from Selective Service at the completion of one term of ROTC instruction. This deferment continues until academic requirements are met and the ROTC course is completed.

Enrollment in the Advanced Course. Each student enrolled in the advanced course of the senior 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 28 years of age.
3. Have successfully completed such survey and general screening tests as may be prescribed.
4. Have completed the basic course or received credit in lieu thereof for having had twelve months or more previous honorable active service in the Army, Navy, Marine Corps, Coast Guard, or Air Force.
5. Be a citizen of the United States.
6. Be physically qualified under standards prescribed by the Department of the Army. Due allowance will be 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 student.
8. Execute a written agreement with the United States to complete the Advanced Course, contingent upon remaining in college; to attend summer camp at time specified unless deferred for cogent reasons; to accept a commission if offered; and satisfy the service obligation after graduation.

Pay. Advanced Course cadets receive a subsistence allowance which totals about \$535. In addition they are paid \$117 for the six-week summer training session plus a 5¢-per-mile travel allowance to and from camp.

Commissions. For a reserve commission a student must meet the following minimum requirements:

1. He must have received a baccalaureate degree.
2. He must successfully complete the course in Military Science. The branch of service in which he is commissioned is determined by his academic concentration and the needs of the Army.

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 27 years, and meet certain physical standards.

Flight Training. A limited number of seniors will have an opportunity to take flight training leading to a private pilot's license and to an opportunity to attend the U. S. Army flight training program after graduation.

Lower Division Courses

- MS 111,112,113. **First-Year Basic Course.** 1 hour each term.
Leadership laboratory; organization of the Army and ROTC; individual weapons and marksmanship; U. S. Army and National Security; counter insurgency; elective subjects totaling 3 credit hours chosen from general academic courses in effective communications, science comprehension, psychology, or political development and political institutions.
- MS 211,212,213. **Second-Year Basic Course.** 1 hour each term.
Leadership laboratory; map and aerial photo reading; introduction to branch tactics and techniques; counter insurgency; American military history.

Upper Division Courses

- MS 311,312,313. **First-Year Advanced Course.** 3 hours each term.
Leadership laboratory; military teaching principles; branches of the Army; small unit tactics and communications; precamp orientation.
- MS 314. **Advanced Summer Camp.** 6 hours.
Practical and theoretical instruction for six weeks at Fort Lewis, Washington. Prerequisite: MS 311,312,313.
- MS 411,412,413. **Second-Year Advanced Course.** 3 hours each term.
Leadership laboratory; operations, logistics; role of the United States in world affairs; army administration; military law; service orientation.

The following courses will not be offered in 1963-64:

- MS 321,322,323. **First-Year Advanced Course.** 3 hours each term.
- MS 324. **Advanced Summer Camp.** 6 hours.
- MS 331,332,333. **First-Year Advanced Course.** 3 hours each term.
- MS 334. **Advanced Summer Camp.** 6 hours.
- MS 351,352,353. **First-Year Advanced Course.** 3 hours each term.
- MS 354. **Advanced Summer Camp.** 6 hours.
- MS 421,422,423. **Second-Year Advanced Course.** 3 hours each term.
- MS 431,432,433. **Second-Year Advanced Course.** 3 hours each term.
- MS 451,452,453. **Second-Year Advanced Course.** 3 hours each term.

Naval Science

(Personnel detailed from United States Navy and Marine Corps)
As of January 1963

Professor DAWLEY (Captain USN) Commanding Officer.

Associate Professor BACON (Commander USN) Executive Officer.

Assistant Professors: RODNEY (Major, USMC); BRYER (Lieutenant Commander USN); DICKEY (Lieutenant USN); BENSON (Lieutenant USN); NAGEL (Lieutenant USN).

Instructors: FOSTER (First Sergeant USMC); GRAY (Senior Chief Quartermaster); WOELFLE (Senior Chief Yeoman); FARMER (Chief Gunner's Mate); COCHRAN (Chief Fire Control Technician); HARTE (Chief Storekeeper).

The NROTC unit is composed of students in two categories: *regular students* and *contract students*.

Regular students are selected by means of a nationwide examination administered by state or regional selection boards. This examination is given each year, generally in December, for entry the following fall term. Students are appointed Midshipmen, USNR. Their tuition, fees, and textbooks are paid for by the Navy for a period not exceeding four years. Their uniforms are provided and they receive retainer pay of \$600 per year. They obligate themselves to complete the prescribed naval science curriculum, to attend three summer cruises, each of from six to eight weeks' duration, to accept a commission as Ensign, USN, or Second Lieutenant, USMC, on graduation, and to serve on active duty for four years unless sooner released by the Secretary of the Navy.

Contract students are selected by the Department of Naval Science at Oregon State University during the new student orientation period from among voluntary applicants. They are paid subsistence amounting to \$27 per month during their last two years only. They are offered commissions as Ensign, USNR, or Second Lieutenant, USMCR upon graduation and are required to serve on active duty for three years.

The active duty obligation in both categories defers participating students from military service during university training.

Requirements: *Every acceptable candidate*, whether applying as a regular or contract student, must:

1. Be a male citizen of the United States.
2. Be a regularly enrolled student in good standing at a college of which the NROTC unit is a part.
3. Have attained his 17th birthday on or before July 1 of the year in which enrolled, but must not attain his 25th birthday before July 1 of the year in which he would normally receive his first baccalaureate degree and be commissioned.
4. Be unmarried and agree to remain unmarried until commissioned or otherwise separated from the NROTC program.
5. Agree, with the consent of his parent or legal guardian, to undergo whatever period of training may be necessary to complete all requirements of the NROTC curriculum.
6. Agree to participate in required summer training courses and cruises.
7. Agree to accept the appropriate commission in the Navy, Marine Corps, Naval Reserve, or Marine Corps Reserve, when offered.
8. Meet general physical requirements as follows: *Height*, minimum 5 feet 6 inches, maximum 6 feet 4 inches. *Vision*, 20/20 each eye; color perception normal. Contract applicants may request waiver of the vision requirement if vision is not less than 20/40 each eye and can be corrected to 20/20 with glasses. *Weight*, in proportion to height. *Teeth*, a minimum of 16 vital, of which 8 must be in each arch. Other physical requirements as prescribed by the Manual of Medical Department for candidates for commissions.
9. Be morally qualified and possess potential officer qualities as evidenced, for example, by appearance, scholarship, and extracurricular activities.
10. Agree, with consent of parents or guardian, to serve on active duty in the Navy or Marine Corps, after receiving his commission, for a period of four years (for regular student) or three years (for contract student).

Status and Curriculum. Students enrolled in the program are not on active duty. They wear the uniform only for drills, on special occasions, and during the summer training cruises.

The program of study covers four years and fits into curricula leading to first baccalaureate degrees. It includes the following requirements:

1. 33 term hours of Naval Science.
2. One year of college physics to be completed by the end of the sophomore year for regular students only. This course provides background for the courses in naval engineering (NS 311,312).
3. One year of college mathematics to be completed by end of sophomore year for regular students only. Contract students must have completed mathematics through trigonometry or take one term of college mathematics by the end of the sophomore year. This is required as background for navigation courses (NS 312,313).
4. One term of general psychology (Psy 201 or 212) ordinarily taken in spring term of sophomore year.
5. Proficiency in written and oral expression. (One year of English is considered adequate.)
6. Two years of physical education. Each student must qualify as a swimmer and should be instructed in lifesaving and resuscitation.

Naval Science (including summer cruise) pursued for four years in one of the undergraduate curricula constitutes a comajor with several of the majors offered in degree-granting divisions of schools. The Department of Naval Science also offers a four-year curriculum with a major in Naval Science coupled with a social science, business, or mathematics option which leads to either a B.A. or B.S. degree in Naval Science. This program is open only to those students enrolled in either the regular or contract NROTC programs. Interested students should confer with the Department of Naval Science.

Curricula in Naval Science

B.A., B.S. Degrees

192 hours for Degree

Freshman Year	Hours	Sophomore Year	Hours
English Composition (Wr 111,112,113).....	9	¹ Economics (Ec 201,202,203) or History of Western Civilization (Hst 101, 102,103)	9
Mathematics (Mth 101,102,200)	12	Physics (Ph 201,202,203)	12
Naval Science (NS 111,112,113)	9	Naval Science (NS 211,212 and Psy 212)	9
General Biology (GS 101,102,103)	12	American Governments (PS 201,202,203)	9
Physical education	3	Elective	6
	45	Physical education	3
		48	

In addition to Basic Curriculum Requirements, students majoring in Naval Science will (1) take one year of foreign language or demonstrate a reading knowledge of a foreign language and (2) take one or more of the following options.

Junior Year	Hours	Senior Year	Hours
Naval Science (NS 311,312,313 or NS 321,322,323)	9	Summer Cruise (NS 450) (taken between junior and senior years).....	6
International Trade (Ec 443)	4	Naval Science (NS 411,412,413 or NS 421,422,423)	9
International Relations (PS 417)	3	International Politics and National Power (SSc 441,442,443)	9
Comparative Economic Systems (Ec 450)	3	Upper division electives (Social Science)	9
Western Political Ideas (PS 431,432, 433)	9	Electives (recommend lit or philosophy)	18
Electives (including foreign language).....	20		
	48		45

¹ Choice dependent upon election of option.

Business

Junior Year		Hours	Summer Cruise (NS 450) (taken between junior and senior years)		Hours
Naval Science (NS 311,312,313 or NS 321,322,323)		9			6
Principles of Accounting (BA 211,212, 213)		9	Senior Year		
Production (BA 201)		4	Naval Science (NS 411,412,413 or NS 421,422,423)		9
Finance (BA 203)		4	Business Statistics (BA 311,312)		9
Marketing (BA 202)		4	Business Law (BA 411,412,413)		9
Electives (including foreign language)		18	Electives (recommended lit or philosophy)		21
		48			45

Mathematics

Junior Year		Hours	Summer Cruise (NS 450) (taken between junior and senior years)		Hours
Naval Science (NS 311,312,313, or NS 321,322,323)		9			6
Differential Equations (Mth 321,322)		6	Senior Year		
Linear Programming & Games (Mth 363)		3	Naval Science (NS 411,412,413 or NS 421,422,423)		9
Linear Algebra (Mth 341)		3	Statistical Inference (St 421,422,423)		9
Computer Coding (Mth 351)		3	Probability (Mth 361)		3
Computer Laboratory (Mth 352)		1	Electives (recommend lit or philosophy)		24
Electives (including foreign language)		23			45
		48			

Lower Division Courses

- NS 111,112,113. **Naval Science I.** 3 hours each term. 5 ①
 Orientation and History of Sea Power: One orientation term of naval organization, naval customs and traditions, and naval discipline followed by two terms of naval history designed to provide an understanding of the role of sea power in world development.
- NS 211,212. **Naval Science II.** 3 hours fall and winter. 5 ①
 Naval Weapons: Basic science of naval ordnance and gunnery, weapon types and principles of construction, operation and delivery, anti-submarine warfare, missile systems, principles of nuclear weapons, and introduction to space technology.

Upper Division Courses

- NS 311,312,313. **Naval Science III.** 3 hours each term. 5 ①
 Naval Operations and Navigation: Fleet tactics and maneuvers, fleet communications, rules of the nautical road, relative movement problems, piloting, celestial navigation, and electronic aids to navigation.
- NS 321,322,323. **Naval Science III: Marine Option.** 3 hours each term. 5 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.
- NS 411,412,413. **Naval Science IV.** 3 hours each term. 5 ①
 Naval Machinery, and Principles and Problems of Naval Leadership: Principles of typical marine engineering plant; boilers, turbines, condensate system, auxiliary equipment, diesel engines; fundamentals of ship stability; naval administration, military justice, and naval leadership.
- NS 421,422,423. **Naval Science IV: Marine Option.** 3 hours each term. 5 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.
- NS 450. **Summer Cruise.** 6 hours summer.
 Six to eight-week training cruise taken aboard naval ships as arranged by professor of Naval Science.

¹ Those electing mathematics as their minor must take Mth 201,202, and 203 during sophomore year.

Division of Physical Education

Faculty

As of January 1963

CLAIR VAN NORMAN LANGTON, Dr.P.H., Ed.D., LL.D., Director of the Division of Physical Education.

Physical Education for Women: Professor SEEN (department head); Associate Professors HUPFRICH, MASILIONIS, MILLIKEN, THOMPSON, WEIR;¹ Assistant Professors J. A. DIXON, McALLESTER (emeritus), SEYMOUR,¹ SHUTE; Senior Instructor POLING; Instructors LEWIS, MANKER, C. D. O'SHEA, PYE, J. WINKLER.

Physical Education for Men: Professors ADRIAN, ALLMAN, C. L. ANDERSON (chairman of hygiene and environmental sanitation), BERGSTROM (chairman of professional physical education), COLEMAN (chairman of service program for men), J. V. DIXON, FOSTER, GILL, KEENE, PROTHRO; Associate Professors COX, DAILEY, DRLICA, FLOOD, KOSKI, MAYSHARK, MCKALIP, MOE, SLEZAK, SWAN, THOMAS; Assistant Professors G. W. ANDERSON, CRAMER, GAWER, MARTINSON, MEGALE, J. P. O'SHEA, TANSSELL, W. WINKLER; Instructor CASEBEER.

Intercollegiate Athletics: Director R. S. KEENE; Athletic Business Manager BARRATT; COACHES: BELL (track), COLEMAN (baseball), GAMBOLD (assistant, football), GILL (basketball), HARRIS (tennis), BARRATT (golf), LONG (assistant, football), MCKITTRICK (assistant, football), PROTHRO (football), ROBERTSON (trainer), SIEGRIST (assistant, football), THOMAS (wrestling), VALENTI (assistant, basketball), WATSON (assistant, football), WINKLER (swimming), ZELINKA (assistant, football).

General Statement

ALL INSTRUCTION AND RELATED ACTIVITIES in the fields of physical education and hygiene are administered by the Division of Physical Education. Close cooperation is maintained with the Student Health Service and other student-welfare agencies.

In addition to its service courses, the Division of Physical Education offers professional courses for students enrolled in certain curricula in the Schools of Education and Science. The major in physical education offered through the School of Education provides preparation for teaching and coaching and leads to the baccalaureate degree in education. Major work in hygiene and sanitation in the School of Science and health education in the School of Education provides professional training for specialists in these fields. The student's basic program may be varied with options in recreation and youth agency leadership which prepare graduates for these rapidly developing fields. Many opportunities exist for combining professional courses in physical education with courses in the Schools of Science, Agriculture, Business and Technology, Engineering, Forestry, and Home Economics.

Students majoring in other teaching fields or schools may take a minor in physical education, health education, recreation, camp education, or the dance by completing at least 27 term hours of professional courses in the respective fields. See curricula under SCHOOL OF EDUCATION.

Requirements for the Oregon teachers' certificates are listed under SCHOOL OF EDUCATION. Students who complete either the health education major or the physical education major include courses in these fields during their fifth year of preparation along with other courses according to their special objectives. Students who devote their fifth year to graduate work for a master's degree may major in education, science education, health education, hygiene, or other

¹ On sabbatical leave 1962-63.

fields and include a graduate minor in physical education. Requirements for the master's degree can be completed with or without thesis. Advanced degrees are granted through the School of Education or the School of Science.

A comprehensive intramural sports program offers sports for all students. Living organizations, clubs, individuals, classes, and institutional departments compete with friendly rivalry in many sports activities. The intramural sports program is separate and apart from intercollegiate athletics.

Clubs and societies for women include Parthenia, an honor society sponsored by the Women's Physical Education Department; Women's Recreation Association, which offers competitive and noncompetitive physical activities for women; and Orange "O," the honorary club for the Women's Recreation Association. Athletic organizations for men include the Minor "O" and Varsity "O" associations and the honor society, Sigma Delta Psi. The Varsity "O" Managers Association includes varsity team managers and the senior intramural sports manager.

A medical examination is required of all entering students. The Student Health Service advises with the Division of Physical Education in the assignment of students to activities in accord with their physical needs. The following activity classification is made, based upon the medical examinations: (a) unlimited activity, (b) unlimited activity with observation, (c) restricted activity, (d) corrective gymnastics, (e) no activity.

Regular registration fees entitle every student to use of gymnasium, pool, and showers, use of gymnasium suits and swimming suits and towels, and laundry service. Every student has a basket or locker in the gymnasium for his or her exclusive use and is urged to use gymnasium facilities to the utmost.

A broad program of physical fitness and recreation is emphasized. All undergraduate men and women are expected to enroll in and complete physical activity courses during the freshman and sophomore years and until physical education requirements have been met. Entering students are required to enroll in swimming unless they pass the divisional swimming test. Students must complete the following:

Freshman year: PE 180 or 190, Physical Education, 1 term hour each for two terms; and PE 160, General Hygiene, 2 term hours for women; PE 150 or PE 160, 1 or 2 term hours for men.

Sophomore year: PE 180 or 190, Physical Education, 1 term hour each term for three terms.

Only one of the courses listed above may be taken in any one term.

The professional activities courses for students taking a major or minor in physical education may be considered as fulfilling the physical education requirement for any term.

Required activity courses are regularly scheduled classes planned as instructional hours leading to a knowledge and appreciation of the technique involved and not merely to give opportunity for recreation or exercise. Ample opportunity for exercise and recreation is provided.

Courses PE 380 or 390 may be taken to the amount of 1 hour per term for juniors and seniors. A total of 6 hours in addition to the regular physical education requirement may be elected.

Curriculum in Physical Education

Students preparing for physical education teaching and coaching or related fields pursue the basic program of required courses listed below.

Basic Program

Freshman Year		Sophomore Year	
	Hours		Hours
Human Biology (Z 114,115,116)	9	Elementary Human Anat (Z 321,322)....	6
English Composition (Wr 111,112,113)..	9	Applied Human Anatomy (Z 323)	3
General Chemistry (Ch 101,102,103)....	9	Professional Activities (PE 294)	6
Introduction to Physical Education (PE		Social Sci (Ec 212, PS 201, Soc 212) ...	9
131)	3	Literature	9
General Hygiene (PE 170)	3	General Psychology (Psy 201,202)	6
Introduction to Health Education (SEd		Field Experience (Ed 200)	2
123)	3	Speech	3
Professional Activities (PE 194)	6	Org & Admin of Intramural Sports	
Defense education or other elective	3-9	(PE 340)	2
		Defense education or other elective	3-9
Junior Year		Senior Year	
	Hours		Hours
Physiology (Z 331,332)	6	School Health Education (SEd 321).....	3
Applied Human Physiology (Z 336)	3	School Health Services (SEd 322)	3
School in American Life (Ed 310)	3	First Aid (PE 358)	3
Educational Psych: Learning (Ed 312)...	3	School Programs and Organization (PE	
Special Secondary Methods (Ed 408h)...	3	442)	5
Psychology of Adolescence (Ed 461)....	3	Evaluation of Physical Education (PE	
Methods in Reading (Ed 350)	3	443)	3
Phys Ed Technique (PE 333,334, or		Conditioning and Care of Injuries (PE	
335)	4	359) (men)	2
Football Coaching (PE 365) (men).....	2	Adaptive and Corrective Physical Edu-	
Basketball or Wrestling Coaching (PE		cation (PE 444)	3
366 or 369) (men)	2	Student Teaching: Secondary (Ed 416)..	12
Baseball or Track and Field Coaching		Seminar (Ed 407)	3
(PE 367 or 368) (men)	2	Community Health Problems (Mb 424 or	
Professional Activities (PE 394)	6	425 or 426) or Nutrition (FN 225) ..	3
Sports Officiating (PE 362) (women) ...	3		
Recr courses (PE 240, Ed 263 or 426)....	3		

Options

For options in recreation and youth agency leadership, consult with advisers in the Division.

Service Courses

Lower Division Courses

- PE 150. **General Hygiene.** 1 hour any term. 2 ①
Health promotion; individual and physiological hygiene; disease prevention and control; community hygiene and public health. Satisfies hygiene requirement for men.
- PE 160. **General Hygiene.** 2 hours any term. 2 ①
Health promotion; individual and physiological hygiene; disease prevention and control; community hygiene and public health. Satisfies hygiene requirement; may be elected by both men and women.
- PE 170. **General Hygiene.** 3 hours. 3 ①
Personal health, exercise, weight control, prevention of infection, social hygiene, diet, stimulants, injurious popular remedies and fads, sunlight, air and ventilation, choosing a doctor, and life-extension problems. Satisfies hygiene requirement; may be elected by both men and women.
- PE 180. **Physical Education (Women).** 1 hour each term, five terms.
- PE 190. **Physical Education (Men).** 1 hour each term, five terms.
Physical activities taught for acquisition of skill and for social adaptation of student.

Upper Division Courses

- PE 380. **Physical Education (Women).** 1 hour each term, six terms. 3 ①
 PE 390. **Physical Education (Men).** 1 hour each term, six terms. 3 ①

Professional Courses

Lower Division Courses

- Ed 121. **Introduction to Recreation.** 3 hours. 3 ①
 Community recreation; public recreation movement; types of recreation; organized recreation in present social order.
- SED 123. **Introduction to Health Education.** 3 hours. 3 ①
 Historical background and underlying philosophy; need for health education; modern practice in and organization for health education; opportunity for professional work.
- PE 131. **Introduction to Physical Education.** 3 hours. 3 ①
 Qualifications for teaching and coaching; place of physical education and athletics; values to development of children and youth; general purposes of program.
- PE 132. **Introduction to Therapy.** 2 hours. 2 ①
 Qualification needed to become registered physical therapist or occupational therapist. Relationship of physical therapy and occupational therapy to field of medicine; values.
- PE 194. **Professional Activities.** 2 hours each term, three terms. 2 ②
 Methods, techniques, skills in activities commonly found in physical education programs.
Fall: team sports (men); basketball, volleyball, field sports (women).
Winter: boxing, wrestling (men); modern dance, folk, square, and social dance (women).
Spring: gymnastics or aquatics (men); softball, track and field, badminton, tennis (women).
- PE 240. **Recreation Leadership.** 3 hours. 3 ①
 Games for family recreation, parties, picnics, clubs, and community centers.
- PE 253. **Introduction to Dance Education.** 3 hours. 3 ①
 Modern developments; aims and objectives; history; modern practices; opportunities in field.
- Ed 263. **Camp Counseling.** 3 hours. 3 ①
 Counselor training, responsibility in camp, camper problems, camp relationships. Three-day practical camping field trip.
- PE 294. **Professional Activities.** 2 hours each term, three terms. 2 ②
 Methods, techniques, and skills in activities found in physical education programs.
Fall: body mechanics, track and field (men); archery, bowling, golf (women).
Winter: boxing, wrestling (men); modern dance, folk, square, and social dance (women).
Spring: individual and dual sports (men); aquatics, advanced modern dance (women).

Upper Division Courses

- Mb 321. **Sanitation.** 3 hours. 1 ② 1 ①
 Home, school, city; control of communicable diseases and their relation to foods, rodents, swimming pools, eating establishments, insects, ventilation, industrial hygiene, etc. Prerequisite: one term of general microbiology or equivalent.
- PE 321. **Games and Relays for the Elementary School.** 2 hours. 2 ①
 Progressive activity skills for all grades, including games, relays, team activities; practical instruction; opportunity to analyze performance of children of various ages.
- SED 321. **School Health Education.** 3 hours. 3 ①
 Developing ability of school student to understand and guide own health and to contribute to health of community. Prerequisite: SED 123.

- PE 322. **Rhythms for the Elementary School.** 2 hours. 2 ①
 Progressive activity skills for all grades, including rhythms and dance; practical instruction; opportunity to analyze performance of children of various ages.
- SEd 322. **School Health Services.** 3 hours. 3 ①
 School procedures which contribute to development, maintenance, and protection of health of students; organization of services, examinations, screening, special services communicable disease control, emergency care, school environment, forms and record-
 Prerequisite: SEd 123.
- PE 323. **Posture and Conditioning for the Elementary School.** 2 hours. 2 ①
 Progressive activity skills for all grades; fundamentals of body movement and conditioning exercises, stunts, and tumbling; practical instruction; opportunity to analyze performance of children of various ages.
- PE 333,334,335. **Physical Education Technique.** 2 hours each term. 4 ①
 Teaching physical activities; problems of directed teaching. Prerequisite: PE 194,294.
- PE 340. **Organization and Administration of Intramural Sports.** 2 hours. 2 ①
 Program for high schools and colleges; aims and objectives; organizing a program; units of competition; program of sports; methods of competition; scoring plans; administrative problems. Prerequisite: PE 131.
- Ed 347,348,349. **Field Work.** 2 hours each term. 2 ①
 Planning, operation, and administration of variety of recreation, youth-organization, and therapy programs under direction and supervision of trained leaders. Prerequisite: Ed 121 or PE 132.
- PE 358. **First Aid.** 3 hours. 2 ① 1 ②
 Emergency treatment for various types of injuries; control of bleeding, artificial respiration, transportation, splinting, and bandaging. Students are required to teach first-aid projects. Course leads to Red Cross Standard, Advanced, and Instructor's Certificates. Open as a service course to all departments.
- PE 359. **Conditioning and Care of Injuries (Men).** 2 hours. 1 ① 1 ②
 Athletic injuries; practical and theoretical aspects of massage, taping, and bandaging; diet and conditioning; various physical therapeutic procedures. Prerequisite: Z 323.
- Ed 360. **Safety Education.** 3 hours. 3 ①
 All phases of safety; home, fire, industrial, water, rural, school, and traffic safety; elementary, secondary, and adult levels. Prerequisite: Ed 310,312.
- PE 360. **Sports Officiating (Men).** 3 hours. 3 ①
 Rules, mechanics, and procedures for competitive sports; enforcement of rules, use of signals; personal appearance and conduct, public relations, duties of officials; suggestions for coaches and administrators, code of ethics, and qualifications for national official's rating.
- PE 362. **Sports Officiating (Women).** 1 hour each term, three terms. 1 ①
 Rules, mechanics, and procedures in competitive sports; enforcement of rules, use of signals; personal appearance and conduct, public relations, duties of officials; suggestions for coaches and administrators, code of ethics, and qualifications for national official's rating. Prerequisite: PE 194.
- Ed 364. **Laboratory Practice in Camping Skills.** 3 hours. 3 ①
 Development of skills in a variety of camping activities. Prerequisite: Ed 263.
- Ed 365. **Camp Management.** 3 hours. 3 ①
 Preparation for camp administration. Prerequisite: Ed 263,364, or camp counseling experience.
- PE 365. **Football Coaching.** 2 hours. 2 ① 1 ②
 Theory and practice, details of each position, training and managing, complete techniques of developing offensive and defensive tactics, comparison of various systems in football. Prerequisite: PE 294.
- Ed 366. **Public School Camping.** 3 hours. 3 ①
 Role of camping in education; school camp and its organization, administration, and leadership. Prerequisite: Ed 365.

- PE 366. **Basketball Coaching.** 2 hours. 2 ① 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: PE 294.
- PE 367. **Baseball Coaching.** 2 hours. 2 ① 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. 2 ① 1 ②
How to train for events; form and technique; conduct of meets; construction, use, and assembling of equipment; development of certain types of individuals for certain events. Prerequisite: PE 294.
- PE 369. **Wrestling Coaching.** 2 hours. 2 ① 1 ②
Offense and defense in modern wrestling; equipment and facilities; meets and tournaments; coaching problems; wrestling styles; weight training and conditioning. Prerequisite: PE 294.
- PE 394. **Professional Activities.** 2 hours each term, three terms. 2 ②
Methods, techniques, and basic skills in activities in physical education programs. *Fall:* Rhythms (men); recreation games, tumbling, and apparatus (women). *Winter:* Fundamentals of body movement (women). *Spring:* Boxing, weight training (men); games, stunts, and relays; marching and drill (women). Prerequisite: PE 294.
- PE 405. **Reading and Conference.** (g) Terms and hours to be arranged.
- ¹PE 407. **Seminar.** (g) Terms and hours to be arranged.
EQUIPMENT AND SUPPLIES.
FACILITIES.
PROBLEMS IN INTRAMURAL SPORTS.
CURRENT STUDIES IN ATHLETICS.
RESEARCH SURVEY.
HISTORY.
SUPERVISION.
CURRICULUM.
PHILOSOPHY.
- PE 420. **Elementary School Physical Education.** 3 hours. 3 ①
Purposes; progressive programs for grades 1-8; obtaining objectives; evaluation.
- Ed 421. **Principles and Philosophy of Recreation.** (g) 3 hours. 3 ①
- Ed 422. **Recreation Programs.** (g) 3 hours. 3 ①
- Ed 423. **Organization and Administration of Recreation.** (g) 3 hours. 3 ①
(For descriptions of Ed 421,422,423 see page 200.)
- Mb 424,425,426. **Community Health Problems.** (g) 3 hours each term. 3 ①
Sanitary, statistical, governmental, epidemiological, sociological problems. Prerequisite: one year of upper division biological science.
- Ed 425. **Youth Agencies.** (G) 3 hours. 3 ①
Youth-serving organizations; organization and leadership. Prerequisite: senior or graduate standing.
- Ed 426. **Community Recreation.** (G) 3 hours. 3 ①
Developing philosophy, trends; organization and administration of program in large, small, and rural communities. Prerequisite: senior standing.
- SEd 431,432,433. **School Health Problems.** (G) 3 hours each term. 3 ①
Maintenance of health; communicable diseases; school sanitation; planning of school buildings; health of school child; hygiene of instruction. Prerequisite: one year of upper division biological science.

¹ Credit for PE 405 plus 407 must not exceed 9 term hours.

- PE 435. **Playground Leadership.** 3 hours spring. 3 ①
 Nature and function of play; adaptation of activities; program making. Playground instruction, management, and supervision.
- SEd 441,442,443. **Health Education.** (G) 3 hours each term. 3 ①
 Philosophy and principles; organization and administration; curriculum; coordination of school health activities with other health resources. Prerequisite: one year of upper division biological science and SEd 321 and 322 or equivalent.
- PE 442. **School Programs and Organization.** 5 hours. 5 ①
 Aims and objectives; selecting activities; typical programs and variations; athletics; standards; state and local requirements; administrative organization; policies and procedures; history and philosophy. Prerequisite: Ed 408.
- PE 443. **Evaluation of Physical Education.** 3 hours. 3 ①
 Techniques for evaluating knowledge, skill, attitudes, appreciations, and organic vigor through physical education instruction. Prerequisite: PE 335.
- PE 444. **Corrective Physical Education.** 3 hours. 3 ①
 Reconstructive health and physical education, including scoliosis, kyphosis, lordosis; methods of posture screen, orthopedic conditioning affecting posture, preventive measures, evaluation of visual aid materials in posture. Prerequisite: Z 323.
- PE 446. **Tests and Measurements in Physical Education.** (g) 3 hours. 3 ①
 Typical tests; scoring; test construction. Prerequisite: PE 442.
- PE 447. **Principles of Physical Education.** (g) 3 hours. 3 ①
 Philosophy and principles and their relation to general education. Prerequisite: PE 442.
- PE 448. **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 442.
- PE 449. **Current Trends and Problems.** (g) 3 hours. 3 ①
 Trends and underlying forces in health, physical education, and recreation; implications of recent developments for administrative responsibility and planning for programs in schools and colleges. Prerequisite: PE 442.
- Mb 453. **Epidemiology.** (G) 3 hours spring. 3 ①
 Causes and behavior of communicable diseases in general population; factors influencing occurrences of epidemics; basic principles underlying control. Prerequisite: Mb 205.
- PE 480. **Driver Education and Training.** (g) 3 hours. 2 ① 1 ②
 Preparation of teachers for driver-training classes in high schools; behind-the-wheel instruction in dual-control training cars sponsored by American Automobile Association and the Department of Motor Vehicles. Limited number of drivers-learners (non-drivers) will be admitted with whom driver-teachers will work. Prerequisite: Ed 310, 312.

Graduate Service Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

- SEd 501. **Research.** Terms and hours to be arranged.
- SEd 503. **Thesis.** Terms and hours to be arranged.
- SEd 505. **Reading and Conference.** Terms and hours to be arranged.
- SEd 507. **Seminar.** Terms and hours to be arranged.

Graduate School

HENRY P. HANSEN, Ph.D., Dean of the Graduate School.

WENDELL H. SLABAUGH, Ph.D., Assistant Dean of the Graduate School.

Graduate Council

H. P. HANSEN (chairman), RALPH COLBY, W. T. COONEY, J. R. DILWORTH, E. J. DORNFELD, MARGARET FINCKE, J. G. KNUDSEN, R. S. McCUTCHEON, J. W. SMERBURNE, W. H. SLABAUGH, E. A. YUNKER, F. R. ZERAN.

Graduate Committees

Science: E. J. DORNFELD (chairman), W. B. BOLLEN, H. FREUND, J. G. JENSEN, A. T. LONSETH, J. G. PATTULLO, F. O. RITCHER, W. D. WILKINSON, S. E. WILLIAMSON, R. A. YOUNG, E. A. YUNKER.

Agriculture: W. T. COONEY (chairman), R. BOGART, E. N. CASTLE, J. R. COWAN.
Education: F. R. ZERAN (chairman), R. B. D. BARON, C. B. AINSWORTH, MAY DUBOIS, H. A. TEN PAS, S. E. WILLIAMSON.

Engineering: G. W. GLEESON (chairman), G. W. HOLCOMB, J. G. KNUDSEN, L. SLEGEL, L. N. STONE, J. S. WALTON.

Forestry: J. R. DILWORTH (chairman), G. H. BARNES, W. A. DAVIES, W. I. WEST.

Home Economics: MARGARET FINCKE (chairman), MAY DUBOIS, IDA INGALLS, CLARA A. STORVICK, H. D. SCHALOCK, MIRIAM SCHOLL.

Pharmacy: R. S. McCUTCHEON (chairman), H. C. FORSLUND, L. A. SCIUCHETTI.

General Studies: E. A. YUNKER (chairman), R. F. FUQUAY, H. H. PLAMBECK, W. D. WILKINSON.

Graduate Minors in Nonmajor Fields: RALPH COLBY (chairman), G. A. BAKKUM, J. L. LEMASTER, M. N. NELSON, J. A. PFANNER, K. R. SWYGARD.

Graduate Faculty

As of January 1963

Departments Offering Majors for Master's and Doctoral Degrees

Agricultural Economics: Professors WOOD (head), BLANCH, CASTLE, HOLLANDS, KORZAN, MUMFORD; Associate Professors BECKER, BROWN, GAROIAN, HALTER, SITTON; Assistant Professors EDWARDS, HUTCHINGS, LANGMO.

Animal Science: Professors MILLER (head), BOGART, HAAG, HEDRICK, JONES, KRUEGER, OLDFIELD, POULTON, WESWIG; Associate Professors ENGLAND, FOX, GATES, OLIVER, RALSTON, WOLBERG; Assistant Professors CHURCH, KENNICK, WU.

Microbiology and Hygiene: Professors ELLIKER (chairman), C. L. ANDERSON, BOLLEN, GILMOUR, LANGTON, PILCHER, THORNE; Associate Professors A. W. ANDERSON, MORITA, PARKS, SANDINE.

Botany: Professors YOUNG (chairman), EVANS, HARDISON, MCWHORTER, MILBRATH, PHINNEY, ROTH, SMITH, VAUGHAN; Associate Professors CAMERON, CHAMBERS, CHILCOTE, CORDEN, DEEP, HORNER, JENSEN, JONES, LEACH; Assistant Professors ALLEN, BRANDT, POWELSON, TRIONE.

Chemical Engineering: Professors WALTON (head), GLEESON, KNUDSEN, WICKS; Assistant Professors JOST, MEREDITH, MRAZEK; Instructor MEYER.

Chemistry: Professors CHRISTENSEN (chairman), CALDWELL, CHELDELIN, DECIUS, FREED, FREUND, GILBERT (emeritus), HAAG, KING, KURTH, LOGAN, MACDONALD, MARVELL, MEHLIG (emeritus), NEWBURGH, NORRIS, REMMERT, RICHARDSON, SCOTT, SLABAUGH, WANG, WESWIG, WILLIAMS; Associate Professors BECKER, FANG, FONG, FREDERICKS, HEDBERG, KICE, LOOMIS, PARSONS, REESE, TERRIERE; Assistant Professors BOND, GAMBLE, KRUEGER, HEISLER, PEEKEMA, REED.

Civil Engineering: Professors HOLCOMB (head), BEHLKE, COOPEY, McCLELLAN, MERRYFIELD; Associate Professors BELL, BURGESS, KOFOID, PAN; Assistant Professors BEECROFT, NORTHCRAFT, PHILLIPS, PRITCHETT, SCHULTZ, SLOTTA.

- Education:** Professors ZERAN (dean), CLINTON, GOODE, MARKSHEFFEL, MUNFORD, ORDEMAN,* REICHAERT, REID, TEN PAS, WILLIAMSON; Associate Professors BARON, GILL, HALL, LEELAND, MILLIKEN, PARKS; Assistant Professors BEALS, FOX, ILIKA, REES, SEVEREIDE,* WALLEN; Instructors BRO, STORM.
- Electrical Engineering:** Professors L. N. STONE (head), ALBERT, COCKERLINE (emeritus), FEIKERT, MAGNUSSON; Associate Professors ENGLE, MICHAEL, OORTHUYNS, WEBER; Assistant Professors ALEXANDER, AMORT, JENSEN, LOONEY, S. A. STONE.
- Entomology:** Professors RITCHER (chairman), MARTIN, SWENSON, TERRIERE, THOMPSON; Associate Professors CROWELL, DICKASON, KRANTZ, GOULDING, ROSENSTIEL, RUDINSKY, STEPHEN; Assistant Professors ANDERSON, BROOKES, LATTIN, NAGEL.
- Family Life and Home Administration:** Professors READ (head), KIRKENDALL, VAN HORN; Associate Professor SCHALOCK; Assistant Professors AIKIN, GRAVATT,* PLONK, STATON; Instructor OLESON.*
- Farm Crops:** Professors COWAN (head), FOOTE, FORE, HILL (emeritus), POULTON; Associate Professors BROOKS,* FURTICK, GATES, HEDRICK, LEACH, MCGUIRE, METZGER; Assistant Professors CHILCOTE,* CHING, FRAKES, GOETZE.
- Fish and Game Management:** Professors DIMICK (head), DOUDOROFF, RAYNER; Associate Professors BOND, KUHN, LONG, WALES, WARREN.
- Food Science and Technology:** Professors SCHULTZ (head), CAIN; Associate Professors DAY, HARVEY, ONSDORFF, SAMUELS, SINNHUBER, STEIN, WILDER, YANG; Assistant Professors ANGLEMIER, DIETZ, MONTGOMERY, SATHER.
- Foods and Nutrition:** Professors FINCKE (head), CHARLEY, HAWTHORNE, MACKEY, STORVICK; Associate Professor McLEAN; Assistant Professors BUSSARD,* WARE.
- Forest Management:** Professors DILWORTH (head), BARNES, BERG, BEVER, KALLANDER, KENISTON, McCULLOCH, ROBINSON, WRIGHT; Associate Professors CHING, FERRELL, JAENICKE, NETTLETON, RANDALL, WHEELER, YODER; Assistant Professors BELL, HERMANN, HOOVEN, IRGENS-MOLLER, KRYGIER,* LAVENDER, LOWRY, SUTHERLAND.
- General Science:** Professors HUMPHREY (chairman), HANSEN, TROUT, WILLIAMSON; Associate Professors BEER, CREWS, FOX; Assistant Professor CONTE.*
- Geology:** Professors WILKINSON (chairman), ALLISON, HANSEN; Associate Professors BOSTWICK, OLES, TAUBENECK; Assistant Professor CUMMINGS.
- Horticulture:** Professors APPLE (head), COMPTON, FRAZIER, HANSEN, ROBERTS; Associate Professors BLANEY, GARREN, MACK, WESTWOOD, ZIELINSKI; Assistant Professor BAGGETT.
- Mathematics:** Professors LONSETH (chairman), ARNOLD, CARTER, FULKS, GASKELL, GOHEEN, OBERHETTINGER, POOLE, STONE; Associate Professors BUSCHMAN, FIREY, GROEMER, KAPLAN, KIRKHAM, REYNOLDS,* SAUNDERS, STALLEY, YOUNG; Assistant Professors BALANTINE, GODARD,* McLEOD.
- Mechanical and Industrial Engineering:** Professors SLEGEL (head), ENGESSER, GRAF (emeritus), HEATH, HUGHES, MARTIN (emeritus), PAASCHE, PAUL, PHILLIPS (emeritus), THOMAS (emeritus); Associate Professors DALY, LARSON, OLLEMAN, RIGGS, SMITH, THORNBURGH, WILSON; Assistant Professors BOUBEL, GELLER, JOHNSON, McCLURE, MINGLE, SMITH, ZAWORSKI.
- Oceanography:** Professors BURT (chairman), BERG, DEHLINGER; Associate Professors BYRNE, FROLANDER, McCAULEY, MORITA, PATTULLO; Assistant Professors CAREY, CURL, McALISTER, PARK, PEARCY, SMALL; Instructors OSTERBERG, RINEHART, SMITH.
- Pharmacy Administration, Pharmaceutical Chemistry, Pharmaceutical Science, Pharmacognosy, Pharmacology:** Professors WILSON (dean), DOERGE, FORSLUND, McCUTCHEON, SAGER, SCIUCHETTI; Assistant Professors CATALFOMO, DOST, SCHULTZ.
- Physics:** Professors YUNKER (chairman), BRADY, VARNER (emeritus); Associate Professors BURCH, DECKER, EASTERDAY, GARMAN, MORGAN (emeritus), NICODEMUS, SCHECTER, VINYARD; Assistant Professors CHURCH,* FAIRCHILD, FORREST, PIERCE.
- Poultry Science:** Professors PARKER (head), BERNIER, HARPER; Associate Professor ARSCOTT; Assistant Professor McCLUSKEY.
- Soils:** Professors CHENEY (head), JACKSON, YOUNGBERG; Associate Professors ALBAN, DAWSON, EVANS, HARWARD, KNOX; Assistant Professors BOERSMA, MOORE, SIMONSON, YOUNG.
- Zoology:** Professors DORNFIELD (chairman), ALLMAN, GORDON, HILLEMANN, KRUEGER, PRATT, STORM; Associate Professors HISAW, MOHLER, OWCZARZAK, PRITCHARD; Assistant Professors ALVARADO, NEWSTEAD; Instructor ANDERSON.

Departments Offering Majors for Master's Degrees Only

- Agricultural Education:** Professor TEN PAS (head); Assistant Professor DAVIS.
- Agricultural Engineering:** Professors RODGERS (head), CROPSEY, LUNDE, SINNARD; Associate Professors BONNICKSEN,* KIRK, WOLFE; Assistant Professors BOOSTER,* CHRISTENSEN.*
- Business Education:** Professors YERIAN (head), LARSE, WINGER; Assistant Professor BARBER.*

* Member of graduate faculty on a limited basis.

Clothing, Textiles, and Related Arts: Professors INGALLS (acting head), EDABURN, PATTERSON; Associate Professors CREEKMORE, DIEDESCH, LEDBETTER, MOSER; Assistant Professors CARLSON, GRANT, WELLS; Instructor BUBL.

Forest Engineering: Professor DAVIES (head); Associate Professors O'LEARY, WILSON.

Forest Products: Professors WEST (head), ESPENAS, GLENNIE, SNODGRASS; Associate Professors GRAHAM, MCKIMMY; Assistant Professors AFT, CURRIER, JOHNSON, KRAHMER, VAN VLIET.

Home Economics Education: Professor DU BOIS (head); Associate Professor McQUESTEN; Assistant Professor HENDRIX.

Industrial Education, Industrial Arts Education: Professors SHEELY, COX (emeritus); Associate Professors AINSWORTH (head), FRAZIER, MEYER (emeritus), ROBLEY; Assistant Professors HOEYE, JOHNSON (emeritus), RIESLAND, SMITH, WILSON;* Instructors COLE,* LABAUN.*

Institution Management: DEAN SCHOLL (acting chairman); Associate Professor CLEAVELAND,* HOLMAN.

Natural Resources: Professors JENSEN (chairman), HIGHSMITH; Associate Professors HEINTZELMAN, MYATT, RUDD.

Science Education: Professors WILLIAMSON (chairman), ANDERSON, LANGTON; Associate Professors FOSTER, FOX, KOSKI, MAYSHARK.

Statistics: Professor CALVIN (chairman); Associate Professor LINK; Assistant Professors HUGHES, JENSEN.

Veterinary Medicine: Professors DICKINSON (head), MUTH, SHAW (emeritus), VAWTER (emeritus); Associate Professors BONE, KNAPP, PETERSON.

Departments Offering Courses Applicable Toward Graduate Minors Only

Business Administration: Associate Professor EASTON (chairman); Professors CAMPBELL, CRAIG, MASER, NEWTON, PFANNER, SEATON; Associate Professors ALLAN, DAVIDSON, MENGLER, STRICKLER.

Economics: Professor FRIDAY (chairman); Assistant Professors HARTER, ORZECZ,* PATTERSON, TOWEY, WILKINS; Instructor NORTON.

English: Professors NELSON (head), CHILDS; Associate Professor GROSHONG; Assistant Professor NORRIS.

Extension Methods: Professors MACK, SMITH; Assistant Professor BERGER.

History: Professors CARSON (chairman), C. K. SMITH, R. W. SMITH; Associate Professors CARLIN, SHAW; Assistant Professor PUTNAM.

Industrial Education, Trade and Industrial Education: Associate Professor AINSWORTH (head); Assistant Professor SMITH.

Physical Education: Professors LANGTON (head), ALLMAN, ANDERSON, BERGSTROM, COLEMAN, SEEN; Associate Professors GILL, MILLIKEN, WEIR.*

Political Science: Professors Walter (chairman), MADDOX, SWYCARD; Associate Professor FUQUAY; Assistant Professor GREEN.

Psychology: Professors CROOKS (chairman), MILLS; Associate Professors CRAWFORD, SIMPSON, ROHDE, WARNATH; Assistant Professors BRODY, MADDEN, SIMMONS.

Sociology: Professors PLAMBECK (chairman), PARKS; Associate Professor FETTER; Assistant Professors CANTRELL, CURRY, FOSTER.*

Speech: Professors WELLS (chairman), LIVINGSTON; Associate Professors HARRIS, HILDEBRANDT.

General Statement

ALL STUDY BEYOND THE BACHELOR'S DEGREE at Oregon State University is conducted through the Graduate School. The formulation of departmental graduate programs and the working out and direction of the programs of individual students are responsibilities of the departments, under the general rules or requirements of the Graduate School.

The Graduate School also administers the institutional program for the encouragement of research by members of the faculty through the provision of necessary facilities and through grants-in-aid.

* Member of graduate faculty on a limited basis.

Organization and Administration. The Graduate Faculty consists of the President of OSU, the academic deans, the chairmen of the several departments in which advanced degrees are offered, and other members of the faculty who have been elected to the Graduate Faculty. Formulation and administration of graduate school policies are carried out by the Graduate Council, which is composed of the chairmen of the several School Graduate Committees. Members of the Graduate Faculty are represented through their respective School Graduate Committees, which are made up of representatives from each of the several departments in the school. Members of the graduate faculty offer graduate courses, conduct seminars, serve on graduate committees, advise with students on their theses, and serve on preliminary and final examination committees. The Graduate Council meets on the first and third Thursdays of each month. The dean of the Graduate School is chairman of the Graduate Council and ex-officio member of all graduate committees.

Oregon State University granted its first advanced degree (A.M.) in 1876. In 1897 definite 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 University 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 at Oregon State to the Graduate School.

The Doctor of Philosophy degree is offered in about seventy fields of study, distributed through thirty departments of instruction. The Doctor of Education degree is offered in General Education and Guidance. Various types of master's degrees are offered in the same fields as the doctoral degrees, and in nineteen additional fields in fourteen departments of instruction. Minors only on graduate degrees are offered in seven departments. The departments of instruction are in nine schools: Science, Agriculture, Business and Technology, Education, Engineering, Forestry, Home Economics, Humanities and Social Sciences, and Pharmacy.

Advanced Degrees

Degrees granted, and fields in which programs of study leading to the respective degrees are offered, are listed below:

Doctor of Philosophy: SCIENCE—botany, chemistry, education, entomology, general science, genetics, geology, mathematics, microbiology and hygiene, oceanography, physics, zoology. AGRICULTURE—agricultural economics, animal science, farm crops, fisheries, food science and technology, genetics, horticulture, poultry science, range management, soils, wildlife management. EDUCATION—education, guidance. ENGINEERING—chemical engineering, civil engineering, electrical engineering, industrial engineering, mechanical engineering. FORESTRY—forest management. HOME ECONOMICS—family life and home administration, foods and nutrition. PHARMACY—pharmaceutical chemistry, pharmaceutical science, pharmacognosy, pharmacology.

Doctor of Education: EDUCATION—education, guidance.

Master of Arts (departmental): SCIENCE—botany, chemistry, entomology, general science, genetics, geology, mathematics, microbiology and hygiene, meteorology, natural resources, oceanography, physics, statistics, zoology. EDUCATION—education, guidance, agricultural education, business education, health education, home economics education, industrial arts education, science education. ENGINEERING—agricultural engineering, chemical engineering, civil engineering, electrical engineering, industrial engineering, mechanical engineering, nuclear engineering. HOME ECONOMICS—clothing, textiles, and related arts, family life and home administration, foods and nutrition, institutional management. PHARMACY—pharmaceutical chemistry, pharmaceutical science, pharmacognosy, pharmacology, pharmacy administration.

Master of Agriculture: AGRICULTURE.

Master of Arts in General Studies: see page 307.

Master of Science: SCIENCE—botany, chemistry, entomology, general science, genetics, geology, mathematics, meteorology, microbiology and hygiene, natural resources, oceanography, physics, statistics, zoology. AGRICULTURE—agricultural economics, agricultural engineering, animal science, farm crops, fisheries, food science and technology, genetics, horticulture, poultry science, range management, soils, veterinary medicine, wildlife management. EDUCATION—agricultural education, business education, education, guidance, health education, home economics education, industrial arts education, science education. ENGINEERING—agricultural engineering, chemical engineering, civil engineering, electrical engineering, industrial engineering, mechanical engineering, nuclear engineering. FORESTRY—forest engineering, forest management, forest products. HOME ECONOMICS—clothing, textiles, and related arts, family life and home administration, foods and nutrition, institution management. PHARMACY—pharmaceutical chemistry, pharmaceutical science, pharmacognosy, pharmacology, pharmacy administration.

Master of Education: education, guidance, agricultural education, business education, health education, home economics education, industrial arts education.

Master of Material Science: See page 309.

Master of Bioengineering: See page 315.

Master of Engineering: See page 316.

Master of Forestry: forest engineering, forest management, forest products.

Master of Home Economics: clothing, textiles, and related arts, family life and home administration, foods and nutrition, general home economics, home economics education, institution management. A major may be selected from among several fields within a department or may involve two or more related departments.

Master of Pharmacy: pharmacy administration, hospital pharmacy.

Engineer:

<i>Degree</i>	<i>Department</i>
Agricultural Engineer (A.E.).....	Agricultural Engineering
Chemical Engineer (Ch.E.).....	Chemical Engineering
Civil Engineer (C.E.).....	Civil Engineering
Electrical Engineer (E.E.).....	Electrical Engineering
Industrial Engineer (I.E.).....	Industrial Engineering
Mechanical Engineer (M.E.).....	Mechanical Engineering
Metallurgical Engineer (Met.E.).....	Mechanical Engineering
Mining Engineer (Min.E.).....	Chemical Engineering

General Regulations

Admission. A student desiring to enter the Graduate School will send (or arrange to have sent) to the Office of Admissions: (1) two completed admission forms; (2) a transcript of all his previous college or university work; (3) a letter indicating the special fields in which he is particularly interested or a statement that he does not wish to become a candidate for a degree; and (4) a small, fairly recent photograph. To be considered for admission to the Graduate School, an applicant must have a baccalaureate degree from an accredited college or university, and a scholastic record and background and other evidence that indicate he is capable of doing 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 expressed aims of the student. The recommendations of the departments are reviewed by the Graduate Office. The student is then notified by the Office of Admissions as to the action taken.

Admission Status. Students may be admitted to the Graduate School under the following categories:

1. REGULAR GRADUATE STUDENTS. Those who have met the academic requirements.
 - a. *Classified.* Those who have been accepted by a major department to work toward an advanced degree.
 - b. *Unclassified.* Those who have graduated from an accredited institution but have not declared a major, or those who want to work toward certification for teaching or other professional work. These students may become classified candidates later, if accepted by a department.
2. CONDITIONALLY ACCEPTED GRADUATE STUDENTS.
 - a. *Provisional graduate students.*
 - (1) Students from nonaccredited institutions must complete at least one term of satisfactory work at Oregon State, after which they may be admitted with full standing in the Graduate School and allowed graduate credit for courses they have completed acceptably while registered as provisional students.
 - (2) Students whose preparation does not warrant full admission to the Graduate School but who may prove acceptable later. If at the end of two quarters of work they fail to show promise as graduate students they will be asked to terminate their work.
 - b. *Nondegree students.* Students rejected as regular graduate students because of poor undergraduate records and a lack of promise for graduate work. Students who are working toward teacher certification but who do

not qualify as regular graduate students may be admitted to this category. As a condition to admission the student shall sign a statement that he understands that while work completed under this category may not be used for a graduate degree, it may be used as a basis for reapplication for admission to the Graduate School.

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 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 terms of residence in the Graduate School is required regardless of the number of credits reserved.

Qualifying Examinations. Graduate students working for advanced degrees are required to take an examination in their major and minor fields designed to determine their weaknesses, deficiencies, and 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 the student's taking undergraduate courses without graduate credit in order to give him the necessary background to go on with his graduate program. The examination may be oral or written, or both, and must be taken during the first term of his graduate enrollment, preferably before the beginning of fall term, but not later than one month after the beginning of the term. In lieu of their own qualifying examination, departments may accept a satisfactory showing in the Graduate Record Examination or some other standard test.

A graduate of OSU who has maintained a grade-point average in major and minor fields of at least 3.25 throughout his undergraduate work may be exempted from taking the qualifying examination.

A student working toward the doctoral degree who has received his master's degree at Oregon State not more than three years before beginning doctoral work is not required to take the qualifying examinations unless his major has been changed. He is required, however, to take examinations in additional minors.

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 a one-year sequence of upper division work in addition to foundational courses in the subject. Graduate credit may not be earned in courses for which the student does not show proper preparation by previous record or special examination.

Term Credit Load. The normal load for a graduate student devoting all of his time to graduate study is 15 term hours (including course work and thesis). The maximum load is 16 term hours (17 term hours on petition). For assistants and fellows the maximum load is 12 term hours; for part-time assistants and fellows the maximum load is 15 term hours. A graduate student using campus space and facilities and/or under supervision of a major professor must register for a minimum of two hours.

Grade Requirement. A 3.00 (B) grade-point average is required in both the major and minor(s). Grades below C are not acceptable.

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 toward a minor only. Blanket numbers, 501, 503, 505, and 507 may be used repeatedly. Number 503 covers the thesis, both the research and the writing. Although thesis credit may be registered each term, the thesis grade is not given until the dissertation is presented at the final oral examination. 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 is used for special work not given under a formal course number. It may include specified reading, laboratory work, field work, or compilation of information essential in the student's program. The work done under this number may be reported either in writing or orally to the instructor concerned. Seminar 507 is used both for departmental seminars and for special work not given in a formal course where several students are concerned.

Petitions. A student who wishes to deviate from the normal graduate school regulations and procedures may present his problem in a letter addressed to the Graduate Council signed by himself and his major professor. The Graduate Council will consider the petition at its next meeting and the student will be advised of the Council's decision. 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 during the academic year should apply for graduation at the Registrar's Office not later than the first week of the winter term preceding Commencement. Students in residence spring term are required to attend Commencement. Students completing requirements previous to the spring term, who cannot attend Commencement, must petition the Academic Requirements Committee to receive their degrees in absentia. Students completing degree requirements during the regular summer session will receive their diplomas in September.

Graduate Fees. Graduate students registered for 8 term hours of work or more pay tuition and fees of \$90 a term. Graduate students do not pay the nonresident fee. Students holding graduate or research assistantships or fellowships pay fees totaling \$34 per term. Graduate students registering for 7 hours of work or less pay the regular 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 \$15 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 residence hall equipment, laboratory equipment, military uniforms, library books, locker keys. If at any time charges against this deposit become excessive, the student may be called upon to reestablish the original amount.

Microfilming. All doctoral candidates pay a fee of \$20 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 Oregon State. Full-time staff members may register normally for not more than 3 hours per term. As many as 5 hours may be permitted provided registration is not for more than one course.

Degree Programs

Master of Arts and Master of Science

Credit Requirement. For the departmental Master of Arts or Master of Science degree, the student must complete a program of study totaling not less than 45 term hours in courses approved for graduate credit. Approximately two-thirds of the work (30 term hours) must be in the major and one-third (15 term hours) in the minor. No correspondence credits may be included. A maximum of 6 of the 45 term hours may be earned under "in absentia" registration, but no thesis credit may be thus registered.

Residence Requirements. The residence requirement for the M.A. and M.S. degrees is one academic year or fair equivalent. A maximum of 15 term hours earned in graduate courses in the General Extension Division of the Oregon State System of Higher Education or at the University of Oregon may be counted as credit earned in residence toward the departmental master's degree. If adequate course offerings are available, all the work toward the Master of Arts (General Studies) degree *Option A* may be earned at the Portland Center.

Transferred Credit. A maximum of 15 term hours of graduate work done at another accredited institution, or in the General Extension Division of the Oregon State System of Higher Education, 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.

Language Requirements. For the Master of Arts degree, the student must show by examination or by adequate undergraduate courses (not less than two years), a reading knowledge of one foreign language, preferably French or German. By petition to the Graduate Council, *before* any language examination is taken, a student may be permitted to substitute another language, if it is equally relevant to his program of graduate studies. A candidate for a master's degree who passes the regular reading-knowledge examination need not repeat such examination if he proceeds toward his doctorate within a reasonable time. 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. As soon as feasible a study program for the master's degree should be filed in the Graduate Office. The program is worked out under the guidance of the major and minor professors, entered on the card for that purpose, and signed by the major and minor professors and the chairman of the school graduate committee before filing in the Graduate Office. The master's degree program should be filed during first term of student's residence.

Time Limit. All work counted toward the master's degree (including work for which credit is transferred from another institution, the thesis, and the final examination) should be completed within a period of seven years, but work taken between seven and ten years before the program is completed may be validated under the supervision of the department, usually by assigned readings or examination or both.

Thesis. A copy of the thesis in final form must be presented to the Graduate Office for collating at least one week prior to the final examinations. Copies of the thesis and abstract are then distributed to members of the examining committee. After the examination the original and the first carbon copy (Library copies) and three copies of the abstract are deposited unbound in the Graduate Office, and the second carbon copy and an abstract with the major department. The student must obtain on the thesis approval page the signatures of major professor, head of major department, and dean of Graduate School. Information on prescribed style for thesis may be obtained at the Graduate School Office.

Credit allowed for the thesis, including research and preparation of the manuscript, varies from 6 to 12 term hours. A Master of Science degree with a major in General Science is offered either with or without thesis.

Final Examination. A final oral examination of not less than two hours is required of every candidate for the master's degree; when deemed desirable a written examination may also be required. (For the master's degree, the examining committee consists of at least four members of the faculty, two in the student's major field, one in the minor field, and one in a field not directly connected with the candidate's studies.)

The examining committee is nominated by the student's adviser, subject to the approval of the dean of the Graduate School, who is *ex officio* a member of all examining committees.

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 workers, and other professional agricultural workers who do not desire the specialized training of the departmental degree and the thesis based on research. Forty-five hours are required, with a minimum of 9 hours in each of at least three agricultural fields. From these departments an advisory committee is chosen which 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 after registration under this program. No thesis is required, but a paper requiring from 3 to 5 term hours of work must be submitted. The general requirements, except for those relating to the thesis and written report, are the same as for the Master of Science degree.

Master of Arts in General Studies. This degree is granted for the attainment of a broad advanced knowledge and cultural achievement rather than for work in a specialized field under the traditional program of the departmental master's degree. A minimum of 9 hours in each of three departments (at least one of which must be in a field in which graduate majors are allocated to the institution) is required, with not more than 21 hours in any one department. The course work must be integrated and organic.

Option A. Under option A, a thesis is required which provides the focus for the selection of a program of courses which serve to support it.

Option B. Under option B, no thesis is required, but the course work must be integrated to provide a well-coordinated program. A minimum of 30 hours is required to be taken on the campus. This program offers an opportunity for secondary school teachers of humanities and social sciences to take graduate work in these areas. Students working toward the Master of Arts in General Studies are advised by the General Studies Committee.

Master of Education. The Master of Education is a professional degree, and satisfactory teaching experience is required. For the degree a minimum of 45 term hours in graduate courses must be completed; additional hours may be required depending on the needs and the undergraduate preparation of the candidate. Liberal provision is made for the earning of credits through the General Extension Division, but a minimum of 12 term hours of academic work (not thesis or field studies) must be earned on the Corvallis campus in one summer session.

The candidate must qualify under one of the following plans: (a) He submits a thesis, which meets all standards for a master's thesis, on some applied or professional aspect of education. For the thesis he receives 6 term hours of credit. (b) He majors in guidance and completes 30 hours in this area, including 18 hours in prescribed courses. The other 12 hours are set up with a choice between two or three subjects. A minor of 15 term hours in psychology is required with at least 6 hours in the field of psychological tests and testing. (c) He completes 45 term hours with 24 term hours in specific courses. No thesis or field studies are required. The remaining 21 hours are elective under the direction of the adviser. In addition to the final oral examination, a written comprehensive examination is required in the candidate's major field.

Under Plan C are offered industrial arts education, business education, and health education majors which deviate from the requirements above in that they consist of a minimum of 30 hours in the respective fields with a minor of 15 hours in general education integrated around research procedures in education and a sequence of not less than 9 hours in administration, guidance and counseling, or curriculum construction. In each case a minimum of 45 hours is required.

Master of Forestry. The professional Master of Forestry degree is intended for potential administrators and technologists in public and private organizations where men of broad ability are demanded and a broader technical training is needed. 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 departments in the School of Forestry or 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 under this plan, but at least two technical reports, correlated with courses in the major fields or assigned or approved topics, must be submitted.

Master of Home Economics. The Master of Home Economics is a professional degree which may be of interest primarily to high school teachers and extension personnel. A major is offered in general home economics and also in each of the departments of the School of Home Economics. A minor is required, to be selected from offerings in the School of Home Economics or from other schools and departments according to the student's needs.

A thesis is not required but at least one written report requiring reading, analysis, criticism, and organization of material shall be prepared and submitted to the Graduate Council and then filed with the department concerned.

The general requirements, except for those relating to the thesis and written report, are the same as for the Master of Science degree.

Master of Science in Nuclear Engineering. A Master of Science degree with a major in Nuclear Engineering is offered through all departments in the School of Engineering. Students will normally work through the department of their undergraduate major. Major work will consist of nuclear courses in any of the departments offering such courses, including chemistry, physics, mechanical or chemical engineering. Work in the minor field will normally be taken within a department. The thesis must be in the nuclear field, and, if possible, should be related to the subject matter of the major department of enrollment. The course work for the engineering degree has been approved by the Atomic Energy Commission for its graduate fellowship program.

Master of Material Science. Graduate study in material 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 distributed approximately 30 hours to a major including thesis, and 15 hours to a minor or minors.

Master of Pharmacy. The Master of Pharmacy is offered with majors in pharmacy administration and hospital pharmacy. A thesis is optional for either major.

Engineer

For the degrees of Agricultural Engineer, Chemical Engineer, Civil Engineer, Electrical Engineer, Industrial Engineer, Mechanical Engineer, Metallurgical Engineer, and Mining Engineer, the candidate must meet one of the following sets of requirements:

(1) 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, by Extension or otherwise, 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 professional experience and compatible with the designation of the degree.

(2) Those who do not hold baccalaureate or master's degrees from Oregon State University are subject to the same requirements as (1) with the additional stipulation that at least 12 term hours of graduate work must be completed in residence upon the Oregon State campus.

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 professional experience and graduate academic credit since receipt of his last degree. Accompanying the statement should be a thesis title and sufficient description or outline of thesis content to provide a basis of 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 his 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. The candidate registers for the degree with the Registrar, either in person or by mail, not later than March 1.

Doctor of Philosophy

General Requirements. The degree of Doctor of Philosophy is granted primarily for attainments and proved ability. There is no rigid credit requirement. It is the policy of the institution not to accept as a candidate for the Ph.D. degree any student whose academic training, both undergraduate and graduate, has been exclusively at Oregon State University.

Graduate Study Program. The study program should be filed in the Graduate Office during the first term of residence after the student completes a master's degree at Oregon State, or during the second term if he enters from another school with a master's degree. The doctoral program consists of a major and two minors. If the major department offers several distinct areas of study, one minor may be in that department, subject to approval of the graduate dean. The study program is formulated under the guidance of the student's doctoral committee, composed of two advisers from the major, one from each of the minors, and the graduate dean or his representative. The committee is approved by the graduate dean. Approximately sixty percent of the program is devoted to the major including the thesis, and forty percent to the minors. After the program has been accepted by the committee it is submitted to the Graduate Council and, if approved, it becomes the obligation of the student to complete the requirements as set up. In order to change the program in any way, approval of such changes must be obtained from the major and minor departments, the chairman of the School Graduate Committee, and the graduate dean. For College Teaching Minor see pages 311, 312.

Residence. For the doctor's degree, at least three years of full-time work beyond the bachelor's degree are required, of which at least one year (usually the last) must be spent in residence at OSU with a minimum of 36 hours of course work.

Language Requirements. For the Doctor of Philosophy degree, a reading knowledge of French and German must be demonstrated by a formal examination in each language. These examinations should be taken as early as possible after the beginning of graduate work, and must be passed before the preliminary examinations may be taken. By petition to the Graduate Council, *before* any language examination is taken, a student may be permitted to substitute another language if it is equally relevant to his program of graduate studies. A foreign student may not substitute his native language for German. If a foreign student is permitted to use his native language, he may be required to take a written examination to demonstrate his ability in translating it into English.

Preliminary Examinations. The student working toward the doctor's degree must pass a group of comprehensive preliminary examinations (at least partly oral) in his major and minor subjects not less than two terms before he takes the final examination. Most departments require a written preliminary taken before the oral. Advancement to candidacy is contingent on passing these preliminary examinations.

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. It is expected that the preparation of an acceptable thesis will require at least the greater part of an academic year.

An abstract of the doctoral thesis of not more than 600 words will be published by University Microfilms in *Dissertation Abstracts*.

Regulations concerning the doctoral dissertation are the same as those for the master's degree, as outlined on a previous page, except that the final draft must be presented to the Graduate Office at least **two weeks** prior to the final examination.

Microfilming Fee. Candidates for the Doctor of Philosophy and Doctor of Education degrees pay a fee of \$20 for microfilming of the thesis in its entirety by University Microfilms. This includes publication of the doctoral abstract in *Dissertation Abstracts* by the same agency.

Final Examination. The final examination for the degree of Doctor of Philosophy may be written in part, but must include an oral examination of at least two hours' duration. The oral examination is open to all members of the faculty and to advanced graduate students. Date of the oral examination is publicly announced at least one week before it is held. The examining committee consists of the candidate's advisory committee, including at least one member not directly connected with the major and minor departments. Additional members may be appointed by the major professor, with the approval of the graduate dean. Unanimous vote is necessary for approval of the thesis. In the oral examination the candidate is expected to defend his thesis and to show a satisfactory knowledge of his major and minor fields.

The final oral examination must be taken within five years after the preliminary examination, or the candidate will be required to take another preliminary examination.

Doctor of Education

For the degree of Doctor of Education, procedures and requirements in respect to residence, preliminary and final examinations, and thesis are similar to those for the Doctor of Philosophy degree. Successful teaching experience is essential. A minimum of two years of teaching at either the elementary or secondary level is a definite requirement. The credit requirement is flexible, but the total number of term hours of graduate credit including thesis must approximate 135.

Along with the educational major, one minor in the field of education and one minor in a field of study outside the School of Education are required. The college teaching minor will not be accepted if the other minor is in education. Foreign languages are required if necessary in the dissertation problem.

Genetics

A program for a major or minor in genetics is offered for the master's and doctor's degrees. Opportunity for specializing in pure and applied genetics is offered in the Schools of Science and Agriculture. The course work is drawn

from the biological departments of these schools. The genetics program is designed to acquaint the student in all the principal phases of genetics, and at the same time permit him to emphasize his research interests in this field. All graduate study in genetics is coordinated through a special committee nominated by the deans of Science and Agriculture and approved by the dean of the Graduate School. The seminar listed below helps unify all genetics studies.

Graduate Courses

- Gen 503. **Thesis.** Terms and hours to be arranged.
 Gen 507. **Seminar.** Terms and hours to be arranged.

General Studies

The General Studies program at Oregon State University is supervised by a special committee of which Dr. E. A. Yunker is chairman. In addition to courses chosen from the offerings of the several schools and departments, the following courses are available for the general studies student.

- GSt 501. **Research.** Terms and hours to be arranged.
 GSt 503. **Thesis.** Terms and hours to be arranged.
 GSt 505. **Reading and Conference.** Terms and hours to be arranged.

Studies in College and University Teaching and Curriculum

Many persons who qualify for master's and doctor's degrees engage in college and university teaching as part of their professional work. The Graduate School prepares students for college and university teaching as well as for research. It offers a group of courses dealing with the philosophy, functions, and structure of higher education and problems of teaching, curriculum development, and student-faculty relationships. In all these courses, students have opportunity to delve into topics of special interest.

Maturity, background, and sincerity of purpose are the principal requisites. There are no course prerequisites in professional education. The program is not planned to fulfill requirements for a teaching credential in any state, although it may be supplemented with additional work to serve this purpose. The coordinator for studies in college and university teaching and curriculum is Professor Delmer M. Goode, Curriculum Consultant.

Graduate Minor in College Teaching. A minor in college and university teaching (15-18 term hours for a master's degree, 21-24 term hours for a doctor's degree) may be taken in conjunction with a subject-matter major. The core program, all of which is required for the teaching minor for a master's degree, consists of the following courses:

- Ed 556. The College Student. 3 hours.
 Ed 557. College and University Teaching. 3 hours.
 Ed 558. American Higher Education. 3 hours.
 507. Seminar (Teaching Procedures). 3 hours.
 (Registration in major departments. By special arrangement, registration may be in CC 507. Ed 557 and either Ed 556 or Ed 558 are prerequisite.)
 CC 506. College Teaching Studies. 3 hours.

For doctoral candidates, additional electives are chosen in appropriate areas to form an integrated program in college teaching.

Studies in Teaching and Curriculum. Studies or projects in curriculum development and improvement of teaching may be engaged in by individuals or faculty groups. Graduate students are encouraged to join these studies since the association of college teachers with students interested in curriculum and teaching is of mutual advantage.

Credit may be earned in the courses listed below. Whenever the nature of the work warrants, credit so earned may be applied toward a graduate major or minor in a department.

Graduate Courses

CC 505. **Reading and Conference.** Terms and hours to be arranged.

CC 506. **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. Ordinarily no credit is given for the teaching itself. Open to graduate students who have teaching assignments concurrent with the course. Special arrangements may be made for those who have already taught in college or university. Prerequisite: Ed 556,557,558.

CC 507. **Seminar.** Terms and hours to be arranged.

CC 508. **Workshop.** Terms and hours to be arranged.

CC 509. **College Curriculum Studies.** Terms and hours to be arranged.

Joint study with staff assistance in any aspect of college curriculum, including problems of teaching, guidance, and coordination. Seminar or workshop procedures are used according to aims of group.

Graduate Appointments

A varying number of graduate teaching and research assistantships are awarded annually to graduates of accredited universities and colleges who have superior records in their undergraduate work. All persons holding these appointments are expected to register in the Graduate School and to become candidates for advanced degrees. Assistants render service to the institution through teaching duties or research and pay fees amounting to \$34 per term, which admit them to all services maintained by the university for the benefit of students. Assistants may carry a maximum of 12 hours per term.

Teaching Assistantships. A teaching assistant renders services amounting to not more than 15 hours a week—reading papers, handling laboratory and quiz sections, etc. He is permitted to enroll for a maximum of 12 hours per term. The stipend for a teaching assistant varies from \$1,600 to \$2,400.

Research Assistantships. A research assistant aids a faculty member in carrying on a research project. Compensation and enrollment limitations are the same as for a teaching assistant.

Agricultural Experiment Station Graduate Research Assistantships. Appointees are usually required to devote the equivalent of one-half time on approved Experiment Station projects; they normally spend two years on the Master of Science degree. Appointment and stipend are based on training, ability, and experience. The stipend varies from \$2,520 to \$3,240 on a twelve-month basis.

Engineering Experiment Station Assistantships. A variable number of assistantships are available through the Engineering Experiment Station under which the student devotes one-third of his time as an assistant on an approved station project. Such projects are in operation in each department of engineering except engineering physics, agricultural engineering, and production technology. The current stipend is \$2,000 on a nine-month appointment.

State Scholarships. A limited number of scholarships covering tuition and laboratory and course fees are available to graduate students. All applicants, to be eligible, must be in need of financial assistance, and must show evidence of superior scholarship.

Application blanks are available from the Scholarship Office. Applications, including transcripts of all academic work to date of application, should be forwarded to the Office of the President by March 1 of each year.

Fellowships. A number of fellowships sponsored by industry, foundations, and governmental 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 credit hours, and pay the full fee of \$90 per term. The following fellowships are open to Oregon State University graduate students:

CROWN ZELLERBACH FOUNDATION FELLOWSHIP IN RESOURCE GEOGRAPHY: \$2,000 to assist an outstanding graduate student majoring in Resource Geography.

DOW CHEMICAL COMPANY FELLOWSHIP: \$1,800 to \$2,500 provided by the Dow Chemical Company for graduate fellowships in chemical engineering; a senior may be selected.

DU PONT POSTGRADUATE TEACHING ASSISTANTSHIP IN CHEMISTRY: \$1,200, plus fees, provided by the E. I. du Pont de Nemours Company for a graduate student in chemistry.

EVANS PRODUCTS COMPANY FELLOWSHIP: \$1,500 available to a graduate student majoring in forest products.

GENERAL FOODS FUND FELLOWSHIPS: Two grants annually for doctorate or master's degree study in any area of Home Economics; \$3,000 for candidate on doctoral program and \$2,000 for a student on a master's degree program, provided by the General Foods Fund, Inc. of New York City.

HYSLOP AGRICULTURAL RESEARCH FELLOWSHIP: \$1,000 a year for research in farm crops in memory of Professor George R. Hyslop.

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 economics and allied fields. Current income about \$3,000 annually.

MARY J. L. McDONALD FELLOWSHIPS IN FORESTRY: Annual grants of \$300 to \$1,000 each to assist graduate students in forestry.

SHELL OIL COMPANY FELLOWSHIPS: \$1,800 plus fees provided by Fellowship Committee of the Shell Oil Company Foundation for student in chemistry.

SOUTH SANTIAM EDUCATIONAL AND RESEARCH PROJECT FELLOWSHIPS: Two \$2,000-\$3,000 fellowships for students in forest management provided by the Louis W. and Maud Hill Foundation.

STAUFFER FELLOWSHIP: \$1,800 for the recipient plus laboratory fees of \$200 provided by the Stauffer Chemical Company in support of research in chemistry.

THE TEXACO INC. FELLOWSHIP IN CHEMICAL ENGINEERING: \$2,700 to \$3,000 plus tuition provided by Texaco Inc. for a graduate research fellowship for twelve months.

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% of GS-5 and GS-7 pay categories. Fellows may carry the normal fellowship load of classwork.

WEYERHAEUSER FELLOWSHIPS IN FOREST MANAGEMENT: Two \$2,000 fellowships provided by The Weyerhaeuser Timber Foundation, for graduate study and research in forest management.

- WEYERHAEUSER FELLOWSHIP IN PULP AND PAPER:** One \$2,000 fellowship provided by the Weyerhaeuser Company Foundation for graduate study and research in pulp and paper; administered by the School of Science.
- WILDLIFE FELLOWSHIPS:** Grants of \$1,500 per year plus quarters and travel expenses for two-year period provided by Oregon Cooperative Wildlife Research Unit and other wildlife agencies; for graduate students who show aptitude for careers in wildlife conservation and management.
- RESEARCH GRANTS:** Various departments of the School 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 of these grants include stipends for graduate students. Applications should be made through the department concerned.
- THE SCIENCE RESEARCH INSTITUTE** has available a number of fellowships and grants ranging in value from \$2,200 to \$3,600 for research in biochemistry. Funds for these grants come from such companies and organizations as the National Science Foundation, Atomic Energy Commission, Office of Naval Research, U. S. Public Health Service, U. S. Department of Agriculture, American Heart Association, Oregon Heart Association, Nutrition Foundation, Life Insurance Medical Research Fund, and American Cancer Society.
- NATIONAL SCIENCE FOUNDATION COOPERATIVE FELLOWSHIPS:** Oregon State University participates in this Federal program for the support of graduate study in the natural sciences and engineering science.
- NATIONAL DEFENSE EDUCATION ACT FELLOWSHIPS.** (Title IV): Oregon State University participates in this Federal program and currently has a number of fellowships. The NDEA Title IV program will undoubtedly continue, and it is expected that additional areas of graduate study for the Ph.D. degree will be available.
- NATIONAL AERONAUTICS AND SPACE ADMINISTRATION:** Oregon State University has a number of three-year predoctoral traineeships in space-related science and technology.

Graduate Work at Portland Continuation Center, G.E.D.

If adequate course offerings are available for an integrated program in the fields in which the student wishes to work, he may complete all the requirements for the Master of Arts (General Studies) degree at the Portland Center of the General Extension Division. Of the 45 term hours of work required for the Master of Education degree, 33 hours may be earned in Portland. In a number of fields, one-third of the work for the Master of Arts (departmental) or the Master of Science degree may be earned in Portland. Graduate work beyond the master's degree is not offered at the Portland Center, except that in some instances arrangements may be made for a limited number of hours of credit toward the Ed.D. degree. Graduate degrees earned at the Portland Center are awarded by Oregon State University or University of Oregon according to major subject, in harmony with allocation of curricula and degrees.

Master of Bioengineering. This degree is offered under authorization of off-campus instruction (Portland Extension) and in cooperation with the Oregon Primate Research Center. Studies are concerned with the application of engineering knowledge, principles, and techniques in the areas of biological and medical research. The program extends for a minimum of two years with each student assigned as a staff research engineer on a part-time basis in the laboratories at the Primate Center. He will normally spend six months in each of four different laboratories selected upon advisement. Graduate work will be under the direction of a major professor selected from among the members of the graduate faculty. A minimum of 45 term hours of work will be required for the degree, divided approximately 30 hours in the major, including thesis, and 15 hours in the minor or minors.

Master of Engineering. This degree is applicable only to those engaged in authorized off-campus graduate instruction (Portland Extension). A minimum of 45 term hours is required, divided into approximately 30 hours for a major and 15 hours for a minor or minors. Included for a variable number of hours within the major will be a formal report in lieu of thesis, the scope and content of the report to be by approval of the major professor. Prerequisite to study for the degree will be 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 for the formal report.

Graduate Work at Los Alamos and Richland

Arrangements have been made whereby a very restricted number of students may complete theses for the Ph.D. degree at Los Alamos, New Mexico.

Oregon State University is one of three northwestern universities cooperating with the University of Washington Center for Graduate Study at Hanford, which is located in Richland, Washington. Employees of the General Electric Company at the Hanford Atomic Products Operation, who are qualified, may earn graduate credits toward advanced degrees at Richland.

In addition to the departmental majors, a major in nuclear engineering will be offered. The minimum residence requirement at Corvallis is one term for a master's degree and two terms for a doctor's degree.

The studies pursued at Richland vary for different students and fields but are subject to approval in each case by the Graduate Council. A plan is followed whereby the course number 509 is used, preceded by the appropriate departmental designation, followed by the name "Richland Studies" with the title of the particular study placed in parentheses.

Graduate Courses

- Ch 509. **Richland Studies.** Terms and hours to be arranged.
- ChE 509. **Richland Studies.** Terms and hours to be arranged.
- EE 509. **Richland Studies.** Terms and hours to be arranged.
- ME 509. **Richland Studies.** Terms and hours to be arranged.
- Mth 509. **Richland Studies.** Terms and hours to be arranged.
- Ph 509. **Richland Studies.** Terms and hours to be arranged.

Research

ADVANCEMENT OF HUMAN KNOWLEDGE and technical and technological service to the commonwealth are recognized functions of institutions of higher learning. Advancement of knowledge through research at Oregon State University is encouraged and assisted by several institutional agencies, including the General Research Fund and the institutes and stations listed in this section.

General Research

General Research includes faculty research, especially of a fundamental nature, that does not fall into the organized and directed programs of other research agencies. The Graduate Council 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 the funds allowed. The school graduate committees are advisory bodies, assisting in the examination and evaluation of projects for which funds are requested. Applications are received from individual staff members, or groups, of the rank of instructor or higher. Grants-in-aid are awarded for problems that give promise of results of general significance to learning. Grants supply apparatus, equipment, certain supplies, wages for some types of assistance, and if the project has advanced sufficiently, a part-time or full-time research assistantship or fellowship. 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 present a written progress report to the dean of the Graduate School on June 1 each year. Projects may be renewed for several years.

Agricultural Experiment Station

FREDERICK EARL PRICE, B.S., Director of the Agricultural Experiment Station.
WALTER F. McCULLOCH, Ed.D., Associate Director in Charge, Forest Research Division.
GEORGE H. BARNES, Ph.D., Assistant Director, Forest Research Division.
RUDOLPH M. KALLANDER, M.F., Assistant Director, Forest Research Laboratory.
ROBERT W. HENDERSON, Ph.D., Assistant Director, Agricultural Research Division.
ROBERT M. ALEXANDER, M.A., Assistant Director.
WILSON H. FOOTE, Ph.D., Assistant Director.
RALPH A. SOLUM, Fiscal Officer.

Agricultural Chemistry: Professors FREED (head of department), BULLIS, HAAG, REMMERT, TERRIERE, WESWIG; Associate Professors FANG, LIKENS; Assistant Professors HEISLER, SCHUBERT, TINSLEY; Instructor ADAMS; Research Associates CONTE, LU; Assistants In Agricultural Chemistry BOURKE, BRANNOCK, DAVIS, FISHER, JARMAN, LOWRY, NORRIS, RICHARDS, VERNETTI; Research Assistants ARNOLD, GREGORY-ALLEN, JOHNSON, MEE-GUNGWAN, MILNE, NISHIKAWA, ROFFLER, STEELE, WONG.

Agricultural Economics: Professors WOOD (head of department), BLANCH, CASTLE, HOLLANDS, KORZAN, MUMFORD, STIPPLER; Associate Professors BROWN, HALTER, SITTON; Assistant Professors CONKLIN, CORNELIUS, EDWARDS, HUTCHINGS, LANGMO, SUTHERLAND; Instructor DICKMANN; Research Associates ROCK, STOEVENER; Assistants in Agricultural Economics BAKER, GREENE, RICKS; Research Assistants BONTRAGER, BRYAN, CLEVINGER, ELLIS, GILBERT, GRAY, JACOBSON, NIELSEN, NORMAN, OLSON, REEDER, RICHARDS, SIMPSON, SINGH.

Agricultural Engineering: Professors RODGERS (head of department), CROPSEY, HARMOND, SINNARD; Associate Professors BONNICKSEN, BRANDENBURG, KIRK, KLEIN, LONG, PAGE, WOLFE; Assistant Professors BOOSTER, CHRISTENSEN; Instructor WATTS; Assistant in Agricultural Engineering MIKKELSON; Research Assistants HAMLIN, OKAMOTO, RINEHART, TRENT, VONGSURI.

- Agricultural Information:** Associate Professors EBERT, MASON; Assistant Professors BIRD-SALL, MILLER; Instructor CALVERT; Assistant In Agricultural Information COENE.
- Animal Science:** Professors MILLER (head of department), BOGART, JONES, KRUEGER, OLDFIELD, POULTON; Associate Professors ENGLAND, FOX, RALSTON, WOLBERG; Assistant Professors CHURCH, ELLINGTON, KENNICK, WU; Instructors ADAIR, KLIWER, RUTLAND; Research Associates RASHEED, STOUT; Assistants In Animal Science KAUFMANS, PETERS, SCHALLIG, TURNER, VANARSEDEL; Research Assistants ADDLEMAN, BULL, CHAPMAN, CULVER, HOORNBECK, MILLER, NORTH, PARER, SMITH, RIKER, THOMPSON, WILSON, YOUNG.
- Botany and Plant Pathology:** Professors YOUNG (head of department), EVANS, HARDISON, MCWHORTER, MILBRATH, MILLER, PHINNEY, ROTH, VAUGHAN; Associate Professors CAMERON, CHAMBERS, CHILCOTE, CORDEN, CULVER, DEEP, DOBIE, HORNER, JENSEN, JONES, LEACH, ZAK; Assistant Professors ALLEN, BRANDT, FORD, POWELSON, TRIONE; Research Associate CLARK; Assistants In Botany and Plant Pathology ANDERSON, CHAMBERS, DAVISON, DOOLEY, HOPPER, LACEY, MARTINSON, OSTROWSKI, PATIL, REYNOLDS; Research Assistants BOYER, CARLSTROM, DEHERTOGH, JOHNSON, KOCHEKI, McDOWELL, MCINTIRE, OWENS.
- Entomology:** Professors RITCHER (head of department), JONES, RUDINSKY, SWENSON, TERRIERE, THOMPSON; Associate Professors CROWELL, DICKASON, GOULDING, KRANTZ, MORRISON, ROSENSTIEL, STEPHEN; Assistant Professors ANDERSON, NAGEL, RYAN, SCHMIDT; Instructor KOONTZ; Research Associate HOWELL; Assistants In Entomology CORBIN, KHOT, PHILLEO, SCHONBROD; Research Assistants BAKER, BLAND, CARPENTER, EIGHME, GREENE, HARMAN, KLINE, O'BERG, OSGOOD, SOHI, TORCHIO, WELTON, WILLARD.
- Farm Crops:** Professors COWAN (head of department), FOOTE, FORE, HEDRICK, POULTON; Associate Professors BROOKS, CHING, FURTICK, JENSEN, LEACH, MCGUIRE, METZGER, RAMPTON; Assistant Professors CALHOUN, CHILCOTE, FRAKES, MACLAUCHLAN; Instructors BOWN, CALLIHAN, HARDIN, KRONSTAD, LEE, ZIMMERMAN; Assistants In Farm Crops BALDWIN, FECHTIG, GOULD, STEVEKING; Research Assistants BRADNER, DUKE, HARRISON, KNUDSON, TAYLOR, VONAMBERG.
- Fish and Game Management:** Professors DIMICK (head of department), DOUDOROFF, RAYNER; Associate Professors BOND, GASHWILER, KUHN, LONG, MILLEMAN, WALES, WARREN; Assistant Professors BRESE, CAMPBELL, CHAPMAN, LIGHTFOOT; Instructors CHADWICK, DAVIS, GARRISON, E. L. HANSEN, HORTON, SHUMWAY, WAGNER; Research Assistants BAILEY, BROCKWAY, CARTER, COCHE, CROUCH, DAHLBERG, FORTUNE, GNOSE, HANSEN, HIGLEY, KATHMAN, LEDUC, LEHMAN, LOWRY, MASON, NEIDER, PEDERSEN, URNESS, YOUNG.
- Food Science and Technology:** Professors SCHULTZ (head of department), CAIN, LITWILLER, RICHARDSON; Associate Professors DAY, HARVEY, ONSDORFF, SAMUELS, SINNHUBER, SMITH, STEIN, WILDER, YANG; Assistant Professors ANGLEMIER, DIETZ, LAW, SATHER, VARSEVELD, YU; Research Associates LIBBEY, MONTGOMERY; Assistants In Food Science and Technology BILLS, GALLOP, GOMEZ, WYATT; Research Assistants ANDERSON, BISHOP, CRAWFORD, DARAVINGAS, HUANG, KHATRI, LANDSBERG, LANGLER, LILLARD, LINDSAY, MERKIFIELD, ORSER, RASULPURL, SERRANO, WONG.
- Forest Research Laboratory (Forest Management):** Professors BEVER, BERG, WRIGHT; Associate Professor CHING; Assistant Professors BLACK, HERMANN, HOOVEN, KANGUR, KUDRJAVCEV, LAVENDER, LOWRY; Assistant In Forest Management CARMICHAEL, HALBER; Research Assistants MACMILLAN, MOZEJKO.
- Forest Research Laboratory (Forest Products):** Professors ESPENAS, GLENNIE, SNODGRASS; Associate Professors ATHERTON, GRAHAM; Assistant Professors AIT, CORDER, CURRIER, JOHNSON, KRAHMER, MILLER, OVERHOLSER, SAMUELS; Instructors KOZLIK, KUNESH, LEHMANN, MOTHERSHEAD; Research Assistants HIGHLEY, LYMAN.
- Forest Science:** Professors BARNES (head of department), KENISTON; Associate Professors FERRELL, MCKIMMY, O'LEARY, RANDALL, ROTHACHER, RUTH, SILEN, WHEELER; Assistant Professors BELL, IRGENS-MOLLER, KRYGIER, LOPUSHINSKY; Instructors BINKLEY, NEWTON, WILLIAMS; Assistant In Forest Science NORRIS; Research Assistants JOHNSON, LIVINGSTON, NICHOLAS, REED, ZAVITKOVSKI.
- Home Economics Research:** Professors STORVICK (head of department), HAWTHORNE, MACKAY; Assistant Professor CARLSON; Instructors BENSON, BUBL, EDWARDS, JOINER; Assistants In Home Economics Research POHL, ROHDE, WOODRING; Research Assistant PETERS.
- Horticulture:** Professors APLE (head of department), COMPTON, FRAZIER, HANSEN, PAINTER, ROBERTS, WALDO; Associate Professors BLANEY, GARREN, MACK, WADSWORTH, WESTWOOD, ZIELNSKI; Assistant Professors BAGGETT, CRABTREE, LAGERSTEDT; Research Assistants ADAMS, DAVIS, HARTLEY.
- Irrigation Water Forecasting (Cooperative Soil Conservation Service):** Professors FROST, WORK; Instructor WHALEY.
- Microbiology:** Professors ELLIKER (head of department), BOLLEN, GILMOUR, PILCHER, THORNE; Associate Professors ANDERSON, MORITA, PARKS, SANDINE; Assistant Professor LU; Research Associate LARSEN; Assistants In Microbiology GOLDBERG, SKOW; Research Assistants AU, BHATT, BRADFORD, BURTON, CHEM, CITTI, CORLETT, DEENEY, ELLIOTT, HAIGHT, HENNING, IHA, KILBOURN, KRABBENHOFT, LEE, MAYEUX, MATHEMEIER, NEAL, PACK, PIGG, SORSOLI, STARR, STEVENSON, TU, TURNER, VEDAMUTHU, WANG, WULLSTEIN.
- Poultry Science:** Professors PARKER (head of department), BERNIER, HARPER; Associate Professor ARSCOTT; Assistant Professor McCLUSKY; Research Assistant RACHAPAETAYAKOM.

Soils: Professors CHENEY (head of department), JACKSON, YOUNGBERG; Associate Professors ALBAN, DAWSON, EVANS, HARWARD, KNOX; Assistant Professors BALSTER, BOERSMA, CHAO, DYRNESS, MOORE, PARSONS, SIMONSON, YOUNG; Instructor STAMMERS; Assistants in Soils CARSTEA, MAAS, MASON, WIPPER, YAHNER; Research Assistants ANDERSON, CHICHESTER, COCHRAN, ETTER, MANGUM, NORGREN, SAYEGH, SINGLETON, WOLLUM, WU.

Statistical Service: Professor CALVIN; Assistant Professor JENSEN; Instructors BASCOM, HICKS; Assistant in Statistical Service BUTLER; Research Assistant BUTLER.

Veterinary Medicine: Professors DICKINSON (head of department), MUTH; Associate Professors BARCOCK, BONE, KILIAN, KNAPP, PETERSON, SMITH; Assistant Professor HARR; Research Associate STEVENS; Assistant in Veterinary Medicine WELTON; Research Assistant DUTSON.

Weather Bureau Agricultural Service: Associate Professor ZIMMERMAN.

Branch Experiment Stations: Professors BULLOCK, HOWELL, OVESON, SAWYER; Associate Professors GROSS, HOFFMAN, HORNING, LOMBARD, McARTHUR, MELLENTIN, RAMIG, ROHDE, TICKNER; Assistant Professors APLEBY, COYIER, DAVIDSON, ELLERTSON, GEORGE, HALL, JOHNSON, McDERMID, PUMPHREY, RALEIGH, RASMUSSEN, RUMBERG, SWAN, SNEVA, WALLACE, WESTIGARD, YUNGEN; Instructors BEUTLER, ELLER, MATHESON, SHEETS; Assistants in Experiment Stations ANDERSON, CARTER, FITCH, GRAHAM, PEIFER, RAUCH.

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 thirteen branch stations so located as to cover the varying agricultural conditions of Oregon. It investigates problems in agriculture, home economics, forestry, fisheries, and wildlife; its general objectives follow: (1) Conservation and efficient use of the State's natural resources including soil, water, fish, wildlife, forest, and ranges and their integrated management to provide the greatest public good. (2) Increasing efficiency of agricultural and forest production. (3) Improving the processing, distribution, and marketing of products of agriculture and forestry. (4) Testing and developing new crops and new uses for old crops as a means of reducing crop surpluses. (5) Collecting and analyzing basic information needed in development of comprehensive agricultural and forestry programs and policies. (6) Advancement of human well-being through research in selection, preparation, and preservation of food; determining of human nutrition requirements; and role of food in maintaining optimal health; selection, construction, and care of clothing and household fabrics.

The Station cooperates with the U. S. Department of Agriculture, the U. S. Department of the Interior, other Federal and State agencies, and the counties in which the branch stations are located. A number of Federal scientists are located in Oregon working on problems of a regional nature.

The Agricultural Research Division of the Station is made up of fifteen campus departments and thirteen branch stations. Some staff members are full time in research while others also teach in the Schools of Agriculture, Science, Engineering, and Home Economics. In addition, some 140 graduate students devote half time to research as Research Assistants.

The research is aimed at problem solving and covers all phases of agricultural production, processing, and marketing; conservation, management, and use of renewable natural resources—soil, water, range, fish, and wildlife; human nutrition and home economics; and basic biological sciences which support the applied fields. Increasing attention is being devoted to basic research—the fundamental discoveries and knowledge essential to solving problems.

With the diversity of growing conditions in the State, the establishment of off-campus programs, including the branch stations, has been necessary. Crops and animals are produced with rainfall varying from 8 to 100 inches, altitudes ranging from sea level to a mile high, a growing season extending from 63 to 283 days, and on land including more than 400 different soil types.

The research departments are Agricultural Economics, Animal Science, Poultry Science, Veterinary Medicine, Fish and Game Management, Farm

Crops, Horticulture, Food Science and Technology, Soils, Agricultural Engineering, Microbiology, Agricultural Chemistry, Botany and Plant Pathology, Entomology, and Home Economics.

The branch experiment stations are John Jacob Astor (Astoria), Eastern Oregon (Union), Klamath, Malheur (Ontario), Mid-Columbia (Hood River and The Dalles), North Willamette (Aurora), Pendleton, Sherman (Moro), Southern Oregon (Medford), Red Soils (Oregon City), Squaw Butte (Burns), Umatilla (Hermiston), and Central Oregon (Redmond).

Permanent field units or laboratories are maintained for research at Milton for beef feeding, Yaquina for marine problems, Astoria for seafood processing, and Brookings for lily bulb production.

The Forest Research Division of the Station consists of two complementary departments: Forest Science, and the Forest Research Laboratory.

The Forest Science Department is concerned with forest research conducted by staff jointly appointed with the School of Forestry and related biological science departments. Chief areas of research currently include forest entomology, genetics, pathology, physiology, soils, marketing, watersheds, and wood anatomy. Applied research in forest engineering is concerned with roads and timber transportation.

The Forest Research Laboratory was established to aid the economic growth of Oregon through research to develop the maximum yield from forests and the best utilization of the forest resource. The program was begun with a small general fund appropriation for forest products research in 1941; expanded in 1947 when a severance tax was established on logs to finance forest products and forest management research; and given substantial impetus with construction of the Laboratory at Corvallis in 1957. From 1953 to 1961 the Laboratory (then known as the Oregon Forest Research Center) was administered by the Forest Protection and Conservation Committee, a state agency affiliated with the State Board of Forestry; in 1961 it was consolidated with Oregon State University.

Major effort in forest products is on utilization of wood residues, discovery of new products, more efficient processing methods, and improvement in the utilization and serviceability of wood. In forest management, research is conducted in the fields of fire and fire weather, forest ecology, genetics, growth and yield, mammalogy, pathology, regeneration, and soils.

These programs, which derive their principal support from the forest industry, supply results of research and provide technical information to timber owners, manufacturers, users of forest products, and others who are interested.

Both departments of the Forest Research Division undertake cooperative research in specialized areas financed by individuals, corporations, associations, and government agencies. The Division benefits from the advice and counsel of two advisory committees, one in forest management and one in forest products, representing industrial associations and organizations and public forestry agencies.

Engineering Experiment Station

Administrative Officers

ROY E. LIEVALLEN, Ed.D., Chancellor, Oregon State System of Higher Education.

JAMES HERBERT JENSEN, Ph.D., President, Oregon State University.

GEORGE WALTER GLESON, Ch.E., Dean, School of Engineering, and Director, Engineering Experiment Station.

JAMES GEORGE KNUDSEN, Ph.D., Assistant Dean, School of Engineering, in charge, Engineering Experiment Station.

JAMES KENNETH MUNFORD, Ed.D., Director of Publications.

Station Staff

ARTHUR LEMUEL ALBERT, M.S., E.E., Communication Engineering.
CHARLES EDWARD BEHLKE, Ph.D., Hydraulics.
FREDRICK JOSEPH BURGESS, M.S., Sanitary Engineering.
MARTIN PORTMAN COOPEY, B.S., Highway Engineering.
EDWARD ARCHIE DALY, M.S., Nuclear Engineering.
WILLIAM FREDERICK ENGESSER, M.S., Industrial Engineering.
GRANT STEPHEN FEIKERT, M.S., E.E., Radio Engineering.
CHARLES OSWALD HEATH, M.S., Engineering Materials.
GLENN WILLIS HOLCOMB, M.S., Structural Engineering.
ARTHUR DOUGLAS HUGHES, M.S., Heat, Power, and Air Conditioning.
JOHN GRANVILLE JENSEN, Ph.D., Industrial Resources.
PHILIP COOPER MAGNUSON, Ph.D., Electrical Engineering Analysis.
ROBERT EUGENE MEREDITH, Ph.D., Chemical Engineering.
FRED MERRYFIELD, M.S., Sanitary Engineering.
ROBERT RAY MICHAEL, M.S., Electrical Materials.
OLAF GUSTAV PAASCHE, M.S., Metallurgical Engineering.
WILLIAM HOWARD PAUL, M.S., Automotive Engineering.
DONALD CHARLES PHILLIPS, Ph.D., Sanitary Engineering.
JEFFERSON BELTON RODGERS, A.E., Agricultural Engineering.
MILTON CONWELL SHEELY, B.S., Manufacturing Processes.
LOUIS SLEGEL, Ph.D., Mechanical Engineering.
LOUIS NELSON STONE, B.S., Servomechanisms and Controls.
JESSE SEBURN WALTON, B.S., Chemical and Metallurgical Engineering.
CHARLES EDWARD WICKS, Ph.D., Chemical Engineering.

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 to the extent of funds allocated or contributed for this purpose. Much of the work of the station has been made possible by the assistance of industries and state and national associations. Inquiries concerning cooperative projects are welcomed.

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 of engineering acts as the administrator in charge, technical editor of publications, and as chairman of the station executive council composed of senior station staff representing the various departments of the School of Engineering. The active staff is composed of members of the instructional staff who may be interested in various specific research projects, or of research fellows who are pursuing graduate study and are assigned to part-time work in the Station. Experts who are especially qualified by training and experience to advise on the investigations in certain fields have been appointed to the staff as special technical counselors. Among these are executives and engineers representing major industries of Oregon and the Northwest, prominent

consulting engineers, and leading engineers of Federal agencies and State departments. Some technical assistants have been supported by manufacturers and industrial associations interested in working out specific problems.

Science Research Institute

VERNON H. CHELDELIN, Ph.D., Director.

T. E. KING, Ph.D., R. W. NEWBURGH, Ph.D., and A. B. SCOTT, Ph.D., Assistant Directors.

Professors: E. F. KURTH, Ph.D.; D. L. MACDONALD, Ph.D.; C. H. WANG, Ph.D.

Associate Professors: R. R. BECKER, Ph.D.; V. J. BROOKES, Ph.D.; F. W. DECKER, Ph.D.; C. T. O. FONG, Ph.D.; W. D. LOOMIS, Ph.D.

Assistant Professors: A. BAICH, Ph.D.; F. N. DOST, D.V.M.; W. GAMBLE, Ph.D.; R. O. MORRIS, Ph.D.; D. J. REED, Ph.D.; E. J. TRIGONE, Ph.D.

Research Associates (Instructors): L. BIEBER, Ph.D., N. HOUX, Ph.D., Y. SEKIZAWA, Ph.D.; S. TAKEMORI, Ph.D.

Research Associates (Acting Instructors): R. D. BARBOUR, M.S.; ALICE J. CLARK, B.S.; R. L. HOWARD, B.S.; K. KENNEDY, B.S.; D. D. LOUIE, B.S.; KAREN NICKEL, B.S.; K. H. SHREEVE, B.S.

Research Fellows: R. R. ALLEN, B.S.; R. D. ALLISON, B.S.; W. W. BAKER, M.S.; L. L. BIEBER, M.S.; O. F. BILEN, B.S.; A. J. BURROTT, B.S.; D. CHAMBERS, B.S.; G. R. CHEUNG, B.S.; GRACE CHEUNG, B.S.; R. G. COFFEY, B.S.; W. A. ENGLE, B.S.; E. DENDER, M.S.; R. P. HYSLIN, B.S.; F. X. KAMIENSKI, B.S.; S. S. KERWAR, M.S.; J. R. KETTMAN, B.S.; M. KUBOYAMA, M.S.; M. MARAGOUDAKIS, M.S.; D. L. MARKS, B.S.; R. B. MELVIN, M.S.; K. PAPPACHAN, B.S.; S. PAPAIOANNOU, M.S.; E. A. POSSEHL, M.S.; J. C. RAMSEY, B.S.; H. SALMEN, B.S.; T. J. SIEK, M.S.; M. K. SIMILA, B.S.; G. G. STILL, B.S.; F. TANAKA, B.S.; D. L. VAN FLEET, B.S.; D. J. VINICOR, M.S.; D. F. WILSON, B.S.

The growth of scientific research on this campus during the past thirty years, coupled with a steady increase in support of research by outside agencies, resulted in the establishment in 1952 of the Science Research Institute. The Institute, operating within the framework of the School of Science, has three functions; first, to assist scientists at Oregon State in obtaining support for research projects; second, to aid in expediting their research programs and to promote interdisciplinary research; and third, to pursue an active research program fitted to the interest and competence of the Institute staff.

The Institute is housed in the new Physics-Chemistry Building. Current studies by the Institute staff include fundamental projects in biochemistry, biophysics, organic chemistry, solid state chemistry, electrochemistry, microbiology, entomology, plant pathology, forest products, pharmacology, and atmospheric science, which derive their support from Oregon State University, government research agencies, research foundations, and industrial concerns.

Staff members of the Science Research Institute receive joint appointments in the Institute and the appropriate teaching departments. Research assistants employed by the Institute also receive appointments in the departments in which their advanced degrees are sought.

Transportation Research Institute

The Transportation Research Institute brings together the resources of the institution for research on transportation of agricultural and forest products, maintenance and operation problems in the trucking industry, traffic problems, and other problems related to the transportation industry.

Water Resources Research Institute

The importance of water for the economic and social development of Oregon resulted in the establishment in 1960 of the Water Resources Research Institute. The function of the Institute is to encourage, facilitate, and coordinate research at Oregon State University on the factors that affect the quantity and quality of water available for use by mankind. The Institute is administered by the Agricultural and Engineering Experiment Stations and is staffed by scientists of the various departments at Oregon State engaged in water resources research.

Extensive facilities are available for Institute scientists including watershed lands, a soils laboratory, water and waste treatment plants, experimental waste treatment facilities, bacteriological and water quality laboratories, freshwater and marine biological laboratories, an experimental stream, and computing equipment for economic research. These facilities afford a unique opportunity for graduate and advanced undergraduate research and instruction. Graduate assistantships are available. Staff members provide both classroom and research instruction, and a graduate minor in water resources may be pursued by students majoring in departments participating in the Institute.

Extension

THROUGH EXTENSION SERVICES the benefits of all the Oregon state institutions of higher education are brought to the people of the State in their own communities. All divisions of the Oregon State System of Higher Education seek through every means possible, so far as resources and facilities permit, to serve the entire State. All extension activities are administered through the General Extension Division and the Federal Cooperative Extension Service.

General Extension Division

JAMES W. SHERBURNE, Ph.D., Dean, General Extension Division.

RALPH W. STEETLE, M.A., Associate Dean, General Extension Division; Director, Educational Media.

DANIEL W. FULLMER, Ph.D., Assistant Dean, General Extension Division; Director, Development and Evaluation.

VIRON A. MOORE, Ed.D., Assistant Dean, General Extension Division; Director, State-Wide Services.

PAUL E. WATSON, Ed.D., Assistant Dean, General Extension Division; Director, Continuation Centers.

General Extension Division is the agency of the Chancellor's Office primarily responsible for innovating, developing, and expediting adult educational and cultural programs, and providing the management by which instructional and service offerings of the Oregon State System of Higher Education are extended. Continuing higher education programs are offered for all interested Oregonians capable of profiting from this instruction.

Through **Continuation Centers** the Division offers college and university courses of the Oregon State System of Higher Education. Special classes for various interest groups, seminars, workshops, conferences, and consultant services are developed to meet personal, social, and economic needs. Continuation Centers are located on university and college campuses. Other centers may be located where demand for service and adequacy of educational facilities indicate.

State-Wide Services of the Division provide the management of adult educational and cultural programs, and the extension of instructional services of the Oregon State System of Higher Education not assigned to Continuation Centers or Educational Media. Independent study programs utilizing correspondence and television are administered. Special programs for business, industry, government, international affairs, and alcohol studies are offered in local communities. Divisional services such as information, publications, printing, duplicating, mailing, business operations, registrar's functions, and others, are managed by State-Wide Services.

Copies of the Correspondence Study catalog and other bulletins may be obtained from the Office of the Dean, General Extension Division, 1633 S. W. Park Avenue, Portland 1, Oregon.

Educational Media is responsible for administering, programing, and engineering *educational radio and television* networks operated by the Oregon State System of Higher Education for the education, information, and enrich-

ment of the people of Oregon. Studios for two radio stations and two television stations are located in Eugene, Corvallis, Salem, and Portland.

Audio-Visual Services of Educational Media makes available to schools, colleges, community groups, and other organizations, motion picture films, tape recordings, slides, and such professional services as planning and production of films, art work, graphics, demonstrations, workshops, and consultations. Audio-Visual libraries are located in Corvallis, Ashland, La Grande, and Portland.

The Corvallis Continuation Center office is located in room 119 Extension Hall on the Oregon State campus.

Federal Cooperative Extension Service

Administration

FREDERICK EARL PRICE, B.S., Director.
 GENE MAURICE LEAR, M.P.A., Associate Director.
 GORDON HOOD, M.S., Assistant Director.
 JEAN WILLARD SCHEEL, M.A., Assistant Director.
 MABEL CLAIR MACK, M.S., Assistant Director.

State Leaders and State Agents

ESTHER ADELIA TASKERUD, Sc.D., Coordinator, Home Economics Extension Programs.
 BURTON SEYMOUR HUTTON, B.S., State 4-H Club Leader.
 RUTH ELIZABETH BRASHER, M.A., State Extension Agent (4-H Club).
 CAL GRAHAM MONROE, M.S., State Extension Agent (4-H Club).
 ALICE LOIS REDMAN, M.S., State Extension Agent (4-H Club).
 MARY EUNICE ABBOTT, M.A., State Extension Agent.
 EVELYN AMANDA FUNK, M.Ed., State Extension Agent.
 TURNER BOND, M.S., State Extension Agent.
 WILLIAM GERALD NIBLER, M.Ed., State Extension Agent.
 JACKSON ROSS, M.S., State Extension Agent.
 MURLE SCALES, M.S., State Extension Agent.
 CLIFFORD LOVEJOY SMITH, Ph.D., State Training Leader.

Federal Cooperative Extension performs one of the three major functions of Oregon State University, which are: resident teaching, research, and extension teaching. It extends the available information of Oregon State University, the United States Department of Agriculture, and other appropriate State and Federal agencies to every portion of the State. A staff of men and women resident in the counties, cooperatively supported by Oregon State, the United States Department of Agriculture, and the counties, and a resident staff of subject-matter specialists in agriculture and home economics work on approved projects.

The work of the Extension Service includes all forms of off-campus instruction and assistance in those phases of agriculture, home economics, and related subjects that can be practically adapted to the needs of the people of the State. Unique teaching methods have been developed through the years, important among which is organization for self-help to bring widespread application of the principles presented. All counties in the State cooperate to bring extension programs to every community.

Extension Projects. In order to assure maximum efficiency, extension work is conducted on the basis of definitely planned projects. These require approval by the proper Oregon State University authority and the U. S. Secretary of Agriculture before Federal and State funds appropriated for the work

may be expended. The several distinct written projects from which citizens of the State are receiving benefit include:

Administration—overall administrative direction and leadership of programs and personnel.

Extension Information—dissemination of information through mass media of communication, including servicing and training of personnel in communications methods, and development and use of mass media and visual aids. Part of this project is supported jointly with General Extension Division.

Agricultural Production, Management, and Natural Resource Development—this project is concerned with the application of science and technology to the organization and operation of farming and ranching enterprises and the conservation and development of agricultural resources. Subject matter fields involved are: animal husbandry, crops, certification of seeds and plants, dairying, agricultural engineering, entomology, farm management, range management, forestry, horticulture, plant pathology, poultry, soils, and fish and wildlife management.

Marketing and Utilization of Agricultural Projects—work with marketing firms is emphasized. Objectives are to create greater efficiencies in processing, handling, and distribution through the application of new technology and improved marketing practices; to expand the market for Oregon farm products; and to get rapid adjustment by farmers, consumers, and marketing firms to changes in technology, supply, and demand. In addition to agricultural economics, subject matter fields involved include food technology, dairy technology, and wood technology.

Home Economics—subject matter areas covered under this project are in child development and human relations, foods and nutrition, home management and equipment, family economics, clothing and textiles, housing, and home furnishings. The project contributes toward economic well-being, desirable human relationships, assumption of civic responsibilities, and appreciation of the land in which we live.

4-H Club Work—through this program, Oregon State University provides an off-campus education service to the boys and girls of Oregon between the ages of 9 and 21. Objectives are to help young people acquire knowledge, skills, and attitudes that will contribute to their success as mature citizens in their home, their community, and their vocation. Agricultural and home economics projects are emphasized, but many others also are included.

Community and Public Affairs—work under this project is designed to assist Oregon citizens to: understand principles and develop skills in the organization and leadership of groups; learn how to proceed systematically in the identification and resolution of public issues—local, state, national and international; understand the political process through which public decisions are achieved and implemented in a democracy; plan and develop public facilities and services in such areas as health, safety, civil defense, recreation, general economic and social improvement; develop and implement long-range plans for the conservation and use of natural resources in the public interest—land, water, forests, and wildlife.

Organization and Supervision of County Extension Operations—provides the basis for conducting the Extension program at the county level.

Oregon State University Faculty

As of January 1963

This list includes the Oregon State University officers of administration, instruction, research, and extension at Corvallis, in the counties, and at experiment stations in various parts of the state. It includes also U. S. Department of Agriculture scientists and those staff members of the State System of Higher Education who hold academic rank and are stationed in Corvallis. The main listing includes only faculty members with rank of *instructor* or above. Faculty with academic rank of *assistant* are included in a separate listing at the end of the main roster.

The date following the name indicates the year of appointment to the OSU faculty. If there is more than one date, a break in service is indicated. For example, "(1936-46, 1948)" indicates appointment to the faculty from 1939 to 1946, a break in service, and then continuous service since 1948.

- MARY EUNICE ABBOTT (1959)
State Extension Agent (Associate Professor).
B.A., Oklahoma Baptist University, 1932;
M.A., Oklahoma State, 1956.
- JOHN ADAIR (1953)
Instructor in Animal Science.
B.S., Oregon State, 1950.
- FRANK WILLIAM ADAMS (1953)
Instructor in Chemistry, Agricultural Chemistry.
B.S., Montana State, 1948; M.S., Oregon State, 1950.
- RICHARD ALTON ADAMS (1947)
Director of Physical Plant (Professor).
- THOMAS FRANCIS ADAMS (1946)
Director of Dormitories (Professor).
B.S., Oregon State, 1930.
- LEONARD ALLEN ADOLF (1955)
Associate Professor of History, Associate Professor of Education.
B.A. Ed., Central Washington College, 1943;
B.A., Washington, 1946, Ph.D., 1953.
On sabbatical leave 1962-63.
- ROBERT EUGENE ADOLPH (1961)
Assistant Professor, Psychology; Counselor, Counseling Center.
B.S., California Polytechnic, 1959; M.S., Oregon, 1960.
- WALTER MILO ADRION (1939)
Professor of Physical Education.
B.S., Michigan State Normal, 1924; M.A., Michigan, 1939.
- HARVEY AFT (1961)
Assistant Professor of Forest Products Chemistry, Forest Research Laboratory.
B.A., USC, 1950; M.S., University of Puget Sound, 1952; Ph.D., Oregon State, 1962.
- MARIAN CUSHING AIKIN (1954)
Assistant Professor of Family Life.
B.Sc., Nebraska, 1939; M.Sc., Iowa State, 1943.
- CHESTER BOYD AINSWORTH (1959)
Professor of Education and Head of Industrial Arts Education.
B.S., John Brown University, 1942; M.S., Oklahoma State, 1947; Ed.D., Missouri, 1956.
- LAWRENCE ARTHUR ALBAN (1952)
Associate Professor of Soils.
B.S., Washington State, 1943, M.S., 1948;
Ph.D., Oregon State, 1950.
- ARTHUR LEMUEL ALBERT (1923)
Professor of Communication Engineering.
B.S., Oregon State, 1923, M.S., 1926, E.E., 1939.
- GERALD CORWIN ALEXANDER (1955)
Assistant Professor of Electrical Engineering.
B.S., Oregon State, 1951; M.S., MIT, 1960.
- ROBERT M. ALEXANDER (1946)
Assistant Director (Professor), Agricultural Experiment Station.
B.S., Oregon State, 1942; M.A., Harvard, 1949.
- HARRY THAIN ALLAN (1956)
Associate Professor of Business Administration.
B.A., Washington and Jefferson College, 1953; B.S., Massachusetts Institute of Technology, 1953; J.D., Chicago, 1956.
- ETHEL E. ALLEN (1917-48)
Assistant Editor of Publications. (Retired.)
B.S., Oregon State, 1916.
- LEONARD JOHN ALLEN (1915)
State 4-H Club Leader (Emeritus.)
B.S., Oregon State, 1914, M.S., 1915.
- THOMAS CORT ALLEN, JR. (1962)
Assistant Professor of Plant Pathology, Botany Department.
B.S., Wisconsin, 1953; Ph.D., California (Davis), 1956.
- IRA SHIMMIN ALLISON (1928)
Professor of Geology.
A.B., Hanover College, 1917; Ph.D., Minnesota, 1924.
- WILLIAM ANDREW ALLISON (1962)
Lieutenant Colonel; Associate Professor, Engineering Branch Chief, Military Science.
B.S.C.E., Oregon State, 1946.
- DELMAR ISAAC ALLMAN (1937)
Professor of Physical Education.
B.S., Michigan State Normal College, 1928; M.S., Michigan, 1931, Dr.P.H., 1936.

- EDWARD CHRISTOPHER ALLWORTH (1925)
Manager and Secretary (Professor) Memorial Union.
B.S., Oregon State, 1916, LL.D., 1929.
- MARGARET MARIE ALLYN (1954)
Columbia County Extension Agent, Home Economics (Assistant Professor).
B.A., Iowa, 1926.
- RONALD HERBERT ALVARADO (1962)
Assistant Professor of Zoology.
B.A., California (Riverside), 1956; M.S., Washington State, 1959, Ph.D., 1962.
- JAMES LEROY AMMON (1960)
Extension Agent-at-large (Assistant Professor).
B.S., Oregon State, 1952.
- DONALD LOUIS AMORT (1959)
Assistant Professor of Electrical Engineering.
B.S. (E. Eng.), Oregon State, 1954, M.S. (E. Engr.), 1960.
- WILBERT LOWELL ANDERSEN (1950-51, 1956)
Curry County Extension Agent (Assistant Professor).
B.S., Oregon State, 1950.
- ARTHUR WALLACE ANDERSON (1953)
Associate Professor of Microbiology.
B.S., North Dakota Agricultural College, 1942; M.S., Wisconsin, 1947; Ph.D., Oregon State, 1952.
- CARL LEONARD ANDERSON (1949)
Professor; Chairman of Hygiene and Environmental Sanitation.
B.S., Michigan, 1928, M.S., 1932, Dr.P.H., 1934.
- DONALD EUGENE ANDERSON (1944)
Extension Dairy Specialist (Associate Professor).
B.S., Iowa State, 1939.
- GORDON WILCOX ANDERSON (1962)
Assistant Professor of Hygiene and Health Education.
B.S. in Ed., Central Washington College of Education, 1943; M.A., Colorado State College of Education, 1949; Ed.D., New York University, 1961.
- NELSON CHRISTIAN ANDERSON (1946)
Morrow County Extension Agent (Professor).
B.S., North Dakota Agricultural College, 1942.
- NORMAN HERBERT ANDERSON (1962)
Assistant Professor of Entomology.
B.S.A. (Honors), University of British Columbia, 1955; M.S., Oregon State, 1958; D.I.C., Imperial College, 1961; Ph.D., London, 1961.
- ALLEN FRANCIS ANGLEMIER (1956)
Assistant Professor of Food Science and Technology.
B.S., Fresno State, 1953; M.S., Oregon State, 1955, Ph.D., 1957.
- PETER ANTON (1955)
Assistant Professor of Philosophy.
A.B., Indiana, 1952, M.A., 1954, Ph.D., 1960.
On sabbatical leave 1962-63.
- SPENCER BUTLER APPLE, JR. (1950)
Professor of Horticulture; Head of Department.
B.S., Texas A & M, 1933; M.S., Washington State, 1936, Ph.D., 1953.
- ARNOLD PIERCE APPEBY (1959)
Assistant Professor of Agronomy, Pendleton Experiment Station.
B.S., Kansas State, 1957, M.S., 1958; Ph.D., Oregon State, 1962.
- BEE ARNOLD (1963 winter and spring terms only)
Instructor in Family Life.
B.S., Brigham Young, 1958, M.S., 1962.
- BRADFORD HENRY ARNOLD (1947)
Professor of Mathematics.
B.S., Washington, 1938, M.S., 1940; Ph.D., Princeton, 1942.
- GEORGE HENRY ARSCOTT (1953)
Associate Professor of Poultry Nutrition.
B.S., Oregon State, 1949; M.S., Maryland, 1950, Ph.D., 1953.
- BETTY JANE ASHBAUGH (1963)
Clackamas County Extension Agent (Instructor).
B.S., Oregon State, 1945.
- GEORGE HARRY ATHERTON (1961)
Associate Professor of Mechanical Engineering, Forest Research Laboratory.
B.S., Oregon State, 1950.
- WINFRED MCKENZIE ATWOOD (1913)
Professor Emeritus of Botany.
A.B., Cornell College, 1907, A.M., 1910; M.S., Chicago, 1911, Ph.D., 1913.
- WILLIAM SAMUEL AVERILL (1930)
County Agent Emeritus, Multnomah County (Professor).
B.S., Oregon State, 1917.
- WILLIAM EDWARD BABCOCK (1945-46, 1949)
Associate Professor of Veterinary Medicine.
B.S., Washington State, 1944, D.V.M., 1945; M.S., Oregon State, 1951.
- GILBERT ARTHUR BACHELOR (1961)
Instructor, Research Associate in Mathematics.
B.A., Eastern Washington College, 1953; M.S., Oregon State, 1955.
- AMERICUS V. H. BACON, JR. (1962)
Commander USN, Associate Professor of Naval Science.
B.S., U.S. Naval Academy, 1943.
- SANFORD L. BACON (1960)
Assistant Professor of Business Administration.
B.A. in E.&B., Washington, 1939; C.P.A. State of Washington, 1946.
- JAMES RONALD BAGGETT (1956)
Assistant Professor of Horticulture.
B.S., Idaho, 1952; Ph.D., Oregon State 1956.
- ANNETTE BAICH (1963)
Research Associate (Assistant Professor), Science Research Institute.
B.S., Roosevelt University, 1951; M.S., Oregon, 1953, Ph.D., 1960.
- LEEDS CRIM BAILEY (1941)
Malheur County Extension Agent, (Assistant Professor).
B.S., Oregon State, 1941; M.A., Michigan State, 1962.
- SAMUEL HALL BAILEY (1947)
Head of News Bureau; Associate Professor of Journalism.
B.S., Utah State, 1942; M.S., Wisconsin 1947.

- GEORGE WILLIAM BAIN (1946-52; 1953)
Malheur County Extension Agent (Assistant Professor).
B.S., Oregon State, 1943.
- JANET ANN BAKER (1961)
Deschutes County Extension Agent, 4-H Club (Instructor).
B.S., California, 1961.
- NAOMI BAKER (1958)
Coos County Extension Agent, 4-H Club (Instructor).
B.S., Iowa State, 1958.
- FLORENCE STAHL BAKKUM (1942-51, 1954)
Assistant Professor Emeritus of Mathematics.
B.A., Grinnell, 1916; M.A., Cornell, 1923.
- GLENN ALMER BAKKUM (1935)
Professor Emeritus of Sociology.
B.S., Iowa State, 1920; M.A., Columbia, 1925; Ph.D., Cornell, 1928.
- WILLIAM EDWARD BALES (1962)
Research Associate (Instructor) in Oceanography.
B.S., Oregon, 1950, M.S., 1951.
- CHARLES S. BALLANTINE (1960)
Assistant Professor of Mathematics.
B.S., Washington, 1953; Ph.D., Stanford, 1959.
- FRANK LLEWELLYN BALLARD (1917)
Associate Director Emeritus Federal Cooperative Extension Service (Professor).
B.S., Oregon State, 1916.
- C. A. BALSTER (1961)
Assistant Professor of Geology and Soils; Geologist, S.C.S. U. S. Department of Agriculture.
B.S., Iowa State, 1948, M.S., 1950.
- SHIRLEY MARGARET BARBER (1956)
Assistant Professor of Business Education and Secretarial Science.
B.S., Oregon, 1950; M.Ed., Oregon State, 1951; Ed.D., Colorado State College, 1961.
- ROYAL DAE BARBOUR (1962)
Instructor, Science Research Institute.
B.S., University of Portland, 1955; M.S., Oregon State, 1959.
- GEORGE HECTOR BARNES (1943)
Assistant Director Forest Research Division, Agricultural Experiment Station; Professor of Forest Management.
B.S., Washington, 1924; M.S., California, 1929; Ph.D., Duke, 1946.
- LLOYD CARL BARON (1945-46, 1957)
Washington County Extension Agent (Associate Professor).
B.S., Oregon State, 1940.
- ROBERT BENJAMIN DENIS BARON (1954)
Associate Professor of Education.
B.A., Alberta 1940, B.Ed., 1942, M.Ed., 1945; Ph.D., USC, 1948.
- JAMES GARNET BARRATT, JR. (1950)
Athletic Business Manager, Intercollegiate Athletics (Associate Professor).
B.S., Oregon State, 1950.
- EDWIN HOMER BARTCHER (1956)
Master Sergeant, Sergeant Major, Instructor in Military Science.
- GEORGENE VIOLETTE BARTE (1959)
Assistant Professor of Foods and Nutrition.
B.S., New Mexico, 1946; M.S., Iowa State, 1948.
On leave of absence 1962-63.
- LESTER MILLER BEALS (1962)
Coordinator of Secondary Student Teaching, Director of Oregon Program (Assistant Professor), Education.
A.B., Nebraska, 1932, M.A., 1934; Ed.D., Oregon, 1950.
- CAROL JOAN BEASLEY (1961)
Jackson County Extension Agent, Home Economics (Assistant Professor).
B.S.H.E., Arkansas, 1959.
- EDWARD BENJAMIN BEATY (1908)
Professor Emeritus of Mathematics.
B.S., Oregon State, 1903; M.A., California, 1916.
- MANNING HENRY BECKER (1948)
Extension Farm Management Specialist; Associate Professor of Agricultural Economics.
B.S., Oregon State, 1947, M.S., 1948.
- ROBERT RICHARD BECKER (1962)
Associate Professor of Chemistry, Science Research Institute.
B.S., North Dakota, 1948; M.S., Wisconsin, 1951, Ph.D., 1952.
- GORDON WILLIAM BEECROFT (1958)
Associate Professor of Civil Engineering.
B.S., Oregon State, 1952, C.E., 1960.
- FRANK M. BEER (1947)
Associate Professor of General Science.
B.S., Oregon, 1929; M.S., Washington, 1939.
- CHARLES EDWARD BEHLKE (1956)
Professor of Civil Engineering.
B.S., Washington State, 1948, M.S., 1950; Ph.D., Stanford, 1957.
- GEORGE SAM BELL (1958)
Track Coach. (Assistant Professor).
B.A., Doane College, 1950; M.S., Oregon, 1957.
- J. RICHARD BELL (1962)
Associate Professor of Civil Engineering.
B.S.C.E., Purdue, 1952; M.S.C.E., 1956, Ph.D., 1963.
- JOHN FREDERICK BELL (1959)
Assistant Professor Forest Management.
B.S.F., Oregon State, 1949; M.F., Duke, 1951.
- ELMA MARSHALL BEMIS (1944)
Binding Librarian Emeritus, Library.
A.B., Phillips, 1915, B.S., 1917, M.A., 1918; M.A., Colorado State College, 1942; B.S. (Lib. Sc.), Denver, 1944.
- CLEON VERNON BENNETT (1958)
Assistant Professor of Speech.
B.S., Murray State College (Kentucky), 1953; M.A., Southern Illinois, 1958.
- NOEL LINDSAY BENNING (1937)
Extension Poultry Specialist (Professor).
B.S., Utah State, 1928; M.S., Kansas State, 1932.
- BURTON ORVILLE BENSON (1960)
Lieutenant, USN, Assistant Professor Naval Science.
B.M.E., Minnesota, 1957.

- EVA MAE BENSON (1958)
Senior Instructor in Nutrition.
B.A., UCLA, 1949; M.A., Los Angeles State, 1955.
- WILLIAM CARL BENTON (1962)
Staff Sergeant, Instructor in Air Science.
- ALAN BEN BERG (1961)
Professor of Forest Management, Forest Research Laboratory.
B.S., Oregon State, 1941; M.S., Washington, 1955.
- JOSEPH WILBUR BERG, JR. (1961)
Professor of Oceanography.
B.S., Georgia, 1948; M.S., Penn State, 1952, Ph.D., 1954.
- BURTON ERDMAN BERGER (1956)
Extension Information Specialist (Assistant Professor).
B.S., Oregon State, 1949, B.S., 1954; M.R.E., Iliff School of Theology, 1952; M.S., Wisconsin, 1955.
- ROBERT WILLIAM BERGSTROM (1941-42, 1946-47, 1950)
Professor; Chairman of Professional Physical Education.
B.S., Oregon State, 1937; M.A., Columbia, 1942, Ed.D., 1947.
- NORBORNE BERKELEY (1946)
Associate Professor of History.
A.B., Oregon, 1924; M.A., Harvard, 1931.
- PAUL EMILE BERNIER (1947)
Professor of Poultry Genetics.
B.S.A., Université Laval, 1932; Ph.D., California, 1947.
- DONALD WILSON BERRY (1954)
Oregon County Extension Agent (Assistant Professor).
B.S., Oregon State, 1947; M.S., University of California, 1962.
- JOSEPH HOWARD BERRY (1951)
Assistant to the President; Executive Secretary Oregon State University Foundation (Professor).
B.S., Oregon State, 1929, Ed.M., 1954.
- RALPH STEPHEN BESSE (1922)
Professor Emeritus of Agriculture.
B.S.A., Missouri, 1913, M.S., 1915. Associate Director of Agricultural Experiment Station, 1949-53.
- GARNET DOUGLAS BEST (1931)
County Agent Emeritus, Wallowa County (Associate Professor).
B.S., Oregon State, 1925.
- LAURN KEMP BEUTLER (1957)
Instructor in Agronomy, Pendleton Experiment Station.
B.S., Utah State, 1957; M.S., Oregon State, 1961.
- DALE NESTRUD BEVER (1961)
Professor of Forest Management, Head of Forest Management Research, Forest Research Laboratory.
B.S., Oregon State, 1942, M.F., 1954.
- AMOS WILBUR BIERLY (1941)
Jefferson County Extension Agent (Associate Professor).
B.S., Oregon State, 1941.
- HERMAN ELDON BIERMAN (1952)
Umatilla County Extension Agent (Assistant Professor).
B.S., Oregon State, 1948.
- JULIUS FLOYD BINDER (1952)
Jefferson County Extension Agent, 4-H Club (Assistant Professor).
B.S., Kansas State, 1948.
- ROBERT HILL BIRDSALL (1952)
Agricultural Information Specialist (Assistant Professor).
B.A., Idaho State, 1949; M.A., Stanford, 1952.
- HAROLD MAYFIELD BLACK (1949)
Clackamas County Extension Agent, 4-H Club (Associate Professor).
B.S., Oregon State, 1947; M.S., Michigan State, 1962.
- HUGH CLARK BLACK (1962)
Assistant Professor of Forest Mammalogy, Forest Research Laboratory.
B.S., Pennsylvania State, 1950; M.S., Oregon State, 1955.
- EVA BLACKWELL (1924)
Assistant Registrar (Assistant Professor).
B.S., Oregon State, 1924.
- RICHARD HARRY BLAKELEY (1961)
Assistant Professor of Landscape Architecture.
B.S.L.A., Louisiana State, 1961.
- GRANT E. BLANCH (1945)
Professor of Agricultural Economics.
B.S., Utah State, 1940; M.S., Illinois, 1941; Ph.D., Cornell, 1944.
- LAWRENCE THOMAS BLANEY (1948)
Associate Professor of Horticulture.
B.S., Penn State, 1941, M.S., 1948; Ph.D., California (Los Angeles), 1955.
- CAROLINE HELENA BLOMBERG (1959)
Yamhill County Extension Agent (Instructor).
B.A., St. Olaf College, 1959.
- RUSSELL OLIVER BLOSSER (1961)
Engineer National Council for Stream Improvement (Assistant Professor).
B.S.C.E., Purdue, 1956; M.S.C.E., 1957.
- JACK BLUESTEIN (1962)
Instructor in Business Administration.
B.Ch.E., Rensselaer Polytechnic, 1957; M.B.A., Harvard, 1962.
- WILBUR LEROY BLUHM (1957)
Marion County Extension Agent (Assistant Professor).
B.S., Nebraska, 1947.
- CHARLES H. BLUMENFELD (1962)
Assistant Professor, Business Office.
A.B., Illinois, 1928, J.D., 1930.
- LARRY BOERSMA (1960)
Assistant Professor of Soils.
M.S., The Netherlands, 1955; Ph.D., Cornell, 1959.
- RALPH BOGART (1947)
Professor of Animal Breeding.
B.S., Missouri, 1934; M.S., Kansas State, 1936; Ph.D., Cornell, 1940.
- WALTER BENO BOLLEN (1929)
Professor of Microbiology.
B.S., Oregon State, 1921, M.S., 1922; Ph.D., Iowa State, 1924.
- CARL ELDON BOND (1949)
Associate Professor of Fisheries.
B.S., Oregon State, 1947, M.S., 1948.
- FREDERICK THOMAS BOND (1962)
Assistant Professor of Chemistry.
B.S., MIT, 1958; Ph.D., California, 1961.

- TURNER HANKS BOND (1943)
State Extension Agent (Associate Professor).
B.S., Oregon State, 1938; M.S., Michigan State, 1961.
- JESSE FRANKLIN BONE (1950)
Associate Professor of Veterinary Medicine.
B.A., Washington State, 1937, B.S., 1949, D.V.M., 1950; M.S., Oregon State, 1953.
- EARL EDWARD BONHAM (1955)
Wasco County Extension Agent, 4-H Club (Assistant Professor).
B.S., Oregon State, 1950.
- LEROY WAYNE BONNICKSEN (1951)
Associate Professor of Agricultural Engineering.
B.S., Iowa State, 1950, M.S., 1951.
- DAVID LEVAN BONSTEEL (1961)
Assistant Professor of Architecture.
B.A.E., Washington State, 1950; Registered Architect. Ohio and Penn.
- DEAN EMERSON BOOSTER (1956)
Assistant Professor of Agricultural Engineering.
B.S., Oregon State, 1954, M.S., 1956.
- DAVID ARTHUR BOSTWICK (1953)
Associate Professor of Geology.
B.A., Montana, 1942; M.A., 1951, Ph.D., Wisconsin, 1958.
- RICHARD WILLIAM BOUBEL (1954)
Assistant Professor of Mechanical Engineering.
B.S., Oregon State, 1953, M.S., 1954.
On leave 1961-63.
- ARTHUR GEORGE BRISTOW BOUQUET (1909)
Professor Emeritus of Horticulture.
B.S., Oregon State, 1906; M.S., Cornell, 1930.
- EDOUARD JOANY BOURBOUSSON (1943)
Professor Emeritus of French.
Licence és Lettres, 1915, Licence en Droit, 1916, Licence és Sciences, 1916, Lyon; Docteur en Droit, 1919, Paris; Docteur de l'Université de Lyon (Lettres, 1950).
- JOHN BUTTS BOURKE (1962)
Instructor in Agricultural Chemistry.
B.A., Colgate, 1957; M.A., Oregon State, 1960.
- DONALD DUDLEY BOURQUE (1961)
Assistant Professor of Business Administration.
B.A., Washington, 1957, M.B.A., 1958.
- BEVERLY JEAN BOWER (1962)
Klamath County Extension Agent (Instructor).
B.S., Oregon State, 1962.
- WALDO BOWERS (1963)
Assistant Director of Admissions (Assistant Professor).
B.A., American Intl. College, 1956; Ed.M., Oregon State, 1959.
- RAYMOND R. BOWMAN (1962)
Harney County Extension Agent (Instructor).
B.S., Oregon State, 1960.
- WILLIAM ELLSWORTH BOYD (1961)
Colonel, Professor of Air Science.
B.S. (E.E.), Colorado, 1938.
- ROBERT FRANKE BRADLEY (1956)
Douglas County Extension Agent, Forestry (Assistant Professor).
B.S., New Hampshire, 1939; M.F., Oregon State, 1962.
- JAMES JOSEPH BRADY (1937)
Professor of Physics.
B.A., Reed, 1927; M.A., Indiana, 1928; Ph.D., California, 1931.
- NORMAN ROBERT BRANDENBURG (1950)
Associate Professor of Agricultural Engineering; Agricultural Engineer, U. S. Department of Agriculture.
B.S., Colorado, 1944; M.S., Oregon State, 1951.
- VERA HASKELL BRANDON (1928)
Professor Emeritus of Home Economics. Acting Dean of the School of Home Economics 1950-54; Associate Dean 1954-55.
B.S., Oregon State, 1911, B.S., 1927, M.S., 1929; Ph.D., Iowa, 1936.
- WILLIAM HENRY BRANDT (1956)
Assistant Professor of Botany.
B.A., Montana, 1950; M.Sc., Ohio State, 1951, Ph.D., 1954.
- RUTH ELIZABETH BRASHER (1958)
State 4-H Extension Agent (Assistant Professor).
B.S., Brigham Young, 1951; M.A., Maryland, 1959.
- LE ROY BREITHAUP (1911-18, 1920)
Extension Agricultural Economist Emeritus.
B.S., Oregon State, 1910.
- WILBUR PAUL BREESE (1953)
Assistant Professor of Fisheries; at Marine Laboratory, Yaquina.
B.S., Oregon State, 1951, M.S., 1953.
- ROBERT NELSON BRENNE (1961)
Instructor, Research Associate in Mathematics.
B.A., Reed College, 1953.
- DONALD HADEN BREWER (1957)
Certification Specialist (Assistant Professor).
B.S., Oregon State, 1955.
- GERALD WILLIAM BROCK (1959)
Assistant to Director of Dormitories. (Instructor).
B.S., Oregon State, 1959.
- ELIZABETH GRAVES BRODY (1958)
Assistant Professor of Psychology, Counselor, Counseling and Testing Center.
B.A., Minnesota, 1934, M.A., 1934, Ph.D., 1938.
- GERALD WALTER BROG (1956)
Jackson County Extension Agent (Assistant Professor).
B.S., Oregon State, 1954.
- FLORENCE RYDER BROMLEY (1955)
Tillamook County Extension Agent (Home Economics) (Assistant Professor).
B.S., Oregon State, 1922, M.S., 1959.
- VICTOR JACK BROOKES (1956)
Associate Professor of Entomology, Science Research Institute.
B.A., Michigan, 1950; M.S., Illinois, 1951, Ph.D., 1956.
- STANLEY NELSON BROOKS (1955)
Associate Professor of Agronomy; Research Agronomist, U. S. Department of Agriculture.
B.S., Colorado State University, 1948; M.S., Kansas State, 1949; Ph.D., Oregon State, 1961.
- DOROTHY FURTICK BROWN (1955)
Benton County Extension Agent, Home Economics (Assistant Professor).
B.S., Colorado, 1949.

- EVELYN STOWELL BROWN (1960)**
Lincoln County Extension Agent (Home Economics) (Assistant Professor).
B.S. in Education, State Teachers College (Framingham, Massachusetts), 1927.
- GORDON G. BROWN (1916)**
Associate Professor Emeritus of Horticulture, Mid-Columbia Experiment Station.
A.B., Pacific University, 1910; B.S., Oregon State, 1912.
- JAMES RUSSELL BROWN (1962)**
Assistant Professor of Mathematics.
B.A., Oregon State, 1953, M.A., 1958.
- ROBERT D. BROWN (1952)**
Associate Professor of English.
A.B., Indiana, 1949, M.A., 1950, Ph.D., 1952.
- WILLIAM GALEN BROWN (1955)**
Associate Professor of Agricultural Economics.
B.S., Kansas State, 1950; M.S., Iowa State, 1953, Ph.D., 1955.
- WILLIAM MALCOLM BROWN, JR. (1959)**
Instructor in Botany.
A.A., Modesto Jr. College, 1955; B.S., California (Davis), 1958.
- JOSEPH CHESTER BRYE (1947)**
Professor of Music.
B.M., Northwestern, 1940, M.M., 1941.
- BRUCE ALFRED BRYER (1962)**
Lieutenant Commander USN, Assistant Professor of Naval Science.
B.A., Dartmouth, 1941.
- JANET LAIRD BUBL (1946-48, fall 1959, 1960)**
Instructor in Clothing and Textiles.
B.A., Vassar, 1940; M.S., Minnesota, 1941.
- WILLIAM HARRY BUCKLEY (1962)**
Lt. Col., Associate Professor of Military Science.
B.A., Oregon, 1949; M.A., Hawaii, 1963.
- DAVID ALVIN BUCY (1955)**
Assistant Professor of General Engineering.
B.S., Oregon State, 1955; P.E., State of Oregon, 1959.
- DELOSS EVERETT BULLIS (1917)**
Professor Emeritus of Chemistry, Agricultural Chemistry.
B.S., Oregon State, 1917, M.S., 1929.
- RICHARD MELVIN BULLOCK (1958)**
Professor of Horticulture. Superintendent North Willamette Experiment Station.
B.S., Kansas State, 1940; M.S., Washington State, 1942, Ph.D., 1950.
- ARCHIE LEE BUNDY (1962)**
MSGT, Inf., Instructor in Military Science.
- DAVID STEWART BURCH (1958)**
Associate Professor of Physics.
B.S., Washington, 1950, M.S., 1954, Ph.D., 1956.
- FREDERICK JOSEPH BURGESS (1953)**
Associate Professor of Civil Engineering. Assistant to the Dean of Engineering.
B.S., Oregon State, 1950; M.S., Harvard, 1955.
- DAVID JAMES BURKHART (1961)**
Umatilla County Extension Agent (Assistant Professor).
A.B., Northwest Nazarene College, 1951.
- WILBUR WILLIS BURKHART, JR. (1947)**
Washington County Extension Agent (Assistant Professor).
B.S., Oregon State, 1947.
- JAMES ALMON BURR (1951-52, 1960)**
Jefferson County Extension Agent (Assistant Professor).
B.S., Oregon State, 1951.
- WAYNE VINCENT BURT (1954)**
Professor of Oceanography; Chairman of Department.
B.S., Pacific College, 1939; M.S., Scripps Institution of Oceanography, 1948, Ph.D., 1952.
- ROBERT GEORGE BUSCHMAN (1958)**
Associate Professor of Mathematics.
B.A., Reed, 1949; M.A., Oregon, 1951; Ph.D., Colorado, 1956.
- MARIE HARRIS BUSSARD (1957)**
Assistant Professor of Foods and Nutrition.
B.S., Montana State, 1956, M.S., 1957.
- IRENE BUTTS (1947)**
Instructor in English.
B.A., Oregon State, 1946.
- JOHN VINCENT BYRNE (1960)**
Associate Professor of Oceanography.
A.B., Hamilton College, 1951; M.A., Columbia, 1953, Ph.D., USC, 1957.
- ROBERT FARMER CAIN (1952)**
Professor of Food Science and Technology.
B.S., Texas Technological College, 1938; M.S., Texas A and M, 1941; Ph.D., Oregon State, 1952.
- WILLIAM ELMER CALDWELL (1930)**
Professor of Chemistry.
Met.E., Montana School of Mines, 1924; B.S., Wisconsin, 1928, Ph.D., 1930.
- WHEELER CALHOUN, JR. (1948)**
Assistant Professor of Agronomy.
B.S., Oregon State, 1946, M.S., 1953.
- ROBERT HAROLD CALLIHAN (1957)**
Instructor in Agronomy.
B.S., Idaho, 1957; M.S., Oregon State, 1961.
- LEONARD JAMES CALVERT (1961)**
Extension Information Specialist (Instructor).
B.A., Oregon, 1955.
- LYLE DAVID CALVIN (1953)**
Professor of Statistics. Acting Chairman of Department.
B.S., Chicago, 1948; B.S., North Carolina State, 1947, Ph.D., 1953.
- H. RONALD CAMERON (1955)**
Associate Professor of Plant Pathology.
B.S., California, 1951; Ph.D., Wisconsin, 1955.
On sabbatical leave until May 31, 1963.
- HOMER JEROME CAMPBELL (1957)**
Assistant Professor of Fisheries; Fishery Biologist, Research Division, Oregon State Game Commission.
B.S., Oregon State, 1948.
- JOHN CARL CAMPBELL (1948)**
Associate Professor of General Engineering.
B.S., Kansas State, 1947; M.S., Oregon State, 1949.
- RONALD KENNETH CAMPBELL (1945)**
Professor of Business Administration.
A.B., Illinois, 1925; M.B.A., Harvard, 1928; Ph.D., Stanford, 1940.

- TILMAN MEADE CANTRELL (1956)**
Assistant Professor of Sociology.
B.A., Texas, 1947; M.A., 1948.
- ANDREW GALBRAITH CAREY, JR. (1961)**
Assistant Professor of Oceanography.
A.B., Princeton, 1955; Ph.D., Yale, 1962.
- CURT GERALD CARLBOM (1962)**
Instructor in Botany.
B.S., Washington, 1955; B.A., 1956.
- HERBERT DEYO CARLIN (1951)**
Associate Professor of History.
B.S., Oregon, 1940; M.S., 1947.
- CECIL L. CARLSON (1961)**
Master Sergeant, Artillery, Instructor in Military Science.
- ELAINE KATHRYN CARLSON (1958)**
Assistant Professor of Clothing, Textiles, and Related Arts.
B.A., Northwest Nazarene College, 1942; B.Mus., 1947; M.S., Oregon State, 1960.
- ROY WERNER CARLSON (1958)**
Assistant Professor of English.
B.A., University of Omaha, 1952; M.A., Washington, 1957; Ph.D., New Mexico, 1961.
- WILLIAM HUGH CARLSON (1945)**
Director of Libraries; Professor.
A.B., Nebraska, 1924; Certificate, New York State Library School, 1926; M.A. (Lib. Sc.) California, 1937.
- PAUL CARPENTER (1920-27, 1934)**
Professor Emeritus of Agricultural Economics.
B.S., Minnesota, 1932.
- GEORGE BARR CARSON, JR. (1961)**
Professor of History, Chairman of Department.
B.A., College of Wooster, 1935; M.A., Chicago, 1940, Ph.D., 1942.
- DAVID SOUTHARD CARTER (1961)**
Professor of Mathematics.
B.A., University of British Columbia, 1946; M.A., 1948; Ph.D., Princeton, 1952.
- RUTH HARRIETT CARTER (1952)**
Instructor in English.
B.S., Boston University, 1930; M.Ed., 1934.
- ARTHUR LARKIN CASEBEER (1962)**
Instructor in Physical Education.
B.S., Wisconsin, 1952; M.S., 1957.
- EMERY NEAL CASTLE (1954)**
Professor of Agricultural Economics.
B.S., Kansas State, 1948; M.S., 1950; Ph.D., Iowa State, 1952.
- PHILIP CATALFOMO (1963)**
Assistant Professor of Pharmacognosy.
B.S., Providence College, 1949; B.S., Connecticut, 1958; M.S., Washington, 1960; Ph.D., 1962.
- RUFUS HENRY CATE, JR. (1945)**
Lincoln County Extension Agent (Associate Professor).
B.S., Oregon State, 1944; M.Ed., Colorado State University, 1954.
- ROBERT EDGAR CAZDEN (1959)**
Assistant Order Librarian (Instructor).
A.B., U.C.L.A., 1952; M.A., U.S.C., 1954; M.L.S., California, 1959.
- GEORGE GRETE CHADWICK (1958)**
Instructor in Fisheries.
Research Biologist, U. S. Public Health Service.
B.S., Oregon State, 1954; M.S., 1959.
- WILLARD JOSEPH CHAMBERLIN (1915)**
Professor Emeritus of Entomology.
B.S., Oregon State, 1915; M.S., 1921; Ph.D., Stanford, 1930.
- KENTON LEE CHAMBERS (1960)**
Associate Professor of Botany; Curator of Herbarium.
A.B., Whittier, 1950; Ph.D., Stanford, 1956.
- TSUN TIEN CHAO (1959)**
Assistant Professor of Soils.
B.S., National Central University, China, 1942; M.S., Oregon State, 1959; Ph.D., 1960.
- DONALD WALLACE CHAPMAN (1957)**
Assistant Professor of Fisheries; Executive Secretary, Water Resources Research Institute.
B.S., Oregon State, 1953; M.S., 1957; Ph.D., 1961.
- HELEN GENEVA CHARLEY (1944)**
Professor of Foods and Nutrition.
A.B., DePauw, 1930; M.S., Chicago, 1941.
- VERNON HENDRUM CHELDELIN (1942)**
Dean, School of Science; Professor of Chemistry; Director, Science Research Institute.
B.A., Reed, 1937; M.S., Oregon State, 1939; Ph.D., Texas, 1941.
- HORACE BELLATTI CHENEY (1952)**
Professor of Soils, Head of Department.
B.S., Iowa State, 1935; Ph.D., Ohio State, 1942.
- DAVID OWEN CHILCOTE (1953)**
Assistant Professor of Crop Physiology.
B.S., Oregon State, 1953; M.S., 1957; Ph.D., Purdue, 1961.
- WILLIAM WESLEY CHILCOTE (1950)**
Associate Professor of Botany.
B.S., Iowa State, 1943; Ph.D., 1950.
- HERBERT ELLSWORTH CHILDS (1935)**
Professor of English.
A.B., Oberlin College, 1926; Ph.D., Washington, 1932.
- LEROY CHILDS (1914)**
Professor Emeritus of Entomology, Mid-Columbia Experiment Station.
A.B., Stanford, 1913.
- KIM K. CHING (1961)**
Associate Professor of Forest Genetics, Forest Research Laboratory.
B.S., Central University, China, 1942; M.F., Michigan State, 1948; Ph.D., 1954.
- TE MAY TSOU CHING (1956)**
Associate Professor of Seed Physiology.
B.S., Central University, China, 1944; M.S., Michigan State, 1950; Ph.D., 1954.
- BERT EINAR CHRISTENSEN (1931)**
Professor of Chemistry; Chairman of Department.
B.S., Washington State, 1927; Ph.D., Washington, 1931.
- LENO VIRGIL CHRISTENSEN (1957)**
Teacher Trainer in Farm Mechanics, Assistant Professor of Agricultural Engineering.
B.Sc., Nebraska, 1941.

- CLARENCE LEWIS CHURCH** (1943-44, 1945)
Assistant Professor of Physics.
A.B., Willamette, 1927; M.A., Southern California, 1936.
- DAVID CALVIN CHURCH** (1956)
Assistant Professor of Animal Nutrition.
B.S., Kansas State, 1950; M.S., Idaho, 1952; Ph.D., Oklahoma State, 1956.
- ALICE JEAN CLARK** (1961)
Research Associate (Acting Instructor), Science Research Institute.
B.A., New Mexico, 1960.
- AVA MILAM CLARK** (1911)
Professor Emeritus of Home Economics.
Ph.B., Chicago, 1910, M.A., 1911, Dean of the School of Home Economics 1917-50.
- ELSIE K. CLARK** (1960)
Polk County Extension Agent (Home Economics) (Assistant Professor).
B.S., New Mexico State, 1942.
- HARRY EDWIN CLARK** (1951)
Lincoln County Special Extension Agent (Associate Professor).
B.S., Oregon State, 1939, M.S., 1942; Ph.D., Wisconsin, 1960.
- RALPH BARLOW CLARK** (1962)
Instructor in Botany and Plant Pathology.
B.S., Brigham Young, 1957; M.S., Utah State, 1959; Ph.D., California (Los Angeles), 1962.
- ROBERT RALPH CLARK** (1945)
Extension Horticulture Specialist (Associate Professor).
B.S., Oregon State, 1925, M.S., 1941.
- LAURA MAE CLEVELAND** (1946)
Associate Professor of Institution Management; Manager Residence Halls Food Service.
B.S., Iowa State, 1930; M.S., Oregon State, 1942.
- SCOTT PHILIP CLEVINGER** (1945)
Lincoln County Extension Agent, 4-H Club (Assistant Professor).
B.S., Oregon State, 1939.
- RILEY JENKINS CLINTON** (1928)
Professor of Education.
A.B., Missouri, 1922, B.S. (in Ed.), 1922, M.A., 1925; Ed.D., Stanford, 1933.
- WILLIAM Y. COBB** (1963)
Research Associate (Assistant Professor) in Food Science and Technology.
B.S., North Carolina State University, 1957, M.S., 1959, Ph.D., 1963.
- FRANCIS DEFORD COCHRAN** (1959)
Chief Fire Controlman, USN, Instructor in Naval Science.
- HAROLD COCKERLINE** (1921)
Professor Emeritus of Electrical Engineering.
B.S. (in E.E.), Oregon, 1912.
- RALPH COLBY** (1928)
Professor of English.
B.A., Minnesota, 1916, M.A., 1917; Ph.D., Illinois, 1928.
- HENRY THOMAS COLE** (1958)
Instructor in Production Technology.
B.S., Oregon State, 1959, M.Ed., 1961.
- LAMAR WILLIAM COLEMAN** (1962)
Research Associate (Assistant Professor) in Physics.
B.S., Virginia Military Institute; M.S., Oregon State, 1959.
- RALPH ORVAL COLEMAN** (1919)
Professor; Chairman of Service Programs for Men; Head Coach of Baseball.
B.S., Oregon State, 1918; M.A., Columbia, 1929.
- OLIVER CECIL COMPTON** (1948)
Professor of Horticulture.
B.S., California, 1931, M.S., 1932; Ph.D., Cornell, 1947.
- MELVIN J. CONKLIN** (1926-39, 1950)
Assistant Professor of Agricultural Economics, Agricultural Experiment Station.
B.S., Montana State, 1922.
- ROBERT DUGGAN CONNOLLY, JR.** (1960)
Lieutenant Colonel (Signal Corps Branch Chief), Associate Professor of Military Science.
A.B., Lafayette College, 1940; M.Ed., Oregon State, 1962.
- FRANK PHILIP CONTE** (1961)
Research Associate (Assistant Professor) in Radiation Biology and Agricultural Chemistry.
A.B., California, 1950, Ph.D., 1961.
- CLIVE WINTON COOK** (1944)
Clackamas County Extension Agent (Assistant Professor).
B.S., Oregon State, 1933.
- WILBUR TARLTON COONEY** (1937)
Associate Dean, School of Agriculture (Professor).
B.S., Oregon State, 1937, M.S., 1942.
- MARTIN PORTMAN COOPEY** (1941)
Professor of Civil Engineering.
B.S., Oregon State, 1936.
- MALCOLM ERNEST CORDEN** (1958)
Associate Professor of Plant Pathology.
B.S., Oregon State, 1952, Ph.D., 1955.
- STANLEY EUGENE CORDER** (1961)
Assistant Professor of Mechanical Engineering, Forest Research Laboratory.
B.S., Oregon State, 1950.
- CLIFFORD BERNARD CORDY** (1935)
Jackson County Extension Agent (Professor).
B.S., Oregon State, 1930; M.S., Michigan State, 1934; Ph.D., Florida, 1961.
- GRANT L. CORNELIUS** (1961)
Assistant Professor of Agricultural Economics; Agricultural Economist, U. S. Department of Agriculture.
B.S., Nebraska, 1950, M.A., 1956; Ph.D., Wisconsin, 1961.
- ELGIN MAC CORNETT** (1942)
Wallowa County Extension Agent (Associate Professor).
B.S., Oregon State, 1939; M.S., Michigan State University, 1958.
- EVERETT STEWART CONTRIGHT** (1944)
Professor of Speech.
B.A., Iowa State Teachers, 1927; M.A., Michigan, 1941.
- BELVA HIGHT COVEY** (1957)
Linn County Extension Agent, Home Economics (Assistant Professor).
B.A., Penn College, Iowa, 1928.

- JOHN RITCHIE COWAN (1948)**
Professor of Agronomy, Head of Department.
B.S.A., Toronto, 1939; M.S., Minnesota, 1942, Ph.D., 1952.
- GEORGE BRYAN COX (1927)**
Professor Emeritus of Industrial Engineering and Industrial Arts.
B.S., Missouri, 1919; M.S., Oregon State, 1940.
- JOSEPH ALFRED COX (1946)**
Associate Professor of Physical Education.
B.A., Colorado College, 1926; M.S., Oregon State, 1938.
- JOSEPH REW COX (1945-50, 1957)**
Washington County Extension Agent (Associate Professor).
B.S., Oregon State, 1939.
- DUANE L. COYIER (1961)**
Assistant Professor of Plant Pathology, Mid-Columbia Experiment Station; Plant Pathologist, U. S. Department of Agriculture.
B.S., Wisconsin, 1950, Ph.D., 1961.
- GARVIN DUDLEY CRABTREE (1958)**
Assistant Professor of Horticulture.
B.S., Oregon State, 1951; M.S., Cornell, 1955, Ph.D., 1958.
- IRENE LOUISE CRAFT (1944)**
Serials Librarian (Associate Professor), Library.
B.S., Fort Hays State, 1930; M.A., Nebraska, 1931; B.S. (Lib. Sci.), Illinois, 1941, M.S. (Lib. Sci.), 1943.
- WILLARD MAXON CRAIG (1938)**
Professor of Business Administration.
B.S., Oregon State, 1926; M.B.A., Washington, 1931, LL.B., 1936.
- RICHARD PRICE CRAMER (1957)**
Assistant Professor of Physical Education; Assistant Swimming Coach.
B.S., Oregon State, 1957, M.S., 1961.
- GENE FRANCIS CRAVEN (1958)**
Instructor in Education and General Science.
B.S., Kansas State College (Pittsburgh), 1954; M.S., Oregon State, 1958.
- FRED ROY CRAWFORD (1959)**
Associate Professor of Psychology.
B.A., Santa Barbara State, 1941; M.S. (Ed.), U.S.C., 1945, Ed.D., 1947.
- F. REID CREECH (1962)**
Instructor in Business Administration.
B.S., Wyoming, 1960, M.S., 1962.
- ANNA MARY CREEKMORE (1963)**
Associate Professor of Clothing, Textiles, and Related Arts.
B.S., Tennessee, 1945, M.S., 1950.
- GRAYDON TALMADGE CREWS (1948)**
Science Student Personnel Adviser (Associate Professor).
B.S., Washington, 1938; M.S., Oregon State, 1950, Ed.D., 1957.
- JOSEPH ROBERT CROCKER, JR. (1962)**
Instructor in English.
A.B., Washington University, 1932, M.A., 1933.
- HOWARD LESTER CROFF (1957)**
Assistant Professor of General Engineering.
B.S., Oregon State, 1942.
- WILLIAM RAMSDEN CROOKS (1947)**
Professor of Psychology, Chairman of Department.
A.B., California, 1937; M.A., Connecticut, 1939; Ph.D., Minnesota, 1952.
- MYRON GEORGE CROPSY (1946)**
Professor of Agricultural Engineering.
B.S., California, 1933; M.S., North Dakota Agricultural College, 1941; Ph.D., Michigan State, 1956.
- HAMBLIN HOWES CROWELL (1946)**
Associate Professor of Entomology.
B.S., Oregon State, 1935, M.S., 1937; Ph.D., Ohio State, 1940.
- ANDREW JACKSON CULVER, JR. (1950)**
Associate Plant Pathologist (Associate Professor), U. S. Department of Agriculture.
B.A., Delaware, 1943; M.S., Vermont, 1948.
- JON CLARK CUMMINGS (1958)**
Assistant Professor of Geology.
B.S., Stanford, 1952, M.S., 1956, Ph.D., 1960.
- HERBERT CHARLES CURL (1961)**
Assistant Professor of Oceanography.
B.S., Wagner College, 1950; M.S., Ohio State, 1951; Ph.D., Florida State, 1956.
- RAYMOND ALAN CURRIER (1961)**
Assistant Professor of Forest Products, Forest Research Laboratory.
B.S., Massachusetts, 1950; M.S., New York State College of Forestry, 1952.
- JOHN GRIFFIN CURRY (1960)**
Assistant Professor of Sociology.
B.A., Colorado, 1946, M.A., 1950.
- IMOGENE CUSAC (1949)**
(Lib. Sc.) Union Cataloger (Instructor), Library.
B.A., Baylor, 1930; B.A. (Lib. Sc.), Oklahoma, 1931; B.A., Highlands, 1937.
- HOWARD EUGENE CUSHMAN (1952)**
Extension Soil Conservation Specialist (Associate Professor).
B.S., Oregon State, 1942.
- CHARLES HENRY DAILEY, JR. (1947)**
Associate Professor of Physical Education.
B.S., North Central College (Illinois), 1943; M.A., Michigan, 1947.
- ALICE FOULK DALBEY (1959)**
Assistant Dean of Women (Assistant Professor).
B.S., Indiana, 1949; M.A., Illinois, 1952.
- HOMER MORROW DALBEY (1958)**
Assistant Professor of Business Administration.
A.B., Indiana, 1949; M.S., Illinois, 1952.
- ROBERT DONALD DALE (1962)**
Instructor in Philosophy.
B.A., B.S., Oregon State, 1957; M.A., Oregon, 1959.
- EDWARD ARCHIE DALY (1957)**
Associate Professor of Mechanical Engineering.
B.S., New Mexico State, 1950; M.S., Michigan State, 1951.
- CHARLES WESLEY DANE (1957)**
Assistant to the Dean (Assistant Professor), Forestry.
B.S., Oregon State, 1952, M.S., 1958.

- VERNON JOHN DAMM (1956)**
Assistant Professor of Psychology.
B.A., Houghton College, 1952; M.A., Bowling Green, 1954.
- ALEXANDER NORMAN DAVIDSON (1956)**
Associate Professor of Business Administration.
B.S., Columbia, 1947; M.B.A., New York, 1948; LL.B., Denver, 1955; C.P.A., Texas, 1953; Oregon, 1958.
- THOMAS PARNELL DAVIDSON (1950)**
Assistant Professor of Horticulture, Superintendent, Umatilla Experiment Station.
B.S., Oregon State, 1949.
- HENRY GEORGE DAVIES (1962)**
Lane County Extension Agent (Assistant Professor).
B.S., Oregon State, 1949.
- WILLIAM ALBERT DAVIES (1946)**
Professor of Forest Engineering; Head of Department.
B.S.F., Washington, 1938, M.F., 1946.
- GERALD EVERT DAVIS (1962)**
Instructor in Fisheries.
B.S.F., Washington, 1956; M.S., Oregon State, 1960.
- PHILIP BARR DAVIS (1958)**
Assistant Professor of Agricultural Education, Assistant Teacher Trainer.
B.S., Oklahoma State, 1950, M.S., 1953; Ph.D., Michigan State, 1959.
- ROGER KEITH DAVIS (1961)**
Captain, Assistant Professor Military Science.
B.S., Oregon State, 1954.
- EUGENE VINCENT DAVISON (1960)**
Assistant Director of Publications (Instructor).
B.S., Oregon State, 1960.
- MELISSA MARTIN DAWES (1915)**
Professor Emeritus of Modern Languages.
A.B., Oregon, 1912; B.S., Oregon State, 1915; A.M., Columbia, 1920.
- JACK B. DAWLEY (1962)**
Captain USN, Professor of Naval Science.
B.A., Washington, 1935.
- MURRAY DRAYTON DAWSON (1954)**
Associate Professor of Soils.
M.Agr.Sc., University of New Zealand, 1949, M.S., 1952; Ph.D., Cornell, 1954.
- EDGAR ALLAN DAY (1958)**
Associate Professor of Food Science and Technology.
B.S., Maryland, 1953; M.S., Penn State, 1955, Ph.D., 1957.
- JOHN COURTNEY DECIUS (1949)**
Professor of Chemistry.
A.B., Stanford, 1941, M.A., 1944; Ph.D., Harvard, 1947.
- FRED WILLIAM DECKER (1946)**
Associate Professor of Physics.
B.S., Oregon State, 1940; M.S., New York, 1943; Ph.D., Oregon State, 1952.
- IRA WASHINGTON DEEP (1953)**
Associate Professor of Botany.
B.A., Miami (Ohio), 1950; M.S., Tennessee, 1952; Ph.D., Oregon State, 1956.
- PETER DEHLINGER (1962)**
Professor of Oceanography.
B.S., Michigan, 1940; M.S., California Institute of Technology, 1943, Ph.D., 1950.
- LaREA DENNIS (1959)**
Instructor in Botany, Assistant Curator of Herbarium.
B.A., Willamette, 1957; M.A., Oregon State, 1959.
- ROBERT DENNIS (1959)**
Major, Associate Professor of Air Science.
B.S., Washington State, 1942.
- JOHN DERYCK DE PREE (1962)**
Assistant Professor of Mathematics.
B.A., Hope College, 1955; M.S., Colorado, 1958, Ph.D., 1962.
- GEORGE WILLIAM DEWEY (1944)**
Extension Specialist in Certification, (Assistant Professor Emeritus).
B.S., Michigan State, 1911.
- ELVIS ARNIE DICKASON (1949)**
Associate Professor of Entomology.
B.S., Oregon State, 1947, M.S., 1949; Ph.D., Michigan State, 1959.
- JAMES PATRICK DICKEY (1962)**
Lieutenant USN, Assistant Professor of Naval Science.
B.S., U. S. Naval Academy, 1957.
- ERNEST MILTON DICKINSON (1927-36, 1938)**
Professor of Veterinary Medicine; Head of Department.
D.V.M., Ohio State, 1927; M.S., Oregon State, 1935.
- FRANK HERMAN JOSEPH DICKMANN (1952)**
Instructor in Agricultural Economics.
B.S., Oregon State, 1951.
- MARIE DIEDESCH (1945)**
Associate Professor of Clothing, Textiles, and Related Arts.
B.A., Washington State, 1933; M.S., Oregon State, 1941.
On sabbatical leave 1963-64.
- JAMES HADLEY DIETZ (1957)**
Assistant Professor of Food Science and Technology.
B.S., Oregon State, 1949, M.S., 1951; Ph.D., Massachusetts, 1953.
- JOHN RICHARD DILWORTH (1946)**
Professor of Forest Management; Head of Department.
B.S., Iowa State, 1937, M.S., 1938; Ph.D., Washington, 1956.
- ROLAND EUGENE DIMICK (1929)**
Professor of Fisheries; Head of Department of Fish and Game Management.
B.S., Oregon State, 1926, M.S., 1931.
- JAMES VICTOR DIXON (1927)**
Professor of Physical Education; Director of Intramural Sports.
B.S., Oregon State, 1931, M.S., 1939.
- JEANETTE ALICE DIXON (1930-48, 1958)**
Assistant Professor of Physical Education for Women.
B.S., Battle Creek College, 1930; M.S., Oregon State, 1940.
- JEANNIE BEGG DIXON (1959)**
Instructor in English.
B.S., Northwestern, 1929, M.A., 1930.
- NORMAN DALE DOBIE (1949)**
Associate Plant Pathologist, Agricultural Experiment Station; Extension Certification Specialist (Associate Professor).
B.S., South Dakota State, 1947; Ph.D., Oregon State, 1954.

- ROBERT F. DOERGE (1960)**
Professor of Pharmaceutical Chemistry, Head of Department.
B.S., Minnesota, 1943, Ph.D., 1949.
- THURSTON ERMON DOLER (1949)**
Assistant Professor of Speech.
B.A., Furman, 1948; M.S., Purdue, 1949.
- ERNST JOHN DORNFELD (1938)**
Professor of Zoology; Chairman of Department.
B.S., Marquette, 1933; M.A., Wisconsin, 1935, Ph.D., 1937.
- FRANK N. DOST (1962)**
Assistant Professor of Pharmacology, Chemistry, and Veterinary Medicine, Science Research Institute.
B.S., Washington State, 1953; M.S., Kansas State, 1959; D.V.M., Washington State, 1953.
- PETER DOUDOROFF (1953)**
Professor of Fisheries; Supervisory Fishery Research Biologist, U. S. Public Health Service.
A.B., Stanford, 1935; Ph.D., California, 1941.
- RIZPAH ANNA DOUGLASS (1949)**
Josephine County Extension Agent, Home Economics (Associate Professor) (Retired).
B.S., Nebraska, 1923; M.A., Columbia, 1938.
- WILLIAM HENRY DRESEN (1918)**
Professor Emeritus of Economics.
A.B., Greenville College, 1907; M.A., Illinois, 1916, Ph.D., 1918.
- KARL FRANCIS DRLICA (1950)**
Associate Professor of Physical Education; Coach of Rowing.
B.S., Oregon State, 1940, M.S., 1952.
- ULYSSES GRANT DUBACH (1913)**
Dean of Men Emeritus.
A.B., Indiana, 1908; M.A., Harvard, 1908; Ph.D., Wisconsin, 1913.
- MARVIN CLARENCE DUBBÉ (1952)**
Assistant Professor of English.
B.S., Columbia, 1929, M.A., 1932; Ed.D., Oregon State, 1956.
- MAY DuBOIS (1939)**
Professor of Home Economics Education; Head of Department.
B.S., Colorado State University, 1931, M.S., 1939; Ph.D., Ohio State, 1951.
- CLEVE ELWOOD DUMDI (1960)**
Lane County Extension Agent (Assistant Professor).
B.S., Oregon State, 1955.
- ANDREW ADRIAN DUNCAN (1958)**
Extension Vegetable Production Specialist (Professor).
B.S., Maryland, 1950, M.S., 1952; Ph.D., 1956.
- CLARENCE RAPHAEL DUNLAP (1958)**
Instructor in Electrical Engineering.
B.S., Oregon State, 1935.
- RUTH GUSTAVSON DYER (1958)**
Klamath County Extension Agent, Home Economics (Assistant Professor).
B.S., Minnesota, 1950.
- CHRISTEN THEODORE DYRNESS (1960)**
Assistant Professor; Soil Scientist, U. S. Forest Service.
B.S., Wheaton College, 1954; M.S., Oregon State, 1956, Ph.D., 1960.
- DOROTHY MAY EAST (1961)**
Instructor in Foods and Nutrition.
B.S., Montana State, 1939; M.S., Oregon State, 1961.
- HARRY TYSON EASTERDAY (1960)**
Associate Professor of Physics.
A.B., California, 1947, Ph.D., 1953.
- EDISON ELLSWORTH EASTON (1951)**
Associate Professor of Business Administration; Chairman of Department.
B.S., Southern California, 1947; M.B.A., California, 1951; C.P.A., Oregon and California.
- ARNOLD CHRISTIAN EBERT (1936)**
Agricultural Information Chairman (Associate Professor).
B.S., Oregon State, 1936.
- CLARA WILLIAMS EDABURN (1939)**
Professor of Clothing, Textiles, and Related Arts.
B.S., Iowa State, 1925; M.A., Columbia, 1939.
On sabbatical leave spring term 1963.
- WALTER EUGENE EDELMAN, JR. (1961)**
Instructor in Mechanical Engineering.
B.M.E., Minnesota, 1956, M.S.M.E., 1958.
- JOHN A. EDWARDS (1961)**
Assistant Professor of Agricultural Economics.
B.S. (Agric.), Wisconsin, 1950; M.A., Nebraska, 1952.
- LOUIS LAIRD EDWARDS (1955)**
Head Counselor and Placement Director, School of Business and Technology; Assistant Professor in Business Administration.
B.S., Montana State, 1935; M.E., Montana, 1949.
- MARGARET ANN EDWARDS (1951)**
Senior Instructor in Nutrition.
B.S., Washington State, 1937.
- JAMES EICKELBERG (1962)**
Assistant Professor of Business Administration.
B.S.C., Iowa State, 1952, J.D., 1958.
- B. RAY ELLER (1961)**
Instructor in Animal Husbandry; Eastern Oregon Experiment Station.
B.S., Abilene Christian College, 1959; M.S., Texas A & M, 1961.
- FLOYD ELROY ELLERTSON (1953)**
Assistant Professor of Entomology, Mid-Columbia Experiment Station.
B.A., Oregon State, 1942, Ph.D., 1958.
- PAUL R. ELLIKER (1947)**
Professor of Microbiology, Chairman of Department.
B.S., Wisconsin, 1934, M.S., 1935, Ph.D., 1937.
- EARL FRANKLIN ELLINGTON (1962)**
Assistant Professor of Animal Science.
B.S., Kentucky, 1955, M.S., 1956; Ph.D., California, 1962.
- RUSSELL EUGENE ELLIS (1949)**
Associate Professor of Architecture; Registered Architect.
B.S., Washington State, 1949, B.Arch.E., 1952.
- JOSEPH WALDO ELLISON (1924)**
Professor Emeritus of History.
A.B., California, 1917, M.A., 1919, Ph.D., 1923.

- WILLIAM FREDERICK ENGESSER (1941)**
Professor of Industrial Engineering.
B.S., Northwestern, 1941, M.S., 1950.
- DAVID CHARLES ENGLAND (1955)**
Associate Professor of Animal Science.
B.S., Washington State, 1949; M.S., Minnesota, 1950, Ph.D., 1952.
- JOHN FRANKLIN ENGLE (1947)**
Associate Professor of Electrical Engineering.
B.S., Oregon State, 1947, M.S., 1951, E.E., 1958.
- LEIF DEDRICK ESPENAS (1961)**
Professor of Forest Products, Head of Forest Products Research, Forest Research Laboratory.
B.S., New York State College of Forestry, 1938; M.S., California, 1940.
- FLORENCE SARAH EUREN (1946-49, 1957)**
(Lib. Sc.) Assistant Serials Librarian (Instructor), Library.
B.E., Moorhead State Teachers College, 1937; B.S. (Lib. Sc.), Minnesota, 1946.
- DANIEL DONALD EVANS (1953)**
Associate Professor of Soils.
B.S., Ohio State, 1947; M.S., Iowa State, 1950, Ph.D., 1952.
- HAROLD J. EVANS (1961)**
Professor of Plant Physiology.
B.S., Kentucky, 1946, M.S., 1948, Ph.D., Rutgers, 1950.
- HAROLD PLYMPTON EWALT (1932)**
Extension Dairy Specialist (Professor).
B.S., Oregon State, 1932.
- GERALD D. EWING (1961)**
Instructor in Electrical Engineering.
A.A., College of Marin, 1955; B.S., California, 1957, M.S.E.E., 1959; E.E., Oregon State, 1962.
- DWIGHT WESLEY FAIRBANKS (1956)**
Extension Visual Instruction Specialist (Associate Professor).
B.S., Colorado State University, 1943; M.S., Michigan State, 1956.
- CLIFFORD EUGENE FAIRCHILD (1962)**
Assistant Professor of Physics.
B.A., Fresno State, 1956; Ph.D., Washington, 1962.
- TAGHI A. FAKOUHI (1962)**
Instructor in Pharmaceutical Chemistry.
A.A., Sacramento City College, B.S., 1961; M.S., Oregon State, 1963.
- SHENG CHUNG FANG (1948)**
Associate Professor of Chemistry, Agricultural Chemistry.
B.S., Fukien Christian University, 1937; M.S., Oregon State, 1944, Ph.D., 1948.
- REX D. FARMER (1961)**
Chief Gunner's Mate, United States Navy, Instructor in Naval Science.
- WILLIAM KING FARRELL (1942)**
Grant County Extension Agent (Associate Professor).
B.S., Oregon State, 1942.
- FREDERICK MELVIN FEARON (1959)**
Technical Sergeant, Instructor in Air Science.
A.A.S., New York Institute of Applied Arts and Sciences at Utica, 1954; B.G.E., University of Omaha, 1962.
- GRANT STEPHEN FEIKERT (1929)**
Professor of Electrical Engineering; Director of Engineering Department of Educational Media.
B.S., Oregon State, 1930, M.S., 1932, E.E., 1937.
- WILLIAM KREITER FERRELL (1956)**
Associate Professor of Forest Management.
B.S.F., Michigan, 1941; M.F., Duke, 1946, Ph.D., 1949.
- GEORGE CROSS FETTER (1961)**
Associate Professor of Sociology.
A.B., Hamilton College, 1943; M.A., Cornell, 1947, Ph.D., 1950.
- KATHERINA FILIPS-JUSWIGG (1962)**
Associate Professor of Modern Languages.
B.A., Teachers College Vinnitsa, USSR, 1940; M.A., University of Montreal, 1955, Ph.D., 1961.
- MARGARET LOUISE FINCKE (1935)**
Professor of Foods and Nutrition; Head of Department.
A.B., Mount Holyoke, 1921; A.M., Columbia, 1932, Ph.D., 1935.
- HAROLD ETHAN FINNELL (1936)**
Extension Certification Specialist (Associate Professor).
B.S., Oregon State, 1934, M.S., 1936.
- DAVID FRANCIS FINNIGAN, JR. (1957)**
Assistant Professor of English.
B.A., Colorado, 1956, M.A., 1957.
- WILLIAM JAMES FIREY (1961)**
Associate Professor of Mathematics.
B.S., Washington, 1948; M.A., Toronto, 1949; Ph.D., Stanford, 1954.
- CHARLES MEREL FISCHER (1947)**
Extension Poultry Marketing Specialist (Associate Professor).
B.S., South Dakota State, 1943; M.S., Iowa State, 1947.
- ERMINA JANE FISHER (1952)**
Marion County Extension Agent, Home Economics (Associate Professor).
B.S., Kansas State, 1938; M.S., Cornell, 1951.
- MARY GENEVIEVE FLETCHER (1959)**
Douglas County Extension Agent, Home Economics (Associate Professor).
B.S., Kansas State, 1928, M.S., 1934.
- ELIZABETH O'BRIEN FLOOD (1954)**
Instructor in Mathematics.
B.S., Oregon State, 1940, M.S., 1947.
- GERHARD RAGNVALD FLOOD (1940-41, 1943)**
Associate Professor of Physical Education.
B.S., Oregon State, 1929, M.S., 1941.
- CONRAD T. O. FONG (1961)**
Associate Professor, Science Research Institute.
B.S., Hawaii, 1939; Ph.D., Cal Tech, 1946.
- WILSON HOOVER FOOTE (1948)**
Professor of Agronomy, Assistant Director, Agricultural Experiment Station.
B.S., Utah State, 1942; M.S., Minnesota, 1946, Ph.D., 1948.
- RICHARD E. FORD (1961)**
Assistant Professor of Plant Pathology.
B.S., Iowa State, 1956; M.S., Cornell, 1959, Ph.D., 1961.

- ROBERT ESTES FORE (1936)**
Professor of Agronomy.
B.S., Iowa State, 1929; M.S., Illinois, 1931, Ph.D., 1935.
- WALTER CYRIL FOREMAN (1948)**
Professor of English.
B.A., Union College (Nebraska), 1933; M.A., Nebraska, 1937; Ph.D., California, 1948.
- ROBERT NEAGLE FORREST (1959)**
Assistant Professor of Physics.
B.S., Oregon, 1950, M.S., 1952, Ph.D., 1959.
- HERMAN CARL FORSLUND (1945)**
Professor of Pharmacy Administration, Head of Department.
B.S., Washington State, 1938, M.S., 1940.
- CHARLES DENNIS FOSTER (1960)**
First Sergeant, USMC, Instructor in Naval Science.
- LEE RUSSELL FOSTER (1947)**
Hood River County Extension Agent (Associate Professor).
B.S., Washington State, 1933.
- ROY ARCHIBALD FOSTER (1955)**
Professor of Hygiene and Health Education.
B.A., Concordia College, 1937; M.S., Indiana, 1950, H.S.D., 1953.
- WILLIAM ABRAM FOSTER, JR. (1958)**
Assistant Professor of Sociology.
B.S., California, 1942; M.S., Cornell, 1947, Ph.D., 1958.
- TED E. FOULKE (1955)**
Medical Consultant, Student Health Service (Professor).
B.S., Case Institute of Technology, 1944; M.D., Western Reserve, 1951.
- CARROLL WARREN FOX (1956)**
Associate Professor of Animal Science.
B.S., Colorado State University, 1943; Ph.D., California, 1954.
- DOROTHY BOURKE FOX (1928)**
Associate Professor of Art.
B.A., California School of Arts and Crafts, 1925.
- FRED WAYNE FOX (1957)**
Associate Professor of Science Education.
B.S.Ed., Miami University (Ohio), 1942; M.A., Ohio State, 1949, Ph.D., 1957.
- RODNEY VANCE FRAKES (1960)**
Assistant Professor of Plant Breeding.
B.S., Oregon State, 1956, M.S., 1957; Ph.D., Purdue, 1960.
- ROBERTA C. FRASIER (1959)**
Extension Family Life Specialist (Associate Professor), Federal Cooperative Extension.
B.A., Washington State, 1933; M.So.W., Washington, 1952.
- LLOYD McDONALD FRAZIER (1947)**
Associate Professor of Production Technology.
B.S., Oregon State, 1949.
- WILLIAM ALLEN FRAZIER (1949)**
Professor of Horticulture.
B.S., Texas A & M, 1930; M.S., Maryland, 1931, Ph.D., 1933.
- GEORGE NORMAN FREDEEN (1956)**
Associate Professor of Landscape Architecture.
B.S., Oregon State, 1950.
- WILLIAM J. FREDERICKS (1962)**
Associate Professor of Chemistry.
B.S., San Diego State, 1951; Ph.D., Oregon State, 1955.
- VIRGIL HAVEN FREED (1943)**
Professor of Chemistry; Head of Department of Agricultural Chemistry.
B.S., Oregon State, 1943, M.S., 1948; Ph.D., Oregon, 1959.
- HARRY FREUND (1947)**
Professor of Chemistry.
B.S., College of City of New York, 1940; M.S., Michigan, 1941, Ph.D., 1945.
- CHARLES BOSTWICK FRIDAY (1950)**
Professor of Economics; Chairman of Department.
B.A., Colorado, 1943, M.A., 1947, Ph.D., 1950.
- WILFORD DEAN FRISCHKNECHT (1956)**
Extension Animal Husbandry Specialist (Associate Professor).
B.S., Utah State, 1942, M.S., 1943.
- ALMA CATHERINE FRITCHOFF (1918-22, 1925)**
Professor Emeritus of Clothing and Textiles.
B.A., Nebraska, 1917; M.A., Columbia, 1925.
- JOHN KITCHENER FRIZZELL (1955)**
Wasco County Extension Agent (Associate Professor).
B.S.A., Saskatchewan, 1942; M.S., Wisconsin, 1955.
- HERBERT FARLEY FROLANDER (1959)**
Associate Professor of Oceanography.
Ed.B., Rhode Island College of Education, 1946; Sc.M., Brown, 1950, Ph.D., 1955.
- WILFRID TUTTLE FROST (1942)**
State Snow Survey Supervisor (Professor), Irrigation Water Forecasting, U. S. Department of Agriculture (Portland).
A.B., California, 1933.
- JOHN LOUIS FRYER (1963)**
Assistant Professor of Food Science and Technology.
B.S., Oregon State, 1956, M.S., 1957.
- WATSON BRYAN FULKS (1960)**
Professor of Mathematics.
B.S., Arkansas State Teachers College, 1940; M.S., Arkansas, 1941; Ph.D., Minnesota, 1941.
- JEANNE MARIE FULLER (1962)**
Instructor in Institution Management.
B.S., Oregon State, 1950.
- WINNIFRED KEIL FULMER (1938)**
Head Counselor, School of Home Economics (Associate Professor).
B.S., Iowa State, 1930, M.S., 1938.
- EVELYN FUNK (1958)**
State Extension Agent (Associate Professor).
B.S., Oklahoma State University, 1942; M.S., Cornell, 1955.
- ROBERT FRANK FUQUAY (1953)**
Associate Professor of Political Science.
B.A., Florida, 1949, M.A., 1950, Ph.D., 1953.
- WILLIAM FURTICK (1949)**
Associate Professor of Agronomy.
B.S., Kansas State, 1949; M.S., Oregon State, 1952, Ph.D., 1958.

- WILBERT GAMBLE (1962)**
Assistant Professor of Chemistry, Science Research Institute.
B.S., Wayne S. U., Ph.D., 1960.
- ROBERT LEE GAMBOLD (1961)**
Assistant Football Coach (Instructor).
B.S., Washington State, 1952.
- ROBERT KEITH GANGER (1962)**
County Statistics Specialist (Instructor).
B.S., Oregon State, 1950.
- JOHN CLIFTON GARMAN (1923)**
Associate Professor of Physics.
B.S., Oregon State, 1922; Ph.M., Wisconsin, 1933.
- LEON GAROIAN (1947-56, 1959)**
Marketing Management Specialist (Associate Professor), Federal Cooperative Extension Service.
B.S., California Polytechnic, 1947; M.S., Wisconsin, 1955, Ph.D., 1959.
- JAMES LATHROP GARRARD (1957)**
Assistant Professor of General Engineering.
B.A., College of Puget Sound, 1933; B.A.Ed., Eastern Washington College of Education, 1937; M.A., Washington, 1951, Ph.D., 1956.
- RALPH GAREN, JR. (1950)**
Associate Professor of Horticulture.
B.S., Oregon State, 1950, M.S., 1954; Ph.D., Purdue, 1961.
- CAROLYN LOUISE GARRISON (1961)**
Harney County Extension Agent, Home Economics (Instructor).
B.S., Oregon State, 1961.
- CHESTER ARTHUR GARRISON (1954)**
Assistant Professor of English.
B.A., Dartmouth, 1940; M.A., Columbia, 1946.
- EVRA ALTA GARRISON (1930)**
Assistant Professor Emeritus of Foods and Nutrition.
B.S., Nebraska, 1923; M.A., California, 1930.
- ROBERT LEON GARRISON (1960)**
Instructor in Fisheries; Fishery Biologist, Research Division, Oregon State Game Commission.
B.S., Oregon State, 1959, M.S., 1961.
- JAMES E. GARVEY (1960)**
Assistant Physician, Professor, Student Health Service.
B.S., Creighton, 1930, M.D., 1932.
- JAY SCHOOLING GASHWILER (1954)**
Associate Professor of Fish and Game Management; Wildlife Biologist, U. S. Fish and Wildlife Service.
B.S., Oregon State, 1937; M.S., Maine, 1939.
- ROBERT EUGENE GASKELL (1959)**
Professor of Mathematics.
B.A., Albion, 1933; M.S., Michigan, 1934, Ph.D., 1940.
- DILLARD HERBERT GATES (1962)**
Extension Range Management Specialist (Associate Professor).
B.S., Nebraska, 1952, M.S., 1953; Ph.D., Utah State, 1956.
- DOROTHY GATTON (1940)**
Professor of Clothing, Textiles, and Related Arts.
B.A., Washington, 1925, M.A., 1933.
- CHARLES GERALD GAVIN (1955)**
Union County Extension Agent (Associate Professor).
B.S., Wyoming, 1949.
- BERMAN A. GAWER (1961)**
Assistant Professor of Physical Education.
B.S., Oregon, 1929; M.A., New York University, 1931, Ed.D., 1951.
- EDWARD WAYNE GELLER (1959)**
Assistant Professor of Mechanical Engineering.
B.S., Colorado, 1951; M.S., Mississippi State, 1954.
- LOUIS GUSTAVE GENTNER (1930)**
Professor Emeritus of Entomology, Southern Oregon Experiment Station.
B.S., Oregon State, 1915; M.S., Wisconsin, 1918; Ph.D., Oregon State, 1953.
- DONALD WAYNE GEORGE (1954)**
Assistant Professor of Agronomy; Research Agronomist, Pendleton Experiment Station, U. S. Department of Agriculture.
B.S., Kansas State, 1948, M.S., 1949.
- WALLACE EUGENE GIBBS (1958)**
Registrar (Associate Professor).
B.S., Oregon State, 1950, Ed.M., 1959.
- EVAN KEITH GIBSON (1947)**
Professor of English.
A.B., Seattle Pacific, 1933; M.A., Washington, 1935, Ph.D., 1947.
- DAVID HEGGIE GILBERT (1957)**
Assistant Professor of English.
B.A., College of Pacific, 1956; M.A., Colorado, 1957.
- EARL C. GILBERT (1917)**
Professor Emeritus of Physical Chemistry.
B.S., Hiram College, 1916, M.S., 1917; Ph.D., Chicago, 1922.
- FRANCOIS ARCHIBALD GILFILLAN (1918, 1922-25, 1927)**
Dean Emeritus of the School of Science; Professor of German and of Chemistry.
B.S., Oregon State, 1918, Ph.G., 1918, Ph.C., 1920; Ph.D., Yale, 1921.
- GORDON WAVERLY GILKEY (1947)**
Professor of Art; Head of Department.
B.S., Albany College, 1933; M.F.A., Oregon, 1936; Arts D., Lewis and Clark, (honorary, 1957).
- HELEN MARGARET GILKEY (1908-11, 1918)**
Professor Emeritus of Botany.
B.S., Oregon State, 1907, M.S., 1911; Ph.D., California, 1915. Curator of Herbarium, 1918-51.
- AMORY TINGLE GILL (1926)**
Head Coach of Basketball (Professor).
B.S., Oregon State, 1925.
- HOWARD EDWARD GILLIAM (1962)**
County Extension Agent-at-Large (Instructor).
B.S., Oregon State, 1949.
- CAMPBELL MOORE GILMOUR (1951)**
Professor of Microbiology.
B.S., British Columbia, 1941, M.S., 1945; Ph.D., Wisconsin, 1949.
- WILLIAM RAY GLASS (1956)**
Assistant Professor of Architecture.
B.Arch., Oregon, 1956.

- GEORGE WALTER GLEESON (1928)**
Dean, School of Engineering; Director Engineering Experiment Station; Professor of Chemical Engineering.
B.S., Oregon State, 1928, M.S., 1943, Ch.E., 1936.
- DOUGLAS WILLIAM GLENNIE (1961)**
Professor of Forest Products Chemistry, Forest Research Laboratory.
B.A., University of British Columbia, 1949, M.A., 1951; Ph.D., Washington, 1955.
- RUSSELL HOLCOMB GODARD (1950)**
Assistant Professor of Mathematics.
B.S., Oregon State, 1938; M.A., Iowa, 1939.
- WOLF GOERTZ (1962)**
Instructor in Modern Languages.
B.A., University of British Columbia, 1958, M.A., 1961.
- NORMAN RICHARD GOETZE (1959)**
Farm Crops Specialist (Assistant Professor), Federal Cooperative Extension.
B.S., Oregon State, 1952, M.S., 1955; Ph.D., Purdue, 1960.
- HARRY EARL GOHEEN (1955)**
Professor of Mathematics.
B.A., Stanford, 1936; M.A., 1938, Ph.D., 1940.
- IVAN DELMAR GOLDBERG (1962)**
Post-doctoral Fellow (Assistant Professor) in Microbiology.
A.B., Pennsylvania, 1959; Ph.D., Illinois, 1961.
- FRANK S. GONZALEZ II (1959)**
Instructor in Speech.
B.A., Montana State, 1949, M.A., 1959.
- DELMER MORRISON GOODE (1919)**
Curriculum Consultant; Professor of Higher Education; Editor of Publications.
B.A., Minnesota, 1916; M.A., Oregon State, 1938.
- KENNETH LLEWELLYN GORDON (1927)**
Professor of Zoology.
A.B., Colorado College, 1923; M.A., Missouri, 1925; Ph.D., Cornell, 1936.
- ROBERT LEE GOULDING (1955)**
Assistant Entomologist (Associate Professor), Agricultural Experiment Station.
B.S., Florida, 1946, M.S., 1948; Ph.D., Ohio State, 1955.
- SAMUEL HERMAN GRAF (1908)**
Professor Emeritus of Mechanical Engineering.
B.S., Oregon State, 1907, E.E., 1908, B.S., 1908, M.E., 1909, M.S., 1909.
- CRAWFORD HENDERSON GRAHAM (1961)**
Assistant Professor, Director of Alumni Relations.
B.S. Engr., Oregon State, 1936.
- ROBERT DOUGLAS GRAHAM (1961)**
Associate Professor of Forest Products, Forest Research Laboratory.
B.S., Pennsylvania State, 1941; M.S., Oregon State, 1947.
- PHYLLIS EMOGENE GRANT (1949)**
Assistant Professor of Clothing, Textiles, and Related Arts.
B.S., Minnesota, 1939; M.S., Oregon State, 1950.
- ARTHUR EUGENE GRAVATT (1959, 1962)**
Instructor in Family Life.
B.A., Linfield, 1949; M.A., Oregon, 1951.
- EDWARD HOBART GRAY (1962)**
Senior Chief Quartermaster USN, Instructor in Naval Science.
- IRIS GRAY (1933-42, 1944)**
Associate Professor of Music.
B.M., Cincinnati Conservatory of Music, 1933; M.M., Idaho, 1944.
- JAMES LATIMER GRAY (1949)**
Associate Professor of General Engineering.
B.S., Oregon State, 1948.
- CHARLES RAYMOND GREEN (1960)**
Assistant Professor of Political Science.
A.B., Augustana College, 1957; M.A., Illinois, 1959, Ph.D., 1960.
- CLAUDE LANE GRIFFIN (1962)**
Instructor in Pharmacology.
B.S., University of Kansas City, 1961, M.S., 1962.
- JOHN KEITH GRIMES (1942-44, 1953)**
Polk County Extension Agent (Assistant Professor).
B.S., Oregon State, 1940.
- ROLAND HERBERT GRODER (1950)**
Extension Fruit and Vegetable Marketing Specialist (Associate Professor).
B.S., Maine, 1950; M.S., Cornell, 1960.
- HELMUT JOHANN GROEMER (1957)**
Associate Professor of Mathematics.
Ph.D., University of Innsbruck, 1954.
- JAMES WILLARD GROSHONG (1946, 1950)**
Associate Professor of English.
A.B., Stanford, 1947, Ph.D., 1957.
- ALVIN EUGENE GROSS (1935)**
Associate Professor of Agronomy, Superintendent, Klamath Experiment Station.
B.S., Oregon State, 1932, M.S., 1935.
- LOUIE HENRY GROSS (1943)**
Yamhill County Extension Agent (Associate Professor).
B.S., Oregon State, 1939.
On sabbatical leave 1962-63.
- DAVID HUBERT GROVER (1957)**
Assistant Professor of Speech.
B.S., Colorado State University, 1949; B.S., Merchant Marine Academy, 1950; M.A., Colorado, 1951; Ph.D., Oregon, 1962.
- JANICE ANONA GUMPRECHT (1960)**
Malheur County Extension Agent (Instructor).
B.S., Colorado State University, 1960.
- PAUL JAMES GUNN (1948)**
Associate Professor of Art.
B.S., Pennsylvania State Teachers (Edinboro), 1947; M.F.A., California College of Arts and Crafts, 1948.
- JOHN REGINALD GURTON (1948)**
Lane County Extension Agent, 4-H Club (Assistant Professor).
B.S., Minnesota, 1939.
- JOSEPH ROY HAAG (1927)**
Professor of Chemistry and Animal Nutrition, Agricultural Chemistry.
B.S., Penn State, 1918, M.S., 1923; Ph.D., Minnesota, 1926.

- FRED HAGELSTEIN (1951-53, 1958)
Coos County Extension Agent (Assistant Professor).
B.S., Oregon State, 1951.
- OSCAR NATHANIEL HAGG (1950)
Extension Dairy Marketing Specialist (Associate Professor).
B.S., Oregon State, 1926.
- JOHN ALPHEUS HAISLIP (1958)
Assistant Professor of English.
B.A., Washington, 1950.
- MARVIN REYNOLDS HAITH (1943-44, 1946)
Associate Professor of General Engineering; Personnel and Placement Officer.
B.S., Nebraska, 1928.
- LUCIA HALEY (1921)
Assistant Librarian Emeritus (Associate Professor).
A.B., Washington, 1911; Graduate, Pratt Institute, 1912, B.L.S., 1942.
- FRANCES ANN HALL (1930-58, 1961)
Klamath County Extension Agent, Home Economics (Associate Professor).
B.S., University of Puget Sound, 1925; M.S., Oregon State, 1930.
- JACK VERNON HALL (1954)
Associate Professor of Elementary Education.
B.A., Central Washington, 1944; M.A., Colorado State College, 1947, Ed.D., 1951.
- PAIGE LeROY HALL (1954)
Lane County Extension Agent (Associate Professor).
B.S., Nebraska, 1930.
- WILLIAM ELLIOTT HALL (1947)
Assistant Professor of Agronomy; Superintendent, Sherman Experiment Station.
B.S., Oregon State, 1943, M.S., 1953.
- ALBERT NELSON HALTER (1960)
Associate Professor of Agricultural Economics.
B.S., Iowa State, 1952, M.S., 1953; Ph.D., Michigan State, 1956.
- MARGARET ELIZABETH HAMILTON (1957)
Multnomah County Extension Agent, Home Economics (Assistant Professor).
B.S., Oregon State, 1944.
- CALVIN L. HAMMAR (1963)
Chief Storekeeper USN, Instructor in Naval Science.
- STEVEN BREWER HAMMIT (1962)
SFC, CE, Instructor in Military Science.
- JOHN BENJAMIN HANCOCK (1962)
Lieutenant Colonel, Associate Professor of Military Science, Artillery Branch Chief.
B.A., Texas A & M, 1942.
- EDWARD LEE HANSEN (1958)
Instructor in Fish and Game Management (Klamath Falls).
B.S., Humboldt State, 1953; M.S., Oregon State, 1955.
- ELMER HANSEN (1935)
Professor of Horticulture.
B.S., Oregon State, 1934, M.S., 1935; Ph.D., Chicago, 1946.
- HENRY PAUL HANSEN (1939)
Dean of Graduate School; Professor of Palynology.
Ph.B., Wisconsin, 1930, Ph.M., 1931; Ph.D., Washington, 1937.
- NIELS JOHN HANSEN (1943)
Polk County Extension Agent (Professor).
B.S., Oregon State, 1941.
- PATRICIA ANN HANSON (1962)
Gilliam County Extension Agent, Home Economics (Instructor).
B.A., Humboldt State College, 1956; M.A., Washington State, 1960.
- EDWARD EUGENE HARDIN (1957)
Instructor in Seed Technology; Seed Certification Specialist.
B.S., Washington State, 1951.
- VERA LUCIA HARDING (1962)
Instructor in Modern Languages.
B.A., Catholic University of Rio, Brazil, 1955.
- JOHN ROBERT HARDISON (1944)
Professor of Plant Pathology; U. S. Department of Agriculture.
B.S., Washington State, 1939; M.S., Michigan, 1940, Ph.D., 1942.
- JESSE EDWARD HARMOND (1945)
Professor of Agricultural Engineering; Principal Agricultural Engineer, Head of Small Seed Harvesting and Processing Investigations. U. S. Department of Agriculture.
B.S., Mississippi State, 1932.
- JAMES ARTHUR HARPER (1942)
Professor of Poultry Science.
B.S., Oregon State, 1940; M.S., Penn State, 1942.
- JAMES ROYCE HARR (1957)
Assistant Professor of Veterinary Medicine.
B.S., Utah State, 1954; B.A., Washington State, 1955, D.V.M., 1957; M.S., Oregon State, 1961.
- CHARLES NEWTON HARRIS (1946)
Associate Professor of Speech.
B.S., Idaho, 1940; M.A., Colorado State College, 1945, Ed.D., 1960.
- IRWIN CECIL HARRIS (1945)
Manager of Educational Activities; Associate Professor of Journalism.
B.S., Oregon State, 1941; M.S.J., Northwestern, 1943.
- BARBARA ANN HARRISON (1962)
Baker County Extension Agent, Home Economics (Instructor).
B.A., University of the Pacific, 1961.
- CHARLES ROY HARRISON (1960-61)
Instructor in Pharmacy Administration.
B.S., Oregon State, 1960.
- LESLIE GORDON HARTE (1960)
Chief Storekeeper, USN, Instructor in Naval Science.
- CHARLOTTE TOSHACH HARTER (1960)
Instructor in Economics.
B.A., Wellesley College, 1948, M.A., Stanford, 1958.
- LAFAYETTE GEORGE HARTER, JR. (1960)
Assistant Professor of Economics.
B.A., Antioch College, 1941; M.A., Stanford, 1948, Ph.D., 1960.
- HUGUETTE CLEMENCON HARTLE (1961)
Instructor in Modern Languages.
B.A., Texas, 1958; M.A., Columbia, 1960.
- HENRY HARTMAN (1919-31, 1932)
Professor Emeritus of Horticulture.
B.S., Washington State, 1917; M.S., Iowa State, 1922.

- EDWARD WINSLOW HARVEY (1938)**
Associate Professor of Food Science and Technology; in charge Seafoods Laboratory, Astoria.
B.S., Massachusetts, 1934; M.S., 1937, Ph.D., 1940.
- FRANCES MADELEINE HARVEY (1946)**
Josephine County Extension Agent, Home Economics (Associate Professor).
B.S., Idaho, 1943; M.S., Oklahoma State, 1957.
- MOYLE E. HARWARD (1955)**
Associate Professor of Soils.
B.S., Brigham Young, 1948; M.S., Massachusetts, 1950; Ph.D., North Carolina State, 1952.
- ARNOLD F. HASELEY (1961)**
Marketing Management Specialist (Assistant Professor).
B.S., Cornell, 1954, M.S., 1955.
- DUANE LEROY HATCH (1959)**
Lane County Extension Agent (Assistant Professor).
B.S., Utah State, 1950.
- ERNEST MILLARD HAUSER (1930)**
Malheur County Extension Agent, 4-H Club (Associate Professor).
B.S., Oregon State, 1928.
- BETTY EILEEN HAWTHORNE (1946)**
Professor of Foods and Nutrition.
B.S., Washington, 1941, M.S., 1944; Ph.D., Michigan State, 1954.
- JOE DAVID HAY (1959)**
Morrow County Extension Agent (Instructor).
B.S., Oregon State, 1958.
- ROBERT E. HAZEL (1962 fall only)**
Assistant Professor of English.
A.S., Ashland Junior College, 1939; B.A., George Washington, 1946; M.A., Johns Hopkins, 1951.
- CHARLES OSWALD HEATH (1946)**
Professor of Engineering Materials.
B.S. (in M.E.), Cal Tech, 1936; M.S., Rutgers, 1944.
- KENNETH WAYNE HEDBERG (1956)**
Associate Professor of Chemistry.
B.S., Oregon State, 1943; Ph.D., Cal Tech, 1948.
On sabbatical leave 1962-63.
- DONALD WARD HEDRICK (1951)**
Professor of Range Management.
B.S., Washington State, 1939; M.S., California, 1949; Ph.D., Texas A and M, 1951.
- OLIVER HARRY HEINTZELMAN (1949)**
Associate Professor of Geography; Associate Professor of Natural Resources.
B.A., Central Washington, 1940; M.A., Washington, 1948, Ph.D., 1952.
- CHARLES RANKIN HEISLER (1957)**
Assistant Professor of Chemistry, Agricultural Chemistry.
B.S., Monmouth College, 1948; Ph.D., Chicago, 1957.
- CHARLES ALBERT HENDERSON (1922)**
Klamath County Extension Agent Emeritus (Professor).
B.S., Oregon State, 1916.
- ROBERT WESLEY HENDERSON (1938-41, 1946)**
Assistant Director (Professor), Agricultural Experiment Station.
B.S., Oregon State, 1938; Ph.D., Minnesota, 1950.
- BERNEITA HENDRIX (1962)**
Assistant Professor of Home Economics Education.
B.S., New Mexico State, 1941; M.A., Teachers College, Columbia, 1955.
- ELIZABETH ARTIS HENLEY (1959)**
Instructor in English.
A.B., Washington, 1934, M.A., 1938.
- DONALD RAYMOND HENRY (1955)**
Assistant Professor of Speech.
B.A., Iowa State Teachers, 1947; M.A., Washington, 1953.
On sabbatical leave, 1962-63.
- ELZIE VANCE HERBERT (1920)**
Order Librarian Emeritus (Assistant Professor).
- FREYA FRIEDERIKE HERMANN (1956-58, 1962)**
Instructor in Pharmacy.
B.S., University of Munich, 1949; B.S., Oregon State, 1959.
- RICHARD KARL HERMANN (1961)**
Assistant Professor of Forest Ecology, Forest Research Laboratory.
B.S., Ludwig-Maximilian University, Munich, 1951; M.F., Yale, 1956; Ph.D., Oregon State, 1960.
- JACOB ABRAHAM HERRMANN (1959)**
Instructor in Mathematics.
C.E., Cornell, 1930.
- BERTHA EMMA HERSE (1910-12, 1916-22, 1924)**
Emeritus Reference Librarian (Associate Professor), Library.
B.S., Oregon State, 1910; B.S., 1928; B.L.S., New York State Library School, 1924.
- JOHN CLARENCE HESKETH (1951)**
Baker County Extension Agent (Associate Professor).
B.S., Oregon State, 1951; M.S., Wisconsin, 1960.
- RAY STORLA HEWITT (1953)**
Associate Professor of English.
A.B., Oregon, 1941, M.A., 1947; Ph.D., California, 1951.
- HUGH JAMES HICKERSON (1959)**
Yamhill County Extension Agent (Assistant Professor).
B.S., Oregon State, 1952.
- RICHARD MORGAN HIGHSMITH, JR. (1947)**
Professor of Natural Resources, Professor of Geography.
B.A., Central Washington, 1941; M.A., Washington, 1946, Ph.D., 1950.
- IDA CATHERINE HILBERS (1940)**
Assistant Catalog Librarian (Assistant Professor), Library.
B.A., Arizona, 1922, Certificate of Librarianship, 1928; M.A. (Lib. Sc.), California, 1931.

- EMERY VERNON HILDEBRANDT (1953)**
Assistant Professor of Speech.
B.S., Oregon State, 1950; M.A., Penn State, 1956.
- RAYMOND BARTLETT HILE (1956)**
Extension Agricultural Statistician (Professor).
B.S., Nebraska, 1932.
- DONALD DAVID HILL (1927)**
Professor Emeritus of Agronomy.
B.S., Oregon State, 1925; M.S., Kansas State, 1927; Ph.D., Cornell, 1936.
- HERSHELL ALBERT HILL (1959)**
Marketing Statistician (Instructor), Federal Cooperative Extension Service.
B.S., Oklahoma State, 1949.
- HOWARD HERBERT HILLEMANN (1946)**
Professor of Zoology.
B.S., Marquette, 1933; M.A., Wisconsin, 1939, Ph.D., 1942.
- IVY ELIZABETH HILTY (1959)**
Jefferson County Extension Agent, Home Economics (Assistant Professor).
B.S., Panhandle Agricultural Mechanical College, 1937.
- ROBERT C. HINZ (1950)**
Assistant Professor of Radio and TV Education. Director of Operations, News Consultant (KOAC AM-TV), General Extension Division.
B.A., Oregon, 1950.
- GOPALAKRISHNA V. HIREMACALUR (1961)**
Professor of Electrical Engineering.
B.Sc., Mysore, 1932, B.E., 1937, A.I.I. Sc., 1954, Dr. Eng., 1958.
- FREDERICK LEE HISAW, JR. (1958)**
Associate Professor of Zoology.
B.S. (Agr.), Missouri, 1950, M.S., 1952; Ph.D., Harvard, 1955.
- PHILIP WEN-JEN HO (1953)**
Assistant Catalog Librarian (Assistant Professor), Library.
B.A., Yenching University (China), 1939, M.A., 1941; M.L., Washington, 1953.
- DATA MAXINE HOCHHALTER (1959)**
Jackson County Extension Agent, Home Economics (Assistant Professor).
B.S., North Dakota Agricultural College, 1940; M.A., Washington State, 1954.
- WYMAN DELOS HOEYE (1959)**
Assistant Professor of Production Technology.
B.S., Oregon State, 1951, M.S., 1958.
- ELBERT NEIL HOFFMAN (1942)**
Associate Professor of Agronomy, Superintendent, Malheur Experiment Station.
B.S., Oregon State, 1939.
- GLENN WILLIS HOLCOMB (1920)**
Head of Department of Civil Engineering; Professor of Structural Engineering.
B.S., Michigan, 1919; M.S., Oregon State, 1931.
- HAROLD FULLER HOLLANDS (1948)**
Professor of Agricultural Economics.
B.S., Minnesota, 1923, Ph.D., 1939.
- MIRIAM MACPHERSON HOLMAN (1944-1950, 1962, fall term only)**
Assistant Professor of Institution Management.
B.S., Oregon State, 1937; M.A., Teacher's College, Columbia, 1939.
- ROBERT EDWARD HOLMES (1962)**
Instructor in Chemistry.
B.S., St. Mary's, 1958.
- MAURICE PAUL HOLSINGER (1962)**
Instructor in History.
A.B., Duke, 1959; M.A., Denver, 1960, Ph.D., 1962.
- JOHN GORDON HOOD (1945)**
Assistant Director, Federal Cooperative Extension Service (Professor).
B.S., Oregon State, 1935; M.S., Michigan State University, 1958.
- EDWARD FRANK HOOVEN (1961)**
Assistant Professor of Forest Mammalogy, Forest Research Laboratory.
B.S., Washington State, 1948; M.S., Oregon State, 1958.
- RICHARD JOHANN HOPEMAN (1960)**
Assistant Professor of Business Administration.
B.S., Oregon State, 1958; M.B.A., Washington, 1959, D.B.A., 1962.
- CHESTER ELLSWORTH HORNER (1951)**
Associate Professor of Plant Pathology; Pathologist, U. S. Department of Agriculture.
B.A., Walla Walla, 1950; Ph.D., Oregon State, 1954.
- THEODORE ROOSEVELT HORNING (1949)**
Associate Professor of Agricultural Engineering; Agricultural Engineer, Pendleton Experiment Station, U. S. Department of Agriculture.
B.S., Idaho, 1931, M.S., 1933.
- ELVERA CHARLOTTE HORRELL (1942)**
Extension Agricultural Economist, Statistics (Assistant Professor).
- HOWARD FRANKLIN HORTON (1958)**
Instructor in Fish and Game Management.
B.S., California Polytechnic, 1953; M.S., Oregon State, 1955.
- VIRGINIA THELMA HOUTCHENS (1958)**
Lane County Extension Agent, Home Economics (Associate Professor).
B.S., Washington State, 1933, M.A., 1947.
- W.H.N. HOUX (1963)**
Research Associate (Instructor), Science Research Institute and Department of Entomology.
Ph.D., Utrecht, 1960.
- CLARENCE WARREN HOVLAND (1949)**
Professor of Philosophy, Professor of Religion; Chairman of Departments.
B.A., Lawrence College, 1940; B.D., Yale, 1943, Ph.D., 1950.
- ROBERT LEE HOWARD (1958)**
Research Associate, Science Research Institute, Instructor in Biochemistry.
B.S., Oregon State, 1958.
- SHIRLEY JEAN HOWARD (1959)**
Director of Women's Programs KOAC AM-TV, General Extension Division (Instructor).
B.S., Oregon State, 1951.
- HERBERT BADOLLET HOWELL (1921)**
Professor, Superintendent, John Jacob Astor Experiment Station.
B.S., Oregon State, 1916.
- GRACE CHENG-TSENG HSU (1962)**
Reserve Book Librarian (Instructor).
B.A., National Tai Wan University, 1959; M.S., Kansas State Teachers College, 1962.

- LYLE TURNER HUBBARD (1961)**
 Research Associate (Instructor), Oceanography.
 B.A., Linfield College, 1958.
- JAMES RUSSELL HUBER (1947)**
 Union County Extension Agent, 4-H Club (Associate Professor).
 B.S., Utah State, 1946, M.S., 1947.
- MILON GEORGE HUBER (1945)**
 Extension Agricultural Engineering Specialist (Associate Professor).
 B.S., (Agric.), Wisconsin, 1929, B.S., M.E., 1932.
- ARTHUR DOUGLAS HUGHES (1938)**
 Professor of Mechanical Engineering.
 B.S., Washington State, 1932, M.S., 1932, M.E., 1953.
- EDWIN JOSEPH HUGHES (1962)**
 Assistant Professor of Statistics.
 B.S., Loyola University of the South, 1949;
 M.S., Tulane, 1951; S.M., Harvard, 1956;
 Ph.D., Iowa State, 1962.
- MARY BOWMAN HULL (1910)**
 Curator Emeritus, Horner Museum.
- DONALD GLEN HUMPHREY (1954-55, 1957)**
 Professor of General Science, Chairman of Department.
 B.S., Iowa, 1949; M.S., Washington, 1950;
 Ph.D., Oregon State, 1956.
- DONALD R. HUNT (1955)**
 Assistant Librarian, Head of Readers Services (Associate Professor) Library.
 B.A., Colorado, 1950, M.A., 1951; A.M. (Lib. Sc.), Michigan, 1954.
- FLORENCE LOUISE HUPPRICH (1937)**
 Associate Professor of Physical Education for Women.
 B.S., Wisconsin, 1923, M.A., 1926; Ed.D., Oregon, 1949.
- HARVEY MYRON HUTCHINGS (1958)**
 Assistant Professor of Agricultural Economics.
 B.S., New Mexico State, 1951; Ph.D., Oregon State, 1962.
- BURTON SEYMOUR HUTTON (1935-43, 1948)**
 State 4-H Club Leader (Professor).
 B.S., Oregon State, 1927.
- JOSEPH ILIKA (1961)**
 Assistant Professor of Education.
 B.S., Northern Illinois State University, 1943; M.A., George Peabody College, 1948.
- IDA INGALLS (1952)**
 Professor and Acting Head of Department of Clothing, Textiles, and Related Arts.
 B.A., Iowa, 1921; M.A., Columbia, 1924.
- JOHN JERRY INSKEEP (1926)**
 County Extension Agent Emeritus Clackamas County (Professor).
 B.S. (Agr.), Purdue, 1921; M.S., Oregon State, 1943.
- HELGE IRGENS-MOLLER (1957)**
 Assistant Professor of Forest Genetics.
 B.S., Royal Veterinary and Agricultural College, Denmark, 1949; Ph.D., Oregon State, 1958.
- JANE CATHERINE IRVING (1955)**
 Marion County Extension Agent, 4-H Club (Assistant Professor).
 B.S., Oregon State, 1927.
- RALPH ALEXANDER JACK (1962)**
 Professor of Physics.
 A.B., Pacific University, 1922; M.A., California, 1924.
- EDWIN RUSSELL JACKMAN (1920)**
 Extension Specialist in Crops and Range Management (Professor Emeritus of Agronomy).
 B.S., Oregon State, 1920.
- MARIE HULL JACKSON (1926-35, 1942)**
 Catalog Librarian (Associate Professor), Library.
 B.A., Oregon, 1925; B.S. (Lib. Sc.), Washington, 1926.
- STONEWALL ANDREW JACKSON (1939)**
 Benton County Extension Agent (Professor).
 B.S., Oregon State, 1937.
- THOMAS LLOYD JACKSON (1952)**
 Professor of Soils.
 B.S., Washington State, 1943, M.S., 1948, Ph.D., 1952.
- ALEX JULIUS JAENICKE (1956)**
 Associate Professor Emeritus of Forest Management.
 B.S., Pennsylvania State, 1912.
- DEMETRIOS GEORGE JAMESON (1950)**
 Associate Professor of Art.
 B.F.A., Washington University, 1949;
 M.F.A., Illinois, 1950.
- KATE WETZEL JAMESON (1923)**
 Dean of Women Emeritus.
 A.B., Ohio Wesleyan, 1903, A.M., 1910;
 A.M., Wisconsin, 1914, Ph.D., 1916.
- JANICE EILEEN JAROSS (1962)**
 Josephine County Extension Agent, 4-H Club and Home Economics (Instructor).
 B.S., Oregon State, 1962.
- ALBERT OTTO JARVI (1960)**
 Associate Professor of General Engineering.
 B.S., Washington, 1938; M.S., MIT, 1939.
- DWIGHT SMITHSON JEFFERS (1957)**
 Professor Emeritus of Forest Management.
 A.B., Illinois Wesleyan, 1906; M.F., Yale, 1911, Ph.D., 1935. Dean and Professor Emeritus, College of Forestry, Idaho.
- WALTER JOHN JENDRZEJEWSKI (1938)**
 Klamath County Extension Agent (Associate Professor).
 B.S., Oregon State, 1938.
- GEORGE HERRICK JENKINS (1927)**
 Coos County Extension Agent (Professor).
 B.S., Oregon State, 1926.
- HAROLD DAVID JENKINS (1944)**
 Professor of English.
 B.A., Kansas, 1929, M.A., 1931; Ph.D., Yale, 1943.
- CLYDE MARCUS JENSEN (1957)**
 Assistant Professor of General Engineering.
 B.S., United States Naval Academy, 1925.
- DONALD RAY JENSEN (1962)**
 Assistant Professor of Statistics.
 B.S., Tennessee, 1955; M.S., Iowa State, 1957, Ph.D., 1962.
- HAROLD JAMES JENSEN (1950)**
 Associate Professor of Nematology, Botany and Plant Pathology.
 B.S., California, 1947, Ph.D., 1950.

- JAMES H. JENSEN (1961)**
President; Professor of Botany.
B.S., Nebraska, 1928, M.A., 1930; Ph.D., Wisconsin, 1935.
- JOHN GRANVILLE JENSEN (1946)**
Professor of Natural Resources; Chairman of Department; Professor of Geography.
A.B., Western Washington, 1939; M.A., Clark, 1942, Ph.D., 1946.
- LELAND CHRISTIAN JENSEN (1955)**
Assistant Professor of Electrical Engineering.
B.S., Oregon State, 1954.
- LOUISA AMES JENSEN (1938)**
Associate Professor of Seed Technology.
B.S., Colorado State University, 1933.
- NORMAN RICHARD JENSEN (1962)**
Assistant Professor, Consultant, Audio-Visual Services, General Extension Division.
B.S., Brigham Young, 1951; M.Ed., Oregon, 1957.
- DUANE PAUL JOHNSON (1959)**
Multnomah County Extension Agent, 4-H Club (Instructor).
B.S., Iowa State, 1959.
- EVELYN JOANN JOHNSON (1961)**
Lane County Extension Agent, Home Economics (Instructor).
B.S., Minnesota, 1960.
- JAMES WENDELL JOHNSON (1961)**
Assistant Professor of Forest Products, Forest Research Laboratory.
B.S., Idaho, 1949; M.S., Oregon State, 1950.
- LA VERNE M. JOHNSON (1962)**
Assistant Professor of Business Administration.
B.S., Oregon, 1951, LL.B., 1952.
- LEONE MILDRED JOHNSON (1948)**
Program Consultant (Assistant Professor), Memorial Union.
B.S., North Dakota State, 1926; M.S., Oregon State, 1948.
- LINWOOD EUGENE JOHNSON (1959)**
Assistant Professor of Mechanical Engineering.
B.S., Oregon State, 1954, M.S., 1955.
- MALCOLM JULIUS JOHNSON (1948)**
Assistant Professor of Agronomy, Superintendent, Central Oregon Experiment Station.
B.S., Oregon State, 1941, M.S., 1954; Ph.D., Purdue, 1961.
- MARTIN FRED JOHNSON (1943)**
Assistant Professor Emeritus of Industrial Arts.
- MAXINE ELLEN JOHNSON (1962)**
Douglas County Extension Agent, 4-H Club (Instructor).
B.S., Linfield College, 1962.
- VICTOR WALDEMAR JOHNSON (1928)**
Umatilla County Extension Agent (Professor).
B.S., Oregon State, 1928.
- ALBERTA BUIS JOHNSTON (1963)**
Extension Home Management Specialist. (Assistant Professor).
B.S., Nebraska, 1943; M.S., Kansas State, 1957.
- BETTY SUE JOINER (1956)**
Instructor in Foods.
B.S., Oregon State, 1941; M.S., Cornell, 1943.
- HILDA MEIUS JONES (1947)**
Assistant Professor of Secretarial Science.
B.S.S., New York, 1939, M.A., 1940.
- IDWAL RALPH JONES (1925)**
Professor of Animal Science.
B.S., Penn State, 1920; M.S., Rutgers, 1921; Ph.D., Minnesota, 1925.
- LEO EDWARD JONES (1950)**
Associate Professor of Botany.
A.B., Chico State, 1940; Ph.D., Oregon State, 1950.
- ROBERT WELLS JONES (1962)**
Instructor in English.
A.B., Nebraska State Teachers, 1953; M.A., Stanford, 1959.
- SIDNEY CARROLL JONES (1930)**
Professor of Entomology.
B.S., Oregon State, 1926; M.S., Iowa State, 1928.
- DONALD M. JORVE (1961)**
Assistant Serials Librarian, Instructor.
B.A., Concordia College, 1952; M.S., Wisconsin, 1955; M.L.S., California, 1957.
- EARLE FRED JOSSY (1943)**
Jackson County Extension Agent (Associate Professor).
B.S., Oregon State, 1938.
- ETTA WESTENHOUSE JUDD (1955)**
Assistant Reference Librarian (Assistant Professor), Library.
B.A., Willamette, 1932; B.S. (Lib. Sc.), Illinois, 1935.
- ANAITA SHELKOVNIKOVA JURGENSON (1946)**
Associate Professor of Modern Languages.
A.B. French College, Alexandre Institute, St. Petersburg, 1915.
- PHILIP BLAINE KALAR, SR. (1951)**
Associate Professor of Radio and TV Education, Director of Music (KOAC AM-TV), General Extension Division.
Mus.B., Columbia School of Music, 1926; Ed.M., Oregon State, 1958.
- RUDOLPH MARTIN KALLANDER (1961)**
Assistant Director Agricultural Experiment Station; Administrator Forest Research Laboratory; Professor.
B.S., Oregon State, 1940, M.F., 1953.
- RUDOLPH KANGUR (1961)**
Assistant Professor of Forest Management, Forest Research Laboratory.
B.S., State University of Tartu (Estonia), 1930, M.F., 1934.
- ANITA ARLENE KANZLER (1962)**
Washington County Extension Agent, 4-H Club (Instructor).
B.S. in Home Economics, Washington State, 1960.
- EDWARD LYNN KAPLAN (1961)**
Associate Professor of Mathematics.
B.S., Carnegie Institute of Tech., 1941; M.A., Princeton, 1950, Ph.D., 1951.
- ROY SERVAIS KEENE (1947)**
Director of Intercollegiate Athletics (Professor).
B.S., Oregon State, 1921.
- LORA IVES KELTS (1944)**
Agriculture-Forestry Librarian (Assistant Professor).
B.A., California (at Los Angeles), 1941; Certificate of Librarianship, California, 1942.

- ROBERT FERNALD KENISTON (1946)
Professor of Forest Management.
B.A., Nebraska, 1929; B.S., California,
1937, M.S., 1941; D. For., Yale, 1962.
- DAVID HONORE KENNEDY (1922)
County Agent Emeritus, Tillamook County
(Associate Professor).
B.S., Oregon State, 1921.
- WALTER HERBERT KENNICK (1959)
Assistant Professor of Animal Science.
B.S., Clemson College, 1948; M.S., Oregon
State, 1958, Ph.D., 1959.
- JOE KENT KERBY (1962)
Assistant Professor of Business Administra-
tion.
B.S., Brigham Young, 1959; M.B.A., North-
western, 1960.
- DAVID EMMET KERLEY (1962, winter term)
Instructor in Zoology.
B.S., Oregon State, 1958, M.S., 1962.
- CLYDE KERNEK (1955)
Surgical Consultant, Student Health Service
(Professor).
B.S., Oklahoma, 1935, M.D., 1937.
- HAROLD EDWARD KERR (1960)
Crook County Extension Agent (Instructor).
B.S., Oregon State, 1957.
- JOHN LORD KICE (1960)
Associate Professor of Chemistry.
A.B., Harvard, 1950, M.A., 1953, Ph.D.,
1954.
- JOHN A. KIESOW (1957)
Lake County Extension Agent (Assistant Pro-
fessor).
B.S., Oregon State, 1954.
- JOHN GEORGE KILIAN (1955)
Associate Professor of Veterinary Medicine.
D.V.M., Iowa State, 1950.
- ARTHUR SOLOMON KING (1929)
Extension Conservation Specialist (Professor).
B.S., Oregon State, 1928, M.S., 1930.
- DAVID BURNETT KING (1962)
Assistant Professor of History.
B.A., Hamilton, 1951; M.A., Rutgers, 1955;
Ph.D., Cornell, 1962.
- ROGER EDWARD KING (1954)
Assistant Professor of English.
A.B., Colorado State College, 1950, M.A.,
1954.
On sabbatical leave 1962-63.
- TSSO E. KING (1950)
Professor of Chemistry; Assistant Director of
Science Research Institute.
B.S., National Central University, China,
1935; M.S., Oregon State, 1948, Ph.D.,
1949.
- DALE EARL KIRK (1942)
Associate Professor of Agricultural Engineer-
ing.
B.S., Oregon State, 1942; M.S., Michigan
State, 1954.
- LESTER ALLEN KIRKENDALL (1949)
Professor of Family Life.
B.S., Kansas State, 1928; M.A., Columbia,
1931, Ph.D., 1937.
- WILLIAM JOHN KIRKHAM (1929)
Professor of Mathematics.
A.B., Indiana, 1927, A.M., 1928, Ph.D.,
1935.
- ESTHER IDA KIRMIS (1958)
Morrow County Extension Agent, Home Eco-
nomics (Assistant Professor).
B.S., North Dakota Agricultural College,
1958.
- ERNEST JOHN KIRSCH (1946)
Gilliam County Extension Agent (Associate
Professor).
B.S., Oregon State, 1940; M.S., Purdue,
1942.
- GLENN ARTHUR KLEIN (1952)
Acting State 4-H Extension Agent (Assistant
Professor).
B.S., Oregon State, 1951; M.A., University
of Maryland, 1962.
- LEONARD MARTIN KLEIN (1939)
Associate Professor of Agricultural Engineer-
ing; Agricultural Engineer; U. S. Department
of Agriculture.
B.S., Oregon State, 1938.
- RAY HENRY KIEWER (1958)
Instructor in Animal Science.
B.S., California State Polytech, 1957;
M.S., Oregon State, 1960.
On leave 1962-63.
- WALTER MARK KIEWER (1961)
Assistant Professor (Post Doctoral) in Botany
and Plant Pathology.
B.S., California State Polytechnic College,
1955; M.S., Cornell, 1958, Ph.D., 1961.
- J. GILBERT KNAPP (1960)
Instructor in Music.
B.S., Bradley University, 1952; M.M.,
Lewis and Clark College, 1961.
- STUART EDWARD KNAPP (1959)
Associate Professor of Veterinary Parasitology.
B.S., Pacific University, 1950, M.S., 1952;
M.S., Idaho, 1953; Ph.D., Kansas State,
1958.
- ROBERT PETER KNOTT (1955)
Assistant Professor of Pharmacy.
B.S., Union University, 1951; M.S., Pur-
due, 1953; Ph.D., Oregon State, 1961.
- ELLIS GILBERT KNOX (1954)
Associate Professor of Soils.
B.S., Illinois, 1949, M.S., 1950; Ph.D.,
Cornell, 1954.
On sabbatical leave 1962-63.
- JAMES GEORGE KNUDSEN (1949-52, 1953)
Assistant Dean, School of Engineering; in
charge of Engineering Experiment Station;
Professor of Chemical Engineering.
B.S., Alberta, 1943, M.S., 1944; Ph.D.,
Michigan, 1949.
- CHARLOTTE KOFFORD (1960)
Hood River County Extension Agent, Home
Economics (Instructor).
B.S., Oregon State, 1960.
- ORVILLE KOFOID (1947)
Associate Professor of Civil Engineering.
B.S., Oregon State, 1932; M.S., Iowa, 1940.
- AGNES KOLSHORN (1929)
Extension Nutrition Specialist (Professor
Emeritus).
B.S., Oklahoma State, 1913; B.S., Columbia,
1918; M.A., Denver, 1919.
- ROBERT FRANK KOONTZ (1956)
Instructor in Entomology.
B.S., Black Hills Teachers College, 1946;
M.S., Northwestern, 1950.

- GERALD EARL KORZAN (1949)**
Professor of Agricultural Economics.
B.S., South Dakota State, 1940; M.A., Minnesota, 1948, Ph.D., 1950.
- WILLIAM ARTHUR KOSKI (1950-58, 1959)**
Associate Professor of Physical Education.
B.S., Oregon State, 1949; M.S., Michigan, 1950; Ed.D., Oregon State, 1954; M.P.H., California, 1959.
- CHARLES JAMES KOZLIK (1961)**
Instructor in Forest Products, Forest Research Laboratory.
B.A., Doane College, 1952; M.F., Duke, 1957.
- LAWRENCE HARVEY KOZOWSKI, JR. (1960)**
Technical Sergeant, Instructor in Air Science.
- WALTER CARL KRAFT (1950)**
Professor of Modern Languages; Chairman of Department.
B.A., Oregon, 1938, M.A., 1941; Ph.D., California, 1950.
- ROBERT LEE KRAHMER (1962)**
Assistant Professor of Timber Mechanics, Forest Research Laboratory.
B.S., Oregon State, 1958, M.S., 1960; Ph.D., New York State, 1962.
- GERALD WILLIAM KRANTZ (1955)**
Associate Professor of Entomology.
B.S., Pittsburgh, 1951; Ph.D., Cornell, 1955.
- CHARLES ROBERT KRATZ (1962)**
Instructor in English.
A.B., Fresno State, 1959.
- CHARLES ERNST KREMER (1958)**
Professor, Director of Student Health Service.
M.D., Harvard Medical School, 1929.
- WARREN ERVIND KRONSTAD (1959)**
Instructor in Agronomy.
B.S., Washington State, 1957, M.S., 1959.
- HUGO MARTIN KRUEGER (1948)**
Professor of Animal Physiology.
A.B., Denver, 1924, M.A., 1926; Ph.D., Michigan, 1930.
On leave of absence 1960-63.
- JAMES HARRY KRUEGER (1961)**
Assistant Professor of Chemistry.
B.S., Wisconsin, 1958; Ph.D., California, 1961.
- JAMES THEODORE KRYGIER (1954)**
Assistant Professor of Forest Management.
B.S., Utah State, 1952, M.S., 1955.
- FEDOR I. KUDRJAVCEV (1961)**
Assistant Professor of Forest Management, Forest Research Laboratory.
B.S., Seminarium Charkov, Russia, 1918; M.S., University of Prague, 1928.
- LEE WALLACE KUHN (1946)**
Associate Professor of Game Management.
B.S., Iowa State, 1940; M.S., Oregon State, 1942.
- NORMAN FREDERICK KUJALA (1960)**
Research Associate (Instructor), Oceanography.
B.S., Oregon State, 1959.
- MARION LAWRENCE KUMLER (1961)**
Instructor in Botany.
B.A., Asbury College, 1936; S.T.B., Boston, 1939; B.S., Oregon State, 1941, M.S., 1959.
- ROBERT HENRY KUNESH (1961)**
Instructor in Forest Products, Forest Research Laboratory.
B.S.F., Michigan, 1952, B.S. (W.T.), 1958, M.W.T., 1960.
- EDITH CARTER KUNEY (1910-15, 1925)**
Associate Professor Emeritus of Modern Languages.
A.B., Willamette, 1909; A.M., Stanford, 1925.
- ERVIN FREDERICK KURTH (1945)**
Professor of Chemistry; Professor (Chemistry), Science Research Institute.
B.S., Wisconsin, 1927, M.S., 1929, Ph.D., 1933.
- GEORGE BRADFORD LABAUN (1958)**
Assistant Professor of Production Technology.
B.S., Oregon State, 1958, M.S., 1960.
- HARRY BERT LAGERSTEDT (1957)**
Assistant Professor of Horticulture.
B.S., Oregon State, 1954, M.S., 1957.
- ADELAIDE VALETA LAKE (1939)**
Associate Professor of Journalism.
B.A., Oregon, 1920; M.A., Oregon State, 1942.
- JOHN HERBERT LANDERS, JR. (1950)**
Extension Animal Husbandry Specialist (Associate Professor).
B.S., Missouri, 1942, M.S., 1950.
- ANDREW S. LANDFORCE (1946)**
Extension Wildlife Management Specialist (Associate Professor).
B.S., Oregon State, 1942.
- DONALD CLELL LANDON (1960)**
Colonel, Professor of Military Science.
B.S., Kansas State, 1934.
- WILLIAM MARTIN LANGAN (1935)**
Agricultural Student Personnel Adviser (Associate Professor).
B.S., Oregon State, 1945.
- REUBEN DONALD LANGMO (1948)**
Assistant Professor (Industrial Engineer) Agricultural Economics.
B.S., Oregon State, 1943, B.S., 1950; M.S., U.C.L.A., 1959.
- CLAIR VAN NORMAN LANGTON (1928)**
Director of the Division of Physical Education; Professor of Physical Education; Professor of Hygiene.
B.S., Michigan, 1923, M.S., 1925, Dr. P.H., 1928; Ed.D., Oregon, 1938; LL.D., Eastern Michigan, 1961.
- LLOYD QUENDERBILT LARSE (1940)**
Professor of Business Education and Secretarial Science.
B.S., Oklahoma State, 1928; Ed.M., Oklahoma, 1935; D.Ed., Oregon, 1954.
- MILTON BYRD LARSON (1952)**
Associate Professor of Mechanical Engineering.
B.S., Oregon State, 1950; M.Eng., Yale, 1951; M.S., Oregon State, 1955; Ph.D., Stanford, 1961.

- JOHN DANIEL LATTIN (1955)**
Assistant Professor of Entomology; Curator of Insect Collection.
B.S., Iowa State, 1950; M.A., Kansas, 1951.
- DENIS PETER LAVENDER (1961)**
Assistant Professor of Forest Physiology. Forest Research Laboratory.
B.S., Washington, 1949; M.S., Oregon State, 1958; Ph.D., Oregon State, 1962.
- DUNCAN KENNETH LAW (1944)**
Assistant Professor of Food Science and Technology; Seafoods Laboratory, Astoria.
B.S., Oregon State, 1944.
- MARGARET LUCILLE LAWRENCE (1945)**
Assistant Professor of English.
B.A., Iowa, 1933.
- DELL PATRICK LEABO (1962)**
Instructor in Electrical Engineering.
B.S., Oregon State, 1961.
- CHARLES MORLEY LEACH (1950)**
Associate Professor of Plant Pathology.
B.S., Queens University (Belfast, Ireland), 1949; B.Agril., 1950; Ph.D., Oregon State, 1956.
On sabbatical leave until August 31, 1963.
- GENE MAURICE LEAR (1939)**
Associate Director, Federal Cooperative Extension Service (Professor).
B.S., Oregon State, 1938; M.P.A., Harvard, 1951.
- MARIE LEDBETTER (1946)**
Associate Professor of Clothing, Textiles, and Related Arts.
B.A., Willamette, 1934; M.S., Oregon State, 1950.
- SYLVIA LEE (1952)**
Curry County Extension Agent, Home Economics (Assistant Professor).
B.S., Washington State, 1927.
- WILLIAM ORVID LEE (1956)**
Instructor in Agronomy; Research Agronomist, U. S. Department of Agriculture.
B.S., Utah State, 1950, M.S., 1954.
- ALBERT LEWIS LEELAND (1954)**
Associate Professor of Elementary Education.
A.B., Colorado State College, 1947, M.A., 1949; Ed.D., Columbia, 1952.
- JOHN ALVAN LEFFEL (1962)**
Yamhill County Agent (Instructor).
B.S., Ag. Ed., Oregon State, 1955.
- WILLIAM FREDRICK LEHMANN (1961)**
Instructor in Forest Products, Forest Research Laboratory.
B.S., Washington State, 1958; M.S., North Carolina State, 1960.
- JEROME LLOYD LE MASTER (1928)**
Professor of Business Administration.
LL.B., Illinois, 1923; Cert d'A en Droit Civile, Bordeaux, 1924; M.A., Colorado, 1925.
- BERLAN LEMON (1959)**
Head Counselor School of Education; Assistant Professor of Education.
B.S. (Education), Oregon State, 1941; M.S. (Psychology), Oregon, 1948.
- ERWIN BERTRAN LEMON (1911)**
Chairman, State Scholarship Commission (Professor).
B.S., Oregon State, 1911.
- DON DAVID LEV (1961)**
Instructor in English.
B.A., San Jose State, 1949.
- JON MOEN LEVERENZ (1960)**
Instructor in Geography, Cartographer.
B.S., Wisconsin, 1956, M.S., 1960.
- GLORIA ALEDORT LEVINE (1960)**
Assistant Professor of Modern Languages.
B.A., Queen's College, 1945; M.A., New Mexico, 1946.
- SHEPARD LEVINE (1954)**
Assistant Professor of Art.
B.A., New Mexico, 1950, M.A., 1951.
- ANN MacGREGOR LEWIS (1961)**
Instructor Physical Education.
B.S., Louisiana State, 1955, M.Ed., 1961.
- EMANUEL RAYMOND LEWIS (1962)**
Assistant Professor of Psychology; Counselor, Counseling Center.
B.A., California, 1951, M.A., 1953; Ph.D., Oregon, 1962.
- MARY EUNICE LEWIS (1928)**
Associate Professor Emeritus of Modern Languages.
B.S., George Fox, 1906; A.B., Penn College (Iowa), 1907; M.A., California, 1918; Ph.D., Washington, 1939.
- JEROME CHING REN LI (1946)**
Professor Emeritus of Statistics.
B.S., Nanking, 1938; Ph.D., Iowa State, 1943.
- LEONARD MORTON LIBBEY (1961)**
Research Associate (Assistant Professor) in Food Science and Technology.
B.V.A., Massachusetts, 1953; M.S., Wisconsin, 1954; Ph.D., Washington State, 1961.
- WILLIAM CARLETON LIGHTFOOT (1958)**
Assistant Professor of Game Management; Game Biologist, Research Division, Oregon State Game Commission.
B.S., Oregon State, 1941.
- JOHN FRANK LIGON, JR. (1946)**
Associate Professor of English; Curriculum coordinator.
A.B., Vanderbilt, 1938; M.A., Peabody, 1940; Ph.D., Washington, 1961.
- SAM TALBERT LIKENS (1951)**
Associate Professor of Chemistry, Agricultural Chemistry. Chemist U. S. Department of Agriculture.
B.S., Oregon State, 1950.
- CHARLENE LIND (1960)**
Multnomah County Extension Agent, 4-H Club (Assistant Professor).
B.S., Utah State, 1955; M.A., Maryland, 1961.
- RICHARD FOREST LINK (1955)**
Associate Professor of Statistics.
B.S., Oregon, 1948, M.A., 1949; M.A., Princeton, 1951, Ph.D., 1953.
- EARL MILO LITWILLER (1942)**
Professor Emeritus of Food Science and Technology.
B.S., Kansas State, 1924, M.S., 1926; Ph.D., Oregon State, 1944.
- HAROLD M. LIVINGSTON (1946)**
Professor of Speech.
A.B., Illinois Wesleyan, 1936; M.A., Colorado, 1941; Ph.D., Southern California, 1961.

- ALBERT VICTOR LOGAN (1946)**
Professor of Chemistry.
B.A., Willamette, 1924; M.S., Massachusetts Institute of Technology, 1928, Ph.D., 1938.
- DAVID ROBERT LONG (1947)**
Associate Professor of Agricultural Engineering.
B.S., Oregon State, 1947, M.S., 1951, B.S. (Agricultural Engineering), 1959.
- GERALD RICHARD LONG (1961)**
Assistant Football Coach (Instructor).
B.S., Oregon State, 1950.
- JAY BASS LONG (1940)**
Associate Professor of Fish and Game Management.
B.S., Oregon State, 1939, M.S., 1948.
- WALLACE EDWIN LONGMIRE (1961)**
Instructor in Pharmacology.
B.A. & B.S., Oregon State, 1955.
- ARVID TURNER LONSETH (1948)**
Professor of Mathematics, Chairman of Department.
A.B., Stanford, 1935; Ph.D., California, 1939.
- WALTER DAVID LOOMIS (1953)**
Associate Professor of Chemistry, Science Research Institute.
B.S., Iowa State, 1948; Ph.D., California, 1953.
- JAMES CHESTER LOONEY (1957)**
Assistant Professor of Electrical Engineering.
B.S., Oregon State, 1954, M.S., 1960.
- CATHERINE LOUGHLIN (1962)**
Assistant Professor of Family Life.
B.S., Oregon State, 1933; M.A., Columbia, 1941.
- LEONARD CARL LOVE (1955)**
Instructor in Production Technology.
B.S., Oregon State, 1955.
- PLUMER PORTER LOWE (1956)**
Sergeant, Armorer; Instructor in Military Science.
- WILLIAM PRESCOTT LOWRY (1961)**
Assistant Professor of Forest Meteorology, Forest Research Laboratory.
A.B., University of Cincinnati, 1950; M.S., Wisconsin, 1955; Ph.D., Oregon State, 1962.
- SHIH-DZUNG C. LU (1961)**
Research Associate in Chemistry, Assistant Professor, Agricultural Chemistry.
M.S., Purdue, 1948, Ph.D., 1951.
- MARTIN JAMES LUDWIG (1949)**
Assistant Professor of English.
B.A., Northwestern (Massachusetts), 1947; M.A., Boston, 1949.
- MARGARET CATHERINE LUMPKIN (1948)**
Assistant Professor of Education.
B.S., Women's College of University of North Carolina, 1944; M.S., Wellesley, 1945; Ed.D., Oregon State, 1957.
- WALTER THOMAS LUND (1937)**
Senior Instructor in Botany.
B.S., Oregon State, 1930; M.S., 1932.
- RALPH NICHOLAS LUNDE (1930)**
Professor of Agricultural Engineering.
B.S., Oregon State, 1926.
- DONALD JOSEPH LUTOSKY (1962)**
Counselor (Instructor) Counseling Center.
B.S., Oregon, 1960; M.S., 1962.
- CAROLINE G. LYBECK (1962)**
Head Circulation Librarian (Assistant Professor).
B.A., Concordia College, 1932; B.S.L.S., University of Denver, 1941; M.A.L.S., Michigan, 1957.
- JAMES JOSEPH McALISTER (1954)**
Acting Extension Rural Defense Specialist (Associate Professor).
B.S., Oregon State, 1942.
- WILLIAM BRUCE McALISTER (1957)**
Assistant Professor of Oceanography.
B.S., Washington, 1949, M.S., 1957; Ph.D., Oregon State, 1962.
- LAURA McALLESTER (1926)**
Assistant Professor Emeritus of Physical Education for Women.
Diploma, Boston Normal School of Gymnastics, 1906; B.S., Oregon State, 1932.
- JAMES ANDREW BELL McARTHUR (1956)**
Associate Professor of Range Management and Animal Science, Superintendent, Eastern Oregon Experiment Station.
B.Sc., University of Alberta, 1948; M.Sc., Texas A and M, 1950, Ph.D., 1951.
- BERNARD LAWRENCE McCARTHY (1959)**
Instructor in Sociology.
ASTP Diploma, Oregon State, 1944; M.A., Chicago, 1949.
- RAYMOND GERALD McCARTY (1953)**
Josephine County Extension Agent (Associate Professor).
B.S., Nebraska, 1936; M.S., Missouri, 1938.
- JAMES ELIAS McCAULEY (1956-60, 1961)**
Associate Professor of Oceanography.
B.S. in Zool., Washington, 1946, M.S., 1949; Ph.D., Oregon State, 1954.
- EDWARD POAGE McCLANAHAN (1958)**
Instructor in English.
B.A., Miami (Ohio), 1955; M.A., Kentucky, 1958.
On leave 1962-63.
- THOMAS JOHN McCLELLAN (1945)**
Professor of Civil Engineering.
B.S., Oregon State, 1945; M.Engr., Yale, 1948.
- WILLIAM ANDREW McCLENAGHAN (1949)**
Associate Professor of Political Science.
B.A., Washington, 1948.
- THOMAS COSHOW McCLINTOCK (1959)**
Assistant Professor of History.
B.A., Stanford, 1949; M.A., Columbia, 1950; Ph.D., Washington, 1959.
- ELDON RAY McCLURE (1958)**
Assistant Professor of Mechanical Engineering.
B.S. (Mech. Eng.), Washington State, 1955; M.Sc. (Mech. Eng.), Ohio State, 1959.
- WILLIAM HARRY McCLUSKEY (1955)**
Assistant Professor of Poultry Science.
B.S., Kings Point Academy, 1944; B.S., Oklahoma State, 1948; M.S., Oregon State, 1958.

- DONNA JEAN McCOY** (1960)
Portland City Extension Agent, 4-H Club (Instructor).
B.S. in Home Economics Education, Iowa State, 1959.
- WILLIAM DAYTON McCRADY** (1962)
Assistant Physician, Student Health Service (Professor).
B.S., Ohio State, 1954, M.D., 1960.
- WALTER FRASER McCULLOCH** (1937)
Dean, School of Forestry; Associate Director of Forest Research Division, Agricultural Experiment Station; Professor of Forest Management.
B.A., British Columbia, 1925; M.S., Syracuse (New York State College of Forestry), 1936; Ed.D., Oregon, 1947.
- EGGY ANN McCULLY** (1962)
Assistant Cataloger (Assistant Professor) Librarian.
A.B. in Spanish, Drury College, 1951; M.S. in Library Science, Illinois, 1957.
- BOB STEWART McCUTCHEON** (1948)
Professor of Pharmacology, Head of Department.
B.S., Idaho, 1933; M.S., Washington, 1946, Ph.D., 1948.
On sabbatical leave 1962-63.
- ACK THOMAS McDERMID** (1945)
Assistant Professor of Agronomy, Superintendent, Red Soils Experiment Station.
B.S., Oregon State, 1942.
- MARGUERITA McDONALD** (1962)
Engineering Librarian (Instructor).
B.A., British Columbia, 1925; M.S., Montana State, 1960.
- HELEN MAY McDOWALL** (1950)
Clackamas County Extension Agent, Home Economics (Assistant Professor).
B.S., Nebraska, 1934; M.S., Oregon State, 1952.
- GERTRUDE ELIZABETH McELFRESH** (1909)
Assistant Professor Emeritus of English.
B.S., Oregon State, 1902; A.B., Cornell, 1909; A.M., Columbia, 1924.
- ELIZABETH BROWN McENTIRE** (1961)
Grant County Extension Agent, Home Economics (Instructor).
B.S., Oregon State, 1961.
- WILLIAM FREDERICK McGRATH** (1954)
Assistant Professor of Radio and Television Education, Network Program Director, Oregon Educational Television, KOAC-TV, KOAP-TV, General Extension Division.
B.S., Minnesota, 1946; M.A., Washington, 1950.
- WILLIAM SAXON McGUIRE** (1956)
Associate Professor of Agronomy.
B.S., Arkansas, 1947; M.S., University of New Zealand, 1951; Ph.D., Washington State, 1952.
- WILLIAM WARD McKALIP** (1937-42; 1953)
Associate Professor of Physical Education.
B.S., Oregon State, 1931, M.S., 1952.
- FREDERICK FRANCIS McKENZIE** (1944)
Professor Emeritus of Animal Science.
B.S.A., British Columbia, 1921; A.M., Missouri, 1923, Ph.D., 1925; D.Agr., Catholic University of Chile, 1941.
- MILFORD D. McKIMMY** (1953)
Associate Professor of Forest Products.
B.S., Michigan State, 1949; M.S., Oregon State, 1951; Ph.D., New York State College of Forestry, 1955.
- ROBERT ORAN McKITTRICK** (1961)
Assistant Football Coach (Instructor).
B.S., Oregon State, 1958.
- DIANE SAUSE McKNIGHT** (1958)
Clackamas County Extension Agent, 4-H Club (Instructor).
B.S., Oregon State, 1958.
- LOUIS NORMAN McKOWN** (1959)
Director, Institutional Research, Associate Professor.
A.B., Stanford, 1951, Ph.D., 1958.
- EARLE KENNETH McLAREN** (1963)
Assistant Professor of Forest Engineering.
B.S., United States Naval Academy, 1934; B.S., Oregon State, 1963.
- EDWARD BLAKE McLEOD, JR.** (1955)
Assistant Professor of Mathematics.
B.A., Occidental College, 1947; M.S., Stanford, 1949, Ph.D., 1953.
- JOHN WALTER McLOUGHLIN** (1960)
Jackson County Extension Agent (Instructor).
B.S., Rutgers, 1957.
- RAY ARTHUR McNEILAN** (1958)
Multnomah County Extension Agent (Assistant Professor).
B.S., New Mexico A and M, 1957; M.S., Oregon State, 1958.
- ISABELLA FRANKLIN McQUESTEN** (1948)
Associate Professor of Home Economics Education.
B.S., Arizona, 1932; M.S., Oregon State, 1940.
- FRANK PADEN McWHORTER** (1930)
Professor of Plant Pathology; Plant Pathologist, U. S. Department of Agriculture.
B.S., Vanderbilt, 1917; M.S., Chicago, 1920; Ph.D., Cornell, 1928.
- DONALD LAURIE MacDONALD** (1962)
Professor of Chemistry, Science Research Institute.
B.A., Toronto, 1944, M.A., 1946, Ph.D., 1948.
- JOHN HOWARD MacDONALD** (1951)
Instructor in Radio and TV Education, Producer-Announcer (KOAC AM-TV), General Extension Division.
B.A., Oregon, 1948.
- REGINALD ANSLOW MacHAFFIE** (1961)
Professor, Assistant Physician, Student Health Service.
B.S., College of City of New York, 1933; M.A., Columbia, 1935; M.D., School of Medicine, Colorado, 1948.
- HARRY JOHN MACK** (1955)
Associate Professor of Horticulture.
B.S., Texas A and M, 1950, M.S., 1952; Ph.D., Oregon State, 1955.
- MABEL CLAIR MACK** (1928)
Assistant Director, Federal Cooperative Extension Service (Professor).
B.S., Oregon State, 1928, M.S., 1940.
- ANDREA C. MACKAY** (1938)
Professor of Foods and Nutrition.
B.S., M.Sc., Nebraska, 1937; Ph.D., Iowa State, 1945.

- ROBERT SCOTT MacLAUHLAN (1957)**
Assistant Professor of Agronomy; Soil Conservation Service, Plant Materials Technician, U. S. Department of Agriculture.
B.S., Maine, 1949.
- IAIN C. MacSWAN (1955)**
Extension Plant Pathology Specialist (Associate Professor).
B.S.A., British Columbia, 1942, M.S.A., 1961.
- THEODORE MARTIN MADDEN (1959)**
Assistant Professor of Psychology.
B.A. (Ed.), Western Washington College of Education, 1946; M.A., Columbia, 1947; Ph.D., Arizona, 1959.
- RUSSELL WEBBER MADDOX, JR. (1950)**
Professor of Political Science.
B.A., Marshall College, 1946; M.P.A., Wayne, 1948; Ph.D., Illinois, 1953.
- WALDO GEORGE MAGNUSON, JR. (1962)**
Instructor in Electrical Engineering.
B.S., Washington, 1955.
- PHILIP COOPER MAGNUSON (1946)**
Professor of Electrical Engineering.
B.S., Washington, 1937; M.S., California, 1938; Sc.D., Massachusetts Institute of Technology, 1941; E.E., Washington, 1947.
- JOSEPH PATRICK MAHER (fall, winter, and spring terms, 1962-63)**
Assistant Professor of Business Administration.
B.S., Seton Hall, 1931; LL.B., Rutgers, 1935.
- JESSALEE AHRENS MALLALIEU (1948)**
Extension Recreation Specialist (Associate Professor).
B.S., Missouri, 1933; M.S., Wisconsin, 1948.
- GILES WILSON MALOOF (1961)**
Assistant Professor of Mathematics.
B.A., California, 1953; M.A., Oregon, 1958; Ph.D., Oregon State, 1962.
- VIRGINIA MARREE MANKER (1962)**
Instructor in Physical Education.
B.S., Arizona, 1959.
- EVERETTE EDWARD MANN, JR. (1962)**
Captain Artillery, Assistant Professor of Military Science.
B.A. (Physiology), UCLA, 1953.
- LESLIE JACK MARKS (1946)**
Wheeler County Extension Agent (Associate Professor).
B.S., Oregon State, 1946.
- STEPHEN CHESTER MARKS (1956)**
Extension Agricultural Economist (Assistant Professor).
B.S., State College (River Falls, Wisconsin), 1948; M.S., Wisconsin, 1955.
- KAY M. P. MARKSHEFFEL (1956)**
Instructor in Secretarial Science.
B.Sc. Ed., USC, 1941; Ed.M., Oregon State, 1959.
- NED DELAND MARKSHEFFEL (1955)**
Professor of Education.
B.S., Utah State, 1933; M.E., Temple, 1953; Ed.D., Stanford, 1958.
- ROBERT KENDALL MARSH (1956)**
Clatsop County Extension Agent, 4-H Club (Assistant Professor).
B.S., Massachusetts, 1941.
- DONALD JOSEPH MARTEL (1947)**
Professor of Landscape Architecture; Head of Department.
B.S., Oregon, 1942.
- CHARLES HERBERT MARTIN (1946)**
Professor of Entomology.
B.A., M.A., Kansas, 1927; Ph.D., Cornell, 1939.
- GEORGE YOUSSEF MARTIN (1936)**
Director of Department of Printing (Associate Professor).
B.S., South Dakota State, 1935.
- WALLACE HOPE MARTIN (1920)**
Professor Emeritus of Mechanical Engineering.
M.E., Minnesota, 1910; M.S., Iowa State, 1930.
- NORMAN HARRY MARTINSON (1958)**
Assistant Professor of Physical Education.
B.S., Oregon State, 1948, M.S., 1949.
- ELLIOT NELSON MARVELL (1948)**
Professor of Chemistry.
B.S., Brown, 1943; Ph.D., Illinois, 1948.
- CLIFFORD ELGES MASER (1942)**
Dean, School of Business and Technology.
Professor of Business Administration.
A.B., Swarthmore, 1934; D.K., Cologne, 1935, Ph.D., 1936.
- G. JEANNETTE ANN MASILIONIS (1960)**
Associate Professor of Physical Education.
B.S., Ohio, 1944, M.S., 1945.
- ROBERT GEORGE MASON (1953)**
Agricultural Experiment Station Editor (Associate Professor).
B.S., Oregon State, 1951; M.S., Wisconsin, 1952; Ph.D., Stanford, 1962.
- JOHN WILLIAM MASSIE (1956)**
Linn County Extension Agent (Assistant Professor).
B.S., Agr., Ohio State, 1951.
- KEITH ISOM MATHESON (1957)**
Instructor in Agronomy, Klamath Experiment Station.
B.S., Utah State, 1952, M.S., 1957.
- JUDSON STILLMAN MATHIAS (1962)**
Instructor in Civil Engineering.
B.S., U. S. Military Academy, 1954.
- CYRUS MAYSHARK (1957)**
Associate Professor of Hygiene and Health Education.
B.A., Williams College, 1949; M.Ed., Boston, 1952; H.S.D., Indiana, 1954; M.S. Hyg., Harvard, 1962.
- THOMAS RICHARD MEEHAN (1962)**
Assistant Professor of History.
A.B., Rutgers, 1949, M.A., 1951; Ph.D., Wisconsin, 1960.
- DONALD MANVELL MEGALE (1958)**
Assistant Professor of Physical Education.
B.S., Oregon State, 1952, M.Ed., 1958.
- JOSEPH PARKE MEHLIG (1920)**
Professor Emeritus of Chemistry.
B.S., Purdue, 1908, M.S., 1910, Ph.D., 1931.
- KENNETH EDWIN MEIER (1960)**
Marion County Extension Agent, 4-H Club (Assistant Professor).
B.S., Oregon State, 1950.

- WALTER M. MELLENTHIN (1950)
Associate Professor of Horticulture, Superintendent, Mid-Columbia Experiment Station.
B.S., Oregon State, 1950, M.S., 1952.
- RICHARD MENGLER (1957)
Associate Professor of Business Administration.
B.A., Nebraska State Teachers College, Kearney, 1933; M.S., Oregon, 1940, LL.B., 1952.
- ROBERT EUGENE MEREDITH (1959)
Assistant Professor of Chemical Engineering.
B.S., California, 1956, Ph.D., 1959.
- ABEL MERRELL (1962)
Instructor in Family Life.
B.S. (Ed.), Idaho, 1948; B.S. (Homemaking Ed.), Brigham Young, 1956.
- ED MERRYFIELD (1927)
Professor of Sanitary Engineering.
B.Sc., Oregon State, 1923; M.Sc., North Carolina, 1930.
- THEODORE LAWRENCE MESANG (1949)
Associate Professor of Music.
B.M., Wisconsin, 1945; M.Ed., Minnesota, 1949.
- RODERICK SMIT MESECAR (1961)
Assistant Professor of Electrical Engineering, NSF Computer Project Engineer.
B.S., Oregon State, 1956, M.S., 1958.
- ROBERT J. METZGER (1954)
Associate Professor of Cytogenetics; Wheat Geneticist, U. S. Department of Agriculture.
B.S., Illinois, 1948, M.S., 1949, Ph.D., 1953.
- QUART MILES METZGER (1962)
Associate Professor of Architecture and Superintendent of Planning and Construction, Physical Plant.
B.Arch., Washington, 1961.
- INSTANCE ANN MEYER (1961)
Linn County Extension Agent, 4-H Club (Instructor).
B.S. (Home Economics), Oregon State, 1961.
- WIN DAVID MEYER (1925)
Associate Professor Emeritus of Industrial Arts.
B.S., Stout Institute, 1927; M.S., Oregon State, 1940.
- ALTER MEYER (1958)
Assistant Professor of Chemical Engineering.
B.Ch.E., Syracuse, 1956, M.Ch.E., 1957.
On leave 1962-63.
- BERT RAY MICHAEL (1947)
Associate Professor of Electrical Engineering.
B.S., Oregon State, 1940, M.S., 1947.
- EAR EDWIN MIKESSELL (1934)
Linn County Extension Agent (Professor).
B.S., Oregon State, 1934.
- JOHN A. MILBRATH (1937)
Professor of Plant Pathology.
B.S., Washington State, 1934; Ph.D., Oregon State, 1938.
- MOND EAGAN MILLEMANN (1963)
Associate Professor of Fisheries.
A.B., Dartmouth, 1948; M.A., California (Los Angeles), 1951, Ph.D., 1954.
- CLAY CARL MILLER (1929)
Multnomah County Extension Agent, 4-H Club (Assistant Professor) (Retired).
B.S., Oregon State, 1923.
- DONALD JAMES MILLER (1961)
Assistant Professor of Forest Products, Forest Research Laboratory.
B.S., Connecticut, 1951; M.F., Yale, 1954.
- JAMES CARLTON MILLER (1958)
Professor of Animal Science, Head of Department.
B.S., Missouri, 1928, M.S., 1929, Ph.D., 1937.
- MIRIAM HALL MILLER (1955)
Extension Information Specialist (Assistant Professor).
B.S., South Dakota State, 1955.
- PAUL WILLIAM MILLER (1930)
Professor of Plant Pathology; Plant Pathologist, U. S. Department of Agriculture.
B.S., Kentucky, 1923, M.S., 1924; Ph.D., Wisconsin, 1929.
- VERGIL V. MILLER (1962)
Assistant Professor of Business Administration.
B.S., Oregon State, 1955; M.B.A., Washington, 1959.
- MARGARET MILLIKEN (1947)
Associate Professor of Physical Education.
B.S., Oregon State, 1942, M.S., 1947.
- WILLIAM WILLIS MILLS (1954)
Professor of Psychology.
A.B., St. Louis, 1939; Ph.D., Minnesota, 1954.
- WILLIAM EDMUND MILNE (1932)
Professor Emeritus of Mathematics.
A.B., Whitman, 1912; A.M., Harvard, 1913, Ph.D., 1915; D.Sc., Whitman, 1942.
- JOHN GLENN MINGLE (1960)
Assistant Professor of Mechanical Engineering.
B.S.M.E., Purdue, 1942; M.S., Oregon State, 1949.
- KENNETH CLAYTON MINNICK (1944)
Benton County Extension Agent, 4-H Club (Assistant Professor).
B.S., Oregon State, 1939, M.Agr., 1954.
- MIRIAM SHARP MINNICK (1957)
Assistant Reference Librarian (Assistant Professor), Library.
B.A., Western Reserve, 1934, M.S. in L.S., 1951.
- EDWARD REAMS MITCHELL (1953)
Associate Professor of English.
A.B., California, 1938, M.A., 1940; Ph.D., Stanford, 1953.
- VELMA ROBERTA MITCHELL (1958)
Lane County Extension Agent (Home Economics) (Assistant Professor).
B.S., Oregon State, 1945.
- LESTER G. MOCK (1959)
Director of Programming and Production (KOAC AM-TV) (Instructor), General Extension Division.
B.S., Oregon State, 1957.
- HAROLD WILLIAM MOE (1935-42, 1949)
Associate Professor of Physical Education.
B.S., Oregon State, 1935, M.S., 1952.

- JAMES DAWSON MOHLER (1955)**
Associate Professor of Zoology.
A.B., Missouri, 1949, A.M., 1950; Ph.D.,
California, 1955.
- KARL HERMAN MOLTSMANN (1956)**
Associate Professor of Music.
B.A., Buena Vista College, 1937; M.M.,
Colorado, 1946.
- CAL GRAHAM MONROE (1942)**
State 4-H Extension Agent (Associate Profes-
sor).
B.S., Oregon State, 1939; M.S., Cornell,
1952. On sabbatical leave, 1962-63.
- MORRIS W. MONTGOMERY (1961)**
Assistant Professor of Food Science and Tech-
nology.
B.S., North Dakota State, 1951, M.S., 1957;
Ph.D., Washington State, 1961.
- HELEN STERLING MOOR (1926-28, 1954)**
Dean of Women (Professor).
A.B., Smith, 1925; M.A., Stanford, 1935.
- DAVID P. MOORE (1960)**
Assistant Professor of Soils.
B.S., North Carolina State, 1953, M.S.,
1955; Ph.D., California, 1960.
- CHARLES EDWARD MOREHEAD (1959)**
Master Sergeant, Instructor in Military Sci-
ence.
- ETHEL POPE MORGAN (1945)**
Instructor in Foods and Nutrition. (Retired.)
B.S., Oregon State, 1923.
- FRED BUCKNER MORGAN (1920-32, 1934)**
Associate Professor Emeritus of Physics.
B.Ped., Kirksville State Normal (Missouri),
1910; A.B., B.S., Missouri, 1915; M.S.,
Pittsburgh, 1930.
- RICHARD YUKIO MORITA (1962)**
Associate Professor of Microbiology and Ocea-
nography.
B.S., Nebraska, 1947; M.S., USC, 1949;
Ph.D., California, 1954.
- JAMES MADISON MORRIS (1928)**
Professor of Radio and TV Education; Direc-
tor of Department; Manager (KOAC AM-
TV), General Extension Division.
B.S. (E. Eng.), Oregon State, 1928, Ed.D.,
1956.
- ROY OWEN MORRIS (1961)**
Research Associate (Assistant Professor), Sci-
ence Research Institute.
B.Sc., London, 1955, Ph.D., 1959.
- HUGH ENGLE MORRISON (1937)**
Associate Professor of Entomology.
B.S., Franklin and Marshall, 1927; M.S.,
Ohio State, 1936.
- NEIL EUGENE MORSE (1959)**
Tillamook County Extension Agent, 4-H Club
(Assistant Professor).
B.S., Oregon State, 1959.
- ROY EDGAR MOSER, JR. (1958)**
Extension Food Technologist, Marketing (As-
sociate Professor).
B.S., Massachusetts, 1947, M.S., 1949.
- RUTH ANNETTA MOSER (1946)**
Associate Professor of Clothing, Textiles, and
Related Arts.
B.S., North Dakota Agricultural College,
1931; M.S., Oregon State, 1950.
- WILLIAM PAUL MOSER (1961)**
Lake County Extension Agent (Instructor).
B.S., Oregon State, 1961.
- WAYNE DELBERT MOSHER (1948)**
Douglas County Extension Agent (Assistant
Professor).
B.S., Oregon State, 1948.
- DON CARLOS MOTE (1923)**
Professor Emeritus of Entomology.
B.S., Ohio State, 1911, M.S., 1912, Ph.D.,
1928.
- JOHN STANLEY MOTHERSHEAD (1961)**
Instructor in Forest Products, Forest Research
Laboratory.
B.S. (Forest Products), Oregon State, 1955
B.S. (Chemistry), 1960.
- ROBERT VERNON MRAZEK (1960)**
Assistant Professor of Chemical Engineering.
B.S. (Ch.E.), Purdue, 1957; Ph.D. (Ch.E.)
Rensselaer Polytechnic, 1960.
- DWIGHT CURTIS MUMFORD (1938)**
Professor of Agricultural Economics.
B.S., Illinois, 1923; M.S., Cornell, 1925.
- JAMES KENNETH MUNFORD (1939-
1948)**
Director of Publications and Oregon State Uni-
versity Press; Professor of Education; Secre-
tary of Administrative Council.
B.S., Oregon State, 1934; Ed.D., Stanfo-
rd, 1948.
- ALAN ALEXANDER MUNRO (1962)**
Assistant Professor of Art.
B.A., George Peabody College, 1952;
M.F.A., Wichita, 1956.
- BERWIN FRANCIS MURRAY (1959)**
Assistant Professor of Music.
B.Mu.Ed., Willamette, 1952, M.Mu.Ed.,
1960.
- OTTO HERBERT MUTH (1929)**
Professor of Veterinary Medicine.
D.V.M., Michigan State, 1929, M.S., 1930.
- WILFORD GERVAIS MYATT (1947)**
Professor of Geography.
B.A., Washington, 1947, M.A., 1950; Ph.D.,
Clark, 1958.
- HIGHLY JOE MYERS (1948)**
Marion County Extension Agent, 4-H Club
(Associate Professor).
B.S., Oregon State, 1949; M.S., Michi-
gan State, 1960.
- LOUIS RICHARD NADELL (1960)**
Sergeant First Class, Signal Corps, Instructor
in Military Science.
- THOMAS SCOTT NAGEL (1961)**
Lieutenant, USN, Assistant Professor
Naval Science.
B.S. (Educ.), Idaho, 1958.
- WILLIAM PAYNE NAGEL (1962)**
Assistant Professor of Forest Entomology.
B.S., New York State, 1953, M.S., 1955,
Ph.D., Cornell, 1962.
- JOHN CHARLES NEELEY (1962)**
Instructor in General Science.
B.S., Portland State, 1960; M.S., Ore-
gon State, 1963.
- HERBERT BENJAMIN NELSON (1927)**
Professor of English; Head of Department.
A.B., Colorado, 1926, M.A., 1927; Ph.D.,
Washington, 1944.

- MILTON NELS NELSON (1926)
Professor Emeritus of Economics.
A.B., Illinois, 1915; M.A., 1917, Ph.D., 1921.
- ORAN MILTON NELSON (1913)
Professor Emeritus of Animal Science.
B.S., Wisconsin, 1913, M.S., 1930.
- PAUL BURGERT NELSON (1959)
Instructor in English.
B.A., Westmar College, 1951; M.A., Colorado, 1955.
- HARRY IRA NETTLETON (1936-42, 1947)
Associate Professor of Forest Management.
B.S., Oregon State, 1921; M.S.F., Idaho, 1928.
- ZELMA REIGLE NEUGART (1955)
Extension Consumer Food Marketing Specialist (Associate Professor).
B.S., Iowa State, 1949; Adm. Dietetic Internship, Aetna Life Ins. Co., 1951; M.S., Cornell, 1962.
- OBERT WARREN NEWBURGH (1953)
Professor of Chemistry; Assistant Director, Science Research Institute.
B.S., Iowa, 1949; M.S., Wisconsin, 1951, Ph.D., 1953.
- LEN ALLEN NEWELL (1944)
Marion County Extension Agent (Professor).
B.S., Oregon State, 1941.
- JAMES DUNCAN NEWSTEAD (1960)
Assistant Professor of Zoology; Electron Microscopist.
B.A., University of British Columbia, 1954, M.A., 1956; Ph.D., Oregon State University, 1962.
- BYRON LOUIS NEWTON (1947-48, 1949)
Professor of Business Administration.
B.S., Northwestern (Oklahoma), 1935; M.S., Oklahoma State, 1939, Ed.D., 1946.
- MICHAEL NEWTON (1960)
Instructor in Forest Management.
B.S., Vermont, 1954; B.S., Oregon State, 1959, M.S., 1960.
- WILLIAM GERALD NIBLER (1940)
State Extension Agent (Professor).
B.S., Oregon State, 1938; M.Ed., Maryland, 1962.
- MAREN LOUISE NICKEL (1961)
Research Associate (Instructor), Science Research Institute.
B.S., Oregon State, 1961.
- DAVID BOWMAN NICODEMUS (1950)
Associate Professor of Physics, Assistant Dean School of Science.
A.B., DePauw, 1937; Ph.D., Stanford, 1946.
- SANDRA LEWIS NISBET (1962)
Instructor in Speech.
B.A., San Jose State College, 1958; M.A., Indiana, 1962.
- FAITH GRIGSBY NORRIS (1947)
Assistant Professor of English.
B.A., British Columbia, 1939; M.A., California, 1941, Ph.D., 1947.
- THOMAS HUGHES NORRIS (1947)
Professor of Chemistry.
A.B., Princeton, 1938; Ph.D., California, 1942.
- MARTIN ELLIS NORTHCRAFT (1955)
Associate Professor of Civil Engineering.
B.S., Oregon State, 1955.
- DALLAS W. NORTON (1947)
Director of Admissions (Professor).
B.S., Oregon, 1936, M.Ed., 1941.
- VIRGIL J. NORTON (1961)
Instructor in Economics.
B.S., Kansas State, 1957, M.S., 1959.
- RAYMOND E. NOVOTNY (1952)
Harney County Extension Agent (Associate Professor).
B.S., Wyoming, 1946.
- FRITZ OBERHETTINGER (1958)
Professor of Mathematics.
Staatsexamen, Breslau, 1936; Ph.D., Berlin, 1942; Ph.D. (habil), Mainz, 1945.
- JOHN ALAN O'CONNOR (1949)
Associate Professor of Music.
B.S., Idaho, 1939, M.S., 1948.
- LOUIS MILTON OESTER (1955)
Curry County Extension Agent (Associate Professor).
B.S., Oregon State, 1949, Ed.M., 1952.
- JAMES EDMUND OLDFIELD (1949)
Professor of Animal Nutrition.
B.S.A., British Columbia, 1941, M.S.A., 1949; Ph.D., Oregon State, 1951.
- JOHN ELMER O'LEARY (1949)
Associate Professor of Forest Engineering.
B.S.F., Michigan, 1942; M.F., Oregon State, 1947.
- KEITH FLOYD OLES (1961)
Associate Professor of Geology.
B.S., Washington, 1943, M.S., 1951, Ph.D., 1956.
- JACQUELIN K. OLESON (1960)
Instructor in Family Life.
B.S., Columbia, 1957, M.A., 1958.
- ALFRED WEAVER OLIVER (1919)
Associate Professor Emeritus of Animal Science.
B.S., Oregon State, 1918; M.S., Wisconsin, 1928.
- ROGER DEAN OLLEMAN (1959)
Associate Professor of Mechanical Engineering.
B.S. (Mech. Engr.), Washington, 1948; M.S. (Met.E.), Carnegie Tech, 1950; Ph.D., Pittsburgh, 1955.
- GUHLI JOHANNA OLSON (1959)
Associate Professor, Prenursing.
B.S., Battle Creek, 1936; R.N., Ohio, 1936; M.S., Western Reserve, 1947.
- THOMAS ONSDORFF (1924)
Associate Professor of Food Science and Technology.
B.S., Oregon State, 1924; M.S., Massachusetts State, 1935.
- PRESTON EUGENE ONSTAD (1956)
Assistant Professor of English.
B.A., College of Puget Sound, 1942, M.A., 1947.
- HENDRIK JACOB OORTHUYNS (1941-44, 1957)
Associate Professor of Electrical Engineering.
B.S., Oregon State, 1934, M.S., 1936.

- DANIEL THOMAS ORDEMAN (1927)**
Professor of English.
A.B., Washington and Lee, 1920, M.A., 1922; Ph.D., Maryland, 1927.
- LOUISE JACKMAN ORNER (1936)**
Assistant Professor of Secretarial Science.
B.S., Oregon State, 1922, M.S., 1940.
- JOSEPH JOHN O'ROURKE (1960)**
Assistant Professor of Business Administration.
B.A., University of Portland, 1952; M.B.A., University of Denver, 1953; C.P.A., Washington State, 1959.
- ZE'EV BERNARD ORZECZ (1957)**
Assistant Professor of Economics.
B.S., California, 1950.
- JOHN LYNN OSBORN (1923)**
Associate Professor Emeritus of Zoology.
Ph.C., Michigan, 1915; A.B., Kansas, 1922; A.M., Nebraska, 1923; Ph.D., Washington, 1939.
- KATHERINE HUGHES OSBORN (1929)**
Science Librarian (Associate Professor), Library.
B.S. (Lib.Sc.), Washington, 1928; M.A., Oregon State, 1939.
- CAROLYN L. O'SHEA (1962)**
Instructor in Physical Education.
B.A., Wooster College, 1959.
- JOHN PATRICK O'SHEA (1962)**
Assistant Professor of Physical Education.
B.A., Michigan State, 1960, M.A., 1962.
- CHARLES LAMAR OSTERBERG (1962)**
Assistant Professor of Oceanography.
B.S., Arizona State, 1948, M.A., 1949; M.S., Oregon State, 1960, Ph.D., 1963.
- GEORGE HOLLIS OTTAWAY (1941-42; 1946-50, 1950)**
Marion County Extension Agent (Associate Professor).
B.S., Oregon State, 1941.
- JAMES LAFAYETTE OVERHOLSER (1961)**
Assistant Professor of Forest Products, Editor, Forest Research Laboratory.
B.S., Oregon State, 1950.
- JEAN SATTERLEE OVERHOLSER (1955)**
Instructor in Mathematics.
B.A., California (at Los Angeles), 1936; M.A., Redlands, 1940.
- MERRILL MAHONRI OVESON (1929)**
Professor of Agronomy, Superintendent, Pendleton Experiment Station.
B.S., Brigham Young, 1927; M.S., Oregon State, 1930.
- ALFRED OWCZARZAK (1955)**
Associate Professor of Zoology.
B.S., Cornell, 1944; Ph.D., Wisconsin, 1953.
- EBEN LOWELL OWENS (1958)**
Development Engineer, NCSI (Instructor), Engineering Experiment Station.
B.S., Idaho, 1952.
- DAVID OYLER (1962)**
Assistant Circulation Librarian (Instructor).
B.A., U.C.L.A., 1961; M.S.L.S., U.S.C., 1962.
- BETTE MARIE PAASCHE (1952; 1955-60; 1962, fall term only)**
Instructor in Institution Management.
B.S., Illinois, 1943.
- OLAF GUSTAV PAASCHE (1946)**
Professor of Mechanical Engineering.
B.S., Illinois, 1943; M.S., Illinois Institute of Technology, 1955.
- EARL LEROY PACKARD (1932)**
Professor Emeritus of Geology.
A.B., Washington, 1911, M.A., 1912; Ph.D., California, 1915.
- GLENN ELLIS PAGE (1949)**
Associate Professor of Agricultural Engineering.
B.S.A., Wisconsin, 1940; B.S., (M.E.), Purdue, 1942, M.S. (M.E.), 1949.
- RICHARD EUGENE PAHRE (1956)**
Assistant Dean of Men (Assistant Professor).
B.S.C., Iowa, 1950, M.A., 1954.
- RUDOLPH STANLEY PAIGE (1960)**
Major, Associate Professor of Air Science.
B.S. (Civil Engr.), Illinois, 1956.
- DAVID PHILIP PAINE (1962)**
Assistant Professor of Forest Management.
B.S., Oregon State, 1953, M.S., 1958.
- JOHN HOWE PAINTER (1948)**
Professor of Horticulture; Horticulturist, U. S. Department of Agriculture.
B.S., Maryland, 1922; M.S., Oregon State, 1924.
- SAL-LUNG PAN (1959)**
Associate Professor of Civil Engineering.
B.S., Hangchow Christian College, 1945; M.S., Illinois, 1949, Ph.D., 1951.
- KILHO PARK (1961)**
Assistant Professor of Oceanography.
B.S., Pusan, 1953; M.S., Texas A & M, 1957, Ph.D., 1961.
- JAMES ROLAND PARKER (1926)**
Douglas County Extension Agent (Associate Professor).
B.S., Oregon State, 1922, M.S., 1924.
- JESSE ELMER PARKER (1946)**
Professor of Poultry Science, Head of Department.
B.S., Tennessee, 1934; A.M., Missouri, 1936, Ph.D., 1940.
- WILLIAM BEVERLY PARKER (1946)**
Multnomah County Extension Agent (Associate Professor).
B.S., Oregon State, 1946.
- HAROLD NEVINS PARKINSON (1947)**
Assistant Professor Emeritus of General Engineering.
B.S., Purdue, 1918.
- FRANK LOVERN PARKS (1949)**
Professor of Sociology; Head Counselor of The School of Humanities and Social Sciences.
B.A., B.E., Colorado, 1929, M.A., 1931; Ph.D., Washington, 1949.
- LEO W. PARKS (1958)**
Associate Professor of Microbiology.
B.S., Illinois, 1952; A.M., Indiana, 1953; Ph.D., Washington, 1956.
- ROGER BRUCE PARSONS (1962)**
Assistant Professor of Soils; Research Soil Scientist. U.S.D.A. Soil Conservation Service.
B.S., Iowa State, 1955; M.S., Tennessee, 1957; Ph.D., Iowa State, 1960.
- THERAN DUANE PARSONS (1955)**
Associate Professor of Chemistry.
B.S., Washington, 1949, Ph.D., 1953.

- DAVID EDWARD PASSON (1960)
Clackamas County Extension Agent (Instructor).
B.S., Oregon State, 1959.
- ELIZABETH DOTSON PATAPOFF (1949-56, 1958)
Assistant Professor of Radio and TV Education, Director, Oregon School of the Air (KOAC AM-TV), General Extension Division.
B.A., Willamette, 1939.
- HENRY RICHARD PATTERSON (1920)
Professor Emeritus of Forest Engineering.
B.S. (C.E.), Oregon, 1909.
- JOAN PATTERSON (1936)
Professor of Clothing, Textiles, and Related Arts.
B.Arch., Oregon, 1931; M.F.A., Cranbrook Academy of Art, 1950.
- KENNETH DENTON PATTERSON (1958)
Assistant Professor of Economics.
B.S., Iowa State, 1951; M.A., Nebraska, 1956, Ph.D., 1961.
- ONE GRACE PATTULLO (1960)
Associate Professor of Oceanography.
B.S., Chicago, 1948; M.S., Scripps Institution of Oceanography, 1950, Ph.D., 1957.
- JUSTIN HORACE PATTY (1961)
Instructor in English.
B.A., St. Benedict's College, 1952; M.A., Idaho State, 1961.
- WILLIAM BLYTHE PAUL (1960)
Captain, Associate Professor of Air Science.
B.A., Washington State, 1954.
- WILLIAM HOWARD PAUL (1926)
Professor of Automotive Engineering.
B.S., Oregon State, 1924, M.S., 1935.
- SCAR INGVAL PAULSON (1941)
State Director of Vocational Education.
B.S., Oregon State, 1920.
- WILLIAM GORDON PEARCY (1960)
Assistant Professor of Oceanography.
B.S., Iowa State, 1951, M.S., 1952; Ph.D., Yale, 1960.
- CHARLES S. PEASE (1925)
Professor Emeritus of Chemistry.
B.S., Denison, 1918; Ph.D., Ohio State, 1928.
- LESTER ALLEN PEEK (1958)
Instructor in Botany.
B.S., Wyoming, 1953, M.S., 1955.
- CHARLES M. PEEKEMA (1961)
Assistant Professor of Chemistry.
B.S., California, 1951; Ph.D., Washington State, 1962.
- WILLIAM McGUIRE PERRY (1945)
Yamhill County Extension Agent, 4-H Club (Assistant Professor). (Retired.)
B.S., Oregon State, 1922.
- RAY OLAF PETERSEN (1953)
Klamath County Extension Agent (Associate Professor).
B.S., Idaho, 1935; M.S., Oregon State, 1962.
- KERMIT JOSEPH PETERSON (1959)
Associate Professor of Veterinary Medicine.
B.S., Minnesota, 1940; D.V.M., Colorado State, 1946.
- RALPH W. PETERSON (1959)
Assistant Professor of Speech.
B.S., Emporia State College, 1940; M.A., Denver, 1950, Ph.D., 1953.
- JOHN ADAMS PFANNER, JR. (1946)
Professor of Business Administration.
A.B., Dartmouth, 1927; M.A., Chicago, 1931, Ph.D., 1939.
- CARMEN ELAINE PHILLIPS (1962)
Instructor in Foods and Nutrition.
B.S., Oregon State, 1959; M.S., Oregon State, 1962.
- DONALD CHARLES PHILLIPS (1961)
Assistant Professor of Civil Engineering.
B.S., Washington State, 1944; M.S., Louisiana State, 1958.
- MARK CLYDE PHILLIPS (1897)
Professor Emeritus of Mechanical Engineering.
B.M.E., Oregon State, 1896.
- ROBERT LEE PHILLIPS (1957)
Assistant Professor of Speech; Assistant in Information.
A.B., Miami (Ohio), 1952; M.S., Illinois, 1954.
- HARRY KENYON PHINNEY (1947)
Professor of Botany.
B.A., Cincinnati, 1941; M.A., Albion, 1943; Ph.D., Northwestern, 1945.
- WILLIAM LUTHER PIERCE (1962)
Assistant Professor of Physics.
B.A., Rice Institute, 1955; M.A., Colorado, 1958, Ph.D., 1962.
- K. STEPHEN PILCHER (1951)
Professor of Microbiology.
B.S., Washington, 1933, Ph.D., 1939.
- RONALD LEWIS PITTMAN (1960)
Hood River County Extension Agent, 4-H Club (Instructor).
B.S., Oregon State, 1960.
- ERNA MARGUERITE PLAGEMAN (1929)
Assistant Director Student Health Service, Assistant Professor.
R.N., School of Nursing, Michigan, 1926.
- HANS HEINRICH PLAMBECK (1946)
Professor of Sociology; Chairman of Department.
B.A., Oregon, 1935, M.A., 1938; Ph.D., Cornell, 1941.
- CONSTANCE PATRICIA PLANTS (1960)
Instructor in Family Life.
B.S., Oregon State, 1946.
- MARTHA AMANDA PLONK (1952)
Associate Professor of Home Administration.
B.S., Woman's College of University of North Carolina, 1940; M.S., Ohio State, 1949.
- DAN WILLIAMS POLING (1937)
Dean of Men (Professor).
B.S., Oregon State, 1928, M.S., 1938; D.Ed., Oregon, 1956.
- HELEN VIRGINIA POLING (1949)
Senior Instructor in Physical Education for Women.
B.S., Oregon State, 1956.
- ALBERT ROBERTS POOLE (1946)
Professor of Mathematics.
B.A., British Columbia, 1929, M.A., 1931; Ph.D., California Institute of Technology, 1935.

- MILOSH POPOVICH (1945, 1947)**
Dean of Administration; Professor of Mechanical Engineering.
B.S., Oregon State, 1939, M.S., 1941.
- ERMIENE LAWRENCE POTTER (1908)**
Professor Emeritus of Agricultural Economics.
B.S., Montana State, 1906; B.S.A., Iowa State, 1908, M.S., 1920.
- RICHARD WENDELL POTTER (1959)**
Assistant Professor of Radio and TV (TV Producer/Director), General Extension Division, KOAC AM-TV.
B.A., Dakota Wesleyan, 1956; M.S., Syracuse, 1958.
- WILLARD CHARLES POTTS (1959)**
Instructor in English.
B.A., Washington, 1952, M.A., 1956.
- CHARLES EDGAR POULTON (1949)**
Professor of Range Ecology.
B.S., Idaho, 1939, M.S., 1948; Ph.D., Washington State, 1955.
- ROBERT LORAN POWELSON (1956)**
Assistant Professor of Plant Pathology, Extension Plant Pathology Specialist.
B.S., Utah State, 1951, M.S., 1956; Ph.D., Oregon State, 1959.
- WILBUR LOUIS POWERS (1909)**
Professor Emeritus of Soils.
B.S., New Mexico State, 1908, M.S., 1909; Ph.D., California, 1926.
- DAVID EDGAR POWNALL (1958)**
Assistant Circulation Librarian (Instructor), Library.
B.M., Wisconsin, 1950; M.M., Tulsa, 1952; M.A. (Lib. Sc.), Indiana, 1957.
- IVAN PRATT (1946)**
Professor of Zoology.
B.A., Emporia, 1932; M.S., Kansas State, 1935; Ph.D., Wisconsin, 1938.
- LOIS ARDELL PREISZ (1962)**
Marion County Extension Agent (Assistant Professor).
B.S., Oregon State, 1945.
- SARA WATT PRENTISS (1917)**
Professor Emeritus of Child Development.
B.S., Oregon State, 1917; M.A., California, 1929.
- CATHERINE HALLENE PRICE (1955)**
Union County Extension Agent, Home Economics (Assistant Professor).
B.S., Kansas State Teachers College, 1927.
- FREDERICK EARL PRICE (1922)**
Dean, School of Agriculture (Professor); Director, Agricultural Experiment Station; Director, Federal Cooperative Extension.
B.S., Oregon State, 1922.
- JOHN ROBERT PRINCE (1959)**
Radiation Health Officer (Instructor).
B.A., Northwest Nazarene College, 1958.
- AUSTIN WYATT PRITCHARD (1953)**
Associate Professor of Zoology.
A.B., Stanford, 1948, M.A., 1949; Ph.D., Hawaii, 1953.
- HAROLD DUANE PRITCHETT (1957)**
Assistant Professor of Civil Engineering.
B.S., Oregon State, 1957, M.S., 1961.
- JAMES THOMPSON PROTHRO, JR. (1955)**
Head Coach of Football (Professor).
B.A., Duke, 1942.
- FLOYD VANCE PUMPHREY (1957)**
Assistant Professor of Agronomy, Eastern Oregon Experiment Station.
B.S., Nebraska, 1943, M.S., 1948.
- MAUD C. PURVINE (1934)**
Crook County Extension Agent, Home Economics (Associate Professor).
B.S., Oregon State, 1933.
- JACKSON KEITH PUTNAM (1958)**
Instructor in History.
B.S., North Dakota, 1952, M.A., 1956.
- LOIS PYE (1960)**
Instructor in Physical Education.
Diploma in Education (Physical Education), Whitelands College, London, 1949.
- HAZEL GUSTINE QUASDORF (1944)**
Assistant Science Librarian (Assistant Professor), Library.
B.A., Cornell College, 1920; B.S. (Lib. Sc.), Illinois, 1928.
- ROBERT JOSEPH RALEIGH (1960)**
Assistant Professor of Animal Nutrition, Squaw Butte Experiment Station.
B.S., Montana State, 1952; M.S., Utah State, 1954, Ph.D., 1959.
- ALLEN THURMAN RALSTON (1960)**
Associate Professor of Animal Science.
B.S., Montana State, 1942; M.S., Washington State, 1958, Ph.D., 1960.
- ROBERT E. RAMIG (1961)**
Associate Professor of Soils, Pendleton Experiment Station; Soil Scientist, U. S. Department of Agriculture.
B.S., Nebraska, 1943; M.S., Washington State, 1948; Ph.D., Nebraska, 1960.
- HENRY HARDY RAMPTON (1936)**
Associate Professor of Agronomy; Research Agronomist, U. S. Department of Agriculture.
B.S., Utah State, 1928; M.S., Oregon State, 1933.
- WARREN ROBERT RANDALL (1947)**
Associate Professor of Forest Management.
B.S., Idaho, 1943, M.S., 1947.
- AHMED ADEL RASHEED (1961)**
Research Associate in Nutrition (Instructor).
B.S., Cairo, 1944; M.S., Oregon State, 1949, Ph.D., 1955.
- DONALD LOUIS RASMUSSEN (1946)**
Marion County Extension Agent (Associate Professor).
B.S., Washington State, 1937; M.S., Oregon State, 1942.
- WARREN WILLARD RASMUSSEN (1958)**
Assistant Professor of Irrigation Engineering; Soil Scientist, U. S. Department of Agriculture, Malheur Experiment Station.
B.S., Utah State, 1948, M.S., 1953.
- GERALD ALFRED RATCLIFF (1963)**
Visiting Professor of Chemical Engineering.
B.A., Cambridge, 1947, M.A., 1951; Ph.D., Cornell, 1954.
- PAUL MEREDITH RAUEN (1959)**
Yamhill County Extension Agent, 4-H Club (Instructor), Federal Cooperative Extension.
A.A., Minnesota, 1949; B.S., South Dakota State, 1958.

- CECIL OTIS RAWLINGS (1946)**
Extension Horticulture Specialist (Associate Professor), (Retired).
B.S., Illinois, 1925; M.S.; New Hampshire, 1946.
- H. JOHN RAYNER (1959)**
Professor of Fisheries, Chief, Research Division, Oregon State Game Commission.
B.S., California, 1935, M.S., 1936; Ph.D., Cornell, 1941.
- KATHERINE HASKELL READ (1941)**
Professor of Family Life; Head of Department of Family Life.
A.B., Mills College, 1925; M.S., Purdue, 1938.
- ALICE LOIS REDMAN (1959)**
State 4-H Extension Agent (Assistant Professor), Federal Cooperative Extension.
B.S., Missouri, 1953; M.S., Maryland, 1959.
- ROBERT STUART REDMOND (1961)**
Captain, Assistant Professor of Military Science.
B.S. (Econ.), Niagara University, 1954.
- DONALD JAMES REED (1962)**
Assistant Professor of Chemistry, Science Research Institute.
B.S., College of Idaho, 1953; M.S., Oregon State, 1955, Ph.D., 1957.
- RUTH LUCILLE REES (1955)**
Assistant Professor of Education.
B.S., Oregon State, 1950, M.Ed., 1955.
- HAMIT DARWIN REESE (1947)**
Associate Professor of Chemistry.
B.A., Brigham Young, 1940; Ph.D., Iowa State, 1947.
- ROBERT RAY REICHART (1926-32, 1934)**
Professor of Educational Psychology.
B.S., Oregon State, 1917, M.S., 1937; D.Ed., Oregon, 1941.
- WILLIAM CURTIS REID (1937)**
Professor of Audio-Visual Instruction; Director of Audio-Visual Services, General Extension Division; Extension Specialist in Visual Instruction.
B.A., Willamette, 1929; M.S., New York, 1932; Ph.D., Oregon State, 1941.
- MARGARET CLARA REIL (1962)**
Sherman County Extension Agent (Instructor).
B.S., Nevada, 1961.
- WILBUR OTTO REIL (1962)**
Klamath County Extension Agent (Instructor).
B.S., California, 1961.
- FRANK CHARLES REIMER (1911)**
Horticulturist Emeritus, Southern Oregon Experiment Station.
B.S., Michigan State, 1903; M.S., Florida, 1905.
- LeMAR FRED REMMERT (1948)**
Professor of Chemistry, Agricultural Chemistry.
B.S., Iowa State, 1939; M.S., Oregon State, 1942; Ph.D., Wisconsin, 1949.
- JACK LOUIS RETTIG (1961)**
Assistant Professor of Business Administration.
B.S., Evansville College, 1949; M.A., San Diego State College, 1956; Ph.D., UCLA, 1962.
- DANIEL CLYDE REYNOLDS (1929)**
Consulting Physician Student Health Service; Professor of Hygiene.
B.S., Michigan, 1916, M.D., 1918.
- NAN NABORS REYNOLDS (1955)**
Instructor in Mathematics.
B.A., Oklahoma College for Women, 1938; M.S., Oklahoma State, 1940.
- ROBERT RAYMOND REYNOLDS (1956)**
Associate Professor of Mathematics.
B.Ed., Chicago Teachers College, 1941; M.S., Oklahoma State, 1948.
- ROGER RAYMOND REYNOLDS (1959)**
Producer-Announcer (KOAC AM-TV) (Instructor), General Extension Division.
B.S., Oregon State, 1960.
- IVAN FRANCIS RICHARDS (1956)**
Assistant Dean of Men (Assistant Professor).
A.A., Boston, 1951; A.B., Antioch College, 1954; M.A., Washington State, 1956.
- GEORGE ARTHUR RICHARDSON (1947)**
Professor Emeritus of Food Science and Technology and of Dairy Chemistry.
B.Sc. (Agr.), Toronto, 1920; M.S., Minnesota, 1925, Ph.D., 1927.
- RICHARD Le VOYLE RICHARDSON (1946)**
Professor of General Engineering; Head of the Department.
B.S., Oregon State, 1940.
- LOUIS EARL RICHTER (1953)**
Associate Professor of Modern Languages.
B.A., Minnesota, 1940; M.A., Oregon, 1947.
- EDWARD ERNEST RIESLAND (1957)**
Assistant Professor of Production Technology.
B.S. in M.E., Oregon State, 1957, M.S., 1960.
- JAMES LEAR RIGGS (1958)**
Associate Professor of Mechanical and Industrial Engineering.
B.S., Oregon State, 1951; M.S. (Mech. Eng.), 1958, Ph.D., 1963.
- WILBUR ALLAN RINEHART (1962)**
Instructor in Oceanography.
B.S., Bowling Green State University of Ohio, 1959; M.S., Utah, 1962.
- PAUL OSBORN RITCHER (1952)**
Professor of Entomology, Chairman of Department; Entomologist in Charge, Agricultural Experiment Station.
A.B., Illinois, 1931, A.M., 1932; Ph.D., Wisconsin, 1935.
- ELIZABETH PROPHET RITCHIE (1920)**
Catalog Librarian Emeritus (Assistant Professor).
A.B., Cotner College, 1900; B.L.S., Illinois, 1909.
- VERNA FORD RITCHIE (1961)**
Assistant Reference Librarian, Instructor.
B.A., Hunter College, 1952; M.A., McGill, 1959; M.A. L.S., Michigan, 1961.
- ALFRED NATHAN ROBERTS (1940)**
Professor of Horticulture.
B.S., Oregon State, 1939, M.S., 1941; Ph.D., Michigan State, 1953.
- ROBERT MILES ROBERTS (1953)**
Instructor in Radio Education, Producer-Announcer (KOAC AM-TV), General Extension Division.
B.A. (Mus.), Oregon, 1950.

- THOMAS EDWARD ROBERTS (1948)**
Associate Professor of Music.
B.A., Iowa Wesleyan, 1942; M.M., Chicago Musical College, 1949.
- WARREN WAYNE ROBERTS (1950-52, 1954)**
Yamhill County Extension Agent (Associate Professor).
B.S., Oregon State, 1950.
- GEORGE MORRIS ROBERTSON (1946)**
Business Manager (Professor).
B.S., Oregon State, 1941; M.S., New York, 1942.
- WILLIAM BARR ROBERTSON (1946)**
Athletic Trainer (Assistant Professor), Intercollegiate Athletics.
B.S., Oregon State, 1948.
- DAN D. ROBINSON (1944)**
Professor of Forest Management.
B.S., Oregon State, 1940; M.F., Syracuse, 1942.
- REGINALD HEBER ROBINSON (1911)**
Professor Emeritus of Chemistry.
A.B., Pacific, 1909; M.S., California, 1912.
- ASA AUSTIN ROBLEY (1938-42, 1947)**
Associate Professor of Production Technology.
B.S., Oregon State, 1939; M.S., Iowa State, 1957.
- JOHN HENRY ROCK (1958)**
Assistant Professor of Art.
B.S.Ed. (Ind. Arts), Oregon State, 1951; M.F.A. (Graphic Art), California College of Arts and Crafts, 1957.
- JEFFERSON BELTON RODGERS (1946)**
Professor of Agricultural Engineering, Head of Department.
B.S., Idaho, 1929, M.S., 1935, A.E., 1939.
- GLENN WESLEY RODNEY (1961)**
Major, USMC, Assistant Professor of Naval Science.
B.S., Western Michigan University, 1959.
- CHARLES RAYMOND ROHDE (1952)**
Associate Professor of Agronomy, Pendleton Experiment Station.
B.S., Montana State, 1947; Ph.D., Minnesota, 1953.
- KERMIT JULIUS ROHDE (1956)**
Associate Professor of Psychology.
B.S., Iowa State, 1943; M.A., Nebraska, 1949; Ph.D., Northwestern, 1951.
- ROBERT GEORGE ROSENSTIEL (1946)**
Associate Entomologist (Associate Professor), Agricultural Experiment Station.
B.S., Oregon State, 1937, M.S., 1939; Ph.D., California, 1950.
- CHARLES ROBERT ROSS (1946)**
Extension Specialist in Farm Forestry (Associate Professor).
B.S.F., Georgia, 1931; M.S.F., Washington, 1932.
- JACKSON ROSS (1951)**
State Extension Agent (Professor).
B.S., Oregon State, 1951; M.S., Wisconsin, 1960.
- LEWIS FRANKLIN ROTH (1940)**
Professor of Botany.
B.A., Miami (Ohio), 1936; Ph.D., Wisconsin, 1940.
- JACK STEVENS ROTHACHER (1961)**
Associate Professor of Forest Management, Research Forester, U. S. Forest Service.
B.S.F., Michigan, 1939; M.F., California, 1947.
- HAROLD ARMOND ROWLEY (1938)**
Chief Accountant, Oregon State System of Higher Education (Associate Professor).
B.S., Oregon State, 1925.
- DORRIS MARY ROY (1952)**
Yamhill County Extension Agent, Home Economics (Assistant Professor).
B.S., Oregon State, 1934; M.S., Wisconsin, 1962.
- ORIS CLARK RUDD (1955)**
Lake County Extension Agent (Associate Professor).
B.S., Utah State, 1951.
On sabbatical leave, 1962-63.
- ROBERT DEAN RUDD (1957)**
Associate Professor of Natural Resources, Associate Professor of Geography.
B.S., Indiana State, 1947; M.S., Wisconsin, 1949; Ph.D., Northwestern, 1953.
- JULIUS ALEXANDER RUDINSKY (1955)**
Professor of Entomology; Forest Entomologist, Agricultural Experiment Station.
Diplom Engineer in Forestry, Slovak University in Bratislava, 1944; Absolutorium in Economics, Göttingen, 1949; Ph.D., Ohio State, 1953.
- CHARLES BUDDY RUMBURG (1958)**
Assistant Professor of Agronomy; Research Agronomist, U. S. Department of Agriculture, Squaw Butte Experiment Station.
B.S., Colorado State University, 1954; M.S., Rutgers, 1956, Ph.D., 1958.
- JOHN VIRGIL RUPPERSBURG (1960)**
Major, Associate Professor of Air Science.
B.A., Emory University, 1940.
- ROBERT HARVEY RUTH (1954)**
Associate Professor of Forest Management, Research Forester, U. S. Forest Service.
B.S., Oregon State, 1943, M.F., 1950.
- PAUL MELTON RUTLAND (1955)**
Instructor in Animal Science (Horsemanship).
- CHARLES VLADIS RUZEK (1914)**
Professor Emeritus of Soils.
B.S.A., Wisconsin, 1909, M.S., 1929.
- ROGER BAKER RYAN (1961)**
Assistant Professor of Forest Entomology; Forest Entomologist, U. S. Forest Service.
B.S., New York State College of Forestry, 1953; M.S., Oregon State, 1959, Ph.D., 1961.
- AZALEA LINFIELD SAGER (1932)**
State Leader Home Economics Extension. (Retired.)
B.S., Montana State, 1919; M.A., Columbia, 1921.
- ROBERT W. SAGER (1961)**
Professor of Pharmaceutical Science, Head of Department.
B.S., Washington, 1944, M.S., 1945, Ph.D., 1949.
- RALPH WILLIAM SALISBURY (1949)**
Extension Publications Specialist (Associate Professor).
B.S., Kansas State, 1949.

- CARL WALTER SALSER (1929)**
Professor Emeritus of Education; Assistant Dean of the School of Education, 1929-47.
B.A., Kansas State Teachers (Emporia), 1911; Ed.M., Harvard, 1926.
- CLIFFORD ELROY SAMUELS (1947)**
Associate Professor of Food Science and Technology.
B.S., California, 1941; M.S., Michigan State, 1954, Ph.D., 1960.
- ROBERT MARTIN SAMUELS (1961)**
Assistant Professor of Pulp and Paper Chemistry, Forest Research Laboratory.
B.S. Ch.E., Washington, 1951.
- GARY HERMAN SANDER (1955)**
Extension Forest Products and Management Specialist (Assistant Professor).
B.S., Missouri, 1951.
- ERNEST NELSON SANDGREN (1948)**
Associate Professor of Art.
B.A., Oregon, 1943, M.F.A., 1948.
- WILLIAM EWALD SANDINE (1958)**
Associate Professor of Microbiology.
B.S., Iowa State, 1950; M.S., North Carolina State, 1955; Ph.D., Oregon State, 1958.
- HARRY RUDOLPH SANDQUIST (1945)**
Malheur County Extension Agent (Professor).
B.S., Oregon State, 1938.
- LOIS ANN SATHER (1945-48, 1952)**
Assistant Professor of Food Science and Technology.
B.S., Oregon State, 1945.
- ROY BLY SAUNDERS (1946)**
Associate Professor of Mathematics.
A.B., Whitman, 1933; M.A., Minnesota, 1940, Ph.D., 1946.
- WILLIAM ARTHUR SAWYER (1934)**
Professor, Superintendent, Squaw Butte Experiment Station, U. S. Department of Agriculture.
B.S., Oregon State, 1931.
- MURLE SCALES (1947)**
State Extension Agent (Professor).
B.S., Trinity (Texas), 1932; M.S., Iowa State, 1947.
- HENRY DELBERT SCHALOCK (1956)**
Associate Professor of Family Life.
B.S., Whitworth, 1951; M.A., Nebraska, 1953, Ph.D., 1956.
- LARRY SCHECTER (1955)**
Associate Professor of Physics.
A.B., California, 1948, M.A., 1951, Ph.D., 1953.
On sabbatical leave 1962-63.
- JEAN WILLARD SCHEEL (1946)**
Assistant Director, Federal Cooperative Extension Service (Professor).
B.S., Kansas State, 1934; M.A., Chicago, 1954.
- ESTHER PETERSEN SCHERICH (1961)**
Instructor in Secretarial Science.
B.A., Northwest Nazarene College, 1939; M.S., Oklahoma State, 1957.
- JOHN HENRY SCHMID (1953)**
Deschutes County Extension Agent, 4-H Club (Assistant Professor).
B.S., Oregon State, 1950, Ed.M., 1962.
- FRED HERMAN SCHMIDT (1962)**
Entomologist (Insect Physiologist) Entomology.
B.S., Illinois, 1957, M.S., 1959.
- GEORGE RUDOLPH SCHNEITER (1955)**
Special County Extension Agent (Assistant Professor).
B.S., Idaho, 1932, M.S., 1933.
- MIRIAM GROSSER SCHOLL (1954)**
Dean, School of Home Economics; Professor of Home Economics.
B.Sc., Washington, 1931; M.A., Columbia, 1939, Ed.D., 1954.
- HARRY AUGUST SCHOTH (1914)**
Professor Emeritus of Agronomy.
B.S., Oregon State, 1914, M.S., 1917.
- HELMUT GEORGE SCHREIMA (1959)**
Assistant Professor of Business Administration.
B.A., Willamette, 1953, LL.B., 1955.
- ELVER AUGUST SCHROEDER (1946)**
Associate Professor of English.
A.B., Elmhurst College, 1934; M.A., Illinois, 1937; Ph.D., Michigan, 1950.
- JANE FOSTER SCHROEDER (1952-59, 1960)**
Deschutes County Extension Agent (Assistant Professor).
B.S. in Home Economics, Kansas State, 1949.
- WALTER GREIFF SCHROEDER (1949)**
County Extension Agent-at-Large (Assistant Professor).
B.S., Oregon State, 1949; M.S., Wisconsin, 1957.
- JOHN ROCKWELL SCHUBERT (1951)**
Assistant Professor of Chemistry, Agricultural Chemistry.
B.S., Pennsylvania State, 1948; M.S., Oregon State, 1951, Ph.D., 1956.
- HAROLD WILLIAM SCHULTZ (1953)**
Professor of Food Science and Technology, Head of Department.
B.A., Colorado College, 1933; M.S., Iowa, 1935, Ph.D., 1937.
- HARRY WAYNE SCHULTZ (1959)**
Assistant Professor of Pharmaceutical Chemistry.
B.S., Iowa, 1952, M.S., 1957, Ph.D., 1959.
- ROBERT JAMES SCHULTZ (1962)**
Assistant Professor of Civil Engineering.
B.S. in Civil Eng., Worcester Polytechnic Institute, 1955, M.S., 1960.
- MACK WALTER SCHWAB (1959)**
Producer-Director (KOAC AM-TV), (Assistant Professor), General Extension Division.
B.A., Harvard, 1931; M.A., Stanford, 1962.
- LEO ANTON SCIUCHETTI (1946)**
Professor of Pharmacognosy, Head of Department.
B.S., Idaho State, 1940; M.S., Washington State, 1942; Ph.D., Washington, 1957.
- ALLEN BREWSTER SCOTT (1941)**
Professor of Chemistry; Assistant Director, Science Research Institute.
B.S., Oregon State, 1937; Ph.D., Washington, 1941.
- HERMAN AUSTIN SCULLEN (1920)**
Professor Emeritus of Entomology.
B.A., Oregon, 1910, M.A., 1927; Ph.D., Iowa State, 1934.

- JOHN SEADERS (1961)**
Instructor in Civil Engineering.
B.S., Oregon State, 1959.
- VELMA MAXWELL SEAT (1959)**
Extension Food Marketing Specialist. (Assistant Professor).
B.S., Washington State, 1935.
- STUART BRUCE SEATON (1950)**
Professor of Business Administration.
B.S., Central State (Oklahoma), 1933;
M.S., Oklahoma State, 1941.
- EVA MARIE SEEN (1935)**
Professor of Physical Education for Women;
Head of Department.
B.S., Knox College, 1922; M.A., Wisconsin, 1926; Ed.D., New York, 1937.
- YASUHARU SEKIZAWA (1961)**
Instructor, Science Research Institute.
B.S., University of Hokkaido, Japan, 1948,
Ph.D., 1960.
- JAMES MAURICE SELF (1962)**
Instructor in Chemistry.
B.S., Central Missouri State, 1959.
- JEAN CARYL SEVEREIDE (1957)**
Assistant Professor of Education.
B.A., Grinnell, 1948; M.Ed., Oregon, 1956.
- MARY LYDIA SEYMOUR (1955)**
Assistant Professor of Physical Education.
B.A., New York State (Albany), 1946;
M.A., Syracuse, 1951.
On sabbatical leave 1962-63.
- RICHARD WARREN SHAFER (1960)**
Associate Professor of Oceanography.
B.S., United States Naval Academy, 1940.
- EDFRED LOREN SHANNON (1945)**
Portland City Agent, 4-H Club (Associate Professor).
B.S., Oklahoma, 1922, M.S., 1932; Ph.D., Cornell, 1941.
- DONALD RAY SHAW (1960)**
Airman First Class, Instructor in Air Science.
- FRANCIS HARDING SHAW (1955)**
Associate Professor of History.
B.A., Reed, 1948; M.A., California, 1951;
Ph.D., Harvard, 1957.
- JAMES NIVEN SHAW (1919-21, 1926)**
Professor Emeritus of Veterinary Medicine.
B.S., Oregon State, 1915; B.S., D.V.M., Washington State, 1917.
- MARVIN NOBEL SHEARER (1950)**
Extension Irrigation Specialist, (Associate Professor).
B.S., Oregon State, 1948; M.S., Michigan State, 1961.
- MILTON CONWELL SHEELY (1939)**
Professor of Production Technology, Head of Department.
B.S. in M.E., Oregon State, 1939.
- WILLIS ARDEN SHEETS (1959)**
Instructor in Horticulture, North Willamette Experiment Station.
B.S., Kansas State, 1952.
- FRED MERLE SHIDELER (1929)**
Professor of Journalism, Head of Department;
Director of Information.
B.S., Kansas State, 1927; M.S., Oregon State, 1941.
- JEAN AGATHE SHIPMAN (1956)**
Consumer Marketing Specialist (Assistant Professor).
B.S., Oregon State, 1956.
On sabbatical leave, 1962-63.
- STEPHENS T. SHOU (1952)**
Assistant Reference Librarian (Assistant Professor), Library.
B.A., Yenching University (China), 1946;
M.A., Washington, 1950, B.A. (Librarianship), 1952.
- KENNETH HOWARD SHREEVE (1962)**
Research Associate (Instructor).
B.S., Oregon State, 1960.
- DEAN LEE SHUMWAY (1960)**
Instructor in Fisheries.
B.S., Oregon State, 1956, M.S., 1960.
- SHIRLEY ANN SHUTE (1962)**
Assistant Professor of Physical Education for Women.
B.S., Memphis State, 1955; M.Ed., Woman's College, North Carolina, 1958.
- THEODORE HENRY SIDOR (1952)**
Union County Extension Agent (Associate Professor).
B.S., Oregon State, 1950; M.S., Michigan State, 1961.
- RONALD WARREN SIEGRIST (1959)**
Assistant Football Coach (Instructor).
B.S., Oregon State, 1956.
- ROY RAGNAR SILEN (1954)**
Associate Professor of Forest Genetics, U. S. Forest Service.
B.S., Oregon State, 1943; M.S.F., Yale, 1948; Ph.D., Oregon State, 1960.
- CLARA LOUISE SIMERVILLE (1950-51, 1955)**
Foreign Student Counselor (Assistant Professor).
A.B., Willamette, 1928; M.A., Oregon, 1930; Ed.D., Oregon State, 1953.
- DALE DAVID SIMMONS (1959)**
Assistant Professor of Psychology.
B.A., College of Puget Sound, 1954; M.A., Oregon, 1958, Ph.D., 1961.
- HELEN SIMMONS (1962)**
Instructor in Family Life.
B.A., University of British Columbia, 1955, M.A., 1957.
- RALPH MELVIN SIMMONS (1959)**
Master Sergeant, Instructor in Air Science.
- GERALD H. SIMONSON (1961)**
Assistant Professor of Soils.
B.S., Minnesota, 1951, M.S., 1953; Ph.D., Iowa State, 1960.
- JAMES ELLIOTT SIMPSON (1957)**
Associate Professor of Psychology.
A.B., California, 1937, M.A., 1940; Ph.D., Kansas, 1957.
- HARRIET SINNARD (1963 spring term only)**
Instructor in Home Administration.
B.S., Iowa State, 1929; M.S., Oregon State, 1942.
- HERBERT REEVES SINNARD (1929-32, 1934)**
Professor of Architecture and Agricultural Engineering; Head of Department of Architecture; Registered Architect.
B.S., Iowa State, 1927, M.S., 1929.

- RUSSELL OTTO SINNHUBER (1939)**
Associate Professor of Food Science and Technology.
B.S., Michigan State, 1939; M.S., Oregon State, 1941.
- HARRIET ELEANOR SISSON (1946)**
Assistant Professor of Pharmacy.
B.S., Minnesota, 1937, M.S., 1939.
- DONALD P. SITES (1947)**
Professor of Music.
B.A., Gustavus Adolphus, 1939; M.S. (Mus. Ed.), Idaho, 1948; M.A., Columbia, 1954. On leave 1963-64.
- GORDON RUSSELL SITTON (1955)**
Associate Professor of Agricultural Economics.
B.S., Oregon State, 1940; Ph.D., Stanford, 1954.
- CHRISTINE OERTEL SJOGREN (1960)**
Assistant Professor of Modern Languages.
B.A., Mills College, 1945; Ph.D., Johns Hopkins, 1950.
- PER H. SJOGREN (1959)**
Assistant Professor of Business Administration.
Ph.B., Uppsala, 1947, Ph.M., 1948.
- FRANCIS ASBURY SKINNER (1946)**
Klamath County Extension Agent, 4-H Club (Associate Professor).
B.S., Oklahoma State, 1941.
- WENDELL HARTMAN SLABAUGH (1953)**
Assistant Dean of Graduate School, Professor of Chemistry.
B.A., North Central, 1936; M.S., North Dakota State, 1938; Ph.D., Washington State, 1950.
- LOUIS SLEGEL (1945)**
Professor of Mechanical Engineering; Head of Department of Mechanical and Industrial Engineering.
B.S., Purdue, 1931, M.S., 1932, Ph.D., 1945.
- EDWARD JOHN SLEZAK (1961)**
Associate Professor of Physical Engineering.
A.B., Michigan, 1938, M.A., 1952.
- LARRY STEWART SLOTTA (1962)**
Assistant Professor of Civil Engineering.
B.S., Wyoming, 1956, M.S., 1959; Ph.D., Wisconsin, 1961.
- LAWRENCE FREDERICK SMALL (1961)**
Assistant Professor of Oceanography.
A.B., Missouri, 1955; M.S., Iowa State, 1959, Ph.D., 1961.
- CAIRNS KING SMITH (1945)**
Professor of History.
B.A., Saskatchewan, 1921; M.A., Minnesota, 1930; Ph.D., Chicago, 1936.
- CHARLES EDWARD SMITH (1961)**
Associate Professor of Mechanical Engineering.
B.S. (M.E.), Oregon State, 1955; M.S. (M.E.), Rensselaer Polytechnic Institute, 1958; Ph.D. (Eng. Mechanics), Stanford, 1962.
- CHARLES WESLEY SMITH (1927)**
Assistant Director Emeritus Federal Cooperative Extension Service. (Professor).
B.S., Washington State, 1921.
- CLIFFORD LOVEJOY SMITH (1931-34, 1941)**
State Extension Training Agent (Professor), Federal Cooperative Extension.
B.S., Oregon State, 1929; M.S., Kansas State, 1930; Ph.D., Wisconsin, 1959.
- DEAN HARLEY SMITH (1956)**
Associate Professor of Veterinary Medicine.
B.S., Washington State, 1944, D.V.M., 1949; M.S., Oregon State, 1959.
- EARL EUGENE SMITH (1957)**
Assistant Professor of Education and Industrial Education.
B.S., Oregon State, 1950; M.A., Colorado State College, 1951.
- EDWARD DOYLE SMITH (1946, 1947)**
Associate Professor of English.
B.S., Oregon State, 1940; M.A., Oregon, 1951.
- FRANK HERSCHEL SMITH (1936)**
Professor of Botany.
B.S., Arkansas, 1929; M.S., Washington State, 1930; Ph.D., Wisconsin, 1932.
- HOWARD GEORGE SMITH (1935)**
Tillamook County Extension Agent (Associate Professor).
B.S., Oregon State, 1935.
- HOWARD HALE SMITH (1926)**
Supply Sergeant, SFC, Instructor in Military Science.
- KATHRYN HASKIN SMITH (1951-52, 1955)**
Director of Teacher Placement (Assistant Professor).
B.S., Oregon, 1949; Ed.M., Oregon State, 1952.
- MAHLON ELLWOOD SMITH (1919)**
Professor Emeritus of English. Dean of Lower Division and Service Departments 1932-49.
A.B., Syracuse, 1906; M.A., Harvard, 1909, Ph.D., 1912.
- ROBERT LEE SMITH (1962)**
Associate Professor of Food Science and Technology.
B.S., Iowa State, 1944, Ph.D., 1954.
- ROBERT LESTER SMITH (1956)**
Clackamas County Extension Agent (Associate Professor).
B.S., Oklahoma State, 1949.
- ROBERT LLOYD SMITH (1961)**
Instructor in Oceanography.
B.A., Reed, 1957; M.A., Oregon, 1959.
- ROBERT WAYNE SMITH (1943)**
Professor of History.
B.A., Kansas, 1924; M.A., Idaho, 1932; Ph.D., California, 1937.
- WESLEY WARREN SMITH (1947-48, 1956)**
Associate Professor of Mechanical Engineering.
B.Sc., Montana State, 1934, M.Eng., 1947.
- WILLIAM CHARLES SMITH (1951)**
Farm Program Director (Associate Professor) (KOAC AM-TV).
B.S., Nebraska, 1942.
- FORREST ARLO SNEVA (1952)**
Assistant Professor of Range Management; Range Conservationist, U. S. Department of Agriculture; Squaw Butte Experiment Station.
B.S., Utah State, 1952.

- JAMES DODD SNODGRASS (1961)**
Professor of Forest Products, Forest Research Laboratory.
B.S., Michigan, 1943, M.W.T., 1951.
- JOY P. SNODGRASS (1962)**
Lane County Extension Agent, 4-H Club (Instructor).
B.S., Oregon State, 1959.
- VERNE THOMPSON SNYDER (1962)**
Assistant Professor of Business Administration.
B.S., Nebraska, 1953, LL.B. (cum laude), 1958.
- INGVALD BEN SOLBERG (1947)**
Associate Professor Emeritus of Landscape Architecture.
B.L.A., Cornell, 1924.
- RAYMOND WALTER SOMMERFELDT (1956-59, 1962)**
Instructor in Physics.
B.S., Oregon, 1951; M.S., Oregon State, 1955.
- WESLEY EARL SOMMERS (1962)**
Instructor in English.
B.A., Montana, 1956.
- MARK RITTER SPONENBURGH**
Professor of Art.
Diploma, Cranbrook Academy, 1940; Cert d'Etudes, Ecole des Beaux Arts (Paris), 1946; M.A., Cairo, 1953; M.A., London, 1957.
- JOHN FREMONT SPROWLS (1952)**
Multnomah County Extension Agent (Associate Professor).
B.S., Oklahoma State, 1942; M.S., Wisconsin, 1959.
- JEANETTE RUTH STAEBLER (1962)**
Washington County Extension Agent, Home Economics (Instructor).
B.S., Oregon State, 1962.
- WALTER RICHARD STAHL (1959)**
Associate Professor of Mathematics.
B.S., M.I.T., 1951; M.D., Harvard Medical School, 1955.
- ROBERT DELMER STALLEY (1956)**
Associate Professor of Mathematics.
B.S., Oregon State, 1946, M.A., 1948; Ph.D., Oregon, 1953.
- WILLIAM NORMAN STAMMERS (1958)**
Instructor in Soils.
B.S.A., Toronto, 1954, M.S.A., 1956.
- MARYANNE KENNEDY STATON (1949)**
Assistant Professor of Family Life and Home Administration.
B.A., B.S., Oregon State, 1949, M.S., 1950.
- WARREN SPENCER STATON (1958)**
Assistant Professor of General Engineering.
B.A., B.S., Oregon State, 1950, M.S., 1951.
- FREDERICK LEE STAVER (1957)**
Assistant Professor of English.
B.A., California, 1949, M.A., 1951.
- ROBERT LLOYD STEBBINS (1962)**
Extension Horticulture Specialist (Assistant Professor).
B.S., Colorado State University, 1955; M.S., California, 1959.
- ROY WILFRED STEIN (1952)**
Associate Professor of Food Science and Technology; Extension Dairy Technologist, Marketing; Superintendent, Dairy Products Laboratory.
B.S., Oregon State, 1937, M.S., 1942.
- WILLIAM PROCURONOFF STEPHEN (1953)**
Associate Professor of Entomology; Associate Entomologist, Agricultural Experiment Station.
B.S.A., Manitoba, 1948; Ph.D., Kansas, 1952.
- LULU MARY STEPHENSON (1941)**
Curator, Horner Museum (Instructor).
- ROSCOE ELMO STEPHENSON (1923)**
Professor Emeritus of Soils.
B.S., Purdue, 1915; M.S., Illinois, 1917; Ph.D., Iowa State, 1920.
- ROBERT HOWARD STERLING (1940-42, 1956)**
Deschutes County Extension Agent (Assistant Professor).
B.S., Oregon State, 1935, M.S., 1962.
- ROBERT HUGH STEVELY (1954)**
Columbia County Extension Agent, 4-H Club (Assistant Professor).
B.S., Cornell, 1941.
- JAMES ORVAL STEVENS (1962)**
Research Associate (Instructor).
D.V.M., Washington State, 1962.
- JOHN RODNEY STEVENS (1960)**
Major, Associate Professor of Military Science.
B.S. in C.E., The Citadel, Charleston, South Carolina, 1951.
- MERWIN ALLEN STEVENS (1962)**
Crook County Extension Agent (Instructor).
B.S., Utah State, 1957, M.S., 1961.
- JEAN AGNES STEWART (1962)**
Instructor in Psychology.
B.A., University of Alberta, 1955; M.A., Boston, 1958.
- HENRY HERMAN STIPLER (1954)**
Professor of Agricultural Economics; Senior Agricultural Economist, U. S. Department of Agriculture.
Diplom Landwirt, Agricultural College (Berlin), 1928; M.S., California, 1936.
- HERBERT HORST STOEVENER (1962)**
Research Associate (Assistant Professor), Agricultural Economics.
B.S., Cornell, 1958; M.S., Illinois, 1960, Ph.D., 1963.
- LOUIS NELSON STONE (1947)**
Professor of Electrical Engineering, Head of Department.
B.S., Oregon State, 1939.
- SOLON ALLEN STONE (1956)**
Assistant Professor of Electrical Engineering.
B.S., Oregon State, 1952.
- WILLIAM MATTHEWSON STONE (1947)**
Professor of Mathematics.
B.A., Willamette, 1938; M.A., Oregon State, 1940; Ph.D., Iowa State, 1947.
- FLORENCE PATRICIA STORM (1962)**
Speech Clinician (Instructor).
B.A., Queens College, 1942.

- ROBERT MacLEOD STORM (1948)
Professor of Zoology.
B.E., Northern Illinois State Teachers,
1939; M.S., Oregon State, 1941, Ph.D.,
1948.
- CLARA A. STORVICK (1945)
Professor of Foods and Nutrition; Chairman
of Home Economics Research, Agricultural
Experiment Station.
A.B., St. Olaf College, 1929; M.S., Iowa
State, 1933; Ph.D., Cornell, 1941.
- FLOYD MADISON STOUT (1959)
Research Associate in Animal Nutrition (In-
structor).
B.S., Colorado State, 1953; M.S., Oregon
State, 1959, Ph.D., 1960.
- ANNE WRIGHT STRACHAN (1956)
Clatsop County Extension Agent, Home Eco-
nomics (Assistant Professor).
B.S., Oregon State, 1953.
- BERNICE STRAWN (1959)
Extension Specialist in Home Management
and Equipment (Associate Professor).
B.S., Iowa State, 1927, M.S., 1931.
- BERNARD LOUIS STREHLER (1962)
Visiting Associate Professor, Science Research
Institute.
B.A., John Hopkins, 1947, Ph.D., 1950.
- GERTRUDE STRICKLAND (1920)
Professor Emeritus of Clothing, Textiles, and
Related Arts.
B.S., Texas State College for Women, 1935.
- LESTER BRADEN STRICKLER (1954)
Associate Professor of Business Administra-
tion.
B.A., Pennsylvania State, 1948, M.A., 1949;
D.B.A., Indiana, 1954.
- ELIZABETH STRONG (1960)
Instructor in Oceanography.
B.A., New York State College for Teachers,
1937.
- ARTHUR D. STUMP (1961)
Research Associate (Acting Instructor) Ocea-
nography.
B.S., Oregon State, 1940, M.S., 1960.
- BERTHA WHILLOCK STUTZ (1918)
Associate Professor Emeritus of Secretarial
Science.
B.Ped., Missouri State Teachers, 1910;
B.S., Oregon State, 1918, M.S., 1927.
- CHARLES FEARN SUTHERLAND JR.
(1959)
Assistant Professor of Forest Management.
B.S., Idaho, 1948, M.F., 1954; Ph.D.,
Michigan, 1961.
- IMRE SUTTON (MR.) (1962)
Instructor in Economics.
B.A., UCLA, 1955, M.A., 1958.
- DEAN GEORGE SWAN (1955)
Assistant Professor of Agronomy, Pendleton
Experiment Station.
B.S., Wyoming, 1952, M.S., 1954.
On sabbatical leave 1962-63.
- GRANT ALEXANDER SWAN (1926)
Associate Professor of Physical Education.
B.S., Oregon State, 1922; M.S., Washing-
ton, 1951.
- STANLEY STEWART SWANSON (1962)
Senior Cataloger (Assistant Professor), Li-
brary.
B.A., Colorado, 1949, M.Ed., 1953;
M.A.L.S., Michigan, 1956.
- KNUD GEORGE SWENSON (1954)
Entomologist (Professor), Agricultural Ex-
periment Station.
B.S., South Dakota State, 1948; Ph.D., Cal-
ifornia, 1951.
- KLINE RUTHVEN SWYGARD (1947)
Professor of Political Science.
B.A., Washington, 1935, Ph.D., 1950.
- MOLLY H. SYLVESTER (1962)
Umatilla County Extension Agent, Home Eco-
nomics (Assistant Professor).
B.S., Washington, 1941, B.S. in Home Eco-
nomics, 1942; M.S., Cornell, 1953.
- SHIGEKI TAKEMORI (1962)
Instructor in Science.
B.S., University of Osaka, 1956, M.S.,
1958, Ph.D., 1961.
- GERTRUDE TANK (1953)
Associate Professor of Nutrition Research.
D.D.S., Temple, 1916.
- GENE N. TANSELLI (1962)
Assistant Professor of Physical Education.
B.S., Oregon State, 1951, M.Ed., 1960.
- ESTHER ADELIA TASKERUD (1947)
Coordinator, Home Economics Extension Pro-
grams (Professor).
B.S., South Dakota State, 1933; M.A., Co-
lumbia, 1947; Sc.D., South Dakota State,
1962.
- JOHN FLETCHER TATOM (1961)
Assistant Professor of Physics, Research As-
sociate.
B.S., U. S. Naval Academy, 1930; M.S.,
Cal Tech., 1939.
- WILLIAM HARRIS TAUBENECK (1951)
Associate Professor of Geology.
B.S., Oregon State, 1949, M.S., 1950;
Ph.D., Columbia, 1955.
- LISA WAITE TAUBMAN (1956)
Instructor in Psychology.
B.A., Washington, 1948; M.Ed., Mills Col-
lege, 1952.
- EDWARD MORGAN TAYLOR (1962)
Instructor in Geology.
B.S., Oregon State, 1958, M.S., 1960.
- NORTON OSCAR TAYLOR (1946-48, 1949)
Umatilla County Extension Agent (Associate
Professor).
B.S., Oregon State, 1942.
- WAYNE PENDLETON TAYSOM (1953)
Associate Professor of Art.
B.F.A., Utah, 1948; M.A., Columbia, 1950.
- RAY HOLT TEAL (1950)
Extension Seed and Grain Marketing Spe-
cialist (Associate Professor).
B.S., Illinois, 1935; M.S., 1937.
- HENRY ARNOLD TEN PAS (1948)
Professor of Agricultural Education; Head of
Department.
B.S., Wisconsin, 1940; M.S., Oregon State,
1949; Ed.D., Washington State, 1954.

- LEON C. TERRIERE (1950)**
Professor of Bio-Chemistry and Insect Toxicology. Agricultural Chemistry and Entomology. B.S., Idaho, 1943; Ph.D., Oregon State, 1950.
- JOHN RALPH THIENES (1952)**
Wasco County Extension Agent (Assistant Professor). B.S., Oregon State, 1949.
- MARTIN BERNHARDT THINGVOLD (1954)**
Benton County Extension Agent (Assistant Professor). B.S., Oregon State, 1953.
- CHARLES EDWIN THOMAS (1918)**
Professor Emeritus of Mechanics and Materials. M.E., Cornell. 1913, M.M.E., 1931.
- DALE OREN THOMAS (1956)**
Associate Professor of Physical Education; Varsity Wrestling Coach, Freshman Wrestling Coach. B.A., Cornell College, 1947; M.P.E., Purdue, 1948; Ph.D., Iowa, 1956.
- MARION DAWS THOMAS (1937-45, 1947)**
Extension Agricultural Economist (Professor). B.S., Oregon State, 1937.
- BENJAMIN GARRISON THOMPSON (1924)**
Professor Emeritus of Entomology. B.S., Oregon State, 1918; M.S., 1924; Ph.D., Washington, 1939.
- BETTY LYND THOMPSON (1927)**
Associate Professor of Physical Education for Women. A.B., Illinois Wesleyan, 1923; M.A., Wisconsin, 1926.
- CLARENCE GARRISON THOMPSON (1960)**
Entomologist (Professor), United States Forest Service. B.S., Oregon State, 1940; M.S., California, 1947; Ph.D., 1950.
- JOHN GRAY THOMPSON (1948)**
Umatilla County Extension Agent, 4-H Club (Associate Professor). B.S., Oregon State, 1948.
- THOMAS WILLIAM THOMPSON (1949)**
Sherman County Extension Agent (Associate Professor). B.S., Oregon State, 1949.
- GEORGE EARL THORNBURGH (1952)**
Associate Professor of Mechanical Engineering. B.S., Nebraska, 1944; M.S., Iowa State, 1950.
- CURTIS B. THORNE (1961)**
Professor of Microbiology. B.S., West Virginia Wesleyan College, 1943; M.S., Wisconsin, 1944, Ph.D., 1948.
- ROBERT LEWIS TICKNOR (1959)**
Associate Professor of Horticulture, North Willamette Experiment Station. B.S., Oregon State, 1950; M.S., Michigan State, 1951, Ph.D., 1953.
- IAN JAMES TINSLEY (1957)**
Assistant Professor of Chemistry, Agricultural Chemistry. B.Sc., Sydney University (Australia), 1950; M.S., Oregon State, 1955, Ph.D., 1958.
- PALMER STANLEY TORVEND (1939)**
Washington County Extension Agent (Professor). B.S., Oregon State, 1938; M.S., Columbia, 1953.
- RICHARD EDWARD TOWEY (1962)**
Assistant Professor of Economics. B.S., University of San Francisco, 1954; M.A., California (Berkeley), 1957.
- LOUIS NAPOLEON TRAVER (1918-22, 1940-49)**
General Superintendent of Physical Plant (Retired).
- BESSIE GWYNETH TRESSLER (1946)**
Order Librarian (Associate Professor), Library. A.B., Emporia, 1926; B.S. (Lib.Sc.), Illinois, 1930.
- EDWARD JOHN TRIONE (1959)**
Assistant Professor of Plant Pathology; Biochemist, U. S. Department of Agriculture; Science Research Institute. B.A., Chico State, 1950; Ph.D., Oregon State, 1957.
- RICHARD HENRY TROJAN (1956)**
Assistant Professor of Art. B.A., Fresno State, 1948; M.A., Columbia, 1953.
- EDRIE DALE TROUT (1962)**
Professor of Radiological Physics in General Science. B.S., Franklin College, 1922, D.Sc. (Honorary), 1952.
- WILLIAM BENJAMIN TUCKER (1921)**
County Agent Emeritus, Jackson County (Professor).
- KARL UHER (1962)**
Associate Professor of Modern Languages. Lehramtsprüfung für Mittelschulen, University of Vienna, 1934, Dr. Phil., 1936, Oberstudienrat, 1961.
- CAROL ULLOCK (1962)**
Instructor in Family Life. B.S., Washington State, 1961.
- WILLIAM FRANCIS UNSOELD (1958)**
Assistant Professor of Philosophy. B.S., Oregon State, 1951; B.D., Pacific School of Religion, 1954; Ph.D., Washington, 1959. On leave of absence 1962-64.
- PAUL BARTHOLOMEW VALENTI (1949)**
Assistant Basketball Coach (Assistant Professor). B.S., Oregon State, 1947, M.S., 1957.
- NORBERT JOSEPH VANDEHEY (1959)**
Linn County Extension Agent, 4-H Club (Assistant Professor). B.S., Oregon State, 1949; M.Ed., Linfield College, 1955.
- EDNA MARJORIE VAN HORN (1939-40, 1942, 1944)**
Professor of Home Administration. B.A., Colorado College, 1923; M.A., Columbia, 1932, Ph.D., 1953.
- ANTONE CORNELIS VAN VLIET (1955)**
Assistant Professor of Forest Products. B.S., Oregon State, 1952, M.S., 1958.

- WILLIAM ROY VARNER** (1920-32, 1934)
Professor Emeritus of Physics.
B.S., Oregon State, 1912; E.E., Westinghouse, 1914; M.S., Oregon State, 1932, Ph.D., 1939.
- GEORGE WALLACE VARSEVELD** (1963)
Assistant Professor of Food Science and Technology.
B.S., University of Alberta, 1957; M.S., Oregon State, 1953.
- EDWARD KEMP VAUGHAN** (1947)
Professor of Plant Pathology.
B.S., New Mexico State, 1929; M.S., Oregon State, 1932; Ph.D., Minnesota, 1942.
- ERNEST VAN COURT VAUGHN** (1924)
Professor Emeritus of History.
B.L., Missouri, 1900, M.A., 1904; Ph.D., Pennsylvania, 1910.
- LYMAN RAY VAWTER** (1951)
Professor Emeritus of Veterinary Medicine.
D.V.M., Kansas State, 1918; M.S., Cornell, 1931.
- JUNIUS DANIEL VERTREES** (1949-53, 1957)
Klamath County Extension Agent (Associate Professor).
B.S., Oregon State, 1940.
- HAROLD ROTH VINYARD** (1938)
Associate Professor of Physics.
B.S. (E.Eng.), Oregon State, 1924, M.S., 1928; Ph.D., Pennsylvania State, 1938.
- EDMUND HOWELL VOLKART** (1962)
Dean, School of Humanities and Social Sciences.
B.A., St. John's College, 1939; M.A., Yale, 1942, Ph.D., 1947.
- FRANK VON BORSTEL, JR.** (1948)
Douglas County Extension Agent, 4-H Club (Assistant Professor).
B.S., Oregon State, 1948; M.Agr.Sc., University of New Zealand, 1952.
- STANLEY ELLIOTT WADSWORTH** (1946)
Associate Professor of Floriculture.
B.S., Cornell, 1935.
- HARRY HENRY WAGNER** (1959)
Instructor in Fisheries; Fishery Biologist, Research Division, Oregon State Game Commission.
B.S., Humboldt State, 1955; M.S., Oregon State, 1959.
- GEORGE FORDYCE WALDO** (1932)
Professor of Horticulture; Horticulturist, U. S. Department of Agriculture.
B.S., Oregon State, 1922; M.S., Michigan State, 1926.
- RODNEY KING WALDRON** (1954)
Associate Librarian (Professor), Library.
B.A., Denver, 1950, M.A., 1950.
- JOSEPH HOWE WALES** (1963)
Associate Professor of Food Science and Technology.
B.A., Stanford, 1930, M.A., 1931.
- ALICE LOCKWOOD INGALLS WALLACE** (1954)
Assistant Professor of Speech.
B.S., Oregon State, 1932; M.A., Northwestern, 1938.
- JOE DEREK WALLACE** (1958)
Assistant Professor of Animal Husbandry, Squaw Butte Experiment Station.
B.S., New Mexico A and M, 1957; M.S., Texas A and M, 1959.
- MARY SUSANNE WALLACE** (1958)
Assistant Professor of Foods and Nutrition.
B.S., New York State University Teacher's College (Plattsburg), 1955; M.S., Rhode Island, 1957.
- CARL JOSEPH WALLEN** (1962)
Assistant Professor of Education.
A.B., California, Santa Barbara, 1956; M.A., San Francisco State, 1960; Ed.D., Stanford, 1962.
- ROBERT BOEN WALLS** (1947)
Professor of Music; Director of Music; Head of Department.
B.E., Minnesota State Teachers (Moorhead), 1932; M.S., North Dakota, 1936.
- DON COIN WALROD** (1948)
Columbia County Extension Agent (Associate Professor).
B.S., Colorado State University, 1942; M.S., Michigan State, 1960.
- AUSTIN FREDERIC WALTER** (1950)
Professor of Political Science; Chairman of Department.
B.A., Carleton, 1940; M.A., Fletcher School of Law and Diplomacy, 1942; Ph.D., Michigan, 1954.
- JESSE SEBURN WALTON** (1945)
Professor of Chemical Engineering; Head of Department.
B.S., Iowa, 1928.
- CHIH HSING WANG** (1950)
Professor of Chemistry; Professor (Chemistry); Science Research Institute; Director, Radiation Center.
B.S., University of Shantung, China, 1937; M.S., Oregon State, 1947, Ph.D., 1950.
- MARGARET CHRISTIAN WARE** (1945)
Assistant Professor of Foods and Nutrition. (Retired.)
B.S., Oregon State, 1941, M.S., 1944.
- CHARLES F. WARNATH** (1961)
Director of Counseling Center; Associate Professor of Psychology.
A.B., Princeton, 1949; M.A., Teacher's College, Columbia, 1951; Ph.D., Columbia, 1954.
- HARRIET JANET WARNER** (1930)
Assistant Reference Librarian Emeritus (Assistant Professor), Library.
A.B., California, 1919; Certificate of Librarianship, 1930.
- CHARLES EDWARD WARREN** (1953)
Associate Professor of Fisheries.
B.S., Oregon State, 1949, M.S., 1951; Ph.D., California, 1961.
- REX WARREN** (1934-45, 1947)
Extension Farm Crops Specialist (Professor).
B.S., Utah State, 1931; M.S., Oregon State, 1933.
- JOSEPHINE WASSON** (1943)
Associate Professor of Art and Architecture.
B.A., Washington State, 1925; M.A., Columbia, 1933.

- JOHN LOWE WATSON (1947)**
Assistant Comptroller, Oregon State System of Higher Education (Professor).
B.A., Washington, 1939; C.P.A., Washington, 1939; Oregon, 1952.
- ROBERT STUART WATSON (1955)**
Assistant Football Coach (Assistant Professor).
B.S., California (Los Angeles), 1951.
- DARRELL GLEN WATTS (1960)**
Instructor in Agricultural Engineering.
B.S., Oklahoma State, 1960; M.S., California, 1962.
- FRANCES MARGARET WATTS (1958)**
Coos County Extension Agent (Home Economics) (Assistant Professor).
B.S., Minnesota, 1949.
- THELMA LOIS WATTS (1962)**
Instructor in Foods and Nutrition.
B.S., California (Davis), 1962.
- JACK LLOYD WAUD (1955)**
Extension Certification Specialist (Instructor).
B.S., Oregon State, 1955.
On sabbatical leave, 1962-63.
- DAROLD DUANE WAX (1962)**
Instructor in History.
B.A., Washington State, 1956; M.A., Washington, 1959, Ph.D., 1962.
- ROGER K. WEAVER (1962)**
Instructor in English.
B.A., Oregon, 1957; M.A., Washington, 1962.
- LEONARD JOSEPH WEBER (1954)**
Associate Professor of Electrical Engineering.
B.S., Oregon State, 1952; M.S., Washington, 1962.
- EMMA LOUISE WEBSTER (1953)**
Multnomah County Extension Agent, Home Economics (Associate Professor).
B.S., Washington State, 1930.
- ERMA MARION WEIR (1945)**
Associate Professor of Physical Education for Women.
B.E., Minnesota State Teachers (Bemidji), 1936; M.S., Washington, 1941.
On sabbatical leave 1962-63.
- VIRGINIA RUTH WEISER (1949-54, 1961)**
Extension Foods and Nutrition Specialist (Associate Professor).
B.A., Hunter College, 1947; M.S., Michigan State, 1949.
- EARL WILLIAM WELLS (1921)**
Professor of Speech; Chairman of Department.
A.B., Iowa, 1921; M.A., Wisconsin, 1927; J.D., Iowa, 1928.
- VERA LUCILE WELLS (1948)**
Assistant Professor of Clothing, Textiles, and Related Arts.
B.S., Oregon State, 1948, M.S., 1953.
- JAMES RICHARD WELTY (1958)**
Associate Professor of Mechanical Engineering.
B.S., Oregon State, 1954, M.S., 1959, Ph.D., 1962.
- HAROLD ELDON WERTH (1949-51, 1956)**
Benton County Extension Agent (Assistant Professor).
B.S., Oregon State, 1948.
- WILLIAM IRVIN WEST (1946)**
Professor of Forest Products; Head of Department.
B.S.F., Washington, 1939, M.F., 1941.
- HAZEL KELSEY WESTCOTT (1919-21, 1926)**
Administrative Assistant (Assistant Professor), President's Office. (Retired.)
B.S., Oregon State, 1920.
- PETER HUGHES WESTIGARD (1962)**
Assistant Professor of Entomology, Southern Oregon Experiment Station.
A.B., San Jose State, 1956; Ph.D., California, 1961.
- MELVIN NEIL WESTWOOD (1960)**
Associate Professor of Horticulture.
B.S., Utah State, 1952; Ph.D., Washington State, 1956.
- PAUL HENRY WESWIG (1941)**
Professor of Chemistry, Agricultural Chemistry.
B.A., St. Olaf College, 1935; M.S., Minnesota, 1939, Ph.D., 1941.
- BOB LEE WHALEY (1959)**
Instructor in Irrigation Engineering, Irrigation Water Forecasting.
A.A., Boise Junior College, 1955; B.S., (Ag.Eng.), Idaho, 1958.
- WILLIAM PERRY WHEELER (1949)**
Associate Professor of Forest Management; Personnel Director, School of Forestry.
B.S., Minnesota, 1948, M.F., 1949.
- HAROLD H. WHITE (1931)**
Professor of Agronomy, Superintendent, Southern Oregon Experiment Station.
B.S., Oregon State, 1920, M.S., 1937.
- JAMES MICHAEL WHITE (1962)**
Instructor in Business Administration.
B.B.A., Notre Dame, 1961; M.B.A., Ohio State, 1962.
- SIDNEY DOUGLAS WHITE (1958)**
Associate Professor of Art.
B.A., New Mexico, 1951; M.S., Wisconsin, 1952.
- WILLIAM QUENTIN WICK (1960)**
Tillamook County Extension Agent (Assistant Professor).
B.S., Oregon State, 1950, M.S., 1952.
- CHARLES EDWARD WICKS (1954)**
Professor of Chemical Engineering.
B.S., Oregon State, 1950; M.S., Carnegie Institute of Technology, 1952, Ph.D., 1954.
- ERNEST HERMAN WIEGAND (1919)**
Professor Emeritus of Food Technology.
B.S.A., Missouri, 1914.
- BERT GUY WILCOX (1962)**
Jackson County Extension Agent (Assistant Professor).
B.S., Utah State, 1957; M.S., Oregon State, 1961.
- CURTIS J. WILDER (1944)**
Associate Professor of Food Science and Technology.
B.S., Montana State, 1940, M.S., 1941.
- BILLY HUGHEL WILKINS (1961)**
Assistant Professor of Economics.
B.B.A., Texas College of Arts and Industries, 1956, M.S., 1957; Ph.D., Texas, 1962.

- WILLIAM DONALD WILKINSON (1932)**
Professor of Geology; Chairman of Department.
B.A., Oregon, 1923, Ph.D., 1932.
- DALE HERBERT WILLEY (1959)**
Instructor in English.
B.A., Linfield, 1950; M.A., Washington State, 1952.
- EARL CLARK WILLEY (1921)**
Professor Emeritus of General Engineering.
B.S., Oregon State, 1921, M.S., 1941.
- CARROLL BURNS WILLIAMS, JR. (1961)**
Instructor in Forest Management; Research Forester, United States Forest Service.
B.S., Michigan, 1955, M.S.F., 1957.
- JESSAMINE CHAPMAN WILLIAMS (1923)**
Professor Emeritus of Foods and Nutrition.
B.S., Columbia, 1906, M.A., 1921.
- MAX BULLOCK WILLIAMS (1941)**
Professor of Chemistry.
B.S., Utah, 1936, M.S., 1938; Ph.D., Cornell, 1941.
- RUSSELL WILLARD WILLIAMSON (1946)**
Associate Professor of Production Technology.
B.S., Oregon State, 1935; M.A., Minnesota, 1948.
On leave 1962-63.
- STANLEY ELLSWORTH WILLIAMSON (1946)**
Professor of Science Education; Chairman of Department.
B.A., Nebraska Wesleyan, 1931; M.A., Columbia, 1936; Ed.D., Oregon, 1956.
- DAVID LEE WILLIS (1962)**
Assistant Professor of General Science.
B.Th., Biola College, 1949; B.A., 1951; B.S., Wheaton College, 1952; M.A., Long Beach State College, 1954.
- CLAYTON STANLEY WILLS (1958)**
Clackamas County Extension Agent (Assistant Professor).
B.S., Oregon State, 1950, M.Ed., 1957.
- CHARLES OWENS WILSON (1959)**
Dean of the School of Pharmacy. Professor of Pharmaceutical Chemistry.
Ph.C., Washington, 1932, B.S., 1934, M.S., 1935, Ph.D., 1938.
- MAUD MATHES WILSON (1925)**
Professor Emeritus of Home Economics Research.
B.S., Nebraska, 1913; A.M., Chicago, 1931.
- NORMAN WILLIAM WILSON (1947)**
Assistant Professor of English.
A.B., Linfield, 1930; M.A., Oregon, 1940.
- ODELIA JUNGERS WILSON (1958)**
Assistant Professor of Music.
A.B., College of St. Teresa, 1930; M.S., Oregon, 1954.
- ROBERT CLAUDE WILSON (1949)**
Assistant Professor of Production Technology.
B.S., Oregon State, 1949, Ed.M., 1955.
- ROBERT ELLIOT WILSON (1957)**
Associate Professor of Mechanical Engineering.
B.S., Oregon State, 1955; M.S., Illinois, 1956.
On leave 1962-63.
- ROBERT LEE WILSON (1952)**
Associate Professor of Forest Engineering.
B.A., Iowa, 1942; M.F., Colorado State University, 1947.
- SHERWOOD ANN WILSON (1959)**
Instructor in Psychology.
B.S. (Ed.), Kansas, 1954, M.A., 1956.
- GUSTAV HANS WILSTER (1929)**
Professor Emeritus of Dairy Technology.
B.S., Iowa State, 1920, M.S., 1921, Ph.D., 1928.
- EDNA MAE WIMSATT (1951)**
Malheur County Extension Agent, Home Economics (Assistant Professor).
B.S., Drexel Institute of Technology, 1950.
- CARLYN REO WINGER (1938)**
Professor of Speech.
B.A., Washington State, 1928, M.A., Wisconsin, 1932.
- FRED EVERETT WINGER (1947)**
Professor of Business Education and Secretarial Science.
B.S., Nebraska, 1934; M.A., Iowa, 1938; D.Ed., Oregon, 1951.
- JUDITH HOFSTRA WINKLER (1957)**
Instructor in Physical Education for Women.
B.S. (Ed.), Michigan, 1957.
- WILLIAM WINKLER (1957)**
Assistant Professor of Physical Education, Varsity Swimming Coach.
B.S. (Ed.), Michigan, 1955, M.S. (Ed.), 1960.
- EUGENE PHILIP WINTERS (1954)**
Jackson County Extension Agent (Assistant Professor).
B.S., Oregon State, 1950.
On sabbatical leave 1962-63.
- PETER H. V. WINTERS (1962)**
Psychiatric Consultant, Student Health Service (Professor).
Doctorandus Medicinal, University of Amsterdam, 1954.
- DON ALLEN WITCRAFT (1961)**
Instructor, Research Associate in Mathematics.
B.S., Oregon State, 1956, M.S., 1961.
- GERTRAUDE CHRISTA WITTIG (1962)**
Microbiologist United States Forest Service, Visiting Associate Professor of Entomology.
Dr. rer. nat., University of Tübingen, 1955.
- DONALD JAMES WOELFLE (1960)**
Senior Chief Yeoman, USN, Instructor in Naval Science.
- FLOYD BYRON WOLBERG (1945)**
Associate Professor of Animal Science.
B.S., Wisconsin, 1928, M.S., 1932.
- JOHN WILLIAM WOLFE (1947)**
Associate Professor of Agricultural Engineering.
B.S., South Dakota State, 1939; M.S., Idaho, 1940; Ph.D., Utah State, 1959.
- GREGORY BURTON WOOD (1951)**
Professor of Agricultural Economics, Head of Department.
B.S., Oregon, 1938; M.S. Oregon State, 1940; Ph.D., Wisconsin, 1945.
- JACK HENRY WOOD (1948)**
Clatsop County Extension Agent (Associate Professor).
B.S., Washington State, 1947; M.A., Columbia (Extension Education), 1958.

- JAMES STUART WOODLAND (1962)**
Assistant Basketball Coach (Instructor).
B.S., Oregon State, 1962.
- ETHAN LINDEN WOODS (1934)**
Crook County Extension Agent (Associate Professor).
B.S., Oregon State, 1934.
- ROBERT A. WORK (1929)**
Head, Water Supply Forecasting Section (Professor), U. S. Department of Agriculture (Portland).
B.S., California, 1927.
- CLYTIE MAE WORKINGER (1910)**
Assistant Professor Emeritus of Education.
- GRACE IRENE WORKMAN (1957)**
Portland City Extension Agent (4-H Club) (Assistant Professor).
B.S., Oregon State, 1936.
- ERNEST WRIGHT (1961)**
Professor of Forest Pathology, Forest Research Laboratory.
B.S., Oregon State, 1923; M.S., California, 1928; Ph.D., Nebraska, 1941.
- LeROY CLINTON WRIGHT (1929)**
Baker County Extension Agent (Associate Professor).
B.S., Oregon State, 1929.
- ARTHUR S. H. WU (1952)**
Assistant Professor of Animal Physiology.
B.S., National Central (China), 1941; M.S., Oregon State, 1949, Ph.D., 1952.
- ROSALIND WULZEN (1933)**
Professor Emeritus of Zoology.
B.S., California, 1904, M.S., 1910; Ph.D., California, 1914; Sc.D., Oregon, 1943.
- BRUCE WYATT (1959)**
Research Associate (Instructor) in Oceanography.
B.S., Humboldt State, 1956; M.S., Oregon State, 1959.
- FRANK OLIVER WYSE (1958)**
Instructor in Mathematics.
A.B., Harvard, 1952; A.M., Princeton, 1955.
- HOYA Y. YANG (1943)**
Associate Professor of Food Science and Technology.
B.S., Nanking, 1936; M.S., Oregon State, 1940, Ph.D., 1943.
- CHARLES THEODORE YERIAN (1937)**
Professor, Head of Departments of Business Education and Secretarial Science.
B.S., Oregon State, 1932; M.S., Iowa, 1936, Ph.D., 1938.
- RAY ARNOLD YODER (1949)**
Associate Professor of Forest Management.
B.S., Oregon State, 1941; M.F., Harvard, 1942.
- NICHOLAS J. YONKER (1962)**
Assistant Professor of Philosophy and Religion.
B.A., Hope College, 1950; M.A., Columbia, 1956, Ph.D., 1960.
- DONALD EDWARD YOST (1962)**
Assistant Professor of Chemical Engineering.
B.S., Delaware, 1958.
- DeLOSS PALMER YOUNG (1927)**
Professor of Speech; Acting Chairman Department of Speech.
B.S., Oregon State, 1926.
- FREDERICK HARRIS YOUNG (1961)**
Associate Professor of Mathematics.
B.A., Oregon State, 1938. M.A., 1948; Ph.D., Oregon, 1951.
- J. LOWELL YOUNG (1957)**
Assistant Professor of Soils; A.R.S., U. S. Department of Agriculture.
B.S., Brigham Young, 1953; Ph.D., Ohio State, 1956. Postdoctoral fellow, Department of Agricultural Biochemistry, Ohio State, 1956-57.
- MARVIN MILES YOUNG (1958)**
Josephine County Extension Agent (Assistant Professor).
B.S., Oregon State, 1954; M.E., Colorado State University, 1962.
- ROY ALTON YOUNG (1948)**
Professor, Chairman of Department of Botany; Head Botany and Plant Pathology, Agricultural Experiment Station.
B.S., New Mexico A and M, 1941; M.S., Iowa State, 1942, Ph.D., 1948.
- CHESTER THEODORE YOUNGBERG (1952-57, 1958)**
Professor of Forest Soils.
B.S., Wheaton College, 1941; M.F., Michigan, 1947; Ph.D., Wisconsin, 1951.
- HAROLD WAYNE YOUNGBERG (1960)**
Washington County Extension Agent (Instructor).
B.S., Oregon State, 1951.
- RUTH TANIS YOUNGBERG (1962)**
Assistant Catalog Librarian (Instructor).
B.A., Wheaton College, 1936; B.S. in L.S., Illinois, 1939.
- TE CHANG YU (1961)**
Assistant in Chemistry, Agricultural Chemistry.
B.S., Taiwan Teacher's College, 1950.
- TEH CHU YU (1951)**
Assistant Professor of Food Science and Technology.
B.S., Fukien Christian University, 1940; M.S., Oregon State, 1951.
- JOHN ALFRED YUNGEN (1950)**
Assistant Professor of Agronomy, Southern Oregon Experiment Station.
B.S., Oregon State, 1950, M.S., 1959.
- EDWIN ARTHUR YUNKER (1925)**
Professor of Physics; Chairman of Department; Director, Engineering Physics.
A.B., California, 1924; Ph.M., Wisconsin, 1930; Ph.D., Stanford, 1940.
- ROBERT JOSEPH ZAWORSKI (1958)**
Assistant Professor of Mechanical Engineering.
S.B. (Mech. Eng.), MIT, 1947, S.M. (Mech. Eng.), 1958.
- LESLIE ZEIGLER (1959)**
Instructor in Philosophy and Religion.
B.S., California, 1936, M.L.S., 1959; B.D., Pacific School of Religion, 1954, Th.D., 1957.
- ROBERT ZELINKA (1955)**
Assistant Football Coach (Instructor).
B.S., California (Los Angeles), 1952.

- FRANKLIN ROYALTON ZERAN (1947)
Dean, School of Education; Director of Summer Session; Professor of Education, Head of Department.
A.B., Wisconsin, 1930, M.A., 1932, Ph.D., 1937.
- ADOLPH ZIEFLE (1914)
Professor Emeritus of Pharmacy.
Ph.C., Michigan, 1904, B.S., 1907, M.S., 1919; Phar.D., Pittsburgh, 1928. Dean of the School of Pharmacy 1914-45.
- QUENTIN BLISS ZIELINSKI (1947)
Associate Professor of Horticulture.
B.S., Oregon State, 1941; M.S., Ohio State, 1942; Ph.D., Virginia, 1947.
- MARTIN JOSEPH ZIMMERMAN (1960)
Sherman County Extension Agent (Instructor).
B.S., Oregon State, 1953.
- CHARLES EDWARD ZIMMERMANN (1962)
Instructor in Agronomy, Research Agronomist USDA.
B.S., Wisconsin, 1954; M.S., Oregon State, 1962.
- THOMAS G. ZINN, JR. (1962)
Columbia County Extension Agent (Instructor).
B.S., Oregon State, 1956.
- AFTON ZUNDEL (1934-44, 1957)
Clackamas County Extension Agent (Associate Professor).
B.S., Oregon State, 1929.
- FRED CASPER ZWAHLEN, JR. (1950)
Associate Professor of Journalism; News Bureau Assistant.
B.A., Oregon State, 1949; A.M., Stanford, 1952.

ASSISTANTS

- WILBUR C. ANDERSON (1961)
Assistant in Horticulture, Mid-Columbia Experiment Station.
B.S., Oregon State, 1962.
- FORREST SANDUSKY BAKER, JR. (1960)
Assistant in Transportation Economics; Coordinator Transportation Research Institute.
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Oregon State System of Higher Education

- ROY E. LIEUALLEN, Ed.D., L.H.D., Chancellor, State System of Higher Education, Professor.
B.S. (1940), L.H.D. (1959), Pacific; M.S. (1947), Oregon; Ed.D. (1955), Stanford. With System since 1946, Chancellor since 1961.
- DAVID W. E. BAIRD, M.D., LL.D., Dean of Medical School; Professor of Medicine.
M.D. (1926), Oregon; LL.D. (1946), Portland. With System since 1927, dean, Medical School, since 1943.
- FRANK BROWN BENNETT, Ed.D., President, Eastern Oregon College; Professor.
B.A. (1921), Willamette; M.A. (1933), Oregon; Ed.D. (1948), Willamette. With System since 1952, president, Eastern Oregon, since 1952.
- HERBERT ARNOLD BORK, M.S., C.P.A., Comptroller and Bursar, State System of Higher Education; Dean; Professor.
B.A. (1924), Wisconsin; C.P.A. (1926); M.S. (1940), Oregon State. With System since 1934, comptroller since 1934.
- WILLIAM HUGH CARLSON, M.A. (Lib.Sc.), Director of Libraries; Professor.
A.B. (1924), Nebraska; certificate (1926), New York State Library School; M.A. (Lib. Sc.) (1937), California. With System since 1945.
- RICHARD LYLE COLLINS, M.A., C.P.A., Secretary of the Board and Budget Director, State System of Higher Education; Professor.
B.B.A. (1927), Oregon; C.P.A. (1931); M.A. (1940), Columbia. With System 1927-29 and since 1932, budget director since 1948.
- ARTHUR S. FLEMMING, A.M., LL.D., President, University of Oregon; Professor.
A.B. (1927), LL.D. (1941), Ohio Wesleyan; A.M. (1928), LL.D. (1942), American; LL.B. (1933), George Washington; numerous honorary degrees. With System since 1961, president, University of Oregon, since 1961.
- JAMES HERBERT JENSEN, Ph.D., President, Oregon State University; Professor.
B.S. (1928), A.M. (1930), Nebraska; Ph.D. (1935), Wisconsin. With System since 1961, president, Oregon State, since 1961.
- DONALD B. LARSON, B.A., Assistant Chancellor and Director of Public Services, Professor.
B.A. (1938) Montana State. With System since 1953, assistant chancellor since 1962.
- BRANFORD P. MILLAR, Ph.D., President, Portland State College, Professor.
A.B. (1935), A.M. (1938), Ph.D. (1946), Harvard. With System since 1959, president, Portland State, since 1959.
- HAROLD J. NOYES, D.D.S., M.D., Dean of Dental School; Professor of Dentistry.
Ph.B. (1923), M.D. (1933), Chicago; B.S. (1928), D.D.S. (1928), Illinois. With System since 1946, dean, Dental School, since 1946.
- WINSTON D. PURVINE, A.B., LL.D., Director, Oregon Technical Institute; Associate Professor.
A.B. (1933), LL.D. (honorary, 1960), Lewis and Clark (Albany College). With System since 1960, director, Oregon Technical Institute, since 1947.
- LEONARD W. RICE, Ph.D., President, Oregon College of Education; Professor.
B.A. (1941), Brigham Young; M.A. (1943), Ph.D. (1950), Washington. With System since 1962, president, Oregon College, since 1962.
- MILES C. ROMNEY, Ph.D., Vice Chancellor of Academic Affairs, State System of Higher Education, Professor of Education.
B.S. (1935), Utah State; Ph.D. (1947), Columbia. With System since 1952, Vice Chancellor since 1963.
- JAMES W. SHERBURNE, Ph.D., Dean, General Extension Division; Professor.
A.B. (1927), Greenville College; M.A. (1928), Michigan; Ph.D. (1938), Ohio State. With System since 1938, dean, Extension Division, since 1956.
- ELMO NALL STEVENSON, Ed.D., President, Southern Oregon College; Professor.
A.B. (1927), San Jose State; A.M. (1929), Ed.D. (1938), Stanford. With System since 1929, president, Southern Oregon, since 1945.

Summary of Enrollment—1961-62

ENROLLMENT BY CURRICULUM AND CLASS, REGULAR SESSION, 1961-62

Curriculum	Fresh- man year	Sopho- more year	Junior year	Senior year	Grad- uate	Spe- cial	Sub- total	Total	
<i>Liberal Arts and Sciences</i>									
School of Humanities and Social Sciences	462	371	161	71	.....	36	1,101	
School of Science	523	367	234	247	562	19	1,952		
Total, Liberal Arts and Sciences, excluding duplicates	985	738	395	318	562	55		3,053	
<i>Professional Curricula</i>									
School of Agriculture	192	170	123	141	178	9	813		
School of Business and Technology	366	351	245	278	.....	17	1,257	
School of Education	396	401	257	294	94	13	1,455		
School of Engineering	543	352	300	305	96	14	1,610		
School of Forestry	115	108	99	84	51	4	461		
School of Home Economics....	198	156	104	82	48	8	596		
School of Pharmacy	97	90	93	131	7	.....	418	
Unclassified .....	.....	.....	.....	.....	63	82	145	
Total, Professional Schools	1,907	1,628	1,221	1,315	537	147	6,755	6,755	
Totals, (excluding duplicates)	2,892	2,366	1,616	1,633	1,099	202		9,808	
Total students, regular session									9,808

ENROLLMENT BY SEX, ALL SESSIONS, 1961-62

Session	Men	Women	Total
Summer Session 1961	1,355	854	2,209
Fall term 1961-62	6,309	2,730	9,039
Winter term 1961-62	6,138	2,619	8,757
Spring term 1961-62	5,778	2,532	8,310
Net total, regular session	6,842	2,966	9,808
Net total, all sessions, Oregon State University	8,197	3,820	12,017

ENROLLMENT IN SUMMER SESSION, 1961

Session	Men	Women	Total
Eight-Week Summer Session	1,299	835	2,134
Second Session and Intersession.....	56	19	75
4-H Club Short Course	1,301	560	1,861
Totals	2,656	1,414	4,070

ENROLLMENT IN GENERAL EXTENSION DIVISION, 1961-62

Classes	Undergraduates	Graduates	Total
<i>Continuation Center Classes:</i>			
Fall, winter, spring terms			
Portland	6,291	2,687	8,978
Other Oregon communities	4,241	3,490	7,731
Summer term, 1962			
Portland	2,922	1,828	4,750
Other Oregon communities	98	66	164
<i>Televised Instruction:</i>			
Fall, winter, spring terms	211	79	290
<i>Correspondence Instruction:</i>			
Total enrollment as of October 6, 1962			2,862
Total, General Extension Division	13,763	8,150	24,775

SUMMARY OF DEGREES CONFERRED 1961-62

<i>Advanced Degrees:</i>		
Doctor of Philosophy	66	
Master of Arts	7	
Master of Science	231	
Master of Agriculture	4	
Master of Education	130	
Master of Forestry	11	
Master of Home Economics	5	
Professional Degrees	4	
Total Advanced Degrees		458
<i>Bachelor's Degrees:</i>		
<i>Bachelor of Arts:</i>		
Humanities and Social Sciences	15	
Science	27	
Business and Technology	9	
Education	7	
Engineering	3	
Home Economics	1	
Pharmacy	2	
<i>Bachelor of Science:</i>		
Humanities and Social Sciences	41	
Science	230	
Agriculture	122	
Business and Technology	264	
Education	232	
Engineering	252	
Forestry	58	
Home Economics	75	
Pharmacy	45	
Total Bachelor's Degrees		1,383
Total Degrees Conferred 1961-62		1,841

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