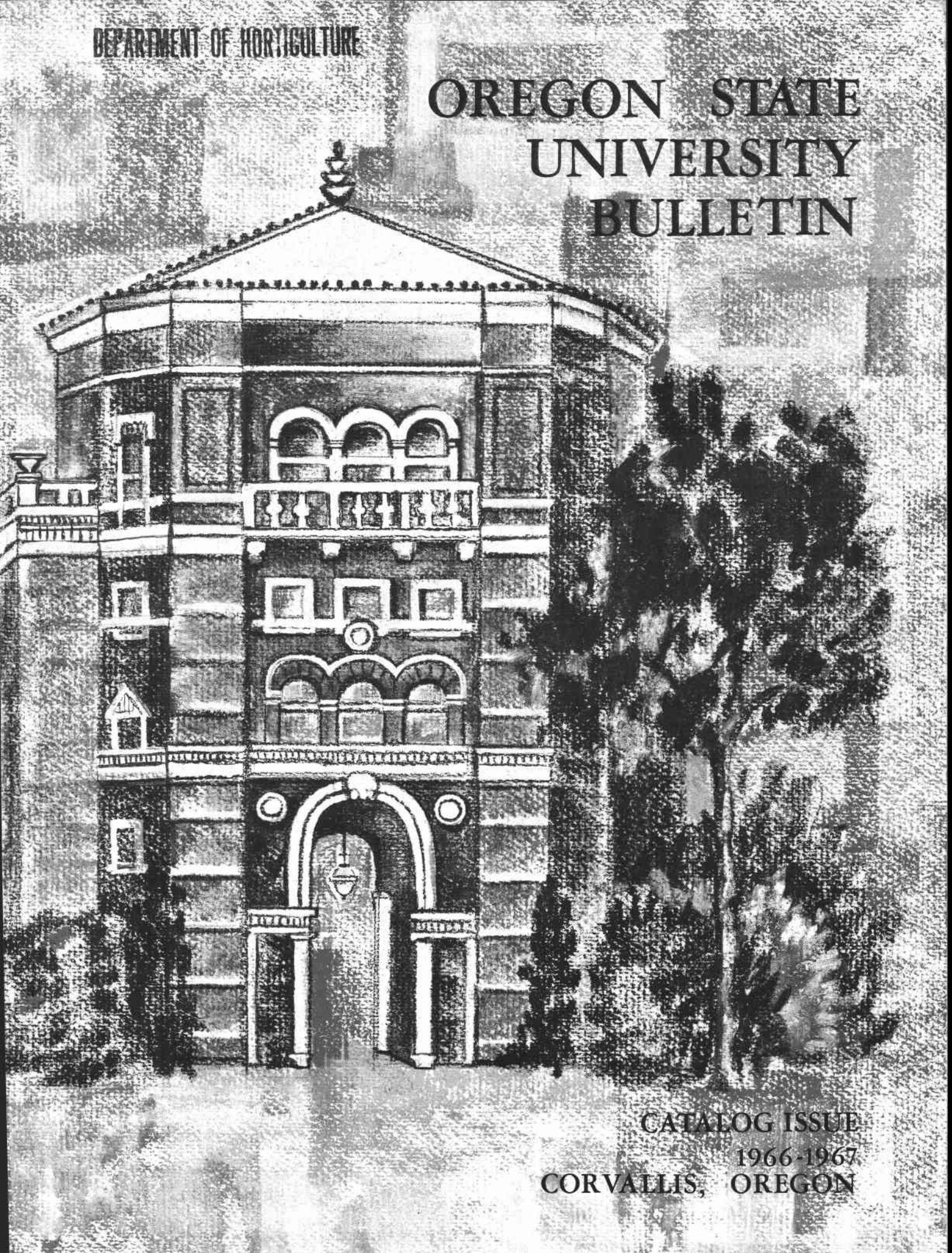
DEPARTMENT OF HORTICULTURE

OREGON STATE UNIVERSITY BULLETIN



CATALOG ISSUE
1966-1967
CORVALLIS, OREGON

OREGON STATE UNIVERSITY BULLETIN

NUMBER 125 **MAY 1966**

Published monthly (except in February, June, August, September, December) by the Oregon State Board of Higher Education at Oregon State University, Corvallis, Oregon. Entered as second-class matter March 28, 1950, at the post office at Corvallis, Oregon, under authority of the act of August 23, 1912, as amended by the act of August 4, 1947 (Sec. 34.21 PL & R).

Oregon State University CATALOG 1966-67

Corvallis, Oregon

Calendar

JUNE 1966

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JULY 1966

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AUGUST 1966

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OCTOBER 1966

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NOVEMBER 1966

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DECEMBER 1966

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JANUARY 1967

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Summer Term 1966

June 20, *Monday*.....Registration
June 21, *Tuesday*.....Classes begin
July 4, *Monday*.....Independence Day holiday
August 12, *Friday*.....End of eight-week courses
September 2, *Friday*.....End of eleven-week courses

Fall Term 1966

September 18-25, *Sunday-Sunday*.....New Student Program
September 22-23, *Thursday-Friday to 3 p.m.*.....Registration
September 26, *Monday*.....Classes begin
October 7, *Friday*.....Latest day for registering or adding courses
October 14, *Friday*.....Latest day to drop a course—returning students
October 22, *Saturday*.....End of fourth week (reports of unsatisfactory progress)
November 4, *Friday*.....Latest day to drop a course—first-term students
November 12, *Saturday*.....End of seventh week
November 19, *Saturday*.....Latest day to withdraw from college without responsibility for grades
November 24-27, *Thursday-Sunday*.....Thanksgiving vacation
December 12-17, *Monday-Saturday*.....Final Week
December 17, *Saturday*.....End of fall term

Winter Term 1967

January 3-4, *Tuesday a.m. and p.m., Wednesday to 12 noon*.....Registration
January 4, *Wednesday, 1 p.m.*.....Classes begin
January 17, *Tuesday*.....Latest day for registering or adding courses
January 24, *Tuesday*.....Latest day to drop a course—returning students
January 31, *Tuesday*.....End of fourth week—(reports of unsatisfactory progress)
February 14, *Tuesday*.....Latest day to drop a course—first-term students
February 18, *Saturday*.....Latest day to withdraw from college without responsibility for grades
February 20, *Monday*.....End of seventh week
March 13-18, *Monday-Saturday*.....Final Week
March 18, *Saturday*.....End of winter term

Spring Term 1967

March 27-28, *Monday a.m. and p.m., Tuesday to 12 noon*.....Registration
March 28, *Tuesday, 1 p.m.*.....Classes begin
April 10, *Monday*.....Latest day for registering or adding courses
April 17, *Monday*.....Latest day to drop a course—returning students
April 24, *Monday*.....End of fourth week (reports of unsatisfactory progress)
May 8, *Monday*.....Latest day to drop a course—first-term students
May 13, *Saturday*.....Latest day to withdraw from college without responsibility for grades
May 15, *Monday*.....End of seventh week
May 27, *Saturday*.....Close of work for graduating students; grades due
May 30, *Tuesday*.....Memorial Day—holiday
June 4, *Sunday*.....Commencement
June 5-10, *Monday-Saturday*.....Final Week
June 10, *Saturday*.....End of spring term

Summer Term 1967

June 19, *Monday*.....Registration
June 20, *Tuesday*.....Classes begin
July 4, *Tuesday*.....Independence Day—holiday
August 11, *Friday*.....End of eight-week courses
September 1, *Friday*.....End of eleven-week courses

Fall Term 1967

September 17-24, *Sunday-Sunday*.....New Student Program
September 25, *Monday*.....Classes begin

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

FEBRUARY 1967

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MARCH 1967

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APRIL 1967

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MAY 1967

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JUNE 1967

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JULY 1967

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AUGUST 1967

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SEPTEMBER 1967

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Oregon State System of Higher Education

THE OREGON STATE SYSTEM OF HIGHER EDUCATION, organized in 1932, provides educational opportunities to young people and adults throughout the State of Oregon. Member institutions are elements of an articulated system, parts of an integrated whole.

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

Members of the Oregon State System of Higher Education are:

Oregon State University	Corvallis
University of Oregon	Eugene
Portland State College	Portland
Oregon College of Education	Monmouth
Southern Oregon College	Ashland
Eastern Oregon College	LaGrande
Oregon Technical Institute	Klamath Falls

Campuses of the Medical School and the Dental School of the University of Oregon are located in Portland. The Division of Continuing Education represents all the institutions in making college-level courses and special programs available to all citizens. The Division has offices in Salem as well as on all OSSHE campuses.

An interinstitutional booklet, "Your Education," lists fields of study at all State System institutions, and gives other important information for prospective students. For a free copy, write "Your Education," State Board of Higher Education, P. O. Box 5175, Eugene, Oregon 97403.

*State Board of Higher Education**

	Term expires
CHARLES R. HOLLOWAY, JR., Portland	1967
ELIZABETH H. JOHNSON, Redmond	1968
J. W. FORRESTER, JR., Pendleton	1969
JOHN W. SNIDER, Medford	1969
PHILIP A. JOSS, Portland	1970
GEORGE LAYMAN, Newberg	1970
RAY T. YASUI, Hood River	1971
RALPH E. PURVINE, Salem	1971
ANCIL PAYNE, Portland	1972

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J. W. FORRESTER, JR. ..... Vice President
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ROY E. LIEUALLEN ..... Chancellor
RICHARD L. COLLINS ..... Secretary of Board

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FREDERICK M. HUNTER, Ed.D., LL.D.	1935-1946
PAUL C. PACKER, Ph.D., LL.D.	1946-1950
CHARLES D. BYRNE, Ed.D.	1950-1955
JOHN R. RICHARDS, Ph.D.	1955-1961

Office of the State Board of Higher Education
Post Office Box 5175
Eugene, Oregon 97403

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

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B.S. (1940), L.H.D. (1959), Pacific; M.S. (1947), Oregon; Ed.D. (1955), Stanford. With System since 1946, Chancellor since 1961.

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M.D. (1926), Oregon; LL.D. (1946), Portland. With System since 1927, dean, Medical School, since 1943.

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B.S. (1928), A.M. (1930), Nebraska; Ph.D. (1935), Wisconsin. With System since 1961, president, Oregon State University, since 1961.

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A.B. (1927), Greenville College; M.A. (1928), Michigan; Ph.D. (1938), Ohio State. With System since 1938, dean, Extension Division, 1956-1962. Vice Chancellor since 1962.

Oregon State University

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Business Affairs
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JAMES WILSON, B.A., Research Analyst

Library (See page 10)

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Printing Department
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CHARLES W. PECKHAM, B.S., Assistant Director

Publications Office
J. KENNETH MUNFORD, Ed.D., Director
THOMAS S. NAGEL, B.S., Assistant Director

Registrar
WALLACE E. GIBBS, Ed.M., Registrar
CLYDE M. JENSEN, B.S., Assistant Registrar
WANDA J. LEACH, Administrative Assistant

Student Services (See page 17)

Summer Term
ROBERT L. PHILLIPS, M.S., Director

Organization and Facilities

Charter

Federal Land-Grant (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 . . .

Act 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.

Designated Land-Grant institution, October 27, 1868

. . . 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.

Action of October 27, 1868, made permanent, October 21, 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. . . .

Full State control, February 11, 1885

. . . the permanent location of the State Agricultural College at Corvallis, in Benton County . . . is hereby ratified and confirmed.—Provided . . . that the general government of the said College shall be vested in . . . a board of Regents of the State Agricultural College of the State of Oregon.

State Board established, March 1, 1929:

There hereby is created a . . . department of higher education . . . under the control of . . . the state board of higher education, [which] . . . shall succeed to and hereby is invested with all the powers and duties . . . of the board of regents of the Oregon State Agricultural College.

Name changed, April 15, 1953:

. . . and such college shall be named Oregon State College (ORS 352.230).

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.

History

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

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 assistance to higher education on October 27, 1868, when it designated Corvallis College "the agricultural college of the State of Oregon." In taking this action the Legislative Assembly accepted the provisions of the First Morrill Act, which President Lincoln had signed on July 2, 1862. This Act provided grants of land to be used by the states for the sole purpose of endowing, supporting, and maintaining publicly controlled colleges. 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 on Fifth Street between Madison and Monroe. A 35-acre farm, part of the present campus, was purchased in 1870. The College moved to the present campus, occupying Benton Hall, a gift of the citizens of Benton County, in 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. (*Continued on page 10*)

CAMPUS

The city of Corvallis, in which Oregon State University is located, has a population of about 29,000. It lies in the heart of the Willamette Valley between the Cascade Mountains on the east and the Coast Range mountains on the west, 80 miles south of Portland and 60 miles from the Pacific Ocean. The climate is mild and equable with rainfall, which occurs mostly during winter months, averaging about 30 inches annually.

Corvallis College moved from downtown to the present campus in 1889, occupying the building now called Benton Hall. As dates in list below indicate several other buildings still in use today were built or started before 1900.

In 1908 the landscape architect John C. Olmstead prepared a plan for development of the campus, a plan which guided the location of numerous buildings and a substantial portion of the expanding grounds. Later, first in 1925 and again in 1945, landscape architect A. D. Taylor prepared new plans for the institution, each time building on the planning that had preceded the then-current effort. The campus today strongly reflects the work of these men.

In 1962 Louis A. DeMonte of the firm of DeMonte and Wagner, University Planning Consultants, began work on a new plan which took into consideration such factors as anticipated enrollment, density of land use, building location and heights, and parking space. After careful consideration of the nature and aims of the University and its expanding role in service to the state, Mr. DeMonte presented a long-range development plan that was approved by University officials and the State Board of Higher Education in 1964. New construction and reorganization of the space in the 400-acre main campus now follow this plan.

Present buildings, with dates of original construction and later additions or remodeling, are given below. For temporary buildings the dates indicate either the date of erection or date acquired by Oregon State.

Administration (1947)
Administration Annex (1948)
Aero Engine Laboratory (1953)
Agricultural Car Pool (1954)
Agriculture Hall (1909, 1911, 1913)
Apperson Hall (1898, 1920, 1950, 1963)
Armory (1910, 1911)
Avery Lodge (1966)
Azalea House (1953)

Batcheller Hall (1913)
Benton Hall (1888)
Bexell Commerce Hall (1922, 1958)
Buxton Hall (1961)

Callahan Hall (1964)
Cauthorn Hall (1957, 1963)
Chemical Engineering Building (1955)
Coed Cottage (1956)
Coliseum (1950)
Cordley Hall (1957)
Covell Hall (1928, 1960)
Cyclotron (1952)

Dearborn Hall (1949)
Dixon Lodge (1966)
Dormitory Service Building (1961)
Dryden Poultry-Veterinary Hall (1927)

Education Hall (1902, 1940)
Engineering Laboratory (1920)
Extension Hall (1921, 1951)

Fairbanks Hall (1892, 1936)
Farm Crops (1919, 1924, 1951)
Ferguson House (1915)
Food Technology (1951)
Forest Insect Laboratory (1957)
Forest Research Laboratory (1961)
Forest Science Laboratory (1962)
Forestry (1917)
Foundry (1899)

Gilbert Chemistry Hall (1939)
Gilmore Agricultural Engineering Hall (1912-1939)
Greenhouse (1928, 1951, 1954, 1957, 1964, 1966)

Hawley Hall (1959, 1963)
Heating Plant (1923, 1949, 1953, 1960, 1966)
Heckart Lodge (1954)
Home Economics (1914, 1920, 1952)

Industrial Building (1947, 1958)

Kent House (1924)

Kerr Library (1963)
Kidder Hall (1918, 1941, 1966)

McNary Hall (1963)
McNary Dining Hall (1963)
Marine Science Center at Newport (1965)
Memorial Union (1928, 1960)
Men's Gymnasium (1915, 1921, 1953)
Mitchell Playhouse (1899, 1950)

Natural History (1948)
Naval ROTC Armory (1946, 1954, 1959)

Oceanography Building (1964)
Orchard Court Apartments (1961, 1963)
Orchard Street Nursery School (1939)

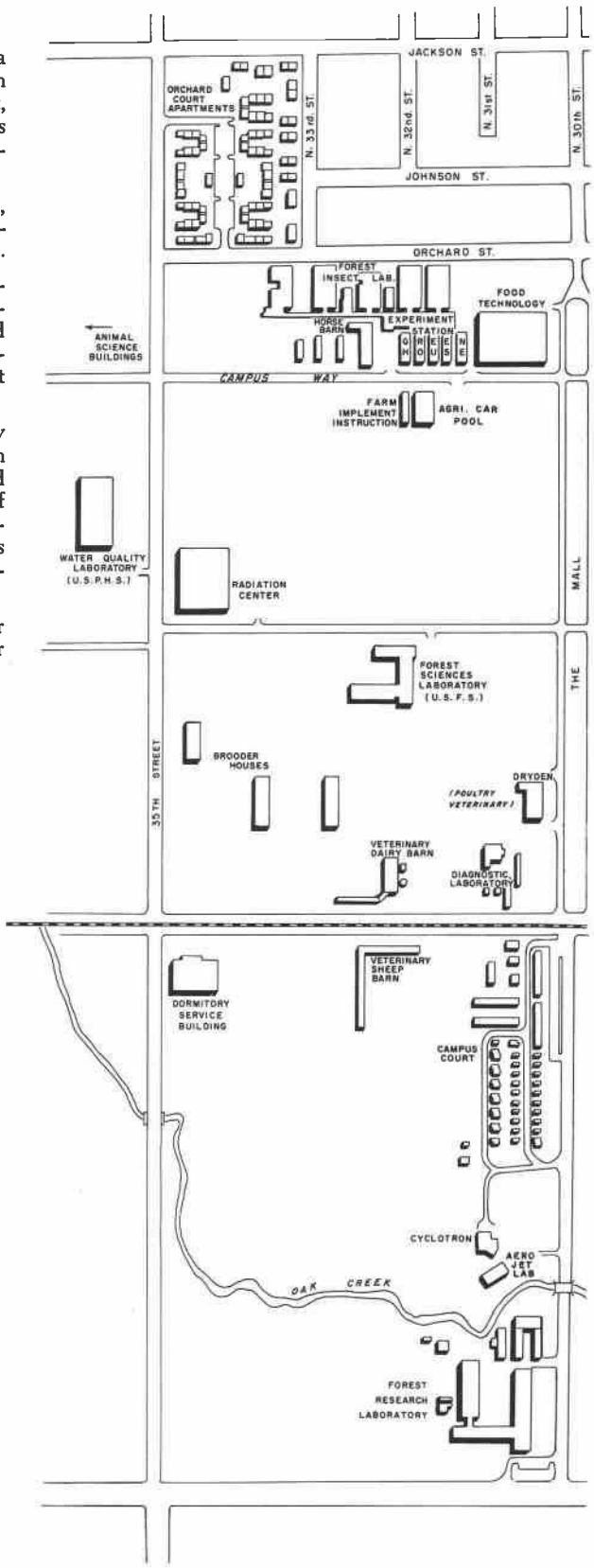
Paleontology Laboratory (1899)
Park Terrace Nursery School (1918)
Pharmacy (1924, 1966)
Physical Plant Warehouse (1948, 1952)
Physical Plant Office (1961)
Poling Hall (1957, 1963)
Production Technology (1908, 1949, 1963)

Radiation Center (1964)
Reed Lodge (1954)

Sackett Hall (1947, 1963)
Shepard Hall (1908)
Snell Hall (1959)
Snell Dining Hall (1959)
Social Science Hall (1912, 1951)
Stadium (1953)
Student Health Service (1936, 1961)

Veterinary Dairy Barn (1930)
Veterinary Diagnostic Laboratory (1952, 1961)
Veterinary Sheep Barn (1938, 1962)

Waldo Hall (1907, 1959)
Water Quality Laboratory (1966)
Weatherford Dining Hall (1957)
Weatherford Hall (1928)
Weniger Hall (formerly Physics-Chemistry) (1959, 1961, 1966)
West Hall (1960)
West Dining Hall (1960)
Wilson Hall (1964)
Withycombe Hall (1952)
Withycombe House (1918)
Women's Building (1926)



CAMPUS MAP

Oregon State University

Corvallis, Oregon

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 (A.M.) was awarded in 1876. A committee on advanced degrees appointed in 1910 began to lay the foundations of the Graduate School. The first Ph.D. degrees were conferred in 1935.

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.

In 1961 the Oceanography Department acquired the 80-foot research vessel *Acona* and in 1964 replaced it with a research vessel of greater range and versatility, the 180-foot *Yaquina*. Also in 1964 the $1,000,000 Oregon State University Marine Science Laboratory with 30,000 square feet of research and aquarium areas and a dock was constructed on Yaquina Bay to permit expansion of studies of the ocean and estuaries by oceanographers, fisheries specialists, engineers, and marine biologists, including zoologists, botanists, entomologists, and microbiologists.

The Radiation Center, established in 1964, houses a number of research and training facilities in nuclear science and engineering. Twenty thousand square feet of specially designed laboratories are available to accommodate radiation research programs.

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; 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 land, 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.

William Jasper Kerr Library

Librarian ..... RODNEY K. WALDRON, M.A.
Associate Librarian ..... DONALD R. HUNT, M.A. in L.S.
Serials Librarian ..... IRENE L. CRAFT, M.S. in L.S.
Head Order Librarian ..... BESSIE TRESSLER, A.B., B.S. in L.S.
Catalog Librarian ..... MARIE HULL JACKSON, B.S. in L.S.
Head Reference Librarian ..... ETTA JUDD, B.A., B.S. in L.S.
Business and Social Sciences Librarian .... STEPHENS T. F. SHOU, M.A., B.A. in L.S.
Chief Science and Technology Librarian .... KATHERINE OSBORN, M.A., B.S. in L.S.
Education and Fine Arts Librarian ..... CAROLINE G. LYBECK, M.A. in L.S.

The William Jasper Kerr Library, now containing 497,000 volumes, is housed in a new building providing space for 590,000 books and 1,600 readers. Books are, with a limited number of exceptions, on open shelves directly available to faculty and students.

The books are grouped into four major areas. On the first floor are 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 houses humanities books, the central reference services, the public catalog, and control and checkout desks.

The third floor is occupied by administrative, order, and cataloging offices and books in business and social sciences. The fourth floor contains books in science, agriculture-forestry, pharmacy, and engineering. Carrels for advanced research, individually assigned on a quarter basis, are provided on all floors. Each floor also has a conference room for the use of undergrad-

uates and others. All book collections are under the direction of subject specialists.

Collections. The books in the Library, and the 29,000 or more volumes added annually, are closely coordinated with teaching and research. The collections are therefore primarily technical and scientific. Books in the humanities and the social sciences are now being acquired in increasing quantities in support of the School of Humanities and Social Sciences. These give the Library 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 4,300 periodicals are received currently. 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 76,000 items. The picture collection includes 82,500 pieces. Newspapers received currently, a number of which are on microfilm, total 151.

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 nearly 2,000,000 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 the University of Oregon at Eugene, where administrative 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 Order Department of the Oregon State University Library 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, Fairbanks 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 encompassing approximately 13,000 articles in all. Visitors to the Museum exceed 60,000 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 500,000 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 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)

NORTHWEST BUSINESS MANAGEMENT (quarterly)

PROCEEDINGS OF THE PACIFIC NORTHWEST CONFERENCE ON HIGHER EDUCATION (annually)

YEARBOOK OF THE ASSOCIATION OF PACIFIC COAST GEOGRAPHERS (annually)

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

ADMISSIONS INFORMATION

OREGON STATE UNIVERSITY WELCOMES ALL STUdents of good moral character who provide evidence of suitable preparation for work at the university 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 13.) Resident applicants with a grade average of 2.50 or higher 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.) An applicant whose high school GPA is between 2.50 and 3.00 will be notified of acceptance 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.

B. **Oregon residents being admitted as freshmen:**
   1. Must be graduated from a standard high school and have:
      (a) For fall term only, a 2.25 grade-point average or above in all high school subjects taken toward graduation*, or a 2.00 (C) average winter or spring terms,
      or
      (b) A combined score of 887 points fall term (880 points winter and spring terms) on the verbal and mathematical sections of the Scholastic Aptitude Test of the College Entrance Examination Board,†
      (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. 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.
      (b) An alternative for the student who does not qualify as outlined in (a) above is the achievement of a minimum grade-point average of 2.25 on 12 term hours of college-level work. (This may be done through summer school, extension, or correspondence courses of an accredited college or university.)

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. *Honors Programs:* On the basis of high school records and College Board test scores, entering freshmen may be invited to enroll in Honors Programs in the Schools of Science or Humanities and Social Sciences. These programs are designed to challenge the greater capacities of the superior student. Seminars, research projects, honors papers, independent study, and special honors courses are offered in the departments of English, Chemistry, Physics, Mathematics, Economics, Political Science, History, and Biological Sciences.
   3. *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.

Admission of Transfer Students

Transfers from other colleges are required to present (1) evidence of eligibility to return to the last college or university attended and (2) a satisfactory grade-point average. Residents may transfer with a 2.00 (C) or higher 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. Foreign students entering as undergraduates should review the section on ADMISSION OF FOREIGN STUDENTS.

Courses taken at accredited two-year institutions of collegiate rank after a student has completed 93 term hours may be used to satisfy course requirements, but credits for such will not count toward graduation from Oregon State University. Hours attempted and points earned are used in calculating cumulative grade-point average. Credits beyond 93 hours must be earned in an accredited baccalaureate-degree-granting institution.

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 approved by societies established by the professions, students admitted to these schools must be prepared to undertake the curriculum at whatever level they enter it and to maintain school standards.

Admission 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; also ADMISSION PROCEDURE, page 13.

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* 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 13.

† Information concerning scheduled examination dates and examination centers may be obtained from the College Entrance Examination Board, Box 1025, Berkeley, California, or P.O. Box 592, Princeton, New Jersey. Official scores are forwarded to Oregon State by Educational Testing Service upon student request.

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 or Graduate School, (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 undergraduate admission 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 Term

The only requirement for admission to the Summer Term 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 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 first term attendance at Oregon State University.

Admission Procedure

Questions regarding admission and applications for admission, accompanied by the $10 nonrefundable application fee (payable to Oregon State University) should be addressed to:

OFFICE OF ADMISSIONS
Administration Building
Oregon State University
Corvallis, Oregon 97331

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 at the close of the first semester of the senior year. 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, applicant should apply during his final term or semester. The deadline for a nonresident undergraduate to apply for fall term admission is September 1.*

A $25 Entrance Deposit is required of all new students, except staff members, admitted for Fall Term. It is due no later than August 31, or by return mail, if the notice of admission is received after August 31. The $25 is a confirmation of intention to enroll for the Fall Term and becomes the breakage deposit required of all students registering for the first time each year. It is refundable, less any deductions, following the close of the academic year for students who matriculate Fall, Winter, or Spring Term of the year in which the deposit is submitted, and nonrefundable for those who do not. Failure to submit the deposit will mean a delay in registration since materials will be prepared in advance only for those students who have prepaid the $25. Complete instructions will accompany the notices of Fall Term admission.

Placement Examinations

High school seniors planning to enter Oregon State should take the Scholastic Aptitude Test (SAT) and the English Composition (EN) and Level I Mathematics Achievement Tests of the College Entrance Examination Board. See footnote page 12.

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.

Board tests should be completed prior to arrival on campus. Students who find it necessary to complete the tests during the special campus administration may face delays in counseling and registration. The SAT may be completed at any time during the senior year. It is recommended that the achievement tests be completed in March or May or at a time close to the term of entry into Oregon State.

Transfer students who do not have academic credit for college-level English must either present English Achievement Test scores or take the test.

Transfer students who have not previously completed a college-level mathematics course must present scores of the College Entrance Examination Board Mathematics, Level I, Achievement Test before registration in an Oregon State University mathematics course.

The **English examination** covers the fundamental principles of grammar, and tests the student's ability to apply these principles in writing.

Students whose test scores indicate a need for further preparation in English before enrolling in Wr 111 may enroll in Wr 10, a noncredit remedial course offered in evening classes by the Division of Continuing Education. An additional fee is charged for this course.

The **mathematics examination** covers the fundamentals of elementary algebra.

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 is described on a later page under STUDENT HEALTH SERVICE.

* This date is subject to change as circumstances demand.

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 to those accepted for admission well in advance of the term of entrance.

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., M.B.A.*
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.S., 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.*
Pharmacy, *B.A., B.S., M.A., M.S., M.Phar., Ph.D.*
Physical Education (through School of Education), *B.A., B.S.*

Aerospace Studies, 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 below) 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, as well as in law and in veterinary medicine.

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 10.)
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 10, 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 (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 Division of Continuing Education courses).
   (3) Last 45 hours for which registered.
   (4) In at least two of the last three terms.
d. Residence: minimum, 45 term hours (of the last 60 hours). Classroom work taken through the Division of Continuing Education is considered as resident work. A student qualifying for his degree by study through the Division of Continuing Education 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 standing[1] 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.

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

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.

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 twelve weeks each.

Summer Term: a session extending from late June for eight or eleven weeks depending upon the program chosen.

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 1½ (every 10 semester hours count as 15 term hours).

Period: a class meeting for discussion, lecture, laboratory, etc. 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.*

Grade-Point Average: Total number of grade points received for A, B, C, D, or F grades divided by total term hours. (See POINTS, below.)

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 and the scheduled final examination has been taken, 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 forms 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- 10.	Noncredit remedial courses not offered in regular curriculum.
11- 49.	Noncredit courses or credit courses of a terminal or semi-professional 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.

For information on fee remissions administered by the State Scholarship Commission see "State Scholarships," page 21.

Regular Tuition Fees

Undergraduate students pay regular fees of $110 per term—$330 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 these privileges.

Nonresident Fee

Undergraduate students who are not residents of Oregon pay regular fees and in addition pay a nonresident fee of $190 per term, or $570 per year—a total of $900 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 six 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.

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 $110 a term. Graduate students do not pay nonresident fee. Teaching or research assistants pay $32 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 $25, payable once each year at the time of first registration. This is required as a protection against loss or damage of institutional property such as laboratory equipment, 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.

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, $14.00

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, $28; 3 term hours, $42; 4 term hours, $56; 5 term hours, $70; 6 term hours, $84; 7 term hours, $98. 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 $110.

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.

Application Fee $10.00

Must accompany application for admission and is nonrefundable.

Entrance Deposit $25.00

Required of all new students admitted for Fall Term except staff members.

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 Fee.....per 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, $14.00

Minimum fee $28; maximum $110.

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.....$4.50 to $11.25
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, $25.00

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.

Student Services

Office of the Dean of Students

Dean of Students ..... Robert W. Chick, Ed.D.
Associate Dean of Students, Dean of Women ..... Jo Anne Johnson, Ph.D.
Associate Dean of Students, Dean of Men ..... Dan W. Poling, D.Ed.
Assistant to the Dean of Students ..... Thomas A. Murphy, M.A.
Assistant Dean of Men ..... Richard E. Pahre, M.A.
Assistant Dean of Men ..... J. Frank Jonasson, Ed.M.
Director of Counseling Center .... Charles F. Warnath, Ph.D.
Counselor .....Robert W. Adolph, M.S.
Counselor ..... Morris L. LeMay, M.A.
Counselor ..... Arie J. Nyman, Ph.D.
Counselor ..... Richard G. Wiegel, M.A.
Director of Housing.....Thomas F. Adams, B.S.
Assistant Director of Housing ..... J. Franz Haun, Ed.M.
Director, Residence Halls Food Service ..... Vernon E. Wiard, B.S., B.A.
Manager, Residence Halls Food Service ..... Laura M. Cleaveland, M.S.
Director of Memorial Union and Student Activities ..... George F. Stevens, B.A.
Manager, Memorial Union ..... Duane S. Fitzgerald, B.S.
Manager, Food Service ..... G. Baker Bokorney, M.S.
Manager, Student Activities ..... Irwin C. Harris, M.A.
Social Adviser, Student Activities ..... Mary Ruth Fechtig, M.S.
Director of Residence Hall Program .... James P. Duncan, Ed.D.
Director of Student Health Service ..... Charles E. Kremer, M.D.
Assistant to the Director ..... F. Leonard Gibson, M.S.H.A.
Pharmacist ..... John C. Kula, B.S.
Physician ..... James E. Garvey, M.D.
Physician ..... John S. Giffin, M.D.
Physician ..... R. A. McHaffie, M.D.
Physician ..... Charles C. Reger, M.D.
Psychiatrist ..... A. A. Straumfjord, M.D.
Foreign Student Counselor ..... Clara L. Simerville, Ed.D.

The Student Services Program aids students in relating out-of-class activities to the university instructional program and assists them in deriving greater benefits from their university experiences. Professional services, staffed with competently trained personnel, complement the academic program. Student Services include student housing, the activities center, Memorial Union, foreign student counseling, student health center, counseling center, and financial aids, including loans, scholarships, part-time employment, and work-study.

Student Housing

At Oregon State University, students live in University residence halls, cooperatives, sororities, fraternities, and off-campus housing. In all areas of housing, the objective of the University is to aid the individual student in relating his life outside the classroom to the instructional program so that he derives the greatest benefit from his educational experience.

The main educational aim of University housing is to encourage the mature self-direction of all students. As a means toward realizing this goal, the living groups elect their own officers who work with University staff members in developing group living rules and the planning of social, recreational, and cultural programs.

The University believes strongly that the kind and quality of student housing has a decided effect upon a student's education and that the right type of living conditions can aid him in his studies and provide opportunities for personal and social growth. Thus, every effort is made to provide living environments conducive to study, stafety, and health. Obviously, certain basic and minimal housing policies are necessary to accomplish these ends. These housing policies, which are developed by a faculty-student committee, are outlined later in this section.

Residence Halls

Approximately 4,000 students are housed in 11 residence halls on the campus. All of these halls are staffed by members of the Student Services staff. Head Residents and Assistant Head Residents are responsible for the total operation of a hall. In addition, Resident Assistants who are upperclass or graduate students work as advisers to individual living groups. All of these staff members work with elected student officers and other members of student living groups to make life in the residence halls enjoyable and profitable for everyone.

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.

All students who live in residence halls take their meals in adjacent dining halls. 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 Housing 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 diets for health reasons are available at an additional charge upon recommendation of the Student Health Service.

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 Housing, 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.

Housing Agreement

The application for a residence hall reservation is for the entire school year, as defined in the official University calendar, and becomes a contract upon payment of the $50 housing reservation deposit. Except in special cases, Housing Agreements for accommodations beginning in September are for the academic year (Fall, Winter, and Spring Terms). Agreements sent out for the Winter Term include both the Winter and Spring Terms. Agreements sent out for the Spring Term are for the Spring Term only. Special agreements for one term are prepared for students engaged in practice teaching and in other unusual cases.

Assignment

The University's acceptance of the application does not guarantee assignment or admission to the University. Assignment is contingent on the final acceptance for admission by the University and on the available space. Assignments are mailed by July 15 for Fall Term, and two weeks before the opening of Winter and Spring Terms. The University reserves the right to refuse applications for accommodations in the University's residence halls by return of the deposit.

Reservation Deposit

Of the $50 reservation deposit, $35 will be applied to the initial charge for board and room, and the remaining $15 will be retained as a general housing deposit as long as the student resides within the residence halls. The general housing deposit may be used to pay outstanding hall dues and/or charges for repair of damaged furniture or fixtures for which the student is responsible. The general housing deposit will be forfeited if the student withdraws from the University before the end of the contract period. Any balance remaining from the $15 general housing deposit will be returned about six weeks after the end of the contract period.

Cancellation and Refunds

The application and contract may be cancelled by a written request to the Director of Housing no later than August 1 for Fall Term. Application and contract for Winter and Spring Terms may be canceled 14 days before the first registration day of Winter or Spring Terms. The reservation deposit will be forfeited if canceled after the above dates. Reservations for Fall Term made after August 1 cannot be canceled without forfeiture of the deposit. If a student registers in school and has not canceled his application and contract by the cancellation deadline, he may be required to live in a residence hall. Should a request to leave the residence halls during the contract period be granted a student by the Housing Committee, the student must expect to pay the rent for the room reserved but not occupied. The student will not be allowed to occupy the space he has vacated in the hall.

The policy on room and board refunds is as follows:

1. Full refund if the student is denied admission to the University, or if accommodations are not available.
2. A prorated refund on board charges for the unused portion of board if the student withdraws from the University or is permitted to move by the Housing Committee.
3. No refunds on room rent will be authorized for the first two weeks of each term. This period is covered by the $35 portion of the Reservation Deposit applied to the initial charge. A prorated refund on room rent after the initial two weeks is permitted if the student withdraws from the University or is permitted to move by the Housing Committee.
4. Board charges will be refunded on a prorated basis if the student is absent from Corvallis for ten or more consecutive days as an academic or health requirement. There is no refund of room rent for this period.
5. Board refund may be granted graduating seniors who leave the institution on commencement day. There is no refund on board for an absence of 10 days or less prior to commencement.
6. Refunds will not be made to students for absences while confined in the Student Health Service because of illness or accident.

Contract Period—Payment of Room and Board

Residence halls will be open to receive students at 9 A.M. on the Sunday preceding registration each term, and will remain open until 12 noon on the day after the last day of final examinations each term. Students may not occupy or leave personal belongings in any student room before the time the residence hall is officially scheduled to open and the student's room becomes available, unless he is participating in a scheduled program and pays an additional rental fee. All room assignments are exclusive of University scheduled vacation periods. This contract terminates 24 hours after the individual student's last final examination at the end of the contract period.

Residence hall charges include both room and board and must be paid in advance. If it is not possible to pay the full term charge at the beginning of each term, partial payments may be made according to published schedules and are due the first day of each month. A memorandum statement of charges may be placed in the student's mail box, but it is the responsibility of the student to pay the posted charges on the due dates. A ten-day extension after the first payment each term may be granted to those receiving payroll checks on the tenth of the month. The student must complete a form in the Housing Office, before the due date, requesting permission for late payment. A penalty of $1 per day up to a maximum of $5 is assessed for late payments. The student's registration may be cancelled if payment is not made by the tenth of the month.

Students living in residence halls must also take their meals in the dining halls. Meal tickets are not transferable. Three meals are served each weekday and Saturdays, and two on Sundays and holidays. Meals are not provided during Thanksgiving, Christmas, or spring vacations.

The State Board of Higher Education reserves the right to change room and board rates.

Termination of Contract

This contract shall be terminated under the following conditions:

1. If a student withdraws from the University. See refund schedule.
2. If a student marries, the room contract will continue until the end of the term. Board charges will be reduced as indicated above. The reservation deposit is forfeited.
3. If a student joins a fraternity, sorority, or cooperative, he may be permitted to vacate the residence hall at the end of the term. Should the student leave the living group to which he has moved during the contract period while remaining a student, the contract will be reinstated.
4. If a student becomes 21 or attains senior standing during the contract period, he may terminate the contract at the end of that term. A hall officer who has fulfilled the eligibility requirements for termination of his contract may wait until the term his office expires to make his choice.

5. If a student is drafted into military service, a prorated refund of both room and board will be made. The deposit, less any charges, is refunded.
6. If a student fails to pay room and board charges as scheduled the student may be suspended from the University.
7. If a student's conduct is such as to require removal, he may be removed from the residence hall in the best interests of other residents and the University.

Residence Hall Rates

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	$310	$250	$228	$788
Callahan ..	Women	369	5	310	250	228	788
Cauthorn ..	Men	329	5	310	250	228	788
Hawley	Women	329	5	310	250	228	788
McNary ..	Men	373	5	310	250	228	788
Poling	Men	329	5	310	250	228	788
Sackett A&B	Women	220	2	310	250	228	788
Sackett C&D	Men	220	2	310	250	228	788
Snell	Women	363	5	310	250	228	788
West	Women	311	5	310	250	228	788
Wilson	Men	373	5	310	250	228	788
Weatherford	Men	385	7	292	235	216	743

Telephone Service

All residence halls, with the exception of West, Sackett, and Weatherford, have telephones located in each student room. Students are able to dial direct to any on-campus number or any number listed in the Corvallis Directory, and receive direct calls. Only collect or credit card calls for long distance service may be made from room phones. All outgoing prepaid long distance calls must be made from pay stations.

Rates for single room and board in Buxton, Callahan, Cauthorn, Hawley, McNary, Poling, Snell, and Wilson are $926.50 a year; for West, $869.50 a year; for Weatherford, $802.00 a year. Single rooms in Sackett Hall, when available, are $899.50 per year. Board and room rates are subject to change by the State Board of Higher Education as circumstances demand.

Additional details concerning residence hall housing are contained in the booklet "Student Housing at Oregon State University," which is available from the Department of Housing, Administration Building 15.

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, junior, and senior 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, Office of the Dean of Women.

Sororities at Oregon State: Alpha Chi Omega, Alpha Delta Pi, Alpha Gamma Delta, Alpha Omicron Pi, Alpha Phi, 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.

Fraternities provide comfortable, supervised accommodations for men. A freshman man pledged to a fraternity may live in the chapter house unless he has made other housing commitments, in which case 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, FarmHouse, 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

Students who live in cooperative houses achieve desirable group and social life at a cost approximately $20 per month less than in other types of group housing. All housework responsibilities, except meal preparation, are shared by members of the group who work approximately six hours a week.

All women's cooperatives have a Head Resident who works closely with the house officers. Men's cooperatives have hostesses and faculty advisers.

Women's cooperative houses

Azalea House and Coed Cottage are women's houses operated by the University. Co-Resident Women, Incorporated, a privately owned corporation, operates four additional houses for women: Jameson House, Heather Rae, The Pines, and Winston House. All women's houses are close to the campus.

Men's cooperative houses

Reed, Heckart, Avery, and Dixon Lodges, located on campus, are operated by the University. Beaver Lodge, Hawthorne Manor, and Davenport House are privately operated cooperatives within walking distance of the campus.

Additional information and application blanks may be obtained from the Department of Housing, Administration Building 15.

Off-Campus Housing

Listings of approved private homes are maintained by the Off-campus Housing Supervisor in the Department of Housing. The Student Housing Committee urges that a written agreement be made between student and householder. Blank contract forms may be obtained from the Department of Housing. Such agreements will be binding upon both householder and student for one term and will be enforced by the Housing Committee.

Agreements may be terminated: (a) If the student properly withdraws from OSU; (2) upon mutual agreement and satisfaction to the student and householder with written notice to the Department of Housing 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 the University. Housing in a private home for fall term should be arranged soon after June 15.

Housing for Married Students

Oregon State maintains a number of furnished apartments for married students. Rentals range from $42 to $85 per month with water and garbage disposal service furnished. Apply to the Department of Housing.

Off-Campus Apartments

A married student wishing to find living accommodations off campus should consult the Department of Housing.

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 Department of Housing, 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. All students 21 years of age or older, seniors, or married students are permitted to live wherever they choose.
3. All single sophomore and junior students under 21 years of age are required to live in residence halls, fraternities, sororities, cooperatives, or other approved housing. Separate listings of approved off-campus housing for men and women are maintained in the Student Housing Office.
4. All single freshmen under 21 years of age are required to live in residence halls, fraternities, or cooperatives unless living at home.
5. Approved housing includes residence halls, cooperatives, fraternities, sororities, and rooming and boarding houses and housekeeping accommodations approved by the Student Housing Committee.
6. Established University rules concerning student conduct apply to all housing, on or off campus.
7. Students making duplicate housing arrangements will be held financially responsible for these arrangements.
8. Changes of address or residence by students under 21 require approval of the Department of Housing.
9. Arrangements for housing in residence halls are for one full year as outlined in official University calendar.
10. All living arrangements in approved off-campus housing are for one term. Should a request to move be granted during the term, the student will be held financially responsible for payment of the room rent for the remainder of the term.
11. Students required to reside in approved housing who are found to be residing in unapproved housing may be required to vacate such housing and may be subject to appropriate disciplinary action.
12. In unusual circumstances, petitions for exceptions to these policies may be considered by the Housing Committee.
13. Because of their recognized danger, firearms should not be kept in student living quarters. Arrangements have been made with the Corvallis City Police whereby such firearms may be stored and withdrawn when desired by the owner.

International Education

The Foreign Student Counselor assists students from abroad in their personal and academic adjustment to American university life. Additional assistance is given in connection with visas, immigration regulations, scholarships, employment, personal counseling, and finances. The Counselor 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.

Registered students 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 overtime in the Infirmary, special medications, X-rays, and laboratory tests.

All expenses connected with surgical operations, fractures, specialized medical care, and special nursing must be met by the student who requires such attention. The Health Service will not pay or be responsible for bills from private physicians or private hospitals.

Limited dispensary service is available during the Summer Term.

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, a psychiatrist, a pharmacist, registered nurses, a laboratory technician, and an X-ray technician.

Medical Examination

A medical examination, tuberculin test, and immunizations are required of all entering students. These are performed by a licensed M.D. or D.O. physician and surgeon of the student's own choice and at the student's expense before he arrives on campus. They are required of former OSU students, including those in the Graduate School, returning to the campus after a lapse of five years.

Tests and immunizations required include 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.

Exceptions to these requirements are made 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 parent or guardian present a written statement expressing religious grounds for declining and agree in writing to assume all expenses incident to their care or quarantine should they fall ill with smallpox, tetanus, or diphtheria while students at this university.

Students transferring from another college or university within the Oregon State System of Higher Education may request a medical transcript from the Student Health Service of the institution previously attended and present it as part of their medical record. They must also complete the first and fourth pages of the OSU medical examination form and complete 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 and fourth pages of the Oregon State University medical examination form and to fulfill the smallpox and diphtheria-tetanus immunization and the tuberculin skin test requirements.

Foreign students are required to purchase approved medical insurance before registering for classes.

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

Motor Vehicles

Space limitations in the University community, coupled with an expected steady increase in University enrollment during the next few years, make the problem of student-operated vehicles one of grave concern to the administration, the faculty, and the students.

In recognition of the difficulties to be faced, the student is advised that the operation of a motor vehicle while enrolled at OSU is a privilege rather than a right. This privilege is like all other privileges in that certain obligations must be assumed along with the implied freedom.

Obligations that the student must be willing to assume are as follows:

a. That he register any vehicle in his possession or control for use in Corvallis during the school year. There is no charge for registration. The student may register his vehicle in the Coliseum during registration for courses each term or at the Traffic Committee Office in Room 12, Home Economics Building, at other times.

b. That he abide by the driving and parking regulations established for the OSU campus. This includes purchase of an appropriate permit. Parking is restricted to certain designated areas and vehicles must display permits to authorize campus parking.

c. That he familiarize himself with all regulations which are published in "Your Car On Campus." This pamphlet may be obtained during registration in the Coliseum, at the Traffic Committee Office in Room 12, Home Economics Building, or from the Visitor's Information Booths at the 26th Street and the Jefferson Street entrances to campus.

d. That he keep his vehicle in mechanically safe driving condition.

e. That he obey the legal stipulations in the State Motor Vehicle Code.

Failure to accept these obligations as personally binding may cause the student driver to lose his motor vehicle privileges or receive more stringent penalties.

Counseling Center

A student in college needs to make decisions regarding majors, educational plans, vocational goals, and day-to-day problems. He also may be faced with personal concerns which interfere with his school work. The Counseling Center provides a setting in which he may discuss with a professionally trained counselor any problems that may be important to him.

Through individual and group interviews as well as test results, the student is helped to think through his difficulty. Although tests are not necessary in many cases, the Center maintains a complete file of interest, ability, personality, and special-aptitude tests. Tests are specifically selected to fit each student's needs. The Center also maintains a library of occupational information as well as catalogs for most western colleges.

There is no charge for counseling although a small fee is charged for testing.

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 $160 to $250 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 at least $500. Nonresident students should be prepared for an initial outlay of about $700. Personal checks in the exact amount provide the most convenient and safest method of payment.

First Year Expenses

	Oregon residents		Nonresidents	
	First term	*First year*	*First term*	*First year*
Regular fees and tuition	$ 110.00	$ 330.00	$ 300.00	$ 900.00
Books, supplies, etc.	45.00	125.00	45.00	125.00
Board and room	310.00	788.00	310.00	788.00
Deposit	15.00	15.00	15.00	15.00
Clothing	25.00	100.00	50.00	130.00
Incidentals	100.00	290.00	100.00	290.00
*Totals	$ 605.00	$1,648.00	$ 820.00	$2,248.00

* Does not include travel to and from the University.

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 16.

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

FINANCIAL AIDS

The University provides financial 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 private endowment.

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. The College Work Study Program, under provisions of the Higher Education Act of 1965, is a part of the over-all employment program of the University. Its purpose is to stimulate and promote part-time employment of students who are in need of the earnings from such employment to continue their education.

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.

Foreign students are permitted to work *only* with permission of the U. S. Immigration Service upon recommendation of the Foreign Student Counselor. Foreign students are usually denied permits to work during their first year in the United States.

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. Eligibility for NDEA loans requires an accumulative grade-point average of 3.25 for high school seniors, 2.50 for college undergraduates, and 3.00 for graduate students. United Student Aid Funds, Inc. provides loans to students through the cooperation of Oregon State University and the student's home town bank. A student must have at least sophomore standing and have satisfactorily completed one term at OSU. Undergraduates may borrow up to $1,000 per academic year and graduate students up to $2,000 per year. The maximum loan to one student is $4,000. Repayment is arranged on a monthly basis following the termination of full-time studies.

Applications for loans should be made to the Financial Aid Office, Commerce 111, 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; Marion Horton 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 Economics in Homemaking Loan Fund for home economics students; E. N. Sidor Memorial Loan Fund for students in Engineering; Benton County TB and Health Loan Fund, for students in health education and prenursing.

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. Rosenkranz Loan Fund (administered by First National Bank, Portland—application made through Student Loan Office, OSU), and Ben Selling Scholarship Loan Fund (administered by First National Bank, Portland).

SCHOLARSHIPS

The scholarships 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 Financial Aid Office, 111 Commerce Hall, or from any Oregon high school principal. *Applications, including transcripts of all academic work to date of application, should be forwarded to the Scholarships Office by March 1 of each year.* Exceptions to these procedures will be noted for certain of the scholarships administered by other agencies.

State

Resident Students

Partial Tuition and Fee Scholarships

Under law created by the Oregon State Legislature, Partial Tuition and Fee Scholarships (regular tuition fees less $32 which the student himself pays each school quarter) are awarded by the State Scholarship Commission equal in number to 2½% of the enrollment in State-supported institutions. Entering freshmen having financial need are eligible to apply if ranked in the upper one-half of their high school class. A college student, with financial need and not on any form of probation, is eligible to be considered for a scholarship if he (1) has a cumulative GPA of 2.50; (2) has earned a 2.50 GPA in the term preceding the selection of scholarship winners. In order to receive a scholarship, however, the student must have earned a 2.50 GPA for the term during which he received official notice of his selection. Currently enrolled students apply directly to the Financial Aid Office, Commerce Hall 111. Applications for Partial Tuition and Fee Scholarships are available to entering freshmen from the high school principal, or the institution the student desires to attend.

District and County Scholarships

The State Scholarship Commission awards annually one four-year scholarship for each Oregon county and for each State Legislative seat. The value of these scholarships is the same as the Partial Tuition and Fee Scholarships. Students wishing to apply for these scholarships do so by making application to the State Scholarship Commission, Box 5175, Eugene, Oregon, through the high school principal.

State Cash Scholarships

Outstanding high school seniors having financial need are eligible to apply for Cash Scholarships awarded by the State Scholarship Commission. These awards have an annual possible maximum value of $500 and are renewable until graduation provided a term and cumulative grade-point average of 2.50 is maintained, and the student earns a 2.50 in the term during which he receives notification of his selection. Selection is based on academic achievement and financial need. The Commission provides each high school principal with scholarship application forms and applications are made directly to the State Scholarship Commission. Recipients of Cash Awards may attend any State or private institution.

Nonresident Students

A limited number of scholarships are available to nonresident students enrolling as freshmen and transfers after June 1, 1963. To be eligible for such scholarships a student, if a freshman, must have earned at least a 3.00 in high school; if an entering transfer, a student must have earned a 2.75 either in a junior college or a four-year college. Currently enrolled nonresident students must meet the same requirement as currently enrolled resident students. A recipient must have financial need, must have demonstrated good character, and must show a potential for future academic success. These scholarships cover a portion of the fees charged—$100, $150, or $190 a term. Applications for these scholarships are made to the Financial Aid Office, Commerce Hall 111, Oregon State University, prior to March 1.

Foreign Students

Scholarships for a limited number of students from foreign countries attending institutions of the Oregon State System of Higher Education are available. All applications for scholarships on the part of foreign students should be made to the Financial Aid Office, Commerce Hall 111.

All-Campus

Associated Women Students Scholarship: Financial aid to one or more women in recognition of outstanding campus service and high scholarship.

Bash Scholarship: $330 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.

Berger Scholarships: Partial tuition and fee scholarships usually awarded to nonresidents. Selections based on high scholarship, financial need, and character, with promise of rendering service to the University. A memorial to Marie Harbeck Berger.

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.

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

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.

William and Alice Herrin Scholarship: Annual tuition and fees scholarship to men or women students in their junior or senior year. Selection based on high scholarship, unimpeachable character, and demonstrated service to the University.

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.

Leonora H. Kerr-Folk Club Scholarship: $330 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.

Naval 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 Bookstore, Inc., Scholarships: Full tuition and fees scholarships presented annually to students who have maintained good scholarship and citizenship and who have financial need.

Oregon State University 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.

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.

Frank and Frances Ramsey Scholarship: $500 to a male student selected by a committee composed of the Dean of Men, Director of Alumni Relations, and the Director of Athletics of Oregon State University; based upon the characteristics of citizenship, academic standing, and athletic ability.

Varsity "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 OSU student who has completed at least 9 term hours in art with grade-point average of 3.25 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 an undergraduate premedical student. Selection based on scholarship, financial need, and qualities such as personality and ability determined by personal interview. Recipient need not be an Oregon resident, and may be of any race, color, or creed.

Boeing Scholarships: Approximately $800 to be divided normally into four scholarships for juniors or seniors in mathematics and physics. Selection made on basis of academic achievement, personal qualities, and financial need. Recipients are chosen without regard to race, color, creed, or national origin, but must be U. S. citizens.

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, formerly head of the Bacteriology Department. Award made to a junior or senior who shows outstanding promise in the School of Science.

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

Crown Zellerbach Foundation Scholarship in Honor of Dr. Leo Friedman: $1,000 to an upper division student in forest products chemistry. Selection based on scholastic achievement and promise. Recipient chosen without consideration of race, creed, sex, or country of origin. A memorial to Dr. Leo Friedman, for many years on the chemistry faculty, and a pioneer in wood chemistry in Oregon.

Milton Harris Scholarships: Two $250 scholarships for outstanding juniors or seniors in science, one preferably in chemistry. Selection based on academic achievement and promise, and on need of financial assistance.

Longview Fibre Company Pulp and Paper Undergraduate Scholarship: Approximately $330 to a worthy sophomore or junior in chemistry. Selection based on need of financial assistance, scholarship, professional interest, and personal qualities. Recipient must be a permanent U. S. resident. Summer employment with company may be available.

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

Texaco Scholarships: Approximately $1,600 divided into three or more scholarships for upper division men in chemistry, physics, mathematics, geology, or engineering, who may qualify for careers in the petroleum industry. Selections based on scholastic ability, financial need, personal qualities, and sound health. Recipient may be of any race, color, or creed, and awards to juniors normally are renewed for the senior year.

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.

P. M. Brandt and G. H. Wilster Memorial Scholarship: One year tuition to sophomore, junior, or senior majoring in food science and technology, or dairy microbiology. Sponsored by the Oregon Dairy Industries.

Bumble Bee Seafoods, Inc. Scholarship: $1,000 annually to a junior in food science and technology, supported by work in selected engineering courses, with potential summer employment between junior and senior years and renewal of scholarship during the senior year. Limited to students with sincere interest in career in commercial fisheries industry.

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

Crown Zellerbach Foundation Scholarship in Fisheries and Wildlife: $500 annually to a junior or senior in fisheries and wildlife, preferably fisheries.

General Foods Fund Scholarships: Ten $400 scholarships for entering freshmen 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.

Intern Management Program: $330, primarily for male majors in agricultural economics with high capacity for success in business management. Selection based upon scholarship, aptitude for business, resourcefulness, and related factors with financial means for continuing beyond freshman year provided by summer training income.

Kiwanis Club of South Riverside Scholarship: $225 annually to a senior in fisheries and wildlife. Award based on scholastic ability and financial need. Recipient must be a resident of Oregon, preferably from the greater Portland area.

Ezra J. Kraus Memorial Scholarship: $300 annually to entering freshman interested in a career in floriculture or nursery management. Hand written letter indicating hobbies, work or real interest in ornamental plant line should accompany scholarship application. Deadline May 1.

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 an outstanding senior in fisheries and wildlife. Preference given qualified students from the Milwaukie area. Selection based on scholastic ability, leadership, career interest in fisheries and wildlife, and financial need.

Multnomah Anglers and Hunters Club Scholarship: $50 for a sophomore major in fisheries and wildlife in recognition of his accomplishments and to promote continued excellence in his studies in wildlife conservation and management.

Multnomah Anglers and Hunters Club Scholarship: $200 for a junior or senior majoring in fisheries and wildlife to assist him in continuing his studies in wildlife conservation and management.

Northwest Packing Company Scholarship: $300 to a freshman in food technology.

North Willamette Valley Horticulture Society Scholarship: One $50 scholarship to an incoming freshman student from Multnomah, Clackamas, or Columbia County, who has expressed an interest and intent to major in horticulture.

Oregon Federation of Garden Clubs Scholarships: Two $300 grants-in-aid for sophomores or upperclassmen, one in landscape architecture and one in ornamental horticulture.

Pacific Northwest Plant Food Association Scholarship: $250 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.

R. M. Wade Foundation Scholarship: $250 annually for a junior or senior majoring in agricultural education.

Western Rod and Reel Club Scholarship: $300 annually to a junior or senior majoring in wildlife or fisheries. Selection based on real financial need, ambition and desire for further study, and scholastic accomplishment.

School of Business and Technology

Boeing Scholarships: Four $200 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 Cub Scholarship Committee from nominations by departments of Business Education and Secretarial Science.

Price-Waterhouse Scholarships: Two $250 scholarships annually to business administration students concentrating in accounting; recommendation by accounting faculty, primarily on the basis of scholarship and professional promise.

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.

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

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, 603 Loyalty Building, Portland.

Eva M. Seen Scholarship: $100 annually to an incoming senior woman in professional physical education; award based on professional interest, womanliness in appearance and character, leadership, and scholarship. Recipient must be a member of Parthenia (Women's Physical Education Honorary).

School of Engineering

Alcoa Foundation Undergraduate Scholarships: Two $600 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.

Boeing Scholarships: Four $250 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.

Esco Undergraduate Scholarship: $500 awarded to a graduating senior in the top twenty-five percent of his class. Candidate should have an interest in manufacturing progress of metallurgy and be willing to accept summer employment with the Corporation Plant at Portland, Oregon. A 2.80 GPA must be maintained.

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: One or more $300 scholarships annually to outstanding seniors 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.

NAHB Undergraduate Scholarship: $500 awarded to persons interested in the home building industry as a future occupation; supplied by the National Association of Home Builders Foundation.

Paper Industry Management Association Scholarship: Resident tuition annually to an engineering undergraduate majoring in chemical, civil, electrical, industrial, or mechanical engineering. Award based on scholastic standing and financial need.

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 Scholarships: Three $750 scholarships provided by the Standard Oil Company of California for one undergraduate student in chemical engineering, one in electrical engineering, and one in mechanical engineering.

Texaco Scholarships: Financial assistance in varying amounts and numbers for upper division majors in 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.

Western Kraft Scholarships: Two $420 scholarships provided by the Western Kraft Corporation to juniors in the School of Engineering for their senior year. Candidates must be U. S. citizens.

School of Forestry

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

Aufderheide Memorial Scholarship: Income from an endowment fund, a memorial to Robert Aufderheide, class of 1935, to an outstanding forestry student.

Autzen Foundation Scholarship: $500 provided for an 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.

Gordon and Priscilla Duncan Scholarship: Income from endowment fund for a deserving forestry student, preferably in forest products, nominated by forestry faculty.

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.

Portland Wholesale Lumbermen's Association Scholarship: $200 annually for outstanding forest products student with a business minor.

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.

Margaret O. Starker Memorial Scholarship: Income from a bequest to further forestry education and research at Oregon State University School of Forestry; awarded to a deserving student selected by forestry staff.

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

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 Round Table of Oregon 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.

International Friendship Scholarship: For an upper division or graduate student from a foreign country studying home economics at Oregon State; provided by the student chapter of the Oregon Home Economics Association.

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

See School of Pharmacy section.

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.

Administered by Other Agencies

Auxiliary to Professional Engineers of Oregon Scholarship: $330 to a Portland State College student transferring into professional engineering at Oregon State University. Application through Portland State College Scholarship Committee.

Corvallis Rotary Club Scholarship: $400 to a graduate of a Benton County high school or a resident of Benton County who, because of school boundaries, attended high school in a neighboring county. Application submitted to the Scholarship Committee of the Corvallis Rotary Club through the club president. Applicant should express financial need, educational interests and goals in a letter of not more than two typewritten pages.

Crown Zellerbach Foundation Scholarships: $625 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.

Forestry Memorial Scholarship: Income from funds contributed as memorials to graduates and friends of the School of Forestry to a worthy student; administered through Oregon State University Alumni Association.

4-H Future Farmers of America, and Future Homemakers of America Scholarships: Members should make inquiries to teachers and club leaders regarding local scholarship opportunities.

Institute of Food Technologists Undergraduate Scholarship: $300 annually to a freshman in field of food technology. Application made on official form to head of department. Selection by Committee on Education, Institute of Food Technology.

Maria C. Jackson-General George A. White Student-Aid Fund for Children of War Veterans: Two $750 scholarships annually (one to a man, one to a woman) to children of war veterans; selection based on need and scholarship. Application through United States National Bank of Portland.

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

Northwest Canners and Freezers Association Scholarship: $100 annually to an outstanding junior majoring in food technology.

Oregon Home Economics Association Scholarship: $500 over a four-year period awarded a senior in an Oregon high school for enrollment as a home economics major in an Oregon college granting a degree in home economics. Application through high school teacher of home economics.

Oregon 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.

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.

E. E. Wilson Scholarships: Annual assistance grants up to $800 each, from a trust fund provided in the will of E. E. Wilson, Corvallis banker and attorney. Awards, based primarily on financial need, followed by character and scholastic attainments, granted to deserving young men and women who are bona fide residents of Benton County. To apply, eligible students should submit a letter to the E. E. Wilson Scholarship Awards Committee, Mr. Fred C. Zwahlen, Jr., Coordinator, Administration 2, Oregon State University.

Air Force ROTC Financial Assistance Program: This scholarship program authorized by the ROTC Vitalization Act of 1964 aids advanced AFROTC students. Available for a limited number of qualified four-year program students on a competitive basis, it pays tuition, books, and fees for the two years of advanced AFROTC. For eligibility requirements contact the Professor of Aerospace Studies, Coliseum 229.

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 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.

Chi 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 (d) 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.

Oregon State University Foundation 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.

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 the 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

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.

Arthur G. B. Bouquet Horticulture Award: Annual award of $100 to a selected junior or senior in horticulture.

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.

S. B. Hall Memorial Award in Animal Science: $275 to the outstanding junior in Animal Science majoring in Dairy Production.

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.

The Oregon Society of Farm Managers and Rural Appraisers Award in Agricultural Economics: $110 to an outstanding sophomore or junior majoring in agricultural economics at Oregon State University.

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 Award: Inscription on School of Business and Technology Honor Plaque of names of outstanding men and women graduates determined by representatives of School of Business and Technology students and faculty.

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 Society of Agricultural Engineers Honor Award: Certificate of recognition and key awarded one recipient from each student chapter ASAE as determined by local selection.

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.

Institute of Electrical and Electronics Engineers: Cash awards, certificate, and travel allowance to regional meeting.

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.

The Industrial Press Award: A copy of Machinery's Handbook to the outstanding student in machine design.

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 to 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.

HONOR SOCIETIES*

Organization	Men or women	Date established nationally	Date established at Oregon State	Type or field of interest
General Honor Societies				
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
Departmental Honor Societies				
Beta Alpha Psi	Both	1919	(1923) 1959	Accounting
Beta Gamma Sigma	Both	1913	1963	Business
Eta Kappa Nu	Both	1904	1921	Electrical Engineering
Iota Sigma Pi	W	1900	1960	Chemistry
Kappa Delta Pi	Both	1911	1928	Education
Mu Beta Beta	Both		1928	4-H
Pi Delta Phi	Both	1906	1962	French
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
Men's Professional Fraternities				
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
Women's Professional Fraternities				
Lambda Kappa Sigma	W	1913	1930	Pharmacy
Phi Chi Theta	W	1924	1924	Commerce (Secretarial Science)
Theta Sigma Phi	W	1909	1925	Journalism
Recognition Societies				
Alpha Phi Omega	M	1925	1946	Service (Boy Scouts of America)
Arnold Air Society	M	1947	1951	Aerospace Studies
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
Talons	W	.....	1933	Service
Thanes	M	.....	1936	Service
Local Honor Societies				
Euterpe	W	.....	1920	Music
Masque and Dagger	Both	.....	1917	Dramatics
Orange O	W	.....	1922	Physical Education
Orchesis	W	.....	1930	Dancing
Parthenia	W	.....	1929	Physical Education
Silver Wings	M	.....	1956	Aerospace Studies

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

School of Forestry

ANNUAL CRUISE PLAQUE: 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.

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 $100 by the Oregon Home Economics Extension Council to a junior in home economics in memory of K. 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.

ELEANOR TRINDLE MEMORIAL AWARD: Annual awards, one of $100 and one of $50, to juniors in Home Economics; provided by the Oregon Home Economics Extension Council.

School of Pharmacy

See SCHOOL OF PHARMACY section.

ACTIVITIES

Oregon State University recognizes the value of student activities as a part of a college education. It is through the activities program that students are stimulated to discover and experiment with their own capabilities and capacities, and to be creative in their approach to problem solving. Leadership experience gained through participation in self-governing organizations and programs encourages the formation of habits of civic responsibility. Activities enhance social and cultural development by fostering participation in the social, intellectual, and aesthetic life of the campus. Because of their close relationship to the educational program, many activities are cocurricular rather than extracurricular.

Memorial Union

The Memorial Union, located in the heart of the campus, is a community center for Oregon State University. It provides services, facilities, and programs to meet the varied social, recreational, and cultural needs of Oregon State University students, faculty, staff, alumni, and campus guests.

The building contains an activity center for the use of all student organizations. It provides a complete food service including cafeteria, snack bar, and banquet facilities, a book store,

recreation area including billiards, bowling, and table tennis facilities, a music room, ballroom, art gallery, lounges, and meeting rooms of all types. From the roof the carillonic 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, recreational, and cultural programs.

The building stands as a constant reminder of this nation's struggle for peace, and a living memorial to the students who have given their lives in the service of their country.

Student Government

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

Associated Women Students (AWS) represents the interests and general welfare of all women students and provides programs which will complement their academic experiences. It is responsible for formulating and implementing the enforcement of women's regulations.

Class Organizations formed by each entering class retain their identity throughout the four undergraduate years.

Councils representing both men's and women's living groups have important roles in student self-government. They include Panhellenic Council, Women's Residence Hall Council, Interfraternity Council, Men's Residence Hall Council, and the Inter-Cooperative 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 Program Council and the Art Department, exhibitions in the Memorial Union stimulate interest in architecture, painting, sculpture, and related arts. They give the student acquaintance with his cultural heritage and an awareness of contemporary art movements throughout the world. Student and faculty art exhibits are shown in the Fairbanks 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.

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

The Corvallis and OSU Music Association 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. The all-student Encore Committee brings to the campus popular entertainment in the form of pops concerts and lectures.

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, the Intercollegiate Forensic Association of Oregon, and model United Nations. Special student organizations, such as Masque and Dagger, the Telemike Club, the Campus Puppeteers, and chapters of Delta Sigma Rho, Tau Kappa Alpha, 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. A full schedule of forensic activities for both men and women students, including debate, oratory, extempore speaking, after-dinner speaking, and discussion, are under the direction of the 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 additional 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. As a member of the Athletic Association of Western Universities (AAWU), Oregon State University conducts a regular program of competition with other large Pacific Coast universities in football, basketball, baseball, track, wrestling, swimming, tennis, and golf. In the following recreational sports, it also engages in some intercollegiate competition: rowing, soccer, rugby, skiing, men's bowling, women's bowling, pistol and rifle, women's field hockey, and gymnastics.

A comprehensive program of intramural sports, closely correlated with instruction in physical education, provides an opportunity for every man, whether he is proficient in a sport or not, to belong to a team that competes with other teams on the campus in a wide variety of outdoor and indoor sports. Stimulation and recognition of achievement in athletics and sports are provided through the Division of Physical Education, the Recreational Sports Committee, honor societies in physical education, and other sports interest groups.

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

Eligibility to Hold Office

To be eligible to hold office in any extracurricular or cocurricular activity officially recognized 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) Have an accumulative GPA of 2.00 or higher.

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. In addition, the Dads Club makes available to the University Student Loan Committee sums of money in $1,000 denominations which are matched through the United Student Aid Fund. Besides these financial aids, certificates of merit are awarded to outstanding high school seniors.

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 organizations 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*, the bimonthly alumni magazine which is distributed to all alumni fund contributors and life members of the association. Complimentary copies go to: (1) members of the Alumni Golden Jubilee Association, (2) retired faculty. *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:

Rudy M. Kallander, '38, President, Corvallis
John M. "Jack" Byrne, '33, Vice President, Eugene
Freida L. Blakely, '37, Vice President, Portland
Terry B. Elder, '47, Treasurer, Corvallis
Richard G. Farnes, '54, Portland
Phyllis G. Hann, '42, Salem
E. B. Lemon, '11, Corvallis
Craig McMicken, '50, Roseburg
Robert G. Swan, '50, Portland
Rudy H. Thielemann, '34, Portland

Directors:

W. Del Ball, '33, Tigard
Larry A. Beck, '57, Mountlake Terrace, Washington
Patricia N. Biggs, '59, Corvallis
Henry L. Burns, '38, Beaverton
James F. Busch, '42, Milton-Freewater
Don A. Butsch, '52, Newport
Mae C. Copenhagen, '40, Lake Oswego
Dale M. Curry, '49, Springfield
Joseph M. Dyer, '23, Astoria
James O. Fisher, Jr., '54, Portland
Gerald B. Homan, '39, Enterprise
M. M. Huggins, '38, Medford
Robert C. Ingalls, '37, Corvallis
Richard J. Jaeger, '54, Condon
Donald E. Johnson, '36, Corvallis
Ralph E. Jones, '27, Grants Pass
Helen Kelly, '51, Portland
Charles H. Mack, '31, Salem
M. I. Masterson, Jr., '35, Long Beach, California
Richard A. Miller, '48, Portland
Floyd C. Mullen, '26, Albany
Lee J. Nelson, '38, Coos Bay
Joe C. Oliver, '38, John Day
Johnnie E. Rice, '55, Corvallis
Robert W. Riggert, '57, Tillamook
Dr. James A. Riley, '42, Corvallis
Robert A. Thompson, '25, Klamath Falls
Alice I. Wallace, '32, Corvallis
Harvey M. Watt, '50, Bend
Clyde E. Williamson, '08, Albany

School Representatives:

Agriculture, Terry B. Elder, '47, Corvallis
Business and Technology, Freida L. Blakely, '37, Portland
Education, Ralph E. Jones, '27, Grants Pass
Engineering, Henry L. Burns, '38, Beaverton
Forestry, Rudy M. Kallander, '38, Corvallis
Home Economics, Patricia N. Biggs, '59, Corvallis
Humanities and Social Sciences, Alice I. Wallace, '32, Corvallis
Pharmacy, Dale M. Curry, '49, Springfield
Science, Dr. James A. Riley, '42, Corvallis

Ex-Officio Members:

Roy Ventura, '66, ASOSU President
Bonnie Gathercoal, '66, AWS President
G. Martin Blakely, Dads Club President
Mrs. Ethan Hull, Mothers Club President
Joseph H. Berry, '29, Executive Secretary OSU Foundation
W. Del Ball, '33, President OSU Foundation
Ursel C. Narver, '28, President OSU Federation

Staff:

C. H. "Scram" Graham, '35, Corvallis, Director of Alumni Relations
C. R. "Chuck" Wenstrom, '60, 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, construct, use, maintain, lease, exchange, and dispose of all kinds of property, whether acquired absolutely or in trust, for the benefit of OSU. Substantial gifts have been received and, since its incorporation in 1947, the Foundation has become an important adjunct to the advancement of Oregon State.

Board of Trustees:

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W. Del Ball, President
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Ex-Officio:

R. M. Kallander, President, OSU Alumni Association
C. H. "Scram" Graham, Director of Alumni Relations
Mrs. Ethan Hull, President, OSU Mothers Club
G. Martin Blakely, President, OSU Dads Club

SUMMER TERM

Director, Associate Professor ROBERT L. PHILLIPS

The Summer Term at Oregon State University is designed for maximum flexibility.

Some students continue their studies during the summer in order to graduate sooner. Other students use the summer to complete graduate degrees and/or to complete requirements for certification. Still others use the summer to prove they can do satisfactory college work and thereby qualify for admission. For these students and others, Oregon State University is a scholarly and friendly place for summer study in many fields.

Summer Courses. Most of the academic work in summer 1966 will be presented in the eight-week term beginning June 20. An eleven-week program beginning June 20 is reserved primarily for the presentation of courses in sequence, meaning that a student may complete a three-term sequence of a given subject in the eleven-week period.

To round out the educational program, over 30 workshops are offered, ranging in length from one to six weeks.

Most of the course work offered in 1966 is taught in the Schools of Education, Humanities and Social Sciences, Business and Technology, Science, and Home Economics although courses are available in every School within the University.

Credits, fees, and housing. The student enrolled in the eight-week session may earn up to 12 hours of credit, or more with the approval of one's dean. The student enrolled in the eleven-week session may take one complete sequence plus 6 hours of credit, making a total of 15-18 hours in the eleven-week period.

The fee for Summer Term is the same for residents and nonresidents; $110 for 8 or more credit hours. Part-time students pay $14 per credit hour.

There is plenty of housing available in the summertime. Information and application forms may be received by writing to the Department of Housing, Oregon State University.

The Summer Term Bulletin and other special announcements may be obtained by writing the Director of Summer Term, Oregon State University.

ITALIAN STUDIES CENTER

University of Pavia, Italy

Resident Director: Associate Professor EMMANUEL HATZANTONIS
Associate Director: Associate Professor JAMES HUGON

The Italian Studies Center, conducted by the Oregon State System of Higher Education under the administration of Portland State College, provides a full academic year of undergraduate study in the humanities and social sciences at the University of Pavia in Italy. Students have an opportunity to choose from undergraduate courses including the following:

RL 70,71,72.	First-Year Italian	12
RL 104,105,106.	Second-Year Italian	12
RL 371,372,373.	Third-Year Italian	9
Hst 341,342,343.	Europe Since 1789	9
AA 363,364,365.	Art History Survey from Prehistoric to Modern Times	9
Hst 407.	Seminar: Modern Italian History	3
PS 407.	Seminar: Contemporary European Political Problems	3
PS 437.	Governments of France, Germany, Italy	3
Ec 407.	Seminar: Contemporary European Economic Problems	3
Hum 407.	Seminar: Creative Epochs in Western Thought	3
AA 401.	Special Studies: Drawing and Painting	6

All courses except those in Italian language and literature are given in English.

The Italian Studies Program provides an opportunity for the qualified student to deepen his understanding of our cultural debt to Europe and to acquire a comprehension attainable in no other way of contemporary European problems and their importance to the United States. Located near Milan in northern Italy, Pavia is within easy traveling distance of many European cultural centers. This permits the enrichment of study through weekend and vacation travel. Limited travel in Italy and southern Switzerland is possible during some weekends and more extensive travel following the academic year.

To be eligible, students must have completed at least one year of college study. The program is intended primarily for juniors, although sophomores are eligible. Normally, a 3.0 cumulative grade-point average is required but may be waived at the discretion of the director.

Cost of transportation from Portland and return, living expenses for the academic year, except for Christmas and spring holidays, and tuition and fees amount to approximately $2,400.

Additional information may be obtained at the office of the dean of the School of Humanities and Social Sciences.

Liberal Arts and Sciences

THOSE AREAS OF SUBJECT MATTER AND KNOWLEDGE KNOWN AS THE Arts and Sciences, or the Liberal Arts and Sciences, are divided at Oregon State University into six broad divisions in two Schools. They are called "liberal" because their study helps to liberate the mind and to foster a critical and creative spirit of inquiry regarding man, society, and nature. As fundamental subjects, they underlie all the professions and most other occupations. At the same time, the Liberal Arts contribute to the development of each person as a moral, social, and aesthetic being. All students, regardless of their intended future careers, are well advised to take as many of these subjects as possible while in the University.

Those fields of knowledge and experience having to do with the productions of man as a feeling, thinking creator and communicator are called *The Humanities*. At Oregon State University the SCHOOL OF HUMANITIES AND SOCIAL SCIENCES has ten departments devoted to research and teaching in the Humanities. These are the departments of Architecture, Art, English, Journalism, Landscape Architecture, Modern Languages, Music, Philosophy, Religion, and Speech.

Those fields of knowledge having especially to do with human institutions, customs, and behavior which define man's social relationships are called *The Social Sciences*. At Oregon State the faculty of the departments of Economics (including Geography), History, Political Science, Psychology, and Sociology and Anthropology in the SCHOOL OF HUMANITIES AND SOCIAL SCIENCES devote themselves to teaching and research in the Social Sciences.

In the School of Science, the natural sciences and closely related fields are grouped for convenience into four sections:

Physical Sciences, Mathematics, and Statistics includes the departments of Chemistry, Mathematics, Physics, and Statistics.

Biological Sciences includes the departments of Botany, Entomology, Microbiology and Hygiene, and Zoology.

Earth Sciences includes the departments of Geology, Natural Resources, Oceanography, and the Meteorology section of the Physics Department.

General Science and Special Programs includes the departments of General Science and Science Education and the preprofessional curricula in dentistry, dental hygiene, medicine, medical technology, nursing, and veterinary medicine.

Humanities and Social Sciences

FACULTY

As of January 1966

GORDON W. GILKEY, Arts D., Dean of the School of Humanities and Social Sciences.

KENNETH D. PATTERSON, Ph.D., Assistant Dean.

FRANK LOVERN PARKS, Ph.D., Head Counselor and Director of Placement.

Emeritus: BAKKUM, BOURBOUSSON, BUTTS, COLBY, DAWES, DREESEN, DUBACH, ELLISON, KUNEY, LAKE, LEWIS, MCELFRESH, M. N. NELSON, SOLBERG, M. E. SMITH, WELLS.

Architecture: Professors SINNARD (department chairman), ELLIS.
Associate Professors GLASS, METZGER, WASSON.
Assistant Professors HARDING, PIPER, STADSVOLD, STEWART.

Art: Professors GUNN (department chairman), JAMESON, SANDGREN, SPONENBURGH, WHITE.
Associate Professors FOX, S. LEVINE, LINDERMAN, MUNRO, ROCK, TAYSOM, WASSON.
Assistant Professors BOWMAN, CHAPPELL, KENNEDY, MUNRO, TAYLOR.
Instructor WIPRUD.

Economics: Professors FRIDAY (department chairman), HARTER.
Associate Professors ORZECH, PATTERSON, WILKINS.
Assistant Professors FARNESS, MCFARLAND, TOWEY, WOLFSON.
Instructors C. T. HARTER, SENINGER.

English: Professors FOREMAN (department chairman), CHILDS, GROSHONG, JENKINS, H. B. NELSON, ORDEMAN, SCHROEDER.
Associate Professors BROWN, GARRISON, HEWITT, LIGON, NORRIS, E. D. SMITH.
Assistant Professors CARLSON, CROCKER, DANKLEFF, DIXON, DUBBÉ, FINNIGAN, GILBERT, HAISLIP, HENLEY, JEFFRESS, JONES, R. E. KING, LAWRENCE, LUDWIG, P. B. NELSON, ONSTAD, POTTS, STAVER, WILLEY, N. W. WILSON.
Senior Instructor CARTER.
Instructors BERVIN, BEYNON, BOTTI, CLEMENTS, ELLIOTT, ENGESSER, HARWARD, LEV, MARTINELLI, MEREDITH, NAGEL, PATTY, REUTER, RUDINSKY, WEAVER, YOUNG.

Geography: Professors HIGHSMITH (department chairman), HEINTZELMAN, JENSEN, MYATT, RUDD.
Assistant Professors FRENKEL, HANSEN, MUCKLESTON.
Instructor ALDRICH.

History: Professors CARSON (department chairman), BERKELEY, CARLIN, C. K. SMITH, R. W. SMITH.
Associate Professors ADOLF, MEEHAN, SHAW.
Assistant Professors HOLSINGER, D. B. KING, MCCLINTOCK, TROW, WAX, WUBBEN.
Instructors MCILVENNA, MORRIS, M. ORZECH, PHILIPP, SQUIRE.

Journalism: Professors SHIDELER (department chairman), BAILEY.
Associate Professors BIRDSALL, DORN, ZWAHLEN.
Assistant Professor CARLSON.

Landscape Architecture: Professor MARTEL (department chairman).
Associate Professor FREDEEN.
Assistant Professors BLAKELEY, WARNER.

Modern Languages: Professors KRAFT (department chairman), GILFILLAN, JURGENSON, RICHTER.
Associate Professors FILIPS-JUSWIGG, C. O. SJOGREN.
Assistant Professors DALY, FERRAN, GLASSER, HARDING, LEVAN, LEVINE, RICARD, SCHMIDT.
Instructors KITCHING, WILSON.

Music: Professors BAUMEL, BRYE, MESANG, WALLS.
Associate Professors GRAY, MOLTMANN, O'CONNOR, ROBERTS, P. L. SCHMIDT, O. J. WILSON.
Assistant Professors KNAPP (acting chairman), MURRAY.
Instructor TARR.

Philosophy: Professor HOVLAND (department chairman).
Associate Professors ANTON, UNSOELD.
Assistant Professors DALE, YONKER.

Political Science: Professors WALTER (department chairman), FUQUAY, MADDOX, SWYGARD.
Associate Professors MCCLENAGHAN, MCGRATH.
Assistant Professors BALLARD, CERVANTES.

Psychology: Professors CROOKS (department chairman), MILLS, ROHDE.
Associate Professors BUCHANAN, CRAWFORD, MADDEN, SIMPSON, WARNATH.
Assistant Professors ADOLPH, DAMM, LEWIS.
Senior Instructors TAUBMAN, S. A. WILSON.

Religion: Professor HOVLAND (department chairman).
Associate Professor UNSOELD.
Assistant Professors CLARKE, YONKER.

Sociology and Anthropology: Professor PLAMBECK (department chairman).
Associate Professors CANTRELL, FOSTER, MALAN.
Assistant Professors CORMACK, CURRY, HOGG, JENNÉ, MCCARTHY, TENNYSON.
Instructor BROWN.

Speech: Professors KELTNER (department chairman), CORTRIGHT, GOETZINGER, HARRIS, LIVINGSTON, VALENTINE, WINGER, YOUNG.
Associate Professors DOLER, E. V. HILDEBRANDT, PHILLIPS, ROBERTSON.
Assistant Professors BENNETT, J. D. LEWIS, OLMSTEAD, A. L. WALLACE, A. S. WALLACE.
Instructors BAKER, H. J. HILDEBRANDT, P. POLING, STORM.

THE SCHOOL OF HUMANITIES AND SOCIAL Sciences offers divisional major programs in Humanities and in general Social Sciences, departmental majors in Art, Economics, English, History, Political Science, and Speech, and an interdepartmental major in Russian Studies.

CURRICULA

In addition to fulfilling institutional requirements, the candidate for a baccalaureate degree must complete the following school requirements:

A. Distribution Requirements: Minimum of 90 hours.

1. *Studies in Science.* Minimum of 18 hours in a or b:
   a. Proficiency in mathematics (at Mth 10 level) plus one year from two of the following: Mathematics, the Physical Sciences, the Biological Sciences (including at least one year of laboratory science).
   b. Two years from any one of the following: Mathematics (accompanied by at least one year of physical or biological laboratory science), the Physical Sciences (with demonstrated mathematical proficiency at Mth 50 level), the Biological Sciences (with demonstrated mathematical proficiency at Mth 50 level).

2. *Studies in Arts and Letters.* Minimum of 18 approved hours. Nine hours must be taken in one of the following fields, and the remaining 9 hours must be elected in one or more of the other fields. No work taken in the student's major field may be used to satisfy this distribution requirement.
   ART
   ARCHITECTURE (including Landscape Architecture)
   THEATER ARTS
   LITERATURE
   CREATIVE WRITING, JOURNALISM, SPEECH
   MUSIC

3. *Studies in History and Philosophy.* Minimum of 18 approved hours. Nine hours must be taken in one of the following fields, and the remaining 9 hours must be elected in one or more of the other fields. No work taken in the student's major field may be used to satisfy this distribution requirement.
   PHILOSOPHY
   RELIGION
   HISTORY

4. *Studies in Social Sciences.* Minimum of 18 approved hours. Nine hours must be taken in one of the following fields, and the remaining 9 hours must be selected in one or more of the other fields. No work taken in the student's major field may be used to satisfy this distribution requirement.
   ANTHROPOLOGY
   ECONOMICS
   GEOGRAPHY
   POLITICAL SCIENCE
   PSYCHOLOGY
   SOCIOLOGY

5. *Studies in Foreign Cultures.* Minimum of 18 approved hours either in modern foreign language or in a cultural area study designed to deepen and enhance the understanding of a culture other than the student's own. No work taken as part of any other distribution or major program may be used to satisfy this requirement.
   a. A student who elects the foreign language option must take at least 18 hours in one foreign language if he has had high school preparation in that language or 21 hours if he has not had high school preparation in that language.
   b. A student who elects the cultural area option must include courses from three of the following groups:
      ARTS AND LETTERS
      HISTORY AND PHILOSOPHY
      SOCIAL SCIENCES
      FOREIGN LANGUAGES

B. Concentration requirements: Maximum 60 hours

1. *Humanities Major.*
   A minimum of 45 to a maximum of 60 hours of approved courses from two or more departments of the Humanities. At least 27 hours must be upper division, including 18 hours in one department and 9 hours in one or more other departments.

2. *General Social Sciences Major.*
   A minimum of 45 to a maximum of 60 hours of approved courses from two or more departments of the Social Sciences. At least 27 hours must be upper division, including 18 hours in one department and 9 hours in one or more other departments.

3. *Departmental Majors.*
   See Departments of Art, Economics, English, History, Political Science, and Speech on the following pages.

4. *Interdepartmental Major.*
   See Russian Studies on next page.

Co-Majors in Officer Education

Under the principles establishing Officer Education (ROTC) at Oregon State University, it is stipulated that the prescribed program in aerospace studies, military science, or naval science may be taken by men as a co-major in any school (see DEGREES AND CERTIFICATES).

Teacher Certification

Basic and Standard Norm programs are offered in literature, writing, and language; social studies; language arts-social studies. Basic Norm programs are authorized in art, French, German, Spanish, Russian, speech and drama, speech correction, journalism, and music.

Students interested in qualifying for a State Teacher's Certificate should consult with their adviser or with the head counselor of the School.

Honors Program

Admission to the Honors Program

1. A high school senior who has demonstrated his ability to do superior work in English, mathematics, history, and languages may apply for admission to the Honors Program. He should include letters from his principal and a teacher of English, history, or languages, and should direct his request to the Dean, School of Humanities and Social Sciences.

2. An entering freshman may be invited by the Honors Council to participate because of high scores in placement tests.

3. A student who has not entered the program as a first term freshman but who petitions the Honors Council for entrance after his first term but not later than the registration period of the junior year may be accepted by action of the Honors Council.

Honors Council Requirements

1. Honors students during the freshman and sophomore years will participate in honors colloquia sequences; for the present those sequences will be GS 111H, 112H, 113H, and GS 214H, 215H, 216H.

2. Honors students will complete two years of study in either French, German, Russian, Spanish, or the equivalent.

3. Upon completion of an independent reading program during a summer (normally between the junior and senior years), the honors student will receive a maximum of 3 credit hours after taking oral and written examination by a committee of the Honors Council.

4. During his senior year the honors student will complete 3 credit hours of senior thesis.

Departmental Requirements

The department requirements will be established by the appropriate departments and will vary accordingly.

Any deviations from the requirements must be approved by the Honors Council.

Evaluation of Honors Students

The Honors Council will exercise wide discretionary powers in determining the students' eligibility to continue in the program. A 3.00 cumulative average is considered a minimum standard.

Programs and Courses in Humanities and Social Sciences

RUSSIAN STUDIES

In response to the persistent importance of the Soviet Union in world affairs and a wide interest in Russian society and culture on the part of the American public, the School of Humanities and Social Sciences offers an undergraduate major program in Russian Studies. The program of study is especially suited to those students interested in a broad knowledge of significant non-American centers of world power and influence.

The B.A. degree with major in Russian studies provides an excellent foundation for advanced study or for special career activities in American business, cultural, technical, and political participation in international agencies.

Requirements for B.A. Degree

1. For university requirements for B.A. degree see page 14. Russian must be used to meet language requirement.

2. For School of Humanities and Social Sciences distribution requirements see previous page. Under "Studies in Foreign Cultures" students will elect option "a".

3. A minimum of 45 hours of approved courses including:

a. Either Hum 327,328,329, *or* Hst 447,448,449 ..... 9 hours

b. A minimum of 33 hours from at least three of the five participating departments, Economics, Geography, History, Modern Languages, Political Science, chosen from the following: 33 hours

Ec 450, 451	PS 346
Geog 427	PS 436
Hst 447, 448, 449	SL 311, 312, 313
Hst 450	SL 314, 315, 316
Hum 327, 328, 329	SL 317, 318, 319
Hum 407	SSc 407

New courses may be added as approved

c. A minimum of one 3-hour seminar (407) in the Russian area in either economics, geography, history, or political science taken during the senior year ..... 3 hours

TOTAL ..... 45 hours

Students interested in electing the major in Russian Studies should consult the Committee on Russian Studies about their programs.

General Humanities Courses

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.

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-JUSWIGG.

Hum 402. **Independent Study.**
Terms and hours to be arranged.

Hum 403. **Thesis.**
Terms and hours to be arranged.

Hum 407. Seminar. (g)
Terms and hours to be arranged.*

General Social Sciences Courses

SSc 307. **Seminar.**
Terms and hours to be arranged.

SSc 402. **Independent Study.**
Terms and hours to be arranged.

SSc 403. **Thesis.**
Terms and hours to be arranged.

SSc 407. Seminar. (g)
Terms and hours to be arranged.*

* Graduate credit in Hum 407 and in SSc 407 may not total more than 9 hours each.

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 another university. 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 10,11,12. **Design Orientation.**
No credit.
Theory and practice of planning and design. Intended to acquaint the student with the scope and nature of the design professions. Required for majors in architecture, landscape, architecture, and interior architecture. Normally taken concurrently with AA 287.

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.

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 Philosophy.**
3 hours any term. 2 ① 1 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 I.
3 hours each term, three terms. 3 ②
Projects and exercises intended to familiarize the student with fundamental form and space concepts of architecture; control of proportion, scale, and design relationships. Students are encouraged to develop habits of problem formulation and sound bases for value judgments; the release of the student's potential creative capacities is a primary concern of the course.

AA 200. Delineation.
2 hours each term, three terms. 2 ②
Perception and communication by use of shade and shadow, orthographic projection, and perspective drawing necessary to indicate common architectural forms. Skills necessary for discrimination of form, color, and composition and for free experimentation of aesthetic expression. Pencil, pen and ink, and related media skills.

AA 207,208,209. History and Theory of Architecture.
3 hours each term. 3 ①
Review of architectural theory and form as a reflection of its social, economic, political, intellectual, and religious context; roots of contemporary theory. Not applicable to major in Architecture at the University of Oregon.

AA 218,219,220. Construction.
2 hours each term. 2 ①
Material and methods; individual research and observation; sketching existing examples: discussion. Prerequisite: AA 179. 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. 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. Design Studio II.
3 hours each term, three terms. 3 ③
Major factors which influence design decisions; relation of the physical and human environment to design; integration of design considerations involved in the production of an art form. Required for majors in architecture, interior architecture, and landscape architecture. Prerequisite: AA 187 or equivalent.

AA 288. Interior Design.
2 hours. 2 ③
Introduction to the field; relation to architecture and allied arts; basic principles and planning processes by which interior spaces and forms are studied and executed.

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.

AA 297. Lower Division Architectural Design.
1 to 3 hours any term, six terms.
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.

ART

The Department of Art offers an undergraduate major with areas of emphasis in the traditional Fine Arts of painting, sculpture, and printmaking, and in commercial art, ceramics, and art history. In addition to completing university and school requirements for graduation, the student must complete language requirements for the B.A. degree.

Departmental requirements at the lower division level are: 6 hours of Basic Design I, 6 hours of Drawing, and 7 to 9 hours selected from two of the following: Advertising Design, Ceramics, Sculpture, Painting, Basic Design II, or Survey of Visual Arts.

Upper division requirements are: 3 hours of Drawing, 9 hours of Art History, 9 hours of art electives, 9 hours at the 300 level and 9 hours at the 400 level of one of the following: Advertising Design, Ceramics, Printmaking, Sculpture, Painting, or Art History.

Subject to his adviser's approval, a student may arrange his major program to suit his personal interests and vocational needs. All major programs require 19 to 21 lower division hours in art and 39 upper division hours in art. For the four-year Basic Norm in Art Education see SCHOOL OF EDUCATION.

Lower Division Courses

Art 195,196,197. Basic Design I.
2 hours each term. 3 ①
Language of visual arts; color, texture, form, and space explored in studio and through study of works of art.

Art 201,202,203. Survey of Visual Arts.
2 hours each term. 2 ①
Principles and functions of architecture, painting, sculpture, and the arts of practical utility with a view toward cultivating general appreciation and application.

Art 205,206. 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.

Art 225,226,227. Industrial Arts Drawing and Design.
3 hours each term. 2 ② 1 ②
Freehand drawing with experience in the design of industrial arts objects; workshop techniques in arts crafts. Art 225,226,227 required for all industrial arts education majors.

Art 231. Art Craft.
3 hours any 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.

Art 235. Jewelry and Metalsmithing.
3 hours, any term, three terms.
2 ② 1 ②
Design, tools, and techniques of jewelry introduced through individual student problems in semiprecious materials and nonferrous metals.

Art 245,246,247. Advertising Design.
3 hours each term. 2 ② 1 ②
Introductory experience in commercial art lettering, layouts, packaging, and display advertising. Prerequisite: Art 195,251.

Art 251. Drawing.
3 hours any 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.

Art 255. Ceramics.
3 hours any term, three terms.
2 ① 1 ②
Pottery-making materials and techniques. Laboratory hours to be arranged.

Art 265. Scientific Illustration.
3 hours any term, two terms.
2 ② 1 ②
Freehand technical drawing adapted to needs of students in science and forestry.

Art 275. Water Color.
3 hours any 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.

Art 285. Sculpture.
3 hours any 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.

Art 291. 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.

Art 295. Basic Design II.
2 hours any 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 Art 201,202,203. Prerequisite: Art 197.

Upper Division Courses

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

Art 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.

Art 345. Advertising Design.
3 hours each term, three terms.
2 ① 1 ②
Lecture and studio projects in advanced layout and lettering typography, production methods in printing; illustration techniques. Prerequisite: Art 247.

Art 351. Drawing.
3 hours each term, three terms.
2 ② 1 ②
Use of various media continued; representation of the human form; analysis of structure and movement. Prerequisite: 6 hours Art 251.

Art 355. Ceramics.
3 hours each term, three terms.
2 ③ 1 ③
Methods for forming clay pottery continued; use of textures and glazes. Prerequisite: 6 hours Art 255.

Art 361,362,363. History of Art.
3 hours each term. 3 ①
Architecture, painting, sculpture, and the minor arts from prehistoric times to present. Must be taken in sequence. Prerequisite: Art 203 or Hst 101,102,103.

Art 371. Creative Art Projects.
2 hours any 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.

Art 381. Printmaking.
3 hours any term, three terms.
2 ② 1 ②
Basic techniques of intaglio, relief, and lithography; development of craftsmanship and creative possibilities of the media. Prerequisite: Art 251.

Art 385. Sculpture.
3 hours each term, three terms.
2 ② 1 ①
Life modeling, anatomical studies, figure composition employing traditional and experimental media. Prerequisite: 9 hours Art 285.

Art 391. Painting.
3 hours each term, three terms.
2 ③ 1 ③
Composition and techniques continued; figure composition, space concepts. Prerequisite: 6 hours Art 291.

Art 405. Reading and Conference. (g)
Terms and hours to be arranged.*

Art 406. Projects.
Terms and hours to be arranged.

Art 407. Seminar. (g)
Terms and hours to be arranged.*

Art 415. 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.

Art 416. 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: Art 415 or Art 313.

* Graduate credit under Art 405 and 407 may not total more than 9 hours.

Art 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: Art 313.

Art 445. Advanced Advertising Design.
3 hours each term, three terms.
2 ② 1 ②
Finished work in advertising illustration in specific directions for a professional portfolio, plus a terminal project. Prerequisite: 9 hours of Art 345.

Art 455. Advanced Ceramics.
3 hours each term, three terms.
2 ③ 1 ③
Perfection of ceramic skills and the growth of imaginative craftsmanship. Prerequisite: 9 hours of Art 355.

Art 461,462,463. History of Modern Art. (g)
3 hours each term. 3 ①
Lineage of contemporary styles and movements in the visual arts; development and interrelationships of Neoclassicism, Romanticism, Eclecticism, and twentieth century movements. Prerequisite: Art 203 or 363.

Art 481. Advanced Printmaking.
3 hours any term, three terms.
2 ② 1 ②
Workshop instruction in making and printing engravings, etchings, lithographs, linoleum cuts and wood cuts. Prerequisite: 9 hours of Art 381.

Art 485. Advanced Sculpture.
3 hours any term, three terms.
2 ③ 1 ③
Mature use of sculptor's materials and media; exploration of sculptor's potentialities. Prerequisite: 9 hours of Art 385.

Art 491. Advanced Painting.
3 hours any term, three terms.
3 ③
Application of techniques used in contemporary painting with emphasis upon student's personal development. Prerequisite: 9 hours of Art 391.

ECONOMICS

The Department of Economics offers a major program leading to the Bachelor of Arts or Bachelor of Science degree. Instruction serves the cultural and informational needs of all students interested in economic problems in relation to citizenship; it provides a sound basis for later professional or graduate education in economics; it supplies a foundation for law, business, or public service; and meets the prescriptions found in professional curricula.

In addition to the university and school requirements, the following courses are required:

Lower Division: Principles of Economics (Ec 201,202,203), College Algebra (Mth 101).

Upper Division: Microeconomic Theory (Ec 457, 458), Macroeconomic Theory and Policy (Ec 475, 476, 477), History of Economic Thought (Ec 470), an approved course in statistics.

Additional economics requirements met by any one of the following options:

a. *General Economics:* 18 additional hours of upper division economics including at least one sequence.

b. *Quantitative Economics:* 18 additional hours of upper division economics including Mathematical Economics (Ec 480, 481, 482), Econometrics (Ec 483).

c. *Economic History and Development:* 18 additional hours of upper division economics including at least 12 from the following: Comparative Economic Systems (Ec 450, 451), Economic History of Modern Europe (Ec 454), Economic Development (Ec 445, 446), American Economic History (Ec 487).

COURSES IN ECONOMICS

Lower Division Courses

Ec 115. Outlines of Economics.
3 hours. 3 ①
Principles and institutions. May not be taken in place of Ec 201,202, or 203.

Ec 201,202,203. Principles of Economics. 3 hours each term. 3 ①
Introduction to economic theory, policy, and institutions.

Ec 213,214. Principles of Economics.
4 hours each term. 4 ①
Similar to Ec 201,202,203. A two-term sequence.

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

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

Ec 380. Survey of Quantitative Economics.
3 hours. 3 ①
Mathematics and statistics used in analysis of economic problems and applications to economic theory and measurement. Prerequisite: Ec 203; Mth 101 or 107.

Ec 401. Research.
Terms and hours to be arranged.

Ec 403. Thesis.
Terms and hours to be arranged.

Ec 405. Reading and Conference. (g)
Terms and hours to be arranged. Graduate credit limited to 9 hours.

†Ec 407. Seminar. (g)
Terms and hours to be arranged.

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.

†Ec 423,424. Money and Banking. (g)
3 hours each term. 3 ①
Ec 423: Nature and functions of money, commercial banking, the Money Market, the Federal Reserve System, introduction to monetary theory and policy. *Ec 424:* Survey of recent monetary controversy, current issues in domestic monetary policy, nonbank financial institutions, foreign banking systems and international finance. Prerequisite: for Ec 423, Ec 203; for Ec 424, Ec 423. TOWEY.

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

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 440,441,442. 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, MCFARLAND.

Ec 445,446. Economic Development. (g) 3 hours each term. 3 ①
Theories and policies for economic development in both the developing and developed parts of the world. Prerequisite: Ec 203.

Ec 450,451. Comparative Economic Systems. (g)
3 hours each term. 3 ①
Contemporary economic systems; capitalism, socialism, communism. Prerequisite: Ec 203. FRIDAY, WOLFSON.

Ec 454. Economic History of Modern Europe. (g)
3 hours. 3 ①
The industrialization of Europe; origin and development of economic institutions; implications for the industrialization of underdeveloped areas. Prerequisite: Ec 203. FARNESS.

Ec 457,458. Microeconomic Theory. (g) 3 hours each term. 3 ①
Decision making in an enterprise economy. Price and output under various market structures; welfare economics. Prerequisite: Ec 203.

Ec 461. Industrial Organization. (g)
3 hours. 3 ①
Industrial and financial dimensions of U. S. business and their implications for economic efficiency, economic power, and social control. Prerequisite: Ed 203. FARNESS.

Ec 462. Economics of Public Control. (g) 3 hours. 3 ①
Government and the economy; historical and theoretical basis and implications for economic performance. Prerequisite: Ec 203. FARNESS.

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. Macroeconomic Theory and Policy. (g)
3 hours each term. 3 ①
National income and product accounts; theory of aggregate demand, employment, price level, economic growth; monetary and fiscal policy; current economic problems.

†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, WOLFSON.

Ec 483. Econometrics. (g)
3 hours. 3 ①
Theory and application of statistical and mathematical methods to problems of economics; model building and testing of demand, production, and macroeconomic hypotheses. Prerequisite: Mth 112; two terms of statistics; Ec 457,476.

Ec 487. American Economic History. (g) 3 hours. 3 ①
Economic development of U. S. from colonial times to present. Prerequisite: Ec 203. FRIDAY, FARNESS.

Graduate Service Courses
See also courses marked (g) above.

Ec 512,513. Economic History and Development.
3 hours each term. 3 ①
Historical development of industrial economies; sources of historical change; structural characteristics; long-term growth trends. FRIDAY, FARNESS.

Ec 514,515,516. Contemporary Economic Thought.
3 hours each term. 3 ①
Twentieth century economics; value theory, welfare economics, imperfect competition; institutionalism; theory of employment, money, national income, economic fluctuations; growth; innovations in methodology. Prerequisite: 475,476,477, or equivalent.

Ec 527,528. History of Economic Thought.
3 hours each term. 3 ①
Contribution of greatest economic thinkers from earliest times to present with particular attention to schools of thought. FRIDAY.

ENGLISH

The Department of English offers an undergraduate major for students interested in literature or writing. Courses are offered to meet the needs of students who seek the cultural and intellectual values of the undergraduate major, of students who plan to pursue graduate work in English, and of the students in professional schools of our campus who desire the broadening influence of humanistic studies. In addition to completing university and school requirements for graduation, the student must complete university language requirements for the B.A. degree. He will also complete one year of Shakespeare, one year of either Survey of English Literature or World Literature, and a total of 27 hours in upper division courses in the department, including 9 hours in literature before 1800 and 9 hours in literature since 1800 (these need not be taken in period courses). He also must include History of Western Civilization. Prospective high school teachers must satisfy state certification requirements. (See SCHOOL OF EDUCATION.)

Students who wish certification as librarians in Oregon schools may meet the State Department of Education requirements for a basic certificate by completing 18 term hours in library science. Courses may be chosen from Lib 481, Lib 484, Lib 486, Lib 488, Lib 490, Ed 435, and Ed 416.

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

COURSES IN LITERATURE

Lower Division Courses

Eng 101,102,103. Survey of English Literature.
3 hours each term. 3 ①
English literature presented in chronological sequence: *Eng 101:* From Beowulf through Milton; *Eng 102:* From Milton through Byron, Keats, and Shelley; *Eng 103:* From Shelley to the present. Recommended for a major or minor in English. GIBSON, HEWITT, MITCHELL, NELSON, ORDEMAN, SCHROEDER.

Eng 104,105,106. Appreciation of Literature.
3 hours each term. 3 ①
Study of types of literature for greater understanding and enjoyment. *Eng 104:* primary emphasis on fiction; *Eng 105:* on drama; *Eng 106:* on poetry.

Eng 107,108,109. World Literature.
3 hours each term. 3 ①
The great plays, poems, and novels of western civilization. *Eng 107:* The Classic World; Hebrew, Greek, Roman, and Christian to St. Augustine. *Eng 108:* The Renaissance to the Age of Reason; Dante to Voltaire. *Eng 109:* The Romantic Revolt; Goethe to Gide. GARRISON, STAVER.

Eng 201,202,203. Shakespeare.
3 hours each term. 3 ①
The major plays. Recommended for a major or minor in English. FOREMAN, NORRIS.

Eng 253,254,255. Survey of American Literature.
3 hours each term. 3 ①
Readings from American literature with emphasis on major writers. *Eng 253:* colonial and early national literature to Hawthorne and Melville; *Eng 254:* Emerson to Henry James; *Eng 255:* Henry Adams to the present. Recommended for a major or minor in English. CARLSON, GARRISON, JENKINS, LIGON.

Eng 263. Great Books.
3 hours spring. 3 ①
Great books of the world and their influence.

Eng 275. The Bible as Literature.
3 hours fall. 3 ①
Structure, literary types, ideas of the Bible; its influence on our literature.

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

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.

Eng 374. The Short Story.
3 hours. 3 ①
Survey of the short story; reading and analysis of masterpieces of the form. 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 401. Research.
Terms and hours to be arranged.

Eng 403. Thesis.
Terms and hours to be arranged.

Eng 405. Reading and Conference. (g)
Terms and hours to be arranged.

Eng 407. Seminar. (g)
Terms and hours to be arranged.

Eng 411,412,413. Development of the Drama. (g)
3 hours each term. 3 ①
Eng 411: Reading and analyzing plays ancient and medieval. *Eng 412:* Renaissance and Neo-classical. *Eng 413:* Romantic and modern. Prerequisite: 18 hours of literature.

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 from the eighteenth century to the present. *Eng 417:* Richardson through Austen; *Eng 418:* Scott through Eliot; *Eng 419:* Conrad through Greene. Prerequisite: 18 hours of literature. GROSHONG.

Eng 425,426,427. Early English Literature. (g)
3 hours each term. 3 ①
Old and Middle English literature with an introduction to the language. Emphasis primarily on Chaucer. Prerequisite: 9 hours of literature.

Eng 430,431,432. Literature of the Renaissance.
3 hours each term. 3 ①
Thought and literary types from late fifteenth century to early seventeenth, exclusive of Shakespeare. Prerequisite: 9 hours of literature.

Eng 440,441,442. Seventeenth-Century Literature. (g)
3 hours each term. 3 ①
Poetry and prose from 1603 through the Restoration. Prerequisite: Eng 101,102,103 or Eng 107,108,109.

Eng 450,451,452. Eighteenth Century Literature.
3 hours each term. 3 ①
Poetry and prose of the century as they relate to social, political, aesthetic, and scientific ideas of period. Prerequisite: 9 hours of literature.

Eng 454,455. Individual Authors.
3 hours winter and spring. 3 ①
Major English authors as listed in the *Schedule of Classes.*

Eng 460,461,462. Literature of the Romantic Period.
3 hours each term. 3 ①
Prose and poetry from Wordsworth and Coleridge to Keats and Shelley; ideas and aesthetics of period. Prerequisite: 9 hours of literature.

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-adapted texts.

Eng 490. Development of the English Language. (g) 3 hours. 3 ①
CHILDS.

Eng 491. The Structure of English. (g)
3 hours 3 ①
New analytic and descriptive methods applied to English grammar. Recommended for prospective teachers of English. Prerequisite: senior standing.

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.

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. DUBBÉ.
Offered only in Division of Continuing Education classes.

Eng 115. Effective Reading.
3 hours any term. 3 ①
To develop better comprehension and greater speed in reading. Offered in summer term and in Continuing Education classes only.

Eng 116. Vocabulary Building.
3 hours any term. 3 ①
Vocabulary improvement through reading, study of roots and prefixes, with frequent progress tests. Open to freshmen and sophomores only. GIBSON, LAWRENCE, WILSON.

COURSES IN WRITING

Lower Division Courses

Wr 10. Corrective English.
No credit. 3 ①
Refresher course in English fundamentals. Offered in summer sessions and in Continuing Education classes only.

Wr 111,112,113. English Composition.
3 hours each term. 3 ①
Readings in literature with frequent written compositions emphasizing clarity and accuracy. Courses must be taken in sequence. Students who pass the placement test with distinction may elect to be exempt from English Composition or enroll in honors sections of Wr 111,112,113.

Wr 214. Business English.
3 hours any term. 3 ①
Current practices in producing clear, concise business letters with appropriate emphasis on psychology and salesmanship. Prerequisite: Wr 113. HEWITT, ONSTAD, PATTY.

Wr 218. Creative Writing.
3 hours. 3 ①
Instruction and intensive practice in imaginative writing, with lectures and personal consultations. Prerequisite: Wr 113. Prose, JEFFRESS; Poetry, HAISLIP.

Wr 227. Technical Report Writing.
3 hours any term. 3 ①
The various skills and forms used in technical communication. Prerequisite: Wr 113. P. NELSON, ONSTAD, PATTY.

Wr 230. Effective Writing.
3 hours. 3 ①
Open only to students who place low on the comprehensive English examination required by some schools. Prerequisite: Wr 113. LAWRENCE.

Wr 233,234,235. Advanced Writing.
3 hours each term. 3 ①
Study and practice at a more advanced level than freshman composition. Prerequisite: Wr 111,112,113. HENLEY.

Upper Division Courses

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

Wr 316,317. Advanced Expository Writing. 3 hours each term. 3 ①
Models of expository writing, writing of various forms of exposition, and careful revision of all compositions. 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. JEFFRESS.

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

COURSES IN LIBRARY

Upper Division Courses

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

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. 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. CARTER.

Lib 481. Bibliography and Reference.
(G) 3 hours. 3 ①
Introduction to reference services; evaluation and use of reference materials; correct bibliographical forms; practical problems in the use of reference books in school and other small libraries.

Lib 484. School Library Administration. (G) 3 hours. 3 ①
School librarianship and objectives of the school library in instructional program; problems relating to budget and finance, housing and equipment, personnel, etc. National and state standards for the instructional materials center.

Lib 486. Introduction to Cataloging and Classification. (G)
3 hours. 3 ①
Instruction and practice in simplified procedures for the classification and cataloging of books, films, filmstrips, phonorecords, and maps. Procedure for ordering and using Library of Congress and Wilson cards.

Lib 488. Books and Related Materials for Young People. (g)
3 hours. 3 ①
Books and nonbook materials suitable for students of junior and senior high-school age; emphasis on selection and evaluation of books, adolescent reading interests, and reading guidance for curricular and personal needs. CARTER.

Lib 490. **Children's Literature.** (g)
3 hours. 3 ①
Reading material suitable for elementary grades and criteria used in selecting books for children. CARTER.

GEOGRAPHY

The Department of Geography, a joint department within the School of Humanities and Social Sciences and School of Science, offers social science courses designed to serve three purposes: (a) the general education needs of students majoring in other curricula, (b) the subject norm requirements for social studies teachers, and (c) a geography concentration option for divisional majors in social sciences. Courses and major programs in resource and physical geography are offered through the Earth Science Division of the School of Science.

Lower Division Courses

Geog 105,106,107. **Introductory Geography.** 3 hours each term. 3 ①
Elements and principles of Geography; regional geography of the tropics; regional geography of the subarctics, middle, and high latitudes.

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

Geog 313. **Geography of the Pacific Northwest.** 3 hours. 3 ①
Human and economic geography of Pacific Northwest with special reference to Oregon. Prerequisite: Geog 107 or consent of instructor.

Geog 321,322,323. **Systematic Cultural Geography.** 3 hours each term. 3 ①
Principles of cultural geography; agency of man in environmental alteration and landscape evolution; spatial aspects of man's cultural traits and imprints on the earth; analysis of cultural landscapes, settlement taxonomy, and typology. Prerequisite: Geog 107.

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 relationship; implications for present and future. Prerequisite: Geog 107. HIGHSMITH.

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.

Geog 427. **Geography of the Soviet Union.** (g) 3 hours. 3 ①
Resources, peoples, economic activities, regions, and world position of the Soviet Union. Prerequisite: 9 hours of geography.

Geog 428,429,430. **Europe.** (g)
3 hours each term. 3 ①
Cultural and physical processes that have shaped man's organization and use of Europe; analysis of spatial evidences of man's developments; significance of Europe in the world's cultural-economic patterns: Geog 428: Historical geography. Geog 429; Cultural geography. Geog 430: Economic geography. Prerequisite: Geog 323.

HISTORY

The Department of History offers an undergraduate major for students interested in a synthesis of the humanistic experience and the social relationships of man in the several eras of his civilized development. A knowledge of the history of the world's civilizations, past and present, is fundamental as background for the social sciences and humanities. It is of special value to students of law, journalism, and business. It is indispensable for liberal education conceived as the intellectual training of free men and women prepared for intelligent and informed participation or leadership in their society, vocation, and profession.

Courses are designed to serve a multiple clientele: those students of inquiring mind who are challenged by the dialogue between culture, science, and technology in mankind's history; those who are considering professional schools or graduate work in history; those who wish to meet the certification requirements for teachers of social studies in the schools; or those who elect history in conjunction with primary curricular emphasis in other fields.

Students are strongly urged to complete language requirements for the B.A. degree. Within the framework of university and school requirements, the student's major program for a B.A. or B.S. degree will be worked out with his adviser. Students interested in high school teaching may have their programs planned to satisfy state certification requirement.

Departmental Requirements: (42 hours)
- 24 upper division hours, including at least 9 hours of 400-level courses.
- History 101,102,103, History of Western Civilization or, with consent of adviser, 15 hours of upper division European history, including courses both before and after 1500.
- Year sequence in United States history.
- Not less than 3 terms (9 hours) of upper division courses in each of two fields selected from the following: Europe before 1500, Europe after 1500, United States, Far East, or Latin America.
- At least one term of seminar (Hst 407).

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 aesthetic activities in Europe, Asia, and Americas. Special effort made to relate past to contemporary events and institutions.

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.

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

Hst 304,305,306. **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. Student not having prerequisite must have consent of instructor.

Hst 311,312,313. **The Middle Ages.**
3 hours each term. 3 ①
Cultural, political, and economic history of the Middle Ages.

Hst 331,332,333. **Early Modern Europe.**
3 hours each term. 3 ①
Renaissance, reformation, scientific revolution, absolute monarchy, the age of reason. Prerequisite: Hst 101,102,103.

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.

Hst 350,351,352. **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.

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.

Hst 405. **Reading and Conference.** (g)
Terms and hours to be arranged.*

Hst 407. Seminar. (g)
Terms and hours to be arranged.*

Hst 445. **Europe Since 1939.** (g)
3 hours. 3 ①
Origins and course of World War II: postwar development of political and economic federation in central and western Europe. Prerequisite: Hst 101,102,103.

* Graduate credit under Hst 405 and 407 may not total more than 9 hours.

Hst 447,448,449. History of Russia. (g)
3 hours each term. 3 ①
Origins of the Russian state; development of the tsarist empire; revolutionary movement since 1861. Prerequisite: Hst 101,102,103.

Hst 450. History of Soviet Political and Economic Institutions. (g)
3 hours. 3 ①
The Communist Party; state and public administration; State planning commission and public corporations; cooperatives, in theory and structure. Prerequisite: Hst 101,102,103; 9 hours of upper division history, political science, or economics.

Hst 457,458,459. Nineteenth-Century America. (g)
3 hours each term. 3 ①
Political, economic, social, and cultural developments from 1801 to 1896. *Fall:* Jeffersonian and Jacksonian Democracy; *Winter:* The Civil War and Reconstruction; *Spring:* The Emergence of Modern America. Prerequisite: Hst 224,225,226.

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.

Hst 476,477. The Westward Movement in the United States. (g)
3 hours each term.
Advance of American settlement across successive frontiers in Continental United States and the contributions made by this movement to American political, economic, social, and cultural institutions. Prerequisite: Hst 224, 225,226.

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, 225,226, or equivalent.

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.

Hst 484,485,486. Early History of the American People. (g)
3 hours each term. 3 ①
The economic, political, social, religious, and intellectual development of colonial North America to the first administration of George Washington. Prerequisite: Hst 224,225,226.

JOURNALISM

Elementary courses in journalism, besides furnishing a background in newspaper methods, introduce students to the fundamentals of newswriting. These courses also enable students to benefit from work on the *Barometer*, student newspaper.

The OSU 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 elsewhere may take two years of college work at Oregon State. 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 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 basic norm for a teaching certificate is offered by the department.

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, winter or spring term. Must be taken in sequence. BAILEY, BIRDSALL, 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. BIRDSALL.

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. BAILEY.

Upper Division Courses

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

J 317. Special Feature Articles.
3 hours 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. BIRDSALL.

J 334. Photo-Journalism.
3 hours fall or 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.

J 431. Broadcast Journalism. (g)
3 hours. 2 ① 1 ②
Philosophy and principles of broadcast news reporting; current operating practices in writing, editing, and presenting news for broadcast; use of audio and video tape, wire services, facsimile, film in news reporting by radio and television. Prerequisite: J 112; Sp 361.

J 450. Press and Society. (g)
3 hours. 3 ①
Organization, operation, functions, duties, and responsibilities of the press and mass communications. Role of consumers of journalism.

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 280. Landscape Design Theory.
3 hours fall or spring. 2 ②
Functional and aesthetic aspects of landscape planning in the creation and preservation of human environment.

AA 289. Landscape Design.
2 hours. 2 ③
(See ARCHITECTURE courses.)

LA 290,291. Landscape Design I.
3 hours each term. 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 290; CE 224,225.

LA 390,391,392. **Landscape Design II.**
3 hours each term. 3 ③
Analysis and problem solving. Prerequisite: LA 280,290.

LA 426,427,428. **Plant Composition.**
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.

LA 490,491,492. **Landscape Design III.**
4 hours each term. 2 ③
City lot, small suburban properties, and other areas; sketch plans, finished renderings, and contour problems. Prerequisite: LA 361,390.

MODERN LANGUAGES

The Department of Modern Languages offers instruction in Chinese, French, German, Italian, Portuguese, Russian, and Spanish. The courses of study offered provide the student with an opportunity to develop audio-lingual proficiency as well as reading and writing skills in the languages listed, and at the same time afford an insight into language as a basic manifestation of human culture. The offerings of the department provide:

(1) An introduction not only to the languages but also to the literatures and cultures of the principal languages taught;

(2) An opportunity to satisfy the state basic teaching norms in French, German, Russian, and Spanish;

(3) Upper division concentration in language and literature for the undergraduate major in General Humanities;

(4) A two-year course of study designed to satisfy the institutional foreign language requirement for the B.A. degree;

(5) An opportunity for graduate students to develop sufficient proficiency in reading to meet the foreign language requirements for advanced degree programs in other schools.

Language Laboratory

A language laboratory provides an opportunity for supervised instruction and supplementary practice and drill in accordance with the newest developments in language teaching methods. Collateral tapes and recordings at appropriate levels of language instruction are provided for both class use and individual study.

Placement

Students who enter with one unit of high school French, German, Russian, or Spanish, and wish to continue the study of the language will normally register for the first-year course. Those entering with two units will register for the second-year college course; those with three or more units will register in the appropriate intermediate or advanced course after consultation with the department. The Department of Modern Languages will *not* approve credit for repetition of foreign language courses taken in high school except as noted above. Students with two or more high school units in a foreign language may, if they so desire, repeat the first-year course *without* credit.

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, SJOGREN, GOERTZ, DALY, KITCHING.

GL 53,54. **First-Year German.**
6 hours each term, winter and spring. 6 ①
Two-term sequence covering work of GL 50, 51,52. For students who wish to begin German in the winter term.

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 or GL 53, 54. KRAFT, KITCHING, 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 or GL 53,54. KRAFT, SCHMIDT, SJOGREN, GOERTZ.

Upper Division Courses

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

GL 311,312,313. **Directed Reading in German.**
1 or 2 hours each term. 1 or 2 ①
Supervised intensive reading in selected German texts to develop reading and comprehension skills. Recommended as a pre-literature course. Prerequisite: two years of college German or equivalent.

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 331. **German Pronunciation and Phonetics.**
3 hours. 3 ①
Fundamentals of German pronunciation and diction. Phonetic analysis of German sounds, German intonation and tone patterns. Supervised practice with individual use of recording equipment.

GL 334,335,336. **Intermediate German Composition and Conversation.**
3 hours each term. 3 ①
Practice in speaking and writing the language; conducted in German. Prerequisite: GL 101, 102,103; GL 111,112,113.

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 411,412. **Age of Goethe.** (g)
3 hours each term. 3 ①
Philosophical and literary currents of eighteenth and early nineteenth century; attention to important writers of period with Goethe's life and work as focal points. Prerequisite: 3 years of college German.

GL 416. **The German Novelle.** (g)
3 hours. 3 ①
History and theory of the genre; selections from Goethe, the Romantics, the period of "buergerlicher Realismus," and the modern age; critical analysis; reports and term paper. Prerequisite: 3 years of college German.

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.

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.

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, GLASSER, DALY.

RL 53,54. **First-Year French.**
6 hours each term, winter and spring. 6 ①
Two-term sequence covering the work of RL 50,51,52. For students who wish to begin French in the winter term.

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 or RL 53, 54. RICHTER, DALY, GLASSER.

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 or RL 53,54. RICHTER, DALY, GLASSER.

Upper Division Courses

RL 307,308,309. **Directed Reading in French.**
1 or 2 hours each term. 1 or 2 ①
Supervised intensive reading in selected French texts to develop reading and comprehension skills. Recommended as a preliterature course. Prerequisite: two years of college French or equivalent.

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 314,315,316. **Intermediate French Composition and Conversation.**
3 hours each term. 3 ①
Extensive practice in speaking and writing the language. Conducted in French. Prerequisite: RL 103; RL 116.

RL 328. French Culture and Civilization. 3 hours. 3 ①
Development of cultural life of the French people from ancient times to present as reflected in history, art, architecture, music, literature, philosophy, science, and social institutions of France. Prerequisite: 2 years of college French.

RL 331. French Pronunciation and Phonetics.
3 hours. 3 ①
Intensive study of French pronunciation and diction; close phonetic analysis of French sounds; French intonation and tone patterns. Supervised practice, with individual use of recording equipment.

RL 417,418,419. Nineteenth-Century French Literature (g)
3 hours each term. 3 ①
Representative prose and poetry of nineteenth-century French writers and dominant literary movements between the French Revolution and World War I. Prerequisite: 3 years of college French.

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. RICHTER, GLASSER.

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.

RL 217,218,219. Directed Reading in Portuguese.
1 to 2 hours each term. 1 or 2 ①
To help students maintain facility in the language. Consent of instructor required.

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, HARDING.

RL 63,64. First-Year Spanish.
6 hours each term, winter and spring. 6 ①
Two-term sequence covering work of RL 60, 61,62. For students who wish to begin Spanish in the winter term.

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 or RL 63, 64. 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 or RL 63,64. HARDING, 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 344,345,346. Directed Reading in Spanish.
1 or 2 hours each term. 1 or 2 ①
Supervised intensive reading in selected Spanish texts to develop reading and comprehension skills. Recommended as a preliterature course. Prerequisite: two years of college Spanish or equivalent.

RL 347,348,349. Intermediate Spanish Composition and Conversation.
3 hours each. 3 ①
Extensive practice in speaking and writing the language; conducted in Spanish. Prerequisite: RL 107,108,109; RL 117,118,119.

RL 350. Spanish Pronunciation and Phonetics.
3 hours. 3 ①
Intensive study of Spanish pronunciation and diction; close phonetic analysis of Spanish sounds; Spanish intonation and tone patterns. Supervised practice, with individual use of recording equipment.

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.

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, FILIPS-JUSWIGG.

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.

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-JUSWIGG, JURGENSON.

SL 314,315,316. Intermediate Russian Composition and Conversation.
3 hours each term. 3 ①
Extensive practice in speaking and writing the language; conducted in Russian. Prerequisite: SL 101,102,103; SL 111,112,113.

SL 317,318,319. Directed Reading in Russian.
1 or 2 hours each term. 1 or 2 ①
Supervised intensive reading in selected Russian texts to develop reading and comprehension skills. Recommended as a preliterature course. Prerequisite: two years of college Russian or equivalent.

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.

Hum 327,328,329. Survey of Russian Culture.
3 hours each term. 3 ①

SL 330. Russian Pronunciation and Phonetics.
3 hours. 3 ①
Fundamentals of Russian pronunciation and diction; close phonetic analysis of Russian sounds; Russian intonation and tone patterns. Supervised practice, with individual use of recording equipment.

MUSIC

The functions of the Department of Music are (1) to help the general student, through participation and listening, to develop sound critical judgment and discriminating taste in music; (2) to provide professional training; (3) to prepare the student for graduate work in music; (4) to prepare him to teach music in the public schools.

Students may participate in music solely for cultural and avocational benefits. For requirements for teaching certificates see SCHOOL OF EDUCATION.

Musical Organizations

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

Applied Music

Private lessons in organ and both private and class lessons in piano, voice, and instruments of the band and orchestra carry one hour of credit for one lesson per week. See following schedule of fees.

Scholarships

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

Regulations and Fees

Students should 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 any term, three terms. 1 ①
Elementary instruction for beginners. Special fee.

Mus 182. Class Lessons in Piano.
1 hour any term, three terms. 1 ①
Elementary instruction for beginners. Special fee.

Mus 183. Class Lessons in Strings.
1 hour any term, three terms. 1 ①
Elementary instruction for beginners. Special fee.

Mus 184. Class Lessons in Wind Instruments.
1 hour any term, three terms. 1 ①
Elementary instruction for beginners. Special fee.

Mus 185. Class Lessons in Percussion.
1 hour any term, three terms. 1 ①
Elementary instruction for beginners. Special fee.

Mus 190. Applied Music.
1 or 2 hours each term, three terms.
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, six terms. 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, six terms. 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, six terms. 3 ①
Open to all students subject to tryout. *University Chorus:* large choral organization; several campus concerts annually. *Choralaires:* concert choir of fifty to sixty voices, concerts on and off campus. *Madrigal Singers:* 16-20 voices; concerts of early and contemporary madrigal literature.

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 214,215,216. Keyboard Harmony.
1 hour each term. 1 ①
Keyboard application of harmonic principles being studied concurrently in Music Theory II; exercises in diatonic and chromatic harmony, modulation, figured bass realization, transposition and improvisation. Prerequisite: Music Theory I or equivalent.

Mus 221. Music Appreciation.
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, three terms.
Sophomore year. Prerequisite: 3 hours of Mus 190 (or 181-185) or qualifying exam.

Upper Division Courses

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

Mus 311,312,313. Counterpoint.
2 hours each term. 2 ①
Study, through analysis and writing, of the basic contrapuntal principles of the sixteenth, eigtheenth, and twentieth centuries. Prerequisite: Mus 213 or equivalent.

Mus 317. Teaching of Music: Elementary School. 3 hours. 3 ①
Survey of methods and materials used in teaching vocal music in schools. Prerequisite: Mus 113.

Mus 323. Conducting.
2 hours. 2 ①
Basic baton techniques in simple meters. Prerequisite: Mus 113.

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 330,331,332. Form and Analysis.
2 hours each term. 2 ①
Elements of form; stylistic analytical techniques, including harmonic, melodic, rhythmic, and structural practices, applied to compositions from representative periods and media. Prerequisite: Mus 213.

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 360,361,362. 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 113.

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 each term, three terms.
Junior year. Prerequisite: 3 hours of Mus 290 or qualifying examination.

Mus 394. Chamber Ensemble.
1 hour each term, six terms. 1 ①
Chamber music for stringed and wind instruments, music for small vocal groupings, piano ensemble or piano with instruments. With the exception of pianists all students enrolled are required to be members of orchestra, band, or chorus as well. Prerequisite: audition.

Mus 395. Band.
1 hour each term, six terms. 3 ①
Prerequisite: six terms of Mus 195 and 295.

Mus 396. Orchestra.
1 hour each term, six terms. 1 ② 1 ①
Prerequisite: six terms of Mus 196 and 296.

Mus 397. Chorus.
1 hour each term, six terms. 3 ①
Prerequisite: six terms of Mus 197 and 297.

Ed 407. Seminar.
3 hours. 3 ①
See SCHOOL OF EDUCATION.

Ed 408o. Special Secondary Methods.
3 hours.
See SCHOOL OF EDUCATION.

Mus 411. Vocal Music Literature. (g)
3 hours. 3 ①
Study of solo and ensemble vocal literature from the Renaissance to the present. Prerequisite: Mus 362.

Ed 416o. Student Teaching: Secondary.
9 to 15 hours.
See SCHOOL OF EDUCATION.

Mus 437,438,439. Composing 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 213 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)
3 hours. 3 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)
3 hours. 3 ①
Repertory of orchestra and string groups in elementary and secondary schools; "method" series; program planning. Prerequisite: Mus 327 or equivalent.

Mus 446. Wind Instrument Literature for Public Schools. (g)
3 hours. 3 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)
3 hours. 3 ①
Study of representative literature of selected master composers from the pre-Bach period to the present. Illustrative performances by students and faculty. Prerequisite: Mus 362.

Mus 449. Orchestral Literature.
3 hours. 3 ①
Major types of orchestral music from the Renaissance to present. Prerequisite: Mus 362.

Mus 453. The Opera.
3 hours. 3 ①
Composers, libretti, styles; emphasis on current operatic repertoire. Assigned reading and listening. Prerequisite: Mus 362.

Mus 461. Chamber Music Literature.
3 hours. 3 ①
Chamber music from Bach to present; emphasis on music in the standard literature. Prerequisite: Mus 362.

Mus 490. Applied Music.
1 or 2 hours each term, three terms.
Senior year. Prerequisite: 3 hours of Mus 390 or qualifying examination.

PHILOSOPHY

Instruction in philosophy is offered 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

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

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 324. Social Philosophy.
3 hours. 3 ①

Phl 331,332,333. Contemporary Philosophy.
3 hours each term. 3 ①
Pragmatism, Process Philosophy, Positivism, linguistic analysis, phenomenology, and Existentialism.

Phl 446. Philosophy of Education. (g)
3 hours. 3 ①
Fundamental problems with some atttempt at their solution; meaning of philosophy; value for teacher and administrator. Prerequisite: graduate standing in Education.

Phl 460. Philosophy of Religion. (g)
3 hours. 3 ①
Religious concepts of reality and human nature; ideas of God; problems 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 470,471. Philosophy of Science. (g)
3 hours each term. 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.

POLITICAL SCIENCE

Undergraduate instruction in political science is designed to provide (1) systematic understanding of political life for the non-major, and (2) bachelor degrees for students preparing for professional and specialized careers.

Undergraduate majors take course work in the Core and in the Fields of Concentration. The Core provides a survey of political science and serves as a foundation for advanced work in the department. Fields of Concentration afford the student an opportunity for study in depth in at least one specialized field within the discipline. A major in political science consists of a minimum of 13 courses, including at least four courses from the Core, at least one Concentration (normally 4 courses) in one Field, and independent study as part of a senior seminar program (one course).

Core courses
PS 101,201,202,203,205,206

Fields of Concentration
American Political Process:
- The Popular Process: PS 324,325,326, 429
- The Legal Process: PS 317,318,319, 413,483
- The Policy Process: PS 309,310,441, 487

Comparative Political Systems:
- European: PS 344,345,346,438
- Asian: PS 330,331,332,419

International Relations:
- PS 417,419,422,438,441,442,443

Lower Division Courses

PS 101. Introduction to Political Systems. 3 hours. 3 ①
Political context of modern life; democratic and nondemocratic political systems and methods of political analysis.

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. Sequence begins with PS 201 and may be completed with any two of the following: PS 202,203, 205,206.

PS 205. International Relations.
3 hours. 3 ①
Basic factors underlying the nation-state system illustrated from contemporary world developments.

PS 206. European Political Systems.
3 hours. 3 ①
Comparative analysis of the political systems of the major European states; cultural and social foundations, parties and pressure groups, power structures of governments, and policies.

Upper Division Courses

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

PS 309. Legislative Politics.
3 hours. 3 ①
Role and functions of legislator and legislative bodies and their vital position in a political system predicated upon the principle of popular sovereignty. Prerequisite: PS 203.

PS 310. Presidential Politics.
3 hours. 3 ①
Office, powers, and politics of the American Presidency, with reference to other executive offices in American government; emphasis on the Presidency as of centripetal importance and effect in American politics. Prerequisite: PS 203.

PS 313. State Governments and Politics.
3 hours. 3 ①
Importance of states in total governmental process; functions, including education, welfare, law enforcement, protection of natural resources, and regulation of business and labor; roles of individual citizens, pressure groups, political leaders, administrators, and legislators in shaping state government. Prerequisite: PS 203.

PS 317,318,319. American Constitutional Law.
3 hours each term. 3 ①
PS 317: the judical process; powers of the courts, Congress, and President; nation-state relationship. *PS 318:* national powers, with emphasis upon commerce, tax, war, and treaty powers. *PS 319:* civil liberties; civil, political, and social rights of individuals. Prerequisite: PS 201. FUQUAY.

PS 324,325,326. American Political Process.
3 hours each term. 3 ①
PS 324: political parties and elections. *PS 325:* the electorate and voting behavior; electoral system; exercise of the suffrage; extent and consequence of voter participation. *PS 326:* public opinion and pressure politics; role and effect of public opinion in the American political system; special interest groups. Prerequisite: PS 201. MCCLENAGHAN.

PS 330,331,332. Government and Politics of Asia.
3 hours each term. 3 ①
PS 330: China, Japan, and Korea. *PS 331:* Southeast Asia. *PS 332:* India and Pakistan.

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 344,345,346. European Governments and Politics.
3 hours each term. 3 ①
PS 344: cultural and social foundations, political parties, and interest groups of West European states; *PS 345:* institutions of government and political processes of West European states; *PS 346:* political processes and institutions of East European states with emphasis on the Soviet Union. Prerequisite: PS 206.

PS 405. Reading and Conference. (g)
Terms and hours to be arranged.*

PS 407. Seminar. (g)
Terms and hours to be arranged.*

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. Concepts of International Relations. (g)
3 hours. 3 ①
Analyses of selected topics, aspects and problems of international relations. Prerequisite: PS 205. WALTER.

PS 419. International Relations of Asia. (g) 3 hours. 3 ①
Selected foreign policies of Asian States; relations with each other and with the world community; special reference to U. S. interests and policies. Prerequisite: Either PS 417, PS 330,331, or consent of instructor.

PS 422. International Law. (g)
3 hours. 3 ①
Theories and historical development of international law, problems in development; classic cases. Prerequisite: PS 205; senior standing.

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 429. Political Behavior. (g)
3 hours. 3 ①
Human behavior in the political system. Prerequisite: PS 324,325,326.

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.

PS 432. Political Theory. (g)
3 hours each term. 3 ①
Political stability and change; social-political change; role of groups, classes, and elites. Prerequisite: PS 201 and any 6 upper division hours in political science.

PS 433. American Political Thought. (g) 3 hours. 3 ①
Political values and theoretical systems in the American tradition. Prerequisite: PS 201, PS 430, PS 432.

PS 438. Comparative Communist Systems. (g) 3 hours. 3 ①
Patterns of culture, power, interests, and policies of countries under communist rule; emphasis on the Soviet Union, China, Yugoslavia; also Poland and Hungary. Prerequisite: PS 346.

* Graduate credit under PS 405 and 407 may not total more than 9 hours.

PS 441,442,443. International Politics and National Power. (g)
3 hours each term. 3 ①
First term: foreign relations and basic 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 *PS 441:* PS 201; for *PS 442, 443:* PS 205, PS 417. Students without prerequisite must have consent of instructor. SWYGARD.

PS 483. Contemporary Problems of American Constitutional Law. (g)
3 hours. 3 ①
Contemporary issues and problems in the area of public law. Prerequisite: PS 317,318,319.

PS 487. The Policy Process. (g)
3 hours. 3 ①
Major policy areas of the national government; topics selected from such fields as foreign policy, defense policy, agriculture and natural resources, welfare, education, civil rights, etc. Prerequisite: PS 202; PS 309 or PS 310.

PSYCHOLOGY

Psychology courses meet the needs of students desiring a knowledge of psychology as part of their general education or professional background and prepare students for graduate training in psychology and the other behavioral sciences.

Psy 201-202 are prerequisite to all courses except Psy 111 and 212. Senior or graduate standing is required for all 400 (g) courses. Statistics 311 is strongly recommended, where not required, for all upper division courses.

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
Scientific study of behavior and experience. Two-term sequence, with Psy 205,211,214, 321, or 361, forms year sequence. Prerequisite: sophomore standing; Psy 201 for Psy 202.

Psy 205. Applied Psychology.
3 hours. 3 ①
Applications of psychological facts and principles in one or more selected fields such as education, industry, business, psychotherapy, psychopharmacology, and community relations. Prerequisite: Psy 202.

Psy 212. Abridged General 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
Human adjustment processes; motivation, perception. learning, communication, and cultural requisites as related to effective living. Prerequisite: Psy 202.

Psy 321. Experimental Psychology: Methodology.
3 hours. 2 ① 1 ③
Philosophical foundations; measurement; psychophysics; psychometrics; design of experiments; collection, analysis, organization, and presentation and reporting of data; evaluation of reported research. Prerequisite: 6 hours of psychology other than Psy 111; St 311 or Mth 200. With instructor's approval St 311 may be satisfied concurrently.

Psy 322. Experimental Psychology: Perception and Learning.
3 hours. 2 ① 1 ③
Applications of psychological research methods to problems of perception and learning; design and conduct of experiments in these areas. Prerequisite: Psy 321.

Psy 323. Experimental Psychology: Personality and Social.
3 hours. 2 ① 1 ③
Application of psychological research methods to the areas of personality and social psychology with emphasis upon specialized techniques in these areas. Prerequisite: Psy 322.

Psy 330. Human Factors in Engineering. 3 hours. 3 ①
Human behavior as related to fundamentals of equipment design, layout, and operation; abilities and limitations of human operators and effect of such on accuracy, speed, safety, training, comfort, and fatigue. Prerequisite: Psy 205.

Psy 331. Human Factors: Design Principles.
3 hours spring. 3 ①
Psychological factors in machine, equipment, and plant design. Input, output, and central processes of human activity as related to illumination, displays, communications, atmospheric conditions, space, health, stress, and safety. Prerequisite: Psy 322.

Psy 332. Human Factors: Systems Development.
3 hours. 3 ①
Human functions and task assignments, personnel sub-systems, job aids, team training, proficiency measures, decision making. Prerequisite: Psy 331.

Psy 361. Group Dynamics.
3 hours. 2 ① 1 ②
Experience through the participative group method to increase self-understanding and to promote sensitivity to group processes and interpersonal interactions. Prerequisite: Psy 202.

Graduate Courses

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

***Psy 401. Research.** (g)
Terms and hours to be arranged.

***Psy 405. Reading and Conference.** (g)
Terms and hours to be arranged.

***Psy 406. Projects.** (g)
Terms and hours to be arranged.

***Psy 407. Seminar.** (g)
Terms and hours to be arranged.

* Credit for Psy 401,405,406, and 407 must not total more than 9 term hours.

Psy 413. Advanced General Psychology. (g) 3 hours. 3 ①
Phychological theories and systems as related to contemporary general psychology and to specific areas of research and theory construction; individual differences, motivation, perception, learning, and personality development. Prerequisite: 3 hours of junior-level work in psychology.

Psy 414. Learning and Motivation. (g)
3 hours. 3 ①
Theoretical and experimental literature of learning and motivation as related to rote learning, motor skills, conditioning, discrimination, problem solving, memory, and social learning. Consideration of applied aspects of learning and motivation in programed learning, systems training, retention and relearning, incentive schedules, and creativity. Prerequisite: Psy 321; senior or graduate standing.

Psy 415. Perception. (g)
3 hours. 3 ①
Fundamental concepts of sensation and perception. Research and theory of perception in relation to learning, motivation, social phenomena. Prerequisite: Psy 321; senior or graduate standing.

Psy 419. Language and Thought. (g)
3 hours. 3 ①
Psychological research and theories of thought and language processes; language in communication, problem-solving, reasoning, originality, scientific and mathematical behavior; psycholinguistics, measurement of meaning, cultural factors in perception and learning of language. Prerequisite: Psy 321.

Psy 421. Psychological Assessment: Principles and Methods. (g)
3 hours. 3 ①
Application of psychological methods to the study of the individual; theoretical and statistical rationale of test construction and interpretation; problems involved in the prediction of human behavior. Prerequisite: St 311 or equivalent; senior or graduate standing.

Psy 423. Psychological Assessment: Group Testing. (g)
3 hours. 3 ①
Group tests of intelligence, special aptitudes, proficiency, interests, values, and personality used in personal and vocational counseling or in personnel selection; methods of developing and validating specific tests; underlying theories and interpretation; use in counseling. Prerequisite: Psy 421.

Psy 424. Psychological Assessment: Individual Testing. (g)
3 hours. 3 ①
The nature and composition of intelligence. Major emphasis upon the administration, scoring, and interpretation of Stanford-Binet Intelligence Scale (1960 revision) and Wechsler Intelligence Scales for Children and Adults. Prerequisite: Psy 421.

Psy 435. Personality Theories. (g)
3 hours. 3 ①
Various theories of personality and specific applications; reading of original works; Freud, Adler, Lewin, Allport, social-psychological, stimulus-response and other theories. Prerequisite: Psy 413.

Psy 446. Industrial Psychology. (g)
3 hours. 3 ①
Human relations in business, industry, the military, government, and other institutions; personnel selection, placement, and training; human engineering. Prerequisite: Psy 205, 311,314, or 321.

Psy 451. Physiological Psychology. (g)
3 hours. 3 ①
Human and animal neuroanatomy and physiology; functioning of vital processes as sensory-motor and glandular-neural control systems; experimental methodology and applied aspects in human engineering, cybernetics, drug therapy, and maintenance medication. Prerequisite: Psy 331; Z 332.

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 481. Pre-practicum in Psychological Services. (g)
3 hours. 2 ① 1 ③
Evaluation of counseling interview transcripts; observation and analysis of interviews; practice in interview write-up; case analyses. Practice in the integration of occupational information, test materials, and psychological theories of occupational choice for individual cases. Consent of instructor required. Prerequisite: Psy 423.

Psy 482. Practicum in Psychological Services. (g)
3 hours. 2 ① 1 ③
Experience in use of psychological and related methods in counseling, under close supervision, with individuals at adolescent and adult levels. Consent of instructor required. Prerequisite: Psy 481 or equivalent.

Psy 485. Counseling and Psychotherapy. (g)
3 hours. 3 ①
Principles, attitudes, and techniques in counseling and psychotherapy applicable in a wide variety of settings and agencies; current issues, research, and selected case studies. Prerequisite: Psy 421.

RELIGION

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 204,205,206. Western Religious Thought.
3 hours each term. 3 ①
History of the main Jewish and Christian traditions from the Old Testament to contemporary religious expressions.

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

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

R 301,302,303. Religions of Mankind.
3 hours each term. 3 ①
Comparative study of religions that command a large following today. *R 301:* Primitivism, Hinduism, Buddhism. *R 302:* Confucianism, Taoism, Islam. *R 303:* Judaism, Christianity.

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 411,412,413. Religion and Culture.
3 hours each term. 3 ①
Relationship of religion to society, the arts, and science.

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.

SOCIOLOGY AND ANTHROPOLOGY

All instruction in sociology is intended to contribute to a better understanding of the nature of human association and human adjustments. Sociology gives particular attention to the forces which operate in group life and in inter-group relations.

Anthropology is the study of culture, its origin, characteristics, changes, and effects on human affairs. The courses in anthropology are designed primarily as supporting work for students majoring in other fields.

Courses in Sociology

Lower Division Courses

Soc 204,205,206. General Sociology.
3 hours each term. 3 ①
Structure and functioning of human groups. Soc 206 stresses social psychological factors in group life. Soc 204 must be taken before Soc 205 or Soc 206. 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.

Upper Division Courses

Upper class standing is required for all 400 courses. Courses numbered 400-499 and designated (g) or (G) may be taken toward a graduate minor.

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.

Soc 325. Sociological Measurement.
3 hours. 3 ①
Levels and problems of measurement in sociological research; statistical tests and measures: types, criteria for selection, computation, and interpretation with respect to sociological variables. Prerequisite: St 311.

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: Soc 205. CURRY.

Soc 329. Applied Methods of Social Research. 3 hours. 3 ①
Application of methods and techniques in sociology for collection, processing, and analysis of data. Class members contribute to and implement research during course. Prerequisite: Soc 325,327.

Soc 341. Demography.
3 hours. 3 ①
Numbers and quality of human populations; basic factors affecting growth rates and composition; trends, policies, and problems. Prerequisite: Soc 204 or 212. PLAMBECK.

Soc 354. Sociological Theory.
3 hours. 3 ①
Theory relating to group life; social and philosophical bases for sociologist theory. Prerequisite: Soc 205. BANKS.

Soc 411. Juvenile Delinquency. (g)
3 hours. 3 ①
A social phenomenon; causes and social consequences; corrective and preventive programs. Prerequisite: Soc 206. TERRY.

Soc 412. Criminology and Penology. (g)
3 hours. 3 ①
History of crime and the treatment of criminals; causes and effects of crime; current theories. Prerequisite: Soc 206. CANTRELL.

Soc 421. Social Change. (g)
3 hours. 3 ①
The nature, types, causes, and consequences; major theories. Prerequisite: Soc 205. BANKS.

Soc 427. Social Movements. (g)
3 hours. 3 ①
Study of processes whereby social movements are formed to attempt to bring about social change; the consequences of various procedures used to change society; the consequences of the organizational structure and ideologies of social movements. Prerequisite: Soc 205.

Soc 434. Social Stratification. (g)
3 hours. 3 ①
Bases; social mobility; significance of stratification in American society. Prerequisite: Soc 205.

Soc 437. Sociology of Race Relations.
(g) 3 hours. 3 ①
Relations between racial, ethnic, and religious groups analyzed in sociological terms; factors causing changes in the relationships. Prerequisite: 6 hours of sociology or of sociology and psychology. PLAMBECK.

Soc 456. Industrial Sociology. (g)
3 hours. 3 ①
Sociology of work relations; industrial worker and his community; industry and society. Prerequisite: Soc 205.

Soc 461. Sociology of Religion. (g)
3 hours. 3 ①
Religion as a social institution; relation between religion and cultural evolution, other social institutions, and general social conditions. Prerequisite: Soc 205.

Soc 468. Sociology of Urban Life. (g)
3 hours. 3 ①
The modern city; its history, structures, functions, and problems. Prerequisite: Soc 205. FOSTER.

Soc 469. Sociology of Rural Life. (g)
3 hours. 3 ①
Rural institutions and communities in a changing society. Prerequisite: Soc 205. FOSTER.

Soc 473,474. Social Psychology. (g)
3 hours each term. 3 ①
Soc 473: Human behavior, individual and social adjustments in terms of prevailing social systems. *Soc 474:* Supporting research contributions. Prerequisite for 473: Soc 206; junior standing. For 474: Soc 327,473.

Soc 475. Community Organization. (g)
3 hours. 3 ①
The community as a social structure, functioning, and development. Soc 205. FOSTER.

Soc 490. Educational Sociology. (g)
3 hours. 3 ①
Contributions of sociology to the understanding of educational philosophies, values, and practices. Prerequisite: 6 hours of sociology or sociology and psychology.

Courses in Anthropology

Lower Division Courses

Anth 214,215,216. Anthropology.
3 hours each term. 3 ①
Interplay of man with his environment; factors influencing physical and cultural development of man. *Anth 214:* Human evolution. *Anth 215:* Culture of prehistoric man. *Anth 216:* Cultural change and problems. Anth 215 must be taken before Anth 216. CORMACK.

Upper Division Courses

Anth 304. Social Anthropology.
3 hours. 3 ①
Culturally defined forms of social organization and community conditions under which they occur. Prerequisite: Anth 216. CORMACK.

Anth 314,315,316. Peoples of the World.
3 hours each term. 3 ①
Historical treatment and development of world culture areas. Significance of regional variations in culture in contemporary world affairs. Prerequisite: Anth 216.

Anth 320. Physical Anthropology.
3 hours. 3 ①
The diversity of man as a bio-cultural being; methods involved in locating the evidence and in formulating it as fact. Prerequisite: Anth 214.

Anth 330. Archaeology.
3 hours. 3 ①
Archaeology of the Old and New World; significance of archaeology to analysis of human culture. Prerequisite: Anth 216.

Anth 352. Anthropological Theory.
3 hours. 3 ①
History, description, and explanation of problem and theory in anthropology; development of method and generalization in anthropology; concepts of evolution, history, structure, function, etc. Prerequisite: Anth 216.

Anth 368. Preindustrial Social Organization. 3 hours. 3 ①
Structure and organization of human social relationships as functions of culture. Use of preindustrial societies as models to illustrate the patterns of kindred, political, economic, and religious behavior. Prerequisite: Anth 216.

SPEECH

Speech courses are offered to develop basic speaking and listening skills; develop understanding and perception of "the self" as a communicator; provide preprofessional and professional training in theater, radio and television, group communication and public speaking, speech correction, and teaching of speech; develop traditional liberal arts insights and capacities; and prepare students for graduate study in speech or communication studies.

The Department of Speech offers an undergraduate major leading to a B.A. or B.S. degree. In addition to fulfilling university and school requirements, a major in speech must accomplish these departmental requirements:

1. Complete 18 term hours in Speech, including Sp 111, Fundamentals of Speech (3); Sp 201,202,203, Survey of Oral Communication (9); Sp 370, Phonetics (3); and Sp 420, Meaning and Communication (3).

2. Demonstrate proficiency in oral communication by passing a performance examination or by a grade of B or better in an additional speech skills course which may not count as part of the major program.

3. Select an area of concentration and complete requirements as advised by the department. Total hours required in each area are: General Speech, 27 hours; Broadcasting, 27 hours; Theater Arts, 35 hours; Speech Correction, 36 hours; and Individual Studies, 27 hours.

Cocurricular Speech Activities

Opportunities for practical experience are available through a number of student activity programs:

The University Theater at Mitchell Playhouse provides *any* university student an opportunity to participate as actor, stage technician, scene designer, costumer, director, or in related functions of theater production.

FM Station KBVR broadcasts daily to the campus and community. The Department supervises the broadcast operations which are managed and staffed by students. Participation is open to *any* student in the university.

The Forensic Activities program provides opportunities for *any* student in the university to take part in intercollegiate debate, extempore speaking, oratory, public reading, discussion, etc., and to gain practical experiences in platform speaking before high school and adult audiences throughout the state and surrounding areas.

The Model United Nations program is sponsored jointly with the Department of Political Science. Opportunities to take part in several M.U.N. assemblies on the

West Coast are open to any student on the campus eligible to take part.

Research programs for undergraduates provide for participation in studies relating to small group behavior and group leadership.

A *Speech and Hearing Clinic* is operated for those having speech and hearing problems needing special attention. The clinic provides for basic diagnostic assistance, referral services, and a limited amount of special training and clinical assistance for those students who need correctional services.

Lower Division Courses

Sp 90. Corrective Speech.
1 hour any term, three terms. 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.

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. Fundamentals of Speech. 3 hours each term. 3 ①
Sp 111: Basic concepts in oral communication; role of speaker, message construction, listening behavior, feedback in interviews, conversation, manuscript reading, discussions, platform speaking. *Sp 112:* Creative speaker-audience communication; emphasis on expository public speaking. *Sp 113:* Introduction to processes of persuasive speaking; rhetoric and psychology of oral communication; theory and laboratory experience. Prerequisite for Sp 113: Sp 111 or 112. Staff.

Sp 120. Voice and Articulation.
3 hours. 3 ①
Expressiveness, intelligibility, pronunciation, projection, quality; principles and techniques of improvement; physics and physiology of voice production; personal adjustment; introduction to phonetics. HARRIS, WINGER.

Sp 121,122. Interpretation.
3 hours any 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.

Sp 201,202,203. Survey of Oral Communication.
3 hours each term. 3 ①
Nature, functions, impact, and problems of oral communication; its developmental, psychological, sociological, aesthetic, and physical bases; introduction to general speech in Sp 201, to theater arts in Sp 202, and to mass media in Sp 203. Need not be taken in sequence, but Sp 201 is recommended as prerequisite to Sp 202 and 203.

Sp 231. Conduct of Meetings.
3 hours winter or spring. 3 ①
Planning and leading open forums; committee, business, and other public or organizational meetings. Parliamentary procedure. WINGER, DOLER.

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. BENNETT.

Sp 241. Fundamentals of Broadcasting.
3 hours. 3 ①
Audio-visual elements of radio and television for commercial and educational programing, including preparation of script, use of sound effects and music, studio acoustic practices, recording methods, and production standards, with recorded examples of the principles involved. Prerequisite: Sp 111. LIVINGSTON, LEWIS.

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.

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. Scenecrafts.
3 hours. 2 ① 2 ③
Constructing scenery and stage properties; practical experience in backstage procedures, designing and construction of setting, both realistic and suggestive. WALLACE.

Sp 245. Stage Lighting.
2 hours. 2 ① 1 ③
Fundamentals of electricity as used in stage lighting; color and light; light instruments and control systems; theory and practice of lighting stage productions. Prerequisite: Sp 244. WALLACE.

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.

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.

***Sp 250. Speech and Theater Workshop.** 1 to 3 hours each term, maximum 6 hours.
Principles of acting, dramatic production, public speaking, and broadcasting; laboratory experience; separate sections for public address and forensics, radio-television and theater. Consent of instructor required. Staff.

***Sp 271. Oratory.**
1 hour each term, four terms. 2 ①
Principles of persuasion; organization and presentation of one or more formal addresses.

***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.

***Sp 277. Debate.**
1 hour each term, four terms. 2 ①
Principles of argumentation; organization and presentation of debate speeches.

Upper Division Courses

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

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.

Sp 321. Reasoning and Evidence in Controversy.
3 hours. 3 ①
Concepts and processes of argumentation, cogency in oral communication, systems of logic, critical analysis of contemporary efforts to convince, construction and presentation of cases. Prerequisite: Sp 111 and sophomore standing. GOETZINGER.

Sp 322. Persuasion.
3 hours. 3 ①
Attention, suggestion, motivation, and reason in persuasive discourse; problems and ethics of altering behavior, changing belief and inducing social control through the spoken word; consideration of ideas, delivery and language style in analyzing and practicing persuasive speaking. Prerequisite: Sp 113 and sophomore standing or consent of instructor. KELTNER, GOETZINGER.

Sp 323. Group Discussion Processes.
3 hours. 3 ①
Dynamics of discussion; group thinking, and decision making; interpersonal relations; types of leadership, study of discussion through laboratory practice and analysis. Prerequisite: Sp 111.

Sp 327. History and Criticism of American Public Address. 3 hours. 3 ①
Bases of speech criticism; study of great American speakers; relation of their speaking to the history of ideas, and to political, social and religious movements. Prerequisite: Sp 111 or 112; Sp 113.

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 350. Speech and Theater Workshop.**
1 to 3 hours each term, maximum 6 hours.
Advanced work in acting, dramatic production, public speaking, and broadcasting; laboratory experience; separate sections for public address and forensics, radio-television, and theater. Prerequisite: 3 term hours of Sp 250.

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. CORTRIGHT, ROBERTSON.

Sp 361. Radio Speaking.
3 hours each term. 2 ① 1 ②
Radio delivery techniques; adapting informational materials to broadcasting; radio station policies. Prerequisite: Sp 111. LIVINGSTON, LEWIS.

Sp 362. Radio Program Production.
3 hours. 3 ①
Basic production techniques for talks and dramatic programs; program planning and promotion. Prerequisite: Sp 111 and 121, or Sp 361. LIVINGSTON, LEWIS.

Sp 363. Radio and Television Writing.
3 hours. 3 ①
Writing for radio and television, including theory and principles adaptable to both educational and commercial broadcasting. Prerequisite: J 111 or Wr 218 or Sp 361. LIVINGSTON, LEWIS.

***Sp 366. Radio-Television Projects.**
2 hours.
Educational projects in radio-television similar to work in Sp 260. Prerequisite: Sp 260 or Sp 361. LIVINGSTON, LEWIS.

* A maximum of 12 hours may be earned in courses designated by an asterisk.

Sp 367. **Basic Television.**
3 hours fall or winter. 2 ① 1 ②
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, LEWIS.

Sp 368. **Television Programing.**
3 hours winter. 2 ① 1 ②
Educational and commercial programing; methods of audience measurement and program evaluation; programs in the public interest. Prerequisite: Sp 367. LIVINGSTON, LEWIS.

Sp 370. **Phonetics.**
3 hours spring. 3 ①
The science of speech sounds as elements of language and the application of this science to oral communication. HARRIS, VALENTINE.

Sp 371. **Speech Science.**
3 hours fall or winter. 3 ①
Anatomy, psychology, and physics of speech; examination of key research on the scientific bases of speech. HARRIS, VALENTINE.

*Sp 375. **General Forensic Speaking.**
1 hour each term, six terms.
Advanced work in general forensic speaking. Prerequisite: Sp 274.

*Sp 378. **Debate.**
1 hour each term, three terms.
Advanced work in debate. Prerequisite: Sp 277.

Sp 401. **Research.**
Terms and hours to be arranged.

Sp 405. **Reading and Conference.** (g)
Terms and hours to be arranged.[1]

* A maximum of 12 hours may be earned in courses designated by an asterisk.

Sp 406. **Projects.**
Terms and hours to be arranged.

Sp 407. **Seminar.** (g)
Terms and hours to be arranged.[1]

Sp 408. **Workshop.** (g)
Terms and hours to be arranged.[1]

Sp 414. **Speech in the Secondary School.** (g) 3 hours winter. 3 ①
History, philosophy, literature, and current practices in curricular and extracurricular speech programs of secondary schools. Prerequisite: 9 hours of upper division speech courses. KELTNER.

Sp 420. **Meaning and Communication.** (g) 3 hours. 3 ①
Theory of speech as communication; barriers and pathologies of oral communication; character of meaning, logic, symbols, and values in oral communication; models of communication and their application to speech behavior. Prerequisite: Sp 111,201,202, or 203. Offered alternate years. VALENTINE.

Sp 429. **Theories of Rhetoric.** (g)
3 hours. 3 ①
History and Philosophy of rhetorical principles. Prerequisite: 9 hours of speech.

J 431. **Broadcast Journalism.** (See JOURNALISM.)

Sp 451. **Instructional Uses of Television.** (g) 3 hours. 3 ①
Adaptation of audio-visual principles of communication to presentation of informational materials by television; uses of sound, film, music, graphics, and related aids. Prerequisite: Sp 367 or consent of instructor. LIVINGSTON.

Sp 472. **Experimental Phonetics.** (g)
3 hours spring. 2 ① 1 ②
Techniques and methods in analysis, synthesis, perception, and measurement of voice and speech. Laboratory period required. Prerequisite: Sp 371. VALENTINE.

[1] Graduate credit under Sp 405,407,408 must not total more than 9 hours.

Sp 481,482,483. **Speech Pathology.** (g)
3 hours each term. 3 ①
Symptoms, causes, and treatment of speech disorders. For students intending to qualify as speech clinicians. *Sp 481:* Functional articulatory defects, delayed speech, emotional disorders. *Sp 482:* Organic disorders; deviations due to congenital malformation, injury, deafness, and neurological impairment. *Sp 483:* More serious or prolonged disorders, including stuttering. Prerequisite: Sp 370,371, or consent of instructor. HARRIS, HILDEBRANDT, VALENTINE.

Sp 484,485,486. **Clinical Methods in Speech Correction.** (g)
2 hours each term. 2 ①
Practical experience in handling cases, including taking of case history, making diagnosis, and giving remedial treatment. Prerequisite: Sp 481,482 or consent of instructor. HARRIS.

Sp 487,488,489. **Audiology.** (g)
3 hours each term. 3 ①
Auditory function, hearing impairment, and education or re-education of persons with hearing loss. *Fall:* Fundamentals of acoustics, anatomy and physiology of the ear, types and causes of hearing loss, speech involvements. *Winter:* Techniques and interpretation of auditory tests such as pure tone and speech audiometry. *Spring:* Psychology of the acoustically impaired, speech and auditory training, school and vocational problems. Prerequisite: Sp 370,371 or consent of instructor. VALENTINE.

Sp 490. **Lip Reading.** (g)
3 hours. 3 ①
Theories and methods of speech reading and auditory training, their part in education and rehabilitation of deaf and hard-of-hearing children and adults; lip reading methods.

Sp 493. **Principles and Techniques of Speech Correction.** (G)
3 hours. 3 ①
Nature, causes, diagnosis, and treatment of speech defects of children and adolescents. Primarily for classroom teachers. HARRIS, HILDEBRANDT.

Science

FACULTY

As of January 1966

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

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

Emeritus Professors GILFILLAN; ATWOOD and GILKEY in Botany; MEHLIG and PEASE in Chemistry; CHAMBERLIN, MOTE, and SCULLEN in ENTOMOLOGY; ALLISON, HODGE, and PACKARD in Geology; MILNE and F. BAKKUM in Mathematics; VARNER and MORGAN in Physics; LI in Statistics; WULZEN and OSBORN in Zoology.

Botany and Plant Pathology: Professors YOUNG (department head), BISHOP, CHAMBERS, CHILCOTE, EVANS, HANSEN, HARDISON, HORNER, JENSEN, MCWHORTER, MILBRATH, MILLER, PHINNEY, ROTH, SMITH, VAUGHAN.
Associate Professors ALLEN, BRANDT, CAMERON, CORDEN, CULVER, DEEP, DOBIE, DOMSCH, HAMPTON, JONES, LEACH, MACSWAN, POWELSON, TRIONE.
Assistant Professors MCINTIRE, MOORE, PEEK, SENGER, SORGER.
Instructors DOOLEY, JOHNSTON, KJELDSEN, LUND, NEMEC, WIEDEMANN.

Chemistry: Professors CHRISTENSEN (department chairman), CALDWELL, CHELDELIN, DECIUS, FREUND, HEDBERG, KICE, KING, KURTH, LOGAN, MACDONALD, MARVELL, NEWBURGH, NORRIS, SCOTT, SLABAUGH, WANG, WESWIG, WILLIAMS.
Associate Professors BECKER, DANIELS, FANG, FREDERICKS, HUNT, LOOMIS, PARSONS, REED, REESE, YOKE.
Assistant Professors BOND, CAPLE, GAMBLE, KRUEGER, SHARMA.
Instructors HILLER, STAHL.

Entomology: Professors RITCHER (department chairman), MARTIN, RUDINSKY, STEPHEN, SWENSON, TERRIERE, THOMPSON.
Associate Professors BROOKES, CROWELL, DICKASON, GOULDING, KRANTZ, LATTIN.
Assistant Professors ANDERSON, NAGEL.

General Science: Professors HUMPHREY (department chairman), BEER, CREWS, TROUT, WILLIAMSON.
Associate Professors CONTE, ELDER, FINSTON, FOX, VAN DYKE, WILLIS.
Assistant Professors HUMPHREYS, MORRIS, SPENCER.
Instructors BURNETT, CRAVEN, FORD, LOTZ, PRINCE, PROPERZIO, RYAN, SAUNDERS.

Geography: Professors HIGHSMITH (department chairman), HEINTZELMAN, JENSEN, MYATT, RUDD.
Assistant Professors FRENKEL, HANSEN, MUCKLESTON.

Geology: Professors WILKINSON (department chairman), TAUBENECK.
Associate Professors BOSTWICK, ENLOWS, OLES.
Assistant Professors BARNES, FIELD, ISAACS, ROBINSON.

Mathematics: Professors LONSETH (department chairman), ANSELONE, ARNOLD, AUFENKAMP, BODVARSSON, CARTER, FIREY, GASKELL, GOHEEN, HOFFMAN, KAPLAN, KIRKHAM, OBERHETTINGER, POOLE, STAHL, STONE.
Associate Professors GUTHRIE, LARRIVEE, SAUNDERS, SMITH, STALLEY.
Assistant Professors BALLANTINE, BROWN, CARLSON, CRITTENDEN, FLOOD, GODARD, HERRMANN, JORGENSEN, G. W. MALOOF, OVERHOLSER, WILSON, WYSE.
Instructors ANDERSON, BACHELOR, BRENNE, COFFIN, DAVIS, HILL, KRATZKE, MAIN, M. A. MALOOF, MATZDORFF, NAGEL, PHILLIPS, SHEN, SIEBLER.

Microbiology: Professors ELLIKER (department head), BOLLEN, GILMOUR, PILCHER, ANDERSON, MORITA.
Associate Professors FRASER, PARKS, SANDINE.
Assistant Professors FRYER, LU, PACHA, SORSOLI.
Instructors NISHIKAWA, SHERMAN, VEDAMUTHU.

Oceanography: Professors BURT (department chairman), BERG, BODVARSSON, BYRNE, DEHLINGER, FROLANDER, HEDGPETH, MORITA, PATTULLO, WEYL.
Associate Professors CURL, DEFFEYS, MCCAULEY, NESHYBA, OSTERBERG, PARK, PEARCY, RITTENHOUSE.
Assistant Professors CAREY, FOWLER, GONOR, KULM, PYTKOWICZ, SMALL, SMITH, STRONG.
Instructors BALES, BORDEN, CUTSHALL, EASLEY, HEBARD, KUJALA, MESECAR, REDMOND, STILL, WYATT.

Physics: Professors BRADY (acting department chairman), NICODEMUS, SCHECTER, YUNKER.
Associate Professors BOEDTKER, BURCH, CUTLER, DECKER, EASTERDAY, GARMAN, TATOM, VINYARD.
Assistant Professors BILHORN, CHURCH, FAIRCHILD, KELLEY, LOWRY, MADSEN, WASSERMAN, ZAFIRATOS.

Science Education: Professor WILLIAMSON (department chairman).
Associate Professors ANDERSON, FOX, KOSKI.
Assistant Professors CRAVEN, GAWER, PHELPS, WILSON.
Instructor FOSTER.

Statistics: Professor CALVIN (department chairman), OVERTON, PETERSEN.
Associate Professors GUTHRIE, HUGHES.
Assistant Professors FAULKENBERRY, ROWE.
Instructor YATES.

Zoology: Professors DORNFELD (department chairman), GORDON, HILLEMANN, KRUEGER, PRATT, PRITCHARD, STORM.
Associate Professor ELLIS, HISAW, MOHLER, OWCZARZAK.
Assistant Professors ALVARADO, HARRIS, JOHNSON, LARSON.
Instructor DARROW.

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.

With the explosive growth of science, beginning in the years following World War II and stimulated in the late 1950's, the activities of the School of Science at Oregon State University have become so diversified and extensive that the school has been informally divided into three sections: PHYSICAL SCIENCES (including Mathematics and Statistics), BIOLOGICAL SCIENCES, and EARTH SCIENCES. This division brings together those departments having the strongest community of interests in research, subject matter, and techniques without implying in any sense a lessened interplay among the sciences.

SPECIAL PROGRAMS in the School of Science provide: (1) opportunities of study in either broad or specialized curricula which involve two or more of the traditional departmental subject areas, (2) curricula for preprofessional programs which in most cases are supervised by committees representing the principal departments concerned, and (3) training for science teachers.

The departments and curricula of the School of Science are grouped in this Catalog as follows:

Physical Sciences, Mathematics, and Statistics: Chemistry, Physics, Mathematics, Statistics.

Biological Sciences: Botany, Entomology, Microbiology, Zoology.

Earth Sciences: Geology, Meteorology, Geography, Oceanography.

Special Programs: General Science; Science Education; preprofessional programs in Dentistry, Dental Hygiene, Medicine, Medical Technology, Nursing, Veterinary Medicine.

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. This program is co-ordinated with a similar honors program in the School of Humanities and Social Sciences.

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 at least a B average in science and mathematics. Consideration also 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.

Basic Science Honors Program

Students must complete the following requirements to graduate with Honors in Science:

(1) Enroll in a special one-credit course each term during the freshman and sophomore years (GS 111,112,113H and GS 214,215, 216H).

(2) Enroll in honors sections, when available, in courses such as botany, physics, chemistry, mathematics, and English.

(3) Develop a reading knowledge in a foreign language approved by the major department.

(4) Take Phl 471, Philosophy of Science, during either the junior or senior year.

(5) Maintain a minimum grade-point average of 3.00. Some departmental requirements are higher for work in the major fields.

(6) Satisfy all departmental honors program requirements during the junior and senior years.

Departmental Honors Program

Departmental 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.

Adjustments in the above requirements are possible in special cases including students in preprofessional curricula. All adjustments require approval by the Honors Council.

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.

Curricula in Science

Curricula are offered leading to the degree of Bachelor of Arts (B.A.), Bachelor of Science (B.S.), Master of Arts (M.A.), Master of Science (M.S.), and Doctor of Philosophy (Ph.D.). (See GRADUATE SCHOOL for statement of requirements for advanced degrees.)

General notes concerning school and institutional requirements for B.A. and B.S. degrees are listed below:

a. In recognition of the need for a balanced general education for those planning professional careers in science, none of the curricula in the School of Science requires more than 60% of the course hours to be in areas of science and in no instance is more than 40% of the work required in a single area; thus, in addition to receiving a firm foundation in the basic sciences, the student has liberal opportunity to elect courses in other fields.

b. All undergraduates must, unless exempt, complete the following work prior to the senior year; five terms of physical education, one term of hygiene, one year of English composition.

c. Each School of Science curriculum requires the student to meet the following minima: (1) one year of approved biological science; (2) one year of approved physical science; (3) one year of approved humanities; and (4) one year of approved social science. The one year requirement in each area is normally satisfied by completion of 3 courses for a minimum of 9 term hours of credit. To apply on requirement, all courses must be approved by both the major department and the Dean of Science.

d. For graduation, each student in the School of Science is required to maintain a minimum 2.00 GPA in his major field as well as to meet OSU institutional requirements. Some science curricula have requirements in excess of this minimum.

Physical Sciences, Mathematics, and Statistics

The Departments of Chemistry, Mathematics, Physics, and Statistics aim (1) to provide a liberal training for students whose interests and capabilities enable them to pursue studies in these areas, (2) to stimulate the creativity through research of graduate students and more capable undergraduate students, and (3) to serve the University by providing instruction for students from other departments and schools whose training requires some knowledge of the physical environment and use of the methods of mathematics and statistics.

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	Hours
General Chemistry (Ch 204,205,206)	15
Mathematics (Mth 104,111,112)	12
Approved biology courses (Students having one year of biological science in high school may by petition reduce this requirement to 5 term hours.)	9
English Composition (Wr 111,112,113)	9
Physical education	3
Officer education or other elective	3

Common Sophomore Year	Hours
Organic Chemistry (Ch 334,335,336)	9
Organic Chemistry Lab (Ch 337,338,339)	6
Approved humanities courses	9
Mathematics (Mth 113,211,321)	11
Intro Class Physics (Ph 207,208,209)	12
Physical education	3
Officer education or other elective	3

MAJOR IN CHEMISTRY

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

Junior Year	Hours
Anal Chem (Ch 420,421,422 or 432)	12
Physical Chemistry (Ch 440,441,442)	9
Physical Chem Lab (Ch 443,444,445)	3
German (GL 50,51,52)	12
Introductory Modern Physics (Ph 311,312, 313) or other elective	9

Senior Year	Hours
Approved upper division chemistry (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 470,472,473 and some microbiology)	9–15
Inorganic Chemistry (Ch 411,412)	6
Approved social science courses	9
Electives	15–21

MAJOR IN AGRICULTURAL CHEMISTRY

See Common Freshman and Sophomore Year

Junior Year	
Analytical Chem (Ch 420,421,422 or 432)	12
Physical Chemistry (Ch 440,441,442)	9
Physical Chem Lab (Ch 443,444,445)	3
German (GL 50,51,52)	12
[1] Electives	9

Senior Year	Hours
Biochem (Ch 490,491,492,493,494,495)	15
Inorganic Chemistry (Ch 411,412)	6
Approved social science courses	9
Statistics (St 421,422)	6
[1] Electives	9–15

[1] 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	Hours
Analytical Chem (Ch 420,421,422 or 432)	12
Physical Chemistry (Ch 440,441,442)	9
Physical Chem Lab (Ch 443,444,445)	3
German (GL 50,51,52)	12
Approved life science electives	9

Senior Year	Hours
Biochem (Ch 490,491,492,493,494,495)	15
Inorganic Chemistry (Ch 411,412)	6
Approved social science courses	9
Electives	9–15

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, applied mathematics, computer science and technology, geometry.

Freshman Year	Hours
Mathematics (Mth 111,112,113)	12
Approved courses in biological sciences	9
English Composition (Wr 111,112,113)	9
Physical education	3
Officer education or other elective	15

Sophomore Year	Hours
Mathematics (Mth 211,212,213)	12
Approved social science courses	9
Approved courses in physical science	9
Physical education	3
Officer education or other electives	15

Junior Year	Hours
Upper division mathematics	18
Approved humanities courses	9
Electives	21

Senior Year	Hours
Approved senior mathematics sequence	9
Electives	39

CURRICULUM IN ENGINEERING PHYSICS

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

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, and meteorology.

Freshman Year	Hours
Intro Class Physics (Ph 207,208,209)	12
Calc with Anal Geom (Mth 111,112,113)	12
General Chemistry (Ch 201,202,203) or General Chemistry (Ch 204,205,206)	9–15
English Composition (Wr 111,112,113)	9
Physical education	3
Officer education or other electives	3–0

Sophomore Year	Hours
Intro Anal Physics (Ph 216,217,218)	9
Intro Mod Physics (Ph 311,312,313)	9
Calc with Anal Geom (Mth 211)	4
Applied Diff Equations (Mth 321, 322)	6
Approved courses in biological science	9
Physical education	3
Officer education or other electives	8

Junior Year	Hours
Electricity and Magnetism (Ph 331,332)	8
Thermodynamics (Ph 353)	4
Geom and Phys Optics (Ph 465,466)	6
Applied Diff Equations (Mth 323)	3
Approved courses in humanities	9
Electives	18

Senior Year	Hours
Mechanics (Ph 424,425,426)	9
Atomic and Nuc Phys (Ph 474,475,476)	9
Electronics (Ph 430) if Ph 437,438,439 is not elected	3
Approved courses in social science	9
Electives	18

STATISTICS

A major curriculum in statistics is offered at the graduate level only, although undergraduate courses are provided for those majoring in other fields. Graduate students may work toward a master's or doctor's degree with specialization in the areas of theory of statistics, operations research, genetic statistics, experimental design, sampling techniques, and applied statistics.

Students working toward advanced degrees in other areas may elect minors in statistics, biometry, or operations research. Students majoring in statistics may minor in biometry or operations research.

COURSES IN PHYSICAL SCIENCES, MATHEMATICS, AND STATISTICS

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, organic and physical, or in some field of special interest such as agricultural chemistry, biochemistry, 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

[1]Ch 101,102,103. **General Chemistry.**
3 hours each term. 2 ① 1 ③
Service course 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.

[1]Ch 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.

[1]Ch 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
Service course for pharmacy, premedical, and medical technology students covering gravimetric, volumetric, and instrumental analysis. Prerequisite: Ch 203 or Ch 241. REESE.

Ch 241. **Chemical Theory.**
4 or 5 hours fall. 3 ① 1 ② 1 ③
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.

[1]Ch 251,252. **Organic Chemistry.**
5 hours fall, 3 hours winter.
3 ① 2 ③; 3 ①
General service course covering aromatic and aliphatic chemistry. Designed for agricultural students. Prerequisite: Ch 203 or Ch 241.

[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 a special section for students majoring in certain curricula.

Upper Division Courses

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

Ch 321,322,323. **Metallurgical Chemistry.**
3 hours each term. 1 ① 1 ⑤
Winning various metals from ores, including fire assaying; chemical treatment and analysis of Northwest minerals. Prerequisite: Ch 203 or Ch 241.

Ch 324,325,326. **Industrial Chemistry.**
3 hours each term. 3 ①
Economics, processes, and material utilization. For students majoring in Business and Technology. Prerequisite: Ch 227.

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 pharmacy, agriculture, and home economics. Prerequisite: Ch 227, or Ch 252, or Ch 222.

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. **Inorganic Chemistry.**
(G) 3 hours each term. 3 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, KRUEGER.

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 420,421,422. Analytical Chemistry.
(g) 4 hours each term. 2 ① 2 ③
Professional course for majors in chemistry and chemical engineering. *First quarter:* Sampling, sample dissolution, separations, and data evaluation: *Second and third quarters:* Electrical, optical, and mechanical instruments assembled and applied to quantitative chemical measurements. Prerequisite or parallel: Ch 440; Ph 209. FREUND.

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 428. Instrumental Analysis. (g)
3 hours spring. 1 ① 2 ③
Service course for the nonspecialist outside the field of chemistry covering a broad spectrum of analytical instrumentation. Prerequisite: senior or graduate standing.

Ch 430,431,432. Advanced Organic Laboratory. (G)
3 hours each term. 1 ① 2 ③
Principles and practice in advanced organic laboratory techniques; distillation, crystallization, filtration, chromatography extractions, spectrographic methods, ion exchange, pressure reactions, and organic synthesis. Third term devoted to advanced organic analysis. Prerequisite: Ch 336,442. CHRISTENSEN, MARVELL.

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 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 211. 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. Service course in biochemistry to meet needs of students who have a limited background in physical chemical principles. First term of course mainly devoted to the physical chemical principles of biochemistry. 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 452. LOOMIS.

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
Chemistry of natural plant materials with special attention to cell wall components, cellulose, the non-cellulosic polysaccharides, lignin, and the extraneous materials in woods. Prerequisite: Ch 336. KURTH.

Ch 472,473. Pulp and Paper Chemistry. (G)
3 hours winter and spring. 3 ①
Chemistry of raw materials and fundamental processes of the pulp and paper industry including pulping, bleaching, beating, sheet formation, fillers, sizing, coloring, and coatings. Prerequisite: Ch 470. KURTH.

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 493,494,495. Biochemistry Laboratory. (G)
2 hours each term. 2 ③
Laboratory work to accompany Ch 490,491, and 492. GAMBLE.

Graduate Courses

See also courses marked (g) and (G) above.

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. Selected Topics in Inorganic Chemistry.
3 hours each term. 3 ①
Chemistry of several groups of nonmetals and metals, complex compounds, and acid-base reactions and reactions in nonaqueous solvents. Prerequisite: Ch 442. NORRIS, YOKE, KRUEGER.

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 520,521,522. Advanced Analytical Chemistry.
3 hours each term. 3 ①
Physical chemical principles underlying separations and modern methods of analytical chemistry measurements. 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 524,525,526. Advanced Instrumental Analysis.
3 hours each term. 1 ① 2 ③
Electrical, optical, and mechanical analytical instruments systems, critical study of principles and performance; special topics in emission spectroscopy, mass spectrometry, gas chromatography; automatic, continuous, and remote methods of analysis, telemetry, data acquisition and storage. Prerequisite: Ch 442. 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
Principles of stereoisomerism, conformational analysis, and advanced methods of synthesis. Prerequisite: passing grade in graduate qualifying examination.

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) organic-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 HENBERG.

Ch 546. Chemical Literature.
1 hour. 1 ①
Use; character of various chemical journals, dictionaries, reference hooks, and other sources of information.

Ch 547,548,549. Solid State Chemistry.
2 hours each term. 2 ①
Elementary crystallography; free-election, band, and valence-bond theories; thermodynamics of perfect, imperfect, and impure crystals; equilibria involving lattice defects; dislocations, ionic diffusion and conduction; dependence of physical properties of crystals upon chemical constitution. Prerequisite: Ch 442 or graduate standing in physics or engineering. SCOTT, FRENERICKS.

Ch 550,551,552. Selected Topics in Biochemistry.
3 hours each term. 3 ①
Nonsequence courses designed to acquaint student with recent advances in hiochemistry and their application to special fields of study. *Ch 550:* Proteins; *Ch 551:* Biological oxidations, nutrition; *Ch 552:* nucleic acids. Prerequisite: Ch 491. Students who have not had Ch 491 must have consent of instructor. BECKER, NEWBURGH, KING, REMMERT, WESWIG.

Ch 554. Biochemical Preparations.
1 or 2 hours each term.
Preparation, purification, and analysis; chemical and hiological resolutions. Maximum credit 6 hours. Prerequisite: Ch 336.

Ch 563,564,565. Selected Topics in Analytical Chemistry.
2 hours each term. 2 ①
Nonsequence courses designed to acquaint the advanced graduate student with recent advances in Analytical Chemistry. Prerequisite: Ch 522 or Ch 526.

Ch 570,571,572. Natural Products.
2 hours each term. 2 ①
Organic chemistry of naturally occurring compounds, particularly steroids and terpenes. Prerequisite: Ch 438 or equivalent. BONN.

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. Those whose high school preparation is not adequate for entrance into Mth 111 (Calculus with Analytic Geometry) will be placed in appropriate lower courses. Those who are studying the calculus in high school should investigate the Advanced Placement Program, under which college credit may be given.

A student who receives "D" in two successive lower division mathematics courses will have to repeat the second with grade "C" or better before registering for the next following course.

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

Senior sequence. The 27 required hours of upper division mathematics must include an approved 3-term sequence at the fourth-year level. Any regularly listed sequence in the range 411-479 may be submitted. Specially recommended as basic are Mth 411,412,413; Mth 421,422, 423; Mth 431,432,433; Mth 441,442,443.

A grade-point average of 2.00 is required in the senior sequence as well as overall in upper division mathematics courses.

Concurrent degrees (for general regulations, see under DEGREES AND CERTIFICATES). On petition, the biological science requirement may be reduced to 5 hours for students taking baccalaureate degrees in both mathematics and engineering, *provided* a year of biology was taken in high school.

Languages. Anyone who contemplates graduate work in mathematics should learn to read at least two of the languages French, German, Italian, and Russian. This should be done early—by the Junior year if possible.

Graduate Study

Master's and doctor's degrees may be earned in any of the broad categories of algebra, geometry, analysis, and applied mathematics.

Problems Seminar. Prospective degree candidates should register in the Problems Seminar during the first year of graduate work. This seminar takes the place of a departmental qualifying examination. One term is required in any program for a higher degree.

Master's Degree options. The M.A. and the M.S. in mathematics may be directed toward either (a) secondary mathematics, for high school teachers; (b) industrial mathematics; or (c) pure or applied mathematical research, supplying a foundation for Ph.D. work.

The doctoral program is designed to train teachers and independent research workers for universities, government laboratories, and industry. The Ph.D. is a research degree. Special emphasis is placed on (1) analysis and its many ramifications, including the differential and integral equations of mathematical physics, numerical methods and abstract functional analysis; (2) automaton theory, including the languages, logic, and design of computer systems; (3) probability theory and its applications (in cooperation with the Department of Statistics); (4) the complementary basic fields of geometry (including topology) and algebra (including number theory).

Special joint programs have been established: Computer Science and Technology (with the Department of Electrical Engineering); Applied Mathematics: Geophysics Option (with the Department of Oceanography).

Staff and Facilities. The faculty includes outstanding research workers and teachers in both pure and applied mathematics. There is an exceptionally good library. The University's computing center is equipped with computers and laboratories which facilitate research and instruction in many directions.

Lower Division Courses

Mth 10. Elementary Algebra.
No credit. 4 ①
Review of beginning high school algebra. Offered only in Summer Session and Continuing Education.

Mth 50. Intermediate Algebra.
4 hours. 4 ①
Quadratics, simultaneous equations, exponents, hinomial theorems, and other topics from second-year high school algebra. No credit for those entering with two full years of high school algebra.

Mth 101. College Algebra.
4 hours. 4 ①
Number systems, logic, mathematical induction, determinants and matrices, polynomials. Prerequisite: Mth 50 or initial placement.

Mth 102. Trigonometry.
4 hours. 4 ①
Trigonometric functions for general angles, solution of triangles, addition formulas, trigonometric equations, graphs, complex numbers. Prerequisite: Mth 101.

Mth 104. Algebra and Trigonometry.
4 hours. 4 ①
Logic and sets, real numbers, 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
Symholic logic, sets, and Venn diagrams; prohability; vectors and matrices; linear inequalities and programing; game theory. Prerequisite: Mth 101 or 104.

Mth 111,112,113. Calculus with Analytic Geometry.
4 hours each term. 4 ①
Functions of one variable, coordinate geometry in the plane. Differentiation and integration, maxima and minima, other applications. Prerequisite: Mth 102 or Mth 104, or initial placement.

Mth 151. Programing Digital Computers.
4 hours. 3 ① 1 ①
Algorithms; the stored program computer; machine language programing; symbolic languages: ALGOL. Console operation. Prerequisite: Mth 50 or Mth 101 placement.

Mth 190. Freshman Honors.
1 hour each term. 1 ①
Consent of instructor required.

Mth 191,192,193. Mathematics for Elementary Teachers.
3 hours each term. 3 ①
Arithmetic as a logical structure. *Mth 193:* the new programs.

Mth 211,212,213. Calculus with Analytic Geometry.
4 hours each term. 4 ①
Analytic geometry of space, vectors, the calculus for functions of several variables; linear systems, elements of differential equations. Prerequisite: Mth 113.

Mth 290. Sophomore Honors.
1 hour each term. 1 ①
Consent of instructor required.

Upper Division Courses

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

Mth 321,322,323. Applied Differential Equations.
3 hours each term. 3 ①
Linear ordinary differential systems arising in mechanics and electricity; numerical methods, vector calculus, complex variable; partial differential equations. Prerequisite: Mth 211.

Mth 331. Coordinate Geometry.
3 hours. 3 ①
A careful second look at Cartesian geometry of two and three dimensions. Prerequisite: Mth 111.

Mth 332. Projective Geometry.
3 hours. 3 ①
Properties which are invariant under the group of projections. Analytic and synthetic methods. Prerequisite: Mth 113.

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 113.

Mth 341. Determinants and Matrices.
3 hours. 3 ①
Linear vector space of n dimensions, solution of systems of linear equations; elementary matrix algebra. Prerequisite: Mth 113.

Mth 342. Theory of Equations.
3 hours. 3 ①
Algebraic polynomials and methods for finding their zeros. Prerequisite: Mth 113.

Mth 343. Theory of Numbers.
3 hours. 3 ①
Integers, Euclid's algorithm, diophantine equations, prime numbers, congruences, residues of powers, law of quadratic reciprocity. Prerequisite: Mth 113.

Mth 347,348,349. Algebraic Structure.
3 hours each term. 3 ①
Topics in linear algebra, matrices, groups, rings, fields. Not more than 9 hours credit given for Mth 341,347,348,349. Prerequisite: Mth 113.

Mth 351. Computer Principles.
3 hours. 3 ①
Machine-language programing for a typical computer. Prerequisite: Mth 151.

Mth 352. Computer Operation.
3 hours. 3 ①
Training in complete operation of a medium-scale electronic digital computer. Prerequisite: Mth 351.

Mth 353. Symbolic Language Programing.
3 hours. 3 ①
More advanced work with ALGOL, introductions to other languages. Prerequisite: Mth 151.

Mth 355. Automata.
3 hours. 3 ①
The Turing machine, strings, Church's hypothesis, some unsolvability problems. Prerequisite: Mth 351.

Mth 359. Introduction to Numerical Calculus.
3 hours. 3 ①
Solutions of equations in one unknown, curve fitting, interpolation, numerical differentiation and integration, list sorting, table look-up. Prerequisite: Mth 113 and either Mth 351 or Mth 353.

Mth 361. Probability.
3 hours. 3 ①
Combinatorial problems, continuous distributions, expectation, laws of large numbers. Prerequisite: Mth 111 or Mth 108.

Mth 362. Finite Differences.
3 hours. 3 ①
Difference techniques used in finite integration and series summation, solution of difference equations. Prerequisite: Mth 111.

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 213 or Mth 113 and 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, and nonlinear oscillation theory. Prerequisite: Mth 213 or Mth 113 and 6 hours of upper division mathematics.

Mth 427. Calculus of Variations. (G)
3 hours. 3 ①
Minimization of integrals involving functions of one or more variables. Prerequisite: Mth 413 or Mth 421,422,423.

Mth 428,429. Linear Integral Equations. (G)
3 hours each term. 3 ①
Conversion of differential problems into linear integral equations of Volterra and Fredholm types, solutions by iteration and other methods, existence theories, eigenvalue problems and the Hilbert-Schmidt theory of symmetric kernels. Prerequisite: Mth 413 or Mth 421, 422,423.

Mth 431,432,433. Principles of Geometry. (G)
3 hours each term. 3 ①
Hilbert's axioms. Coordinate systems and linear transformations: the affine and projective groups and geometries. Moebius transformations: the elliptic, parabolic and hyperbolic groups and geometries. Prerequisite: 6 hours from Mth 331-349.

Mth 434,435,436. Differential Geometry. (G)
3 hours each term. 3 ①
Curves and surfaces in 3-space; tensor theory of Riemannian geometry. Prerequisite: Mth 213 or Mth 341.

Mth 437. Tensor Analysis. (G)
3 hours. 3 ①
Multilinear forms and operations. Prerequisite: Mth 421 or Mth 341.

Mth 440. Selected Topics in Number Theory. (G)
3 hours each term. 3 ①
May be repeated for credit. Prerequisite: Mth 343.

Mth 441. Matrices and Quadratic Forms. (G)
3 hours. 3 ①
Matrix algebra, norms, quadratic forms, canonical reductions. Prerequisite: Mth 341.

Mth 442. Logic and Boolean Algebra.
(G) 3 hours. 3 ①
Sentences, quantifiers, truth functions; the sentential calculus, Boolean algebra, lattices. Prerequisite: 6 hours from Mth 333-349, or Phl 461.

Mth 443. Abstract Algebra. (G)
3 hours. 3 ①
Semigroups, groups, rings, integral domains, ideals; with illustrations from several branches of mathematics. Prerequisite: 6 hours from Mth 341-349.

Mth 451,452,453. Numerical Calculus.
(G) 3 hours fall, winter, spring. 3 ①
Mth 451: Matrix problems; theory and programing of numerical techniques. *Mth 452:* Ordinary differential equations: theory and programing of numerical techniques. *Mth 453:* Partial differential equations: theory and programing of numerical techniques. Prerequisite: for *Mth 451*, Mth 341 and Mth 359; for *Mth 452*, Mth 322 and Mth 359; for *Mth 453*, Mth 323 and Mth 359.

Mth 454, 455, 456. Numerical Methods for Scientists. (G)
3 hours each term. 3 ①
Computer programing; finite differences; interpolation, numerical integration, linear systems, polynomials, differential equations. Primarily for advanced students in physical or engineering science. Prerequisite: Mth 321, or 6 hours of upper division mathematics.

Mth 457,458. Systems Programing. (G)
3 hours each term. 3 ①
Theory and construction of monitors, interpreters, simulators, assemblers, and compilers. Prerequisite: Mth 353.

Mth 461,462,463. Mathematical Methods in Statistics. (G)
3 hours each term. 3 ①
Sampling distributions, estimation and tests of hypotheses. Prerequisite: Mth 213 or Mth 113 and Mth 341. (Equivalent to St 481, 482,483.)

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 467. Finite Markov Chains. (G)
3 hours. 3 ①
Classifications of states; transition matrix and fundamental matrices; limiting behavior and passage times; random walks, applications. Prerequisite: Mth 341,361.

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 474. Axioms of Mechanics. (G)
3 hours. 3 ①
Variational and other principles from which the theorems of analytical mechanics may be deduced. Prerequisite: Mth 323, or consent of instructor.

Mth 475,476. Mechanics of Continua. (G) 3 hours each term. 3 ①
Elements of tensor theory with applications to study of continuous matter: fluids, plastics, elastic solids. Prerequisite: Mth 323 or consent of instructor.

Mth 477,478,479. Partial Differential Equations of Physics. (G)
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 491,492,493. Mathematics for Secondary Teachers. (g)
3 hours each term. 3 ①
Mth 491: arithmetic. *Mth 492:* algebra. *Mth 493:* geometry. Study in depth of the new curricula, especially those being developed by the School Mathematics Study Group. Prerequisite: 3 hours of upper division mathematics. Equivalent to summer session courses Mth 591,592,593.

Mth 494. Foundations of Elementary Mathematics. (g)
3 hours. 3 ①
Arithmetic, algebra, and geometry. Prerequisite: 3 hours of upper division mathematics.

Mth 495. History of Elementary Mathematics. (g)
3 hours. 3 ①
Arithmetic, algebra, and geometry from ancient times into the modern era. Prerequisite: 3 hours of upper division mathematics.

Mth 496. History of the Calculus. (G)
3 hours. 3 ①
Areas, volumes, rates from early Greek mathematics to modern times. Prerequisite: 6 hours of upper division mathematics.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

Mth 501. Research.
Terms and hours to be arranged.

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
Mth 517: one-dimensional Lebesgue measure and integral, convergence in mean. *Mth 518, 519:* functions of two or more real variables, other generalizations and applications. Prerequisite: Mth 413.

Mth 521. Sequential Hilbert Space.
3 hours. 3 ①
Denumerably infinite dimensional spaces with quadratic norms; linear functionals and operators, bounds; strong and weak convergence; complete continuity, solution of infinite linear systems. Prerequisite: Mth 441.

Mth 522,523. Abstract Hilbert Space.
3 hours each term. 3 ①
Inner product spaces, both separable and nonseparable. Linear operators, special problems. Prerequisite: Mth 517, Mth 521.

Mth 527,528,529. Partial Differential Equations.
3 hours each term. 3 ①
Advanced theory, including existence proofs. Prerequisite: Mth 479, Mth 513.

Mth 531,532,533. Topology.
3 hours each term. 3 ①
Point sets, metrisation, compactness, continua, mappings, homology, combinatorial topology. Prerequisite: Mth 413.

Mth 534,535,536. Algebraic Topology.
3 hours each term. 3 ①
Homology theory, fixed point theorems, classification of maps, covering spaces, and homotopy; introduction to fiber bundles, obstruction theory, and characteristic classes. Prerequisite: Mth 441.

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 442.

Mth 552. Computer Algorithms.
3 hours winter. 3 ①
Prerequisite: Mth 442.

Mth 553. Computer Languages.
3 hours spring. 3 ①
Prerequisite: Mth 442.

Mth 561,562,563. Applications of Stochastic Processes.
3 hours each term. 3 ①
Various types of random processes occurring in the physical and biological sciences, engineering and management. Prerequisite: 6 hours of upper division analysis and 6 hours of upper division probability or mathematical statistics. (Equivalent to St 561,562,563.)

Mth 564,565,566. Topics in Probability Theory.
3 hours each term. 3 ①
A theoretical course, based on measure theory. 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. Selected Topics in Classical Analysis.
3 hours. 3 ①
May be repeated for credit. Consent of instructor required.

Mth 582. Selected Topics in Numerical Analysis.
3 hours. 3 ①
May be repeated for credit. Consent of instructor required.

Mth 583. Selected Topics in Functional Analysis.
3 hours. 3 ①
May be repeated for credit. Consent of instructor required.

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

[1]Ph 201,202,203. General Physics.
4 hours each term. 2 ① 2 ②
Mechancs, sound, heat, light, electricity, magnetism, and modern physics. 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.

[1]Ph 207,208,209. Introductory Classical 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 111, 112,113 previously or parallel.

[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.

[1]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.

Ph 216,217,218. **Introductory Analytical Physics.** 3 hours each term. 3 ②
Application of mathematical methods to problems of classical physics using calculus and differential equations. Prerequisite: Ph 209; Mth 211,321 previously or parallel.

Upper Division Courses

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

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 112,113,211 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.

Ph 353. **Thermodynamics.**
4 hours. 3 ① 1 ②
Thermodynamical theory and measurements. Prerequisite: Ph 203 or 209; Mth 211.

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; printing control, exteriors, interiors, special lighting, 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.**
Terms and hours to be arranged.

[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 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 203 or 209.

Ph 437,438,439. **Electronics.**
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 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 471,472,473. **Introduction to Theoretical Physics.** (G)
3 hours each term. 3 ①
Mathematical treatment of theories of classical and quantum physics. Prerequisite: three years of approved physics or graduate standing; Mth 323.

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.

Ph 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.

Graduate Courses

Graduate courses are given only when warranted by demand. The dates are given when courses are offered alernate years.

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.

Ph 515. **Relativity.**
3 hours. 3 ①
Application of Lorentz transformation theory to mechanics and electrodynamics; general relativity. Prerequisite: Ph 522.

Ph 517,518,519. **Quantum Mechanics.**
4 hours each term. 4 ①
Transformation theory; quantum mechanical equations of motion and their solutions; transition probabilities; relativistic quantum theory; illustrative applications. Prerequisite: Ph 476, 521.

Ph 521,522. **Dynamics.**
3 hours each term. 3 ①
Lagrangian and Hamiltonian mechanics; canonical transformations; Hamilton-Jacobi theory; continua. Prerequisite: Ph 426.

Ph 531,532. **Electromagnetic Theory.**
4 hours each term. 4 ①
Mathematical treatment of classical theories of electricity, magnetism, and radiation. Prerequisite: graduate standing in physics or consent of instructor.

Ph 546,547,548. **Introductory Solid State.**
3 hours each term. 3 ①
Mechanical and thermal properties of crystals; magnetic and dielectric behavior; band theory; theory of metals and semiconductors; superconductivity. Prerequisite: Ph 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 476 or graduate standing in chemistry, mathematics, or engineering.

Ph 557,558,559. **Statistical Thermophysics.**
3 hours each term. 3 ①
Statistical mechanics; kinetic theory; thermodynamics. Prerequisite: Ph 521 previously or parallel.

Ph 563. **Physical Optics.**
4 hours. 4 ①
Prerequisite: Ph 532.

Ph 567,568,569. **Quantum Field Theory.**
3 hours each term. 3 ①
Quantization of scalar and vector fields. Applications to the physics of solid state, electrodynamics, and elementary particles. Prerequisite: Ph 519.

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 phyiscs 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

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

Ph 390. Basic Meteorology.
3 hours. 2 ① 1 ②
Weather phenomena; weather instruments. Prerequisite: Ph 191; Ph 202 or 208 or 212.

Ph 391,392,393. Synoptic Meteorology.
3 hours each term. 2 ① 1 ②
Atmospheric thermodynamics, heat exchanges, motions, statics, and moisture. Application of atmospheric physics in weather analysis and forecasting. Prerequisite: Ph 203 or 209; Ph 390; Mth 111.

Ph 490. Introduction to Biometeorology.
(G) 3 hours winter. 2 ① 1 ②
Micrometeorological energy budgets; interactions of atmospheric processes and the biological processes of plants, animals, and humans; air pollution. Prerequisite: Ph 212; GS 103 or Bot 201.

Ph 491,492,493. Dynamic Meteorology.
(G) 3 hours each term. 3 ①
Meteorological applications of thermodynamics, hydrostatics, hydrodynamics, and radiation. Prerequisite: Ph 393; Mth 211.

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. Prerequisite: Ph 390; Ph 430.

Ph 497,498,499. Synoptic Meteorology.
(G) 3 hours each term. 1 ① 2 ②
Advanced course in three-dimensional weather analysis; examination of local and broad-scale flow patterns; contouring; graphic and kinematic analysis; hydrostatics. Prerequisite: Ph 393; Ph 493 previously or parallel.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

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.

STATISTICS

The Department of Statistics offers undergraduate service courses, and graduate courses and programs leading to the M.A., M.S., or Ph.D. degrees or to a minor for an advanced degree in other fields. No undergraduate degrees in statistics are offered. Minor options are available in biometry and operations research.

The department provides consulting and computing services to the staff and students of the University. The Computing Laboratory includes both an IBM 1620 computer for instructional use and an IBM 1410 computer for research use.

Upper Division Courses

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

St 311,312. Introduction to Statistics.
3 hours each term. 3 ①
Descriptive statistics, fundamentals of probability and frequency distributions, sampling distributions, estimation and hypothesis testing, confidence limits, linear regression and correlation, nonparametric methods, analysis of variance.

St 371,372,373. Basic Statistics and Operations Research.
3 hours each term. 3 ①
Basic statistics and operations research. Introduction to statistics, programing, linear programing, queue theory, stochastic models. Prerequisite: Mth 211.

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)
3 hours. 2 ① 1 ②
Use of IBM equipment in the processing of statistical data.

St 413. Advanced Data Processing. (G)
3 hours. 3 ①
Computer programing on the assembly language level. Prerequisite: St 411.

St 414,415. Data Systems Analysis. (G)
3 hours each term. 3 ①
Role of systems analysis; data systems development and design; equipment selection and application; data system implementation. Prerequisite: St 411; Mth 353 or BA 431.

St 421,422,423. Statistical Inference.
(G) 3 hours each term. 3 ①
Prerequisite: Mth 50.

St 424. Basic Concepts. (g)
3 hours. 3 ①
Basic concepts behind statistical procedures of estimation and hypothesis testing. A one-quarter course for graduate minors, assuming only a knowledge of high school algebra. Prerequisite: Mth 50.

St 426. Regression Analysis. (G)
3 hours. 3 ①
Multiple linear regression; polynomial models; transformations; harmonic analysis; multiple covariates; nonlinear methods. Prerequisite: St 423.

St 431. Design of Experiments. (G)
3 hours. 3 ①
Principles used; comparison of designs; interpretation of results. Prerequisite: St 423.

St 441,442. Sampling Methods. (G)
3 hours each term. 3 ①
Simple and stratified random sampling, systematic sampling, cluster sampling, double sampling, area sampling, analytical surveys, estimation of sample size. Prerequisite: St 422.

St 481,482,483. Theory of Statistics.(G)
3 hours each term. 3 ①
Sampling distributions, estimation, and tests of hypotheses. Prerequisite: Mth 211.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

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 531. Advanced Experimental Design.
3 hours. 3 ①
Foundations of experimental inference; factorial experiments; incomplete blocks; designs for regression analysis; sequential designs. Prerequisite: St 431, St 483.

St 534. Statistical Concepts in Genetics.
3 hours. 3 ①
Genetic probability, quantitative inheritance, designs for estimating genetic parameters, multiple trait selection. Prerequisite: St 422; one graduate course in genetics.

St 551,552. General Linear Hypothesis.
3 hours each term. 3 ①
Multivariate normal and related distributions; moments and characteristic functions; estimation and distribution of estimators; principle of least squares; confidence regions and test of hypothesis; regression models; general weighted least squares. Prerequisite: St 483; Mth 441. Mth 411 corequisite.

St 553. Multivariate Analysis.
3 hours. 3 ①
The generalized T^2 statistic; the Wishart distribution; the k-sample problem; discriminant functions; principal components; canonical correlation. Prerequisite: St 552.

St 561,562,563. Applications of Stochastic Processes.
3 hours each term. 3 ①
Theory and applications of processes, including stationary and non-stationary processes, prediction, queueing theory and inventory control. Prerequisite: Mth 413; St 483,573, or Mth 465.

St 571,572,573. Operations Research.
3 hours each term. 3 ①
Statistical methods, queue theory, linear programing, game theory. Prerequisite: Mth 211.

St 577,578. Decision Theory.
3 hours each term. 3 ①
Structure of statistical decision problems; principles of choice; Bayes rules; sufficiency; invariance; sequential analysis; estimation. Prerequisite: St 481 or Mth 464.

St 581,582,583. Estimation and Testing of Hypotheses.
3 hours each term. 3 ①
Advanced probability theory; estimation and testing of hypotheses. Prerequisite: St 483; Mth 413.

St 591,592,593. Special Topics.
3 hours each term. 3 ①
Topics of special and current interest not covered in other courses.

Biological Sciences

Opportunities at Oregon State University for the study of biological or life sciences at both the undergraduate and graduate levels are extensive. Students elect major programs in the Departments of Botany, Entomology, Microbiology, or Zoology; or combination programs through the Departments of General Science and Science Education. The several curricula provide for supporting work in mathematics and the physical sciences. Courses in biological oceanography, radiation biology, biochemistry, and statistics, offered respectively in the Departments of Oceanography, General Science, Chemistry, and Statistics, may be included as electives in biological curricula. A special program is offered jointly by the Schools of Science and Agriculture for a graduate major or minor in Genetics. (See GRADUATE SCHOOL.)

Recent rapid extension of knowledge in the physical sciences has found immediate application in biological research and has permitted a burst of progress in the biological sciences. Courses at OSU are designed to provide thorough grounding in biological systems as rapidly as the student becomes able to accommodate them. Although meaningful progress in this direction may be made at the undergraduate level, complete accommodation often requires graduate study.

BOTANY

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

Graduate majors: anatomy, cytology, ecology, forest pathology, morphology, mycology, nematology, palynology, plant pathology, phycology, physiology, physiology of parasitism, systematic botany.

Freshman Year	Hours
General Botany (Bot 201,202,203)	9
English Composition (Wr 111,112,113)	9
General Chemistry (Ch 204,205,206)	15
Foreign language	9–12
Physical education	3
Defense education or other elective	0–3

Sophomore Year	
Upper division botany (Bot 321,331,341, 351,371,470)	12
General Zoology (Z 200)	5
Mathematics	4
Organic Chemistry (Ch 226,227)	10
Genetics (Z 341)	3
Physical education	3
Defense education or other elective	3–9

Junior Year	
Upper division botany	12
Statistical Techniques (St 314)	3
Approved humanities courses	9
Electives	24

Senior Year	
Seminar	3
Approved social science courses	9
Supporting science	9–15
Electives	21–27

ENTOMOLOGY

Undergraduate and graduate major: entomology

Students planning to specialize in forest entomology should confer with either Dr. Julius Rudinsky or Dr. William Nagel. Prospective economic entomologists should elect Ch 226,227, and 252 or their equivalent as early as possible.

Freshman Year	Hours
General Zoology (Z 201,202,203)	9
General Chemistry (Ch 201,202,203)	9
English Composition (Wr 111,112,113)	9
Approved humanities courses	9
Physical education	3
Officer education or other electives	9

Sophomore Year	Hours
General Entomology (Ent 314)	4
Mathematics	4
General Botany (Bot 201,202,203)	9
General Microbiology (Mb 204)	4
Abridged General Physics (Ph 211,212)	6
Technical Report Writing (Wr 227)	3
Physical education	3
Officer education or other electives	15

Junior Year	Hours
Approved social science courses	9
Plant Pathology (Bot 351)	5
Approved upper division courses in entomology	18
Electives	16

Senior Year	Hours
Statistics	3
Plant Ecology (Bot 341)	4
Approved upper division courses in entomology	14
Electives	27

MICROBIOLOGY AND HYGIENE

Undergraduate majors: microbiology, sanitary microbiology.

Graduate majors: microbiology, dairy microbiology, food microbiology, hygiene and sanitation, industrial microbiology, microbial physiology, soil microbiology, molecular biology or microbial genetics, marine microbiology, microbiology of water and sewage, and virology.

Common Freshman Year	Hours
General Zoology (Z 200)	5
English Composition (Wr 111,112,113)	9
General Chemistry (Ch 204,205,206)	15
Physical education	3
Officer education or other electives	16

Common Sophomore Year	Hours
Approved humanities courses	9
Organic Chemistry (Ch 226,227)	10
Quantitative Analysis (Ch 234)	5
General Microbiology (Mb 204,205)	8
Physical education	3
Officer education or other electives	13

MICROBIOLOGY

Junior Year	Hours
Approved social science courses	9
General Physics (Ph 201,202,203)	12
Elementary Physical Chemistry (Ch 340)	3
Approved upper division microbiology	15
Electives	9

Senior Year	Hours
Approved upper division microbiology courses	15
Seminar (Mb 407)	3
Electives (mathematics, modern language, biochemistry, and physical chemistry recommended for those who plan to obtain the Ph.D.)	30

SANITARY MICROBIOLOGY

Junior Year	Hours
Approved social science courses	9
Food Sanitation Microbiology (Mb 411)	4
Dairy Microbiology (Mb 412)	4
Approved upper division microbiology	8
Community Health Problems (Mb 424,425, 426)	9
Abridged General Physics (Ph 211,212)	6
Electives	8

Senior Year	Hours
Approved upper division microbiology	13
Pathogenic Microbiology (Mb 432)	3
Pathogenic Microbiology Lab (Mb 433)	2
Epidemiology (Mb 453)	3
Food Microbiology (Mb 460)	4
Microb of Water and Sewage (Mb 470)	4
Seminar (Mb 407)	3
Electives	16

ZOOLOGY

Undergraduate major: Zoology

Graduate majors: anatomy and embryology, physiology, invertebrate zoology and parasitology, cellular biology, genetics, and natural history and ecology.

Freshman Year	Hours
English Composition (Wr 111,112,113)	9
General Zoology (Z 201,202,203)	9
General Chemistry (Ch 201,202,203)	9
Foreign language	9–12
Physical education	3
Officer education or other electives	6–9

Sophomore Year	Hours
Comp Vert Embry and Anat (Z 324,325, 326)	12
Mathematics or statistics	12
Organic Chemistry (Ch 226,227)	10
Physical education	3
Officer education or other electives	11

Junior Year	Hours
Electives in Invertebrate Zoology (Z 451, 452,454,456, or approved courses in entomology)	8–10
Genetics (Z 341)	3
General Botany (Bot 201,202)	6
General Physics (Ph 201,202,203)	12
Approved humanities courses	9
Electives	8–10

Senior Year	Hours
Electives in physiology (Z 431,432, or 434,435)	8–10
Electives in natural history and cellular biology (two courses from Z 371,372, 376,473,483 and one from Z 461,462, 463, or *vice versa*)	10–13
Approved social science courses	9
Electives	16–21

BOTANY

Courses offered provide a basis for a liberal arts major in botany or comprehensive and advanced training for majors who intend to enter any of the professional fields. Undergraduate majors do not specialize but obtain thorough grounding in fundamental botany that will enable them to continue in various specialized areas of botany or plant pathology or in related fields in forestry or agriculture. Students are encouraged to broaden their training by taking a range of courses in related sciences and in the humanities. Qualified students interested in entering professional fields of botany or plant pathology should plan to take additional training beyond the baccalaureate degree since, for most positions, an M.A., M.S., or a Ph.D. degree is a prerequisite.

The undergraduate curriculum is intended to qualify major students for (1) graduate work in various areas of botany or in plant pathology, (2) certain state or federal civil service positions, (3) teaching positions in secondary schools. Graduate programs are designed to qualify students for teaching positions in colleges or universities or for research positions in industry or with units of the Federal Government such as the Agricultural Research Service, the Forest Service, or the Public Health Service.

An extensive or diversified research program offers an opportunity for undergraduate experience in research and for a variety of types of specialized graduate training.

Lower Division Courses

Bot 201,202,203. General Botany.
3 hours each term. 3 ②; 3 ②; 1 ① 1 ② 1 ③
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

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

Bot 316. Aquatic Plants.
3 hours fall. 1 ① 2 ③
Ecology, taxonomy, and economic significance. Prerequisite: Bot 203 or equivalent. PHINNEY, JOHNSTON.

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. Offered 1966-67. ROTH.

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 330. Introductory Plant Physiology.
3 hours winter. 2 ① 1 ③
Fundamental concepts of physiological processes. Service course for students majoring in forestry. Prerequisite: Bot 201,202. MOORE.

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 414. Agrostology. (G)
4 hours fall. 2 ① 2 ②
Taxonomy of grasses. Identification in vegetative condition and in flower. Prerequisite: Bot 321 or equivalent. CHAMBERS.

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: Z 341; 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. BISHOP.

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. Not offered 1966-67. 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. Offered 1966-67. DEEP.

Z 454. Principles of Symbiosis. (G)
4 hours winter. 2 ① 2 ②
See ZOOLOGY.

Bot 461. Mycology. (G)
4 hours fall. 2 ① 2 ③
Occurrence, significance, structure, function, and relationship 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. 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. SMITH.

Bot 480. Fungus Genetics. (G)
2 hours winter. 2 ①
Genetic mechanisms in microorganisms other than bacteria and viruses. Prerequisite: Z 341. CAMERON.

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. Offered 1966-67. PHINNEY.

Graduate Courses

See also courses marked (g) and (G) above.

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.**
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. Not offered 1966-67. 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.

G 543. **Palynology.**
4 hours spring. 2 ① 2 ③
See GEOLOGY.

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 biology. ALLEN.

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. Not offered 1966-67. 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. Offered 1966-67. 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. Not offered 1966-67. 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.

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 500,000 specimens of insects and mites, is also available for research purposes. Research or teaching assistantships open to qualified graduate students provide valuable work experience.

Upper Division Courses

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

Ent 314. **General Entomology.**
4 hours any term. 2 ① 2 ②
Study of insects with emphasis on biology, ecology, classification, morphology, physiology, and control.

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 423. **Forest Entomology.** (G)
4 hours fall. 2 ① 2 ②
Bark beetles, sawflies, Lepidoptera, and Homoptera injurious to forest trees. Prerequisite: one year of forestry or Ent 314. NAGEL.

Ent 425. **Forest Insect Dynamics.** (G)
3 hours winter. 2 ① 1 ③
Population dynamics; host susceptibilty and resistance; host selection. Prerequisite: Ent 423 or equivalent. 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. Not offered 1966-67. MARTIN.

Ent 433. **Aquatic Entomology.** (G)
4 hours spring. 2 ① 2 ②
Biology, ecology, collection and identification of aquatic insects. Prerequisite: upper division standing. ANDERSON.

Ent 441,442,443. **Economic Entomology.** (G)
3 hours each term. 3 ①
Ent 441 (fall): Pesticides, their chemistry, formulation, environmental and legal aspects, and resistance. *Ent 442* (winter): Principles involved in the chemical, cultural, and biological control of insect pests of crops. *Ent 443* (spring): Principles utilized in control of arthropod pests of man, his animals, goods, and structures. Prerequisite: for *Ent 441*, Organic chemistry; 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 314. LATTIN.

Z 454. **Principles of Symbiosis.** (G)
4 hours spring. 2 ① 2 ②
See ZOOLOGY.

Ent 461. **General Acarology.** (G)
4 hours spring. 2 ① 2 ②
Taxonomy of mites and ticks; collection and preservation. Consent of instructor required. Prerequisite: Ent 314. Offered alternate years. Not offered 1966-67. KRANTZ.

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. Offered 1966-67. MARTIN.

Ent 481. **Insect Morphology.** (G)
3 hours fall. 2 ① 1 ③
The external skeleton and its appendages. Prerequisite: Ent 314. MARTIN.

Ent 482. **Insect Morphology.** (G)
3 hours winter. 3 ②
Morphology of internal organs. Prerequisite: Ent 314. MARTIN.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

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. **Methods of Insect Population Analysis.**
3 hours winter. 2 ① 1 ②
Applied biometry, sampling techniques, life table and component analyses. Prerequisite: Animal ecology; St 421,422. Offered alternate years. Not offered 1966-67. NAGEL.

Ent 516,517,518. **Selected Topics in Entomology.**
3 hours each term. 3 ①
Topics: (1) Economic entomology; (2) Forest entomology; (3) Insect toxicology; (4) Insect physiology; (5) Systematic entomology; (6) Aquatic entomology.

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. Not offered 1966-67. SWENSON.

Ent 554. **Immature Insects.**
3 hours fall. 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. Not offered 1966-67. 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. Offered 1966-67. 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 314 or equivalent, Ent 482. Offered alternate years. Not offered 1966-67. THOMPSON.

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, 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 130. **Introductory Microbiology.**
3 hours any term. 2 ① 1 ②
Microbiology applied to everyday living. Relationships of microorganisms to sanitation, foods, water, soil, industry, and medicine. Science elective for students in agriculture, home economics, engineering, humanities and social science.

Mb 204,205,206. **General Microbiology.** 4 hours each term. 2 ① 2 ②
Mb 204: Bacteria, yeasts, molds, viruses, and related organisms; elementary techniques 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 metabolism. 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

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

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.

Mb 322. Communicable and Noncommunicable Diseases.
3 hours. 3 ①
Modern concepts of diseases; prevention and control of disease, characteristics of common communicable diseases; chronic disease problem, specific chronic diseases, and programs of prevention and control. Prerequisite: One year of biological science and one term of microbiology.

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 with emphasis on bacteria, yeasts, molds, and bacteriophages in cultured milks and cheeses. Prerequisite: Mb 411. ELLIKER.

Mb 415. Marine Microbiology. (g)
2 hours spring. 2 ①
Ecology, function, and importance of microorganisms in the ocean; microbiology of sedimentary processes, low temperature and hydrostatic pressure effects on marine microorganisms. Prerequisite: Mb 204 or Oc 441. MORITA.

Mb 416. Marine Microbiology Laboratory. (g)
2 hours spring. 2 ②
Laboratory studies to accompany Mb 415. MORITA.

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. GILMOUR.

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 1965-66. GILMOUR.

Mb 424,425,426. Community Health Problems. (g)
3 hours each term. 3 ①
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. 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. PILCHER.

Mb 433. Pathogenic Microbiology Laboratory. (G)
2 hours. 2 ③
Laboratory studies to accompany Mb 432. PILCHER.

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. GILMOUR.

Mb 442. Systematic Microbiology Laboratory. (G)
2 hours winter. 2 ②
Laboratory studies to accompany Mb 441. Prerequisite: Mb 431. GILMOUR.

Mb 451. Microbial Physiology. (G)
3 hours spring. 3 ①
Energetics; microbial growth; metabolic pathways; biosynthesis; and regulatory control mechanisms in microorganisms. Prerequisite: Mb 205 and organic chemistry. PARKS.

Mb 452. Microbial Physiology Laboratory. (G)
2 hours spring. 1 ④
Laboratory studies to accompany Mb 451. 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. 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.

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 1965-66. PILCHER.

Mb 481. Immunology and Serology Laboratory. (G)
2 hours spring. 2 ③
Laboratory exercises to accompany Mb 480. PILCHER.

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 1965-66.

Mb 495. Microbial Genetics. (G)
4 hours spring. 2 ① 2 ③
Genetic principles as applied to microorganisms; available techniques and experimental procedures. Prerequisite: one course in microbiology and one course in genetics.

Graduate Courses

See also courses marked (g) and (G) above.

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 551,552. Advanced Microbial Physiology.
3 hours each term, fall and winter. 3 ①
Mb 551: Aerobic and anaerobic sporeformers, photosynthetic and autotrophic bacteria; relation of structure to function in bacteria. *Mb 552:* Regulation of cell metabolism; control and mechanism of macromolecular syntheses in microorganisms; coding structures and function. Prerequisite: Mb 451 or equivalent; organic, physical chemistry, and biochemistry. SANDINE, PARKS.

Mb 553. Microbial Biochemistry.
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 1965-66. 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; Ch 450 or equivalent. Offered alternate years. Not offered 1965-66. 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 71.

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.

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

[1]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. Ellis.

Z 117,118,119. **Human Biology Laboratory.** 1 hour each term. 1 ②
Laboratory work to accompany Z 114,115, 116. Ellis.

[1]Z 200. **General Zoology.**
5 hours spring. 3 ① 2 ③
Basic topics in present-day zoology. For students of biology, agriculture, and others. Owczarzak.

[1]Z 201,202,203. **General Zoology.**
3 hours each term. 2 ① 1 ③
For zoology majors and premedical, predental, prenursing, pharmacy, physical education, psychology, fisheries and wildlife students, and others. Hisaw, Alvarado.

Upper Division Courses

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

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. Johnson.

Z 324. **Comparative Vertebrate Embryology.**
4 hours fall. 2 ① 2 ③
Comparative study of the early development of vertebrates, with a descriptive, experimental, and evolutionary approach. 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 325,326. **Comparative Vertebrate Anatomy.**
4 hours winter and spring. 2 ① 2 ③
Comparative study of the development and anatomy of all organ systems of vertebrates, with a descriptive, experimental, and evolutionary approach. Prerequisite: Z 324. Hillemann.

Z 331,332. **Physiology.**
3 hours fall and winter. 2 ① 1 ②
For students in home economics 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.

Z 341. **Genetics.**
3 hours fall or spring. 3 ①
The gene as basis of variation and heredity; principles of genetics. Prerequisite: general chemistry and zoology, botany, or biology. Mohler.

Z 345. **Evolution.**
3 hours spring. 3 ①
Evidences and mechanisms, including genetic variation, selection, isolation. Prerequisite: Z 341. 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; utilization of biotic resources. 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 423. **Applied Human Anatomy.** (g)
3 hours spring. 2 ① 1 ②
For physical education students. Prerequisite: Z 321,322. Johnson.

Z 431,432. **Physiology.** (g)
4 hours winter and spring. 3 ① 1 ③
Two-term sequence for students in pharmacy, medical technology, zoology, and related areas, and for graduate minors. Prerequisite: Z 203 and organic chemistry. Alvarado.

Z 433. **Applied Human Physiology.** (g)
3 hours spring. 2 ① 1 ②
For students in physical education. Prerequisite: Z 331,332. Johnson.

Z 434. **General Physiology.** (G)
5 hours fall. 3 ① 2 ③
Physiological processes primarily at the cellular level: cell chemistry and colloidal properties, metabolism, permeability and active transport, muscle contraction, conduction. Prerequisite: Organic chemistry and two years of zoology. Pritchard.

Z 435. **Comparative Physiology.** (G)
5 hours winter or spring. 3 ① 2 ③
Comparative analysis of regulation in physiological systems; respiration, circulation, excretion, osmotic and ionic regulation, nervous systems and coordination. Prerequisite: Z 434 or Z 432. 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 454. **Principles of Symbiosis.** (G)
4 hours spring. 2 ① 2 ②
Compares basic principles of inter-organismic relationships: animal-animal, animal-plant, plant-plant, plant-animal. Prerequisite: general chemistry; 2 years of biology. Knapp.

Z 456. **Parasitology.** (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 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. Owczarzak.

Z 463. **Experimental Embryology.** (G)
4 hours spring. 3 ① 1 ③
Analysis of fertilization, cleavage, gastrulation; induction and tissue differentiation; regeneration. Prerequisite: Z 324. Owczarzak.

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. 3 ① 1 ③
Problems, principles, and methods in field zoology. 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

See also courses marked (*g*) and (*G*) above.

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.
3 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. OWCZARZAK.

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: physiology and Z 326. 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.

Z 534,535,536. Mammalian Physiology Laboratory.
2 hours each term. 2 ③
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. Protozoology.
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 454 or 456. 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, and organic chemistry. DORNFELD.

Z 565. Selected Topics in Cellular Biology.
3 hours. 1 ① 2 ③
Advanced laboratory training and theoretical discussion in the special fields of histochemistry, tissue culture, etc. Prerequisite: Z 461, 462,561,562,563, and biochemistry. DORNFELD, OWCZARZAK, HARRIS.

Z 566. Electron Microscopy.
3 hours fall. 3 ①
Biological applications of the electron microscope, including discussion of basic principles of electron optics and standard preparation techniques. Prerequisite: elementary physics, biochemistry, graduate standing in biological science. HARRIS.

Z 567. Electron Microscopy Laboratory.
3 hours fall. 3 ②
Prerequisite: Z 566 previously or parallel and approval of instructor. Knowledge of photographic techniques desirable. HARRIS.

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 ②
Distribution of animals: general principles; faunal areas of world and of North America. Prerequisite: Z 371,272, and Z 483. GORDON.

Earth Sciences

All branches of science are related in some way to the earth, but those specfic divisions which deal with the earth directly are grouped under the general title EARTH SCIENCES. The divisions recognized for the purpose of specialized training are: Geology and Paleontology, Meteorology, Geography, and Oceanography. Students interested in undergraduate and advanced training in these areas have excellent opportunity through the comprehensive course offerings.

GEOLOGY

Undergraduate and graduate majors: Geology, Paleontology.
Graduate majors: area geology, economic geology, structural geology, petrology, sedimentology, stratigraphy, invertebrate paleontology, micropaleontology, palynology.

MAJOR IN GEOLOGY

Freshman Year	Hours
English Composition (Wr 111,112,113)	9
Geology (G 201,202,203)	9
Geology Laboratory (G 204,205,206)	3
General Chemistry (Ch 101,102,103)	9
Mathematics (Mth 101,102,111)	12
Physical education	3
Officer education or other elective	3

Sophomore Year	Hours
Mineralogy, Rock Study (G 312,313,314)	12
Approved courses in humanities	9
General Physics (Ph 201,202,203)	12
Physical education	3
Officer education or other electives	12

Junior Year	Hours
Structural Geology (G 321)	4
Geomorphology (G 322)	4
Photogeology (G 323)	4
Approved course in social science	9
Technical Report Writing (Wr 227)	3
Field Methods (G 380)	3
Electives	21

An approved field course of at least 9 credit hours required for graduate training.

Senior Year	Hours
Upper division geology sequence	12
Seminar (G 407)	3
Paleontology or other biological science	9–12
Electives	21–24

MAJOR IN PALEONTOLOGY

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

METEOROLOGY

See Department of Physics

Undergraduate students may elect courses in meteorology as part of any program leading to the B.A. or B.S. degree in one of the established major fields of science such as physics, mathematics, general science, and others. By completing approved courses, these students may enter professional employment or continue studies at the graduate level.

Graduate programs for the M.A. or M.S. degree in meteorology require a thesis based on original meteorological research for which OSU has singularly appropriate equipment, facilities, and location. Doctoral candidates in other fields may select meteorology as a minor. Graduate specialties include biometeorology, synoptic meteorology, and physical meteorology, the last including radar meteorology and the physics of clouds and precipitation.

GEOGRAPHY

Undergraduate major: physical and resource geography
Graduate major and minor: systematic physical geography, general physical geography, systematic resource geography, area resource geography.

Freshman Year	Hours
English Composition (Wr 111,112,113)	9
General Chemistry (Ch 101,102,103)	9
Intro Geography (Geog 105,106,107)	9
Seminar (Ggs 407)	3
Physical education	3
[1] Officer education or other electives	15

Sophomore Year	Hours
Approved course in humanities	9
Cartography (Ggs 261,262,263)	9
General Botany (Bot 201,202,203)	9
Soils (Sls 210)	5
Physical education	3
[1] Officer education or other electives	13

Junior Year	Hours
Physical Geography (Ggs 327,328,329)	9
Phys Geog Lab (Ggs 321,322,323)	3
Techniques of Field Research (Ggs 361)	5
Geog of Pacific Northwest (Geog 313)	3
[1] Electives in resource fields	18
[1] Electives	10

Senior Year	Hours
Aerial Photointerpretation (Ggs 413)	3
World Resources (Ggs 421,422,423)	9
Conservation (Ggs 411)	3
Thesis (Ggs 403)	6
[1] Electives	27

[1] See departmental recommendations on use of electives.

OCEANOGRAPHY

Degrees in Oceanography are granted only at the graduate level. Specialization can be in the field of physical, geological, geophysical, chemical, or biological oceanography, or in geophysics.

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

Students working for a bachelor's degree in one of the other departments of the School of Science can register for a full year's upper division work in Oceanography if their program permits.

COURSES IN EARTH SCIENCES

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

[1]G 200. **Physical Geology.**
3 hours. 3 ①
Elective short course on earth materials, processes, and history.

[1]G 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. Field trips required.

G 221. **Basic Geology.**
3 hours. 2 ① 1 ③
Physical geology including laboratory study of minerals, rocks, and topographic maps.

[1] See footnote [1], page 65.

Upper Division Courses

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

[1]G 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.

[1]G 315,316,317. **Mineralogy and Rock Study.**
3 hours each term. 1 ① 2 ②; 1 ① 2 ②; 2 ① 1 ②
Field trips required. 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 202,204,205.

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.

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. Field trips required.

G 380. **Field Methods.**
3 hours. 1 ① 1 ⑥
Geologic mapping and surveying; pace-and-compass traverses, plane table plotting. Prerequisite: G 321.

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.

[1] G 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, G 201, and G 221.

G 420. **Geophysical Exploration.** (g)
3 hours. 3 ①
Physical methods used in mining and oil prospecting. Prerequisite: Ph 203; G 321,323.

G 421,422. **Economic Geology.**
3 hours each term. 2 ① 1 ②
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. 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. 2 ① 2 ③
Use of fossils in chronology and correlations; paleo-ecology; stratigraphic succession of invertebrates; collection, preparation, and identification of megafossils. Field trips required. Prerequisite: G 445.

G 430. **Principles of Stratigraphy.** (G)
4 hours fall. 3 ① 1 ③
Stratigraphic column; environmental, biologic, tectonic factors; correlation; field, laboratory procedures. Field trips required. 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
Field trips required. Prerequisite: G 431.

G 443,444,445. **Invertebrate Paleontology.** (g)
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: two years of general geology or two years of biological science.

G 480. **Field Geology.**
12 hours.
Small area studied intensively in eight-week summer camp. Prerequisite: G 380.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

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 520,521,522. **Economic Geology.**
3 hours each term. 2 ① 1 ③
Origin and occurrence of metallic and nonmetallic ore deposit including fossil fuels. Field trips required. 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 540,541. **Micropaleontology.**
4 hours each term. 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 443.

G 543. **Palynology.**
4 hours. 2 ① 2 ③
Preparation of sediments; interpretation of pollen profiles and diagrams. Prerequisite: G 540 or graduate standing in botany or geology.

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. Prerequisite: G 321.

G 580. **Graduate Field Geology.**
Terms and hours to be arranged.
Advanced field problems assigned to meet the requirements of the graduate student.

GEOGRAPHY

The Department of Geography, a joint department within the Schools of Science and Humanities and Social Sciences, offers courses and major programs in physical and resource geography and technical supporting courses. The major curriculum prepares students for employment in positions in such fields as land and environmental evaluation and classification, area and industrial resource analysis, planning, a variety of government services, and teaching; it also prepares students for graduate work in geography.

The undergraduate program is designed to provide background in related sciences, the spatial distributions and spatial relations of physical systems and subsystems of the earth, world resources as the bases of man's activities, the geographic point of view, research techniques and methods, problem analysis, and reporting. At the graduate level, emphasis is placed upon systems analysis, problem formulation, and research methodology utilizing the United States as the frame of reference. Advanced students may develop concentrations in systematic physical geography, general physical geography, systematic resource geography, or physical and resource geography of selected areas.

Oregon State University offers outstanding supporting facilities for the study of geography. As one of the nation's land-grant universities, the campus provides course work in a wide range of basic sciences, applied sciences, and technologies. Additional support is pro-

vided in business fields, and in social science aspects offered through the School of Humanities and Social Sciences. The OSU library has an outstanding collection of scientific, technical, and resource literature, as well as an excellent map collection. The immediate environs of Corvallis provide variety for field study.

Lower Division Courses

Ggs 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

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

Ggs 321,322,323. **Physical Geography Laboratory.**
1 hour each term. 1 ②
Laboratory to accompany Ggs 327,328,329; required of all majors and recommended for all students desiring more intimate knowledge of physical geography.

Ggs 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.

Ggs 361. **Techniques of Field Research.**
5 hours spring. 1 ② 2 ③
Gathering, recording, classifying, and analyzing data.

Ggs 401. **Research.**
Terms and hours to be arranged.

Ggs 403. **Thesis.**
Terms and hours to be arranged.

Ggs 405. **Reading and Conference.**
Terms and hours to be arranged.

Ggs 407. **Seminar.**
Terms and hours to be arranged.

Ggs 411. **Conservation.**
3 hours spring. 3 ①
Examination and appraisal; resources development; policies of public agencies and private enterprise. Prerequisite: upper division standing.

Ggs 413. **Geographic Photointerpretation.** (G) 3 hours. 1 ① 2 ②
Identification, analysis, and interpretation of landscape elements from aerial photographs; use in geographic analysis, map compilation, planning, and intelligence. Prerequisite: 18 hours of geography including 1 year of physical geography.

Ggs 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.

Ggs 461. **Map Design.** (G)
4 hours 2 ① 2 ②
The theory of map design; quantification of map symbols; representation of complex data; problems of reproduction. Prerequisite: 5 hours of cartography; Mth 113; and 18 hours of upper division geography or equivalent.

Graduate Courses

Ggs 501. **Research.**
Terms and hours to be arranged.

Ggs 503. **Thesis.**
Terms and hours to be arranged.

Ggs 505. **Reading and Conference.**
Terms and hours to be arranged.

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

Ggs 511. **Conservation in the United States.**
3 hours fall. 3 ①
Principles and needs. Prerequisite: graduate standing. HIGHSMITH.

Ggs 513. **Mexico.**
3 hours. 3 ①
Resource geography of Mexico. JENSEN.

Ggs 524,525,526. **Physical Geography.**
3 hours each term. 2 ① 1 ②
Elements of physical environment and their interrelationships; investigation, interpretation, and classification systems. Prerequisite: Ggs 327,328,329. RUDD.

Ggs 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: Ggs 327,328,329 or equivalent. HIGHSMITH, JENSEN, HEINTZELMAN.

Ggs 561. **Research Techniques.**
3 hours each term, two terms.
1 ① 2 ②
Data gathering, analysis, and interpretation; model studies in resource and area analysis; Fall: field; winter: quantitative methodology. Graduate standing required. Prerequisite: Ggs 361. HIGHSMITH, HANSEN.

OCEANOGRAPHY

Oceanography is a composite subject that requires the use of mathematics and the basic sciences to study the processes taking place in estuaries and in the sea. Oceanographers are usually specialists in one of the sciences but are required to have some training in others.

The Department of Oceanography at Oregon State University prepares students for (1) research and teaching positions with colleges and universities, (2) Civil Service positions with federal or state governments, (3) research and technical positions at oceanographic laboratories, (4) research and instrument development with industry, and (5) applied research related to other areas of study, such as fisheries, geology, meteorology, or engineering.

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 or marine radioecology. Minors for both the Ph.D. and M.S. degrees are offered to students majoring in other fields. Candidates for advanced degrees 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 or mathematics, 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 four options preparing students to enter careers in different branches of geophysics lead to M.S. or Ph.D. degrees. All four 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.

APPLIED MATHEMATICS WITH GEOPHYSICS OPTION: Emphasizes use of applied mathematical methods in theoretical geophysical problems. Courses in mathematics, physics, and geology are required.

Lower Division Course

Oc 133. **Elements of Oceanography.**
3 hours winter. 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. For freshmen and sophomores only.

Upper Division Courses

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

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. 3 ①
See GEOLOGY.

GS 431. **Physical Limnology.** (G)
3 hours spring. 3 ①
See GENERAL 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; calculus; 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.

GS 461. Marine Radioecology. (G)
3 hours spring. 3 ①
See General Science.

Oc 480. Marine Geophysics. (G)
3 hours winter. 3 ①
Geophysical methods, including seismic, gravity, magnetic, etc. Prerequisite: Mth 213; G 203; Ph 203.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

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.

Mb 530. Marine Microbiology.
4 hours spring. 2 ① 2 ②
See Microbiology.

Oc 543. Marine Nekton.
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; foodchain relationships; special problems of deep-sea life; methods of sampling. Prerequisite: two years of biology; Oc 441.

Oc 544. Marine Phytoplankton Ecology.
3 hours fall. 3 ①
Floating plant life in the sea and estuaries; systematics and distribution; physiology; population dynamics; environmental factors; artificial cultivation; effect upon environment and position in food webs. Prerequisite: Oc 441 or two years of biology.

Oc 545. Marine Phytoplankton Physiology.
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 546. Marine Primary Production.
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 547. Marine Phytoplankton Systematics.
2 hours fall. 2 ②
Classification, identification, and geographic distribution of marine phytoplankton; biometry and problems of speciation; techniques of sampling, preparation of specimens for examination and identification, use of literature. Prerequisite: Oc 441 or Oc 444 (may be concurrent).

Oc 548. Marine Benthic Ecology.
3 hours spring. 3 ①
Ecology of the marine bottom environment; marine and estuarine bottom communities; effects of the environment on distribution and abundance of fauna; adaptations to the environment; population dynamics. Prerequisite: Z 451,452.

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 552,553. Chemical Oceanography.
4 hours winter and spring. 3 ① 1 ③
Chemical composition and properties of sea water; standard chemical methods of determining salinity, pH, dissolved gases, nutrients; carbon dioxide and nutrient cycles; chemical equilibria in sea water; organic matter; biogeochemistry. Prerequisite: undergraduate degree in chemistry.

Oc 554. Theoretical Chemical Oceanography.
4 hours fall. 3 ① 1 ②
Systematic development of inorganic physical chemistry of sea water. Prerequisite: Oc 553.

Oc 561. Geological Oceanography.
4 hours spring. 3 ① 1 ②
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 measurements 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 568. Ecology of Foraminifera.
3 hours winter. 3 ①
Morphology and physiology; physical, chemical, and biological controls on the distribution and abundance of benthic and planktonic foraminifera; gross population trends; seasonal variations in faunas; applications to other fields. Prerequisite: Oc 441 or G 540 or two years of biology.

Oc 569. Distribution of Modern Foraminifera.
2 hours winter. 1 ① 1 ③
Laboratory identification and classification; field and laboratory techniques, use of literature; numerical analysis of faunas; familiarization with bathymetric and zoogeographic index species of benthic and planktonic foraminifera; specialized research problems. Prerequisite: Oc 568 and G 540 (may be concurrent).

Oc 571. Marine Hydrodynamics.
4 hours winter. 4 ①
Mathematical treatment of motion in the ocean; solving physical problems. Prerequisite: Mth 322.

Oc 572. Underwater Sound.
3 hours fall. 3 ①
Sound transmission; factors affecting sound transmission in the sea; uses of sound; active and passive sonar, sofar, Swallow, sediment study, depth determination, navigation. Prerequisite: Oc 432; Mth 213.

Oc 573. Waves and Tides.
4 hours spring. 3 ① 1 ②
Cause, nature, measurement, analysis, and prediction of surface waves, tides, and tidal currents; tsunamis; storm surges. Prerequisite: Mth 322; Oc 432.

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; Ph 332 or 426; Oc 480 or equivalent.

Oc 581. Theoretical Geophysics: Earth Gravity.
3 hours fall. 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 or equivalent.

Oc 582. Theoretical Seismology.
3 hours winter. 3 ①
Fundamental elastic wave equation and solutions, including body and surface waves; layered half-space problem; effects of gravity, curvature, and viscosity; wave equations and solutions for plates and cylinders, wave propagation in medium with variable velocity. Prerequisite: Mth 423 or 412; Oc 580.

Oc 583. Earthquake Seismology.
3 hours spring. 3 ①
Description of earthquakes; types of earthquakes; seismograph theory; seismic ray paths; velocity determinations; shallow and deep earthquakes; magnitude and energies of earthquakes; locating earthquakes; microseisms; seismicity. Prerequisite: Oc 582.

Oc 584. Physics of the Earth.
3 hours spring. 3 ①
Effects of confining pressure, temperature, time, and solutions on properties of rocks; earth and moon in solar system; source materials and their reliabilities for determining nature and composition of the earth; composition of core, crust, and mantle; processes within the earth with special reference to their effect on earthquakes, isostasy, crustal structure, island arcs. Prerequisite: Mth 323; two years of physics; one year of geology; Oc 480 or equivalent.

GENERAL SCIENCE

Undergraduate majors: General Science with options in biological science, physical science, or biophysical science.

Graduate majors: General Science with emphasis on biological science, physical science, or biophysical science; biophysics, radiation biology, radiological physics, radiological health, history of science.

Common Freshman Year	Hours
Approved courses in biological or physical science	9–15
English composition (Wr 111,112,113)	9
[1] Approved mathematics (mathematics beyond Mth 50)	12
Physical education	3
Officer education or other electives	9–15

Common Sophomore Year	
Approved courses in physical science or biological science	9–15
Approved science sequence	9–15
Approved humanities courses	9
Physical education	3
Officer education or other electives	6–18

BIOLOGICAL SCIENCE

Junior Year	Hours
Approved courses in upper division biology	9–15
Approved social science courses	9
[1] Foreign language	9–12
Electives	12–21

Senior Year	
Approved upper division science electives to bring total to 30 credits	9–15
[1] History of Science (GS 411,412, or 413)	6
[1] Philosophy of Science (Phl 471)	3
Seminar	1–3
Electives	21–29

BIOPHYSICAL SCIENCE

Junior Year	Hours
Approved courses in upper division biophysical science	9–15
Approved social science courses	9
[1] Foreign language	9–12
Electives	12–21

Senior Year	
Approved upper division science electives to bring total to 30 credits	9–15
[1] History of Science (GS 411,412, or 413)	6
[1] Philosophy of Science (Phl 471)	3
Seminar	1–3
Electives	21–29

PHYSICAL SCIENCE

Junior Year	Hours
Approved courses in upper division physical science	9–15
Approved social science courses	9
[1] Foreign language	9–12
Electives	12–21

Senior Year	
Approved upper division science electives to bring total to 30 credits	9–15
[1] History of Science (GS 411,412, or 413)	6
[1] Philosophy of Science (Phl 471)	3
Seminar	1–3
Electives	21–29

[1] This requirement does not apply to students in other special programs in science education and preprofessional curricula.

Students wishing to combine the two-year dental hygiene program with one designed to meet baccalaureate requirements may attend Oregon State University for the freshman and senior years or for two years following completion of Dental School training. The first option is recommended.

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 program see School of Education pages 106 and 115.

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 predental 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.

Students wishing to combine the two-year dental hygiene program with one designed to meet baccalaureate requirements may attend Oregon State University for freshman and senior years or for two years following completion of dental school training. The first option is recommended.

Counselors for predental students are Dr. A. W. Pritchard, professor of zoology, chairman; Dr. H. D. Reese, associate professor of chemistry; Dr. Richard E. Moffitt, D.M.D.; and Dr. Frank C. Morris, D.M.D.

THREE-YEAR PREDENTAL CURRICULUM

Freshman Year	Hours
English Composition (Wr 111,112,113)	9
General Chemistry (Ch 204,205,206)	15
General Zoology (Z 201,202,203)	9
Mathematics (Mth 50,101)	8
Physical education	3
Officer education or other elective	4

Sophomore Year	
Approved courses in social science	9
General Physics (Ph 201,202,203)	12
Comp Vert Embryology (Z 326)	4
Comp Vert Anatomy (Z 324,325)	8
Physical education	3
Officer education or other electives	12

Junior Year	
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	Hours
English Composition (Wr 111,112,113)	9
Gen Chem (Ch 204,205,206)	15
General Zoology (Z 201,202,203)	9
Mathematics (Mth 100,101)	8
Physical education	3
Officer education or other elective	4

Sophomore Year	
Organic Chemistry (Ch 226,227)	10
Quantitative Analysis (Ch 234)	5
Gen Physics (Ph 201,202,203 or Ph 207, 208,209)	12
Comp Vert Embry (Z 326)	4
Comp Vert Anat (Z 324,325)	8
Physical education	3
Officer education or other elective	6

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.

The counselors for premedical students are Dr. J. D. Mohler, Associate Professor of Zoology, chairman; Dr. R. H. Alvarado, Assistant Professor of Zoology; Dr. V. H. Cheldelin, 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:

	Units
English	4
Algebra	1½
Physics	1
Chemistry	1
Geometry	1
Latin	2
History	1
German or French	2
Electives	1½
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 aerospace, military, or naval science). The following work is prescribed:

		Term hours
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

Freshman Year	Hours
English Composition (Wr 111,112,113)	9
General Chemistry (Ch 204,205,206)	15
General Zoology (Z 201,202,203)	9
Mathematics (Mth 101,102)	8
Physical education	3
Officer education or other elective	4

Sophomore Year	
Organic Chemistry (Ch 226,227)	10
Quantitative Analysis (Ch 234)	5
General Physics (Ph 201,202,203)	12
Comparative Vert Embryology (Z 326)	4
Comparative Vert Anatomy (Z 324,325)	8
Physical education	3
Officer education or other elective	6

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

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.

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.

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	Hours
General Chemistry (Ch 204,205,206)	15
English Composition (Wr 111,112,113)	9
General Zoology (Z 201,202,203)	9
Intermediate or College Algebra (Mth 100, 101)	4
Physical education	2
General Hygiene (PE 160)	2
Approved electives	7

Sophomore Year	
General Microbiology (Mb 204,205)	8
Quantitative Analysis (Ch 234)	5
Organic Chemistry (Ch 226,227)	10
Physiology (Z 331,332)	6
Approved social science courses	9
Physical education	3
Approved electives	7

Junior Year	
Pathogenic Microbiology (Mb 432,433)	5
Abridged General Physics (Ph 211,212)	6
Approved humanities courses	9
Approved science and other electives	28

Senior Year *Medical School*	
Medical technology	49

NURSING

Oregon State offers the one year of prenursing required for entrance into the University of Oregon School of Nursing in Portland. Director of the School is Miss Jean E. Boyle; adviser of students in the prenursing program is Miss Guhli Olson.

Freshman Year	Hours
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 Backgrounds 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. Curriculum and electives must be adapted to meet the specific requirements for admission into the chosen professional school of veterinary medicine.

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	Hours
Intermediate Algebra (Mth 50)	4
English Composition (Wr 111,112,113)	9
General Chemistry (Ch 204,205,206)	15
Approved social science courses	9
Physical education	3
Officer education or other electives	8

Sophomore Year	Hours
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
Officer education or other electives	14–20

GENERAL SCIENCE

The Department of General Science offers curricula which allow considerable flexibility in the development of strong undergraduate preparation and some graduate programs each of which emphasizes the interdisciplinary approach to knowledge. Although the curricula in general science are not intended to prepare students for graduate majors in those science departments which offer complete undergraduate programs, special options are available which prepare a student for graduate work in certain areas of biology and in departments which lack undergraduate majors, such as oceanography and statistics. Some of the students in the preprofessional programs of medicine and dentistry may also major in general science. Other curricula in general science are specially designed for students interested in fields that involve two or more of the traditional physical and biological sciences, i.e., radiation biology, radiological physics, biophysics, paleobiology, history of science. Both undergraduate and graduate programs are also offered in general science for those who are preparing for science teaching.

Lower Division Courses

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

[1]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 111,112,113H. **Honors Colloquia.**
1 hour each term.
Reading and discussion groups organized on a modified tutorial basis. Reserved for School of Science and School of Humanities and Social Science honors freshmen.

GS 214,215,216H. **Honors Colloquia.**
1 hour each term.
Reading and discussion groups organized on a modified tutorial basis. Reserved for School of Science and School of Humanities and Social Sciences honors sophomores.

Upper Division Courses

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

GS 321,322,323. **Modern Concepts in Physical Science.**
3 hours each term. 3 ①
A synthesis of modern ideas concerning man's physical environment. Prerequisite: two years of approved physical science.

[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 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. BEER.

GS 361. **Machine Sources of X-Rays.**
3 hours fall. 2 ① 1 ③
X-ray machines and systems used in medical, industrial, and research applications. Prerequisite: 1 year of college physics.

GS 362. **X-Ray Measurements.**
3 hours winter. 2 ① 1 ③
Instrumentation and procedures used in measurement of X-rays from medical, industrial, and research machines and systems. Prerequisite: GS 361.

GS 363. **X-Ray Applications.**
3 hours spring. 2 ① 1 ③
Use of X-rays in medicine, industry, and research. Prerequisite: GS 362.

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. **Science in Antiquity.** (G)
3 hours fall. 3 ①
History of science in ancient times. Developments in scientific thought in astronomy, physics, biology from ancient civilizations to Roman times. Prerequisite: 27 hours of science including one year of upper division science.

GS 412. **The Scientific Revolution.** (G)
3 hours winter. 3 ①
Sixteenth, seventeenth, eighteenth century science. Rise of experimental science, and origin of modern science. Prerequisite: 27 hours of science including one year of upper division science.

GS 413. **Nineteenth-Century Scientific Thought.** (G) 3 hours spring. 3 ①
Dominant physical and biological thought in the nineteenth century. Prerequisite: 27 hours of science including one year upper division.

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: 27 hours of science including one year of upper division science

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 450. **Biology and Radiation.** (G)
2 hours fall. 2 ①
Biological phenomena directly associated with the major divisions of the electro-magnetic radiation spectrum and responses derived from radiation interactions with living matter. Prerequisite: senior standing in basic or applied science.

GS 451. **Introductory Radiation Biophysics.** (G) 3 hours fall. 2 ① 1 ③
Physics of Radiation for biologists. Prerequisite: 1 year of general physics; 1 year of biology; senior standing.

GS 452. **Cellular Radiation Biology.**
(G) 2 hours winter. 2 ①
Biochemical and physical properties of cells as they are influenced by interaction with ionizing radiation. Discussion of alteration of macromolecular systems, genetic material, permeability of cell membranes, and cellular replication processes. Prerequisite: GS 451; or modern physics; background needed in genetics and physiology.

GS 453. **Vertebrate Radiation Biology.**
(G) 2 hours spring. 2 ①
Etiology of radiation pathogenesis, morphological and physiological aspects of radiation injury in vertebrates. Emphasis on induction of alterations in immune, bloodforming, gastrointestinal, and metabolic systems. Prerequisite: GS 452.

GS 454. **Cellular Radiation Biology Laboratory.** (G) 2 hours winter. 2 ③
Experimental problems demonstrating principles underlying cellular radiation biology phenomena. To be taken concurrently with GS 452. Prerequisite: GS 450.

GS 455. **Vertebrate Radiation Biology Laboratory.** (G) 2 hours spring. 2 ③
Experimental problems demonstrating principles underlying vertebrate radiation biology phenomena. To be taken concurrently with GS 453. Prerequisite: GS 452, GS 454.

GS 461. **Marine Radioecology.** (G)
3 hours winter. 3 ①
Artificial radionuclides in the marine environment, their measurement, identification; their uptake and transference through marine food chains. Prerequisite: GS 451. OSTERBERG.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

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.

GS 521,522,523. **Topics in the History of Science.**
3 hours each term. 3 ①
Advanced treatment of nineteenth-century physical thought, nineteenth-century biological thought, the Newtonian revolution, etc. Topics determined by demand; not all topics given any one year. Prerequisite: GS 423 or 411, 412, and 413.

GS 551,552,553. **Selected Topics in Radiation Biology.**
3 hours each term. 3 ①
Advanced theoretical discussion in the special fields of radiation genetics, physiology, immunology, photobiology, etc. Topics, determined by demand and staff available. Prerequisite: GS 453.

GS 560. **Radiation Dosimetry.**
3 hours winter. 3 ①
Radiation detection, interaction of radiation with matter and energy absorption processes. Prerequisite: GS 450.

GS 561. **Radiological Physics.**
3 hours spring. 2 ① 1 ③
Physical principles underlying the concept of radiation dosimetry. Laboratory designed to develop proficiency in calibration and operation of radiation sources and measuring devices used in radiobiological and biophysical research. Prerequisite: GS 451; two years of physics.

GS 562,563. **Biophysics.**
3 hours winter and spring. 3 ①
Quantitative properties of biological systems and biological phenomena using concepts derived from mathematics and physics. Prerequisite: calculus; two years of physics; two years of biology.

GS 565. **Selected Topics in Biophysics.**
3 hours any term. 3 ①
Topics include advanced-level work in radiological physics, radiation biology, bioenergetics, molecular structure, action spectra, biopotentials, photo reactivation, biological control systems. Not all topics covered each year. Prerequisite: GS 563.

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.

SCIENCE EDUCATION

Graduate Courses for Secondary School Science Teachers

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.

Bot 590,591. **Fundamentals of Plant Science.**
4 hours winter and spring. 3 ① 1 ③
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. 3 ① 1 ③
Application in fields of inorganic, organic, analytical, and physical chemistry; recent advances in chemistry. Prerequisite: one year each of chemistry, physics, and mathematics. CALDWELL, YOKE.

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.

Mb 590. **Principles and Applications of Microbiology.**
4 hours spring. 3 ① 1 ③
Bacteria, molds, yeasts, and viruses; microbiology in agriculture, industry, medicine, and sanitation. Prerequisite: two years of biological science. ANDERSON.

Ggs 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. HIGHSMITH.

Ph 590,591. **Recent Advances in Modern Physics.**
4 hours winter and spring. 3 ① 1 ③
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. DORNFELD, staff.

Summer Courses for Secondary School Science Teachers

*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 530. **Plant Physiology.**
3 hours summer.

*Bot 540. **Plant Ecology.**
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.

*Ent 555. **Natural History of Insects.**
3 hours summer.
Phylogeny, biology, anatomy, parasitism, distribution, social behavior; collection, preservation and rearing methods. Prerequisite: one year of biological science.

*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 592. **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.

The Professional Schools

THOSE COURSES OF STUDY THAT PREPARE STUDENTS TO ENTER DIRECTLY into a specific professional or occupational field are grouped at Oregon State University into seven professional schools and one division. In addition to these are the three separate departments of the Reserve Officers Training Corps: Aerospace Studies, Military Science, and Naval Science.

The professional areas at Oregon State University described on the following pages are:

The School of Agriculture

The School of Business and Technology

The School of Education

The School of Engineering

The School of Forestry

The School of Home Economics

The School of Pharmacy

The Division of Physical Education

For further information about any of these fields, inquiries should be directed to the dean of the school or head of the division concerned.

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.

Agriculture

FACULTY

As of January 1966

WILBUR TARLTON COONEY, M.S., Dean of Agriculture.

WILLIAM MARTIN LANGAN, B.S., Head Adviser.

Dean Emeritus FREDERICK EARL PRICE.

Emeritus Professors BOUQUET, DIMICK, HAAG, HARTMAN, HILL, JONES, LITWILLER, MCKENZIE, NELSON, ONSDORFF, OLIVER, POTTER, POWERS, RICHARDSON, RUZEK, STEPHENSON, SHAW, WILSTER, WIEGAND.

Agricultural Economics: Professors BLANCH (acting department head), BECKER, BROWN, GAROIAN, HALTER, HOLLANDS, KORZAN, MUMFORD, SITTON.
Associate Professors EDWARDS, LANGMO.
Assistant Professors SMITH, STOEVENER.

Agricultural Education: Professor TEN PAS (department head).
Associate Professor DAVIS.

Agricultural Engineering: Professors RODGERS (department head), CROPSEY, KIRK, LUNDE, SINNARD, WOLFE.
Associate Professors BONNICKSEN, BOOSTER, LONG, PAGE.
Assistant Professors CHRISTENSEN, WATTS.

Animal Science: Professors MILLER (department head), BOGART, HEDRICK, OLDFIELD, POULTON.
Associate Professors ENGLAND, FOX, RALSTON, WOLBERG.
Assistant Professors CHURCH, ELLINGTON, KENNICK, KLIEWER, STOUT, WU.
Instructor RUTLAND.

Extension Methods: Professor C. L. SMITH.

Farm Crops: Professors COWAN (department head), FOOTE, FORE, FURTICK, HEDRICK, MCGUIRE, POULTON.
Associate Professors CALHOUN, CHILCOTE, CHING, FRAKES, JENSEN.
Assistant Professors APPLEBY, KRONSTAD.
Instructor CALLIHAN.

Fisheries and Wildlife: Professors SCOTT (department head), BOND, DOUDOROFF, LONG, RAYNER, WARREN.
Associate Professors HORTON, KUHN, MILLEMANN, WIGHT.
Assistant Professors CAMPBELL, HALL, LIGHTFOOT.

Food Science and Technology: Professors SCHULTZ (department head), CAIN, DAY, SAMUELS, SINNHUBER.
Associate Professors ANGLEMIER, SATHER, STEIN, YANG.
Assistant Professors BEAVERS, LINDSAY, MONTGOMERY, VARSEVELD.

Horticulture: Professors APPLE (department head), COMPTON, FRAZIER, HANSEN, ROBERTS, ZIELINSKI.
Associate Professors BAGGETT, BLANEY, GARREN, MACK, WADSWORTH, WESTWOOD.
Assistant Professors CRABTREE, LAGERSTEDT.

Poultry Science: Professors PARKER (department head), ARSCOTT, BERNIER, HARPER.
Assistant Professor MCCLUSKY.

Range Management: Professors COWAN AND MILLER (co-administrators), POULTON (program leader), HEDRICK.

Soils: Professors CHENEY (department head), DAWSON, HARWARD, JACKSON, KNOX, YOUNGBERG.
Associate Professors MOORE, SIMONSON.
Assistant Professor BOERSMA.

Veterinary Medicine: Professor DICKINSON (department head).
Associate Professors BONE, KNAPP.
Assistant Professors HARR, STEVENS.

High School Preparation

The remarkable advances in technology and science in agriculture make the study of physical, biological, and social sciences and communications a vital necessity. Therefore, the following preparation in high school is strongly recommended for students in agriculture: English, 4 units; mathematics, 3 units; physics, chemistry, and biology, 1 unit each; and social studies, 3 units.

Individual Counseling

Every student is considered an important individual; his or her study program is developed in personal consultation with a faculty adviser. This person is selected from faculty members serving the department in which the student has expressed a major interest. As early as informed judgment will permit, students select a subject area and become associated with instructors and other students of similar interests. Initial or early counseling is based upon the student's high school record and all placement test scores. When preparation is found to be inadequate, the student is encouraged to enroll in courses providing the education, training, and experience necessary to help assure success at the university level even though such work may require the student to take one or more additional terms to complete a prescribed four-year curriculum.

Activities

Students achieving acceptable academic work are encouraged to participate in activities to the extent of their interest and desire. Throughout Oregon State University there are activities to fit the needs of every student, and within the School of Agriculture, departmental clubs provide an excellent initial base for involvement in extracurricular projects that give meaning and breadth to their total education, along with the development of leadership abilities. For these reasons, all students are encouraged to become associated with the departmental club related to their particular area of interest.

Coordination of student activities within the school is effected by the Agricultural Executive Council, which is composed of representatives from each departmental club. In addition, Alpha Zeta, an Agricultural Honorary which accepts students for membership on the basis of scholarship and leadership, provides valuable service to the agricultural students and faculty alike.

The activity center in the Memorial Union specializes in the guidance of student groups, clubs, and organizations. The School of Agriculture is proud of the fact that over the years it has had more than its share of student body presidents.

Job Opportunities

There is a wide diversity of professional and occupational areas in agriculture. These include production, processing, and marketing of food and fiber; outdoor recreation, and efficient utilization of human and natural resources. Opportunities in agriculture have expanded in variety, interest, and challenge. These opportunities exist in research, extension, teaching, communication, production, sales, and services. Curriculum options allow specialization in business, technical, or scientific aspects in preparation for these areas.

Graduation Requirements

A student, to be eligible for a bachelor of science (B.S.) degree, must meet the following:

1. The general and institutional requirements listed under *Degrees and Certificates*, p. 14.
2. The School of Agriculture requirements:
   a. Satisfactory completion of one of the three curriculum options listed on the following pages.
   b. A passing grade in a comprehensive examination in English.
   c. Completion of a minimum of 192 credit hours.
3. The curricular requirements in the department in which the student is majoring.

Work performance and personal conduct on the part of the student within his or her selected area of concentration are carefully evaluated by the faculty. Students are expected to maintain ethical, professional, and academic standards. Failure to maintain such standards as adjudged by the faculty will be grounds for terminating the student's enrollment in the department or school.

B.S., B.Agr., M.Agr., M.S., Ph.D. degrees

The Bachelor of Science (B.S.) or Bachelor of Agriculture (B.Agr.) degree is offered in the options listed below. Through the Graduate School the advanced degrees of Master of Agriculture (M.Agr.), Master of Science (M.S.), and Doctor of Philosophy (Ph.D.) are also offered.

Minimum Requirements

	Agricultural Science	Agricultural Business	Agricultural Technology
	(Hours)	*(Hours)*	*(Hours)*
Agriculture			
Departmental and subject area requirements	38	48	60
Orientation	(2)	(2)	(2)
Agricultural economics	....	(11)	(8)
Hours other than in agricultural economics and student's major department	....	(9)	....
Hours in other than student's major department including at least 3 hours in each of three departments	....	....	(34)
Communications	18	18	18
English composition	(9)	(9)	(9)
Oral communications	(3)	(3)	(3)
Electives	(6)	(6)	(6)
Humanities and Social Science	18	24	18
Economics	(3)	(9)	(3)
Electives	(15)	(15)	(15)
Business	....	26	....
Accounting	....	(6)	....
Production	....	(4)	....
Finance	....	(4)	....
Marketing (business administration or agricultural economics)	....	(3)	....
Business law	....	(3)	....
Management (BA 301,302 or AE 312,313)	....	(6)	....
Biological and Physical Science			
Majors in ag econ	54	36	35
Students other than ag econ majors	72	36	35
* Botany	(6)	(6)	(6)
† Zoology	(5)	(5)	(5)
Genetics	(3)	(3)	(3)
Chemistry			
Majors in ag econ	(9)	(9)	(9)
Students other than ag econ majors	(14)	(9)	(14)
Physics (not required for majors in agricultural education)	(6)	(3)	(3)
Mathematics			
through Mth 111	(12)	....	....
through Mth 101	....	(4)	(4)
Statistics	....	(6)	....
‡ Electives			
Majors in agricultural economics	(13)	....	(5)
Students other than ag econ majors	(26)	....	....
Physical education	6	6	6
Electives	40	34	55
TOTAL TERM HOURS (minimum)	192	192	192

* Three hours of physics may be substituted for 3 hours of botany. General Biology (GS 101,102,103) may be substituted in some programs of study for Bot 201,202, Z 200, and Z 341; not recommended for students interested in the plant sciences.

† Majors in agricultural education and landscape construction and maintenance may elect either zoology or botany.

‡ All electives are under the advisement of the departmental faculty except for 9 hours in the junior year and 9 hours in the senior year which are to be unrestricted.

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	*	*	*
Mechanical technology		x	x
Poultry science	x	x	x
Range management	x		
Soils	x	x	x
Wildlife management	x		x

* See special curricula under HORTICULTURE.

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, management, and other business aspects of agriculture. Students completing this option may expect to find employment in industries serving agriculture such as chemical and 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 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.

Freshman Year

Common to all Curriculum Options

	Term			Total Hours
	Fall	*Winter*	*Spring*	
English Composition (Wr 111,112,113)	3	3	3	9
[1]General Chemistry (Ch 201,202,203)	3	3	3	9
[2]General Botany (Bot 201,202)	3	3	..	6
[2]General Zoology (Z 200 or 201,202, 203)	(3)	(3)	5(3)	5(9)
[3]College Algebra (Mth 101)	4	..	..	4
Concepts of Agriculture (Ag 100)	2	..	..	2
Physical education	1	1	1	3
[4]Electives	..	0–6	0–4	10
	16	16	16	48

[1] Students not qualified to enroll in Ch 201 will be expected to complete nine (9) credits of General Chemistry in the Ch 101 series and then (4) credits of Ch 241.

[2] General Biology (GS 101,102,103) may be substituted for Bot 201, 202, and Z 200 in certain programs of study.

[3] A minimum of Mth 101 is required of all students electing the agricultural technology and agricultural business options. Mth 111 is required as a minimum in the agricultural science option.

[4] Basic requirements of one of the three options are to be met and should be considered when selecting elective courses.

Agriculture (General)

Ag 100. **A Concept of Agriculture.**
2 hours fall. 2 ①
A perspective of agriculture in society and an understanding of educational and training opportunities.

Ag 407. **Seminar.**
Terms and hours to be arranged.

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 people 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 training in technical agriculture and agricultural economics. Students who intend to 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 to develop a strong background in agricultural economics,, economics, statistics, mathematics, and the physical and biological sciences. Especially those students 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. **Agricultural Economics.**
3 hours fall or winter. 3 ①
An introduction to farm management, marketing, agricultural business, finance, and land economics; farm policies and programs. Korzan, Mumford.

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

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 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 312,313,314. **Agricultural Business Analysis.**
3 hours each term. 3 ①
First term: Agricultural business profits as affected by product mix, input combinations, and level of output. *Second term:* Consumer behavior; markets and prices for agricultural commodities and factors. *Third term:* Quantitative analysis applied to agricultural business problems. Prerequisite: Ec 203; Mth through 111; St 311, 312 (Statistics may be taken concurrently).

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 1965-66.

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.

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
Management principles and techniques for choosing and combining farm enterprises; farm plans with input factors nonrestrictive and restrictive; visits to observe farm organizational features. Prerequisite: AEc 211. Blanch.

AEc 418. **Federal Programs and the Farmer.** (g)
3 hours winter 1 ① 1 ②
Federal and State programs (ASC, SCS, FHA, BLM, FCES, ERS, State agencies) as they affect the operation of Oregon farms and ranches. Prerequisite: senior standing. Mumford.

AEc 421. **Plant Efficiency Analysis.**
(g) 3 hours winter. 1 ① 1 ②
Designing effective use of labor, materials, equipment, and fixed facility inputs for the production, processing, handling, and marketing of agricultural products. Techniques to assist management in selecting alternative systems. Prerequisite: AEc 341 or consent of instructor. 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. Prerequisite: senior standing. Blanch.

AEc 431. **Farm Finance.** (G)
3 hours spring. 3 ①
Finance requirements, principles, and problems; credit role, arrangements, and costs; credit sources; risk; intergeneration transfer of estates. 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. STOEVENER.

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. SITTON.

AEc 471. Managerial Economics.
(G) 3 hours spring. 3 ①
Business policies in agricultural supply and marketing firms. Prerequisite: AEc 312; Ec 457. GAROIAN.

Graduate Courses
See also courses marked (g) and (G) above.

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.

Ec 514,515,516. Contemporary Economic Thought.
3 hours each term. 3 ①
Twentieth century economics; value theory, welfare economics, imperfect competition; institutionalism; theory of employment, money, national income, economic fluctuations; growth; innovations in methodology. Prerequisite: Ec 475,476,477, or equivalent.

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: Ec 480; Ec 457.

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.

AEc 561. Economics of Natural Resource Development.
3 hours spring. 3 ①
Welfare economics and benefit-cost analysis. Allocation of natural resources over time and among uses. Optimum and multiple use concepts. Prerequisite: AEc 461 or equivalent. Offered alternate years. Offered 1966-67.

AEc 562. Water Resources Policy.
3 hours spring. 3 ①
External economies and diseconomies; valuation of extra-market goods; input-output analysis; stochastic planning models; problems of social organization. Prerequisite: AEc 461 or equivalent. Offered alternate years. Not offered 1966-67.

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 113; St 426. Offered alternate years. Not offered 1966-67. EDWARDS.

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.

AEc 573. Agricultural Price Analysis.
3 hours spring. 3 ①
Supply and demand theory; statistical procedures. Prerequisite: St 423; Ec 457. EDWARDS.

AEc 585,586. Mathematical Economics. 4 hours fall and winter. 4 ①
Application of mathematics to economics. Prerequisite: Mth 113. Offered alternate years. Offered 1966-67. 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 the Bachelor of Science, Master of Science, and Master of Agriculture degrees 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:

	Hours
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
Agricultural Processing (AE 371)	3
Farm Implements (AE 391)	3
Seminar (AE 407)	2
Utilities in the Home (AE 435)	3
Statics and Strength of Materials (AE 421)	3
Dynamics of Solids and Fluids (AE 422)	3
Heat Energy Processes (AE 423)	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. Mechanical Problems in Agriculture.
2 hours fall, winter. 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 50 or equivalent. LONG.

AE 213. Mechanical Applications in Agriculture.
3 hours spring. 1 ① 2 ③
Farm surveying, mechanics, maintenance of equipment, and dehydration. Prerequisite: AE 211. LONG.

AE 221. Agricultural 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. BOOSTER.

AE 222. Agricultural Mechanics.
3 hours spring. 1 ① 2 ③
Farm machinery; farm equipment; farm-type electrical equipment. Prerequisite: AE 221. CHRISTENSEN.

Upper Division Courses

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

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
The automobile, its parts, and accessory units; design, function, operation, adjustment, 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 winter and spring. 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 317. Power Mechanics.
3 hours fall. 2 ① 1 ③
Internal combustion engine cycles, principles, and accessories; adjustments, overhaul procedures, and trouble shooting related to small engines; hydraulic and air-powered equipment. LUNDE.

AE 319. Land Drainage.
3 hours spring. 2 ① 1 ③
Surface and subsurface drainage systems; ponds and earth dams; erosion control. Prerequisite: Sls 210. WATTS.

AE 321. Pumps and Irrigation.
3 hours fall. 2 ① 1 ③
Sprinkler and gravity irrigation systems; irrigation pumps; wells. Sls 311 and CE 322 recommended. 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
Building services, economical utilization, materials and types of construction, and creative farmstead planning. BONNICKSEN.

AE 371. Agricultural Processing.
3 hours fall. 2 ① 1 ③
Processing and handling agricultural materials. Prerequisite: Ph 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
Power farming implements; operation, maintenance, adjustments, calibration and use. Prerequisite: Mth 50 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 421. Statics and Strength of Materials.
3 hours fall. 2 ① 1 ②
Statics and strength of materials and their applications in agricultural technology. Prerequisite: Ph 211.

AE 422. Dynamics of Solids and Fluids.
3 hours winter. 2 ① 1 ②
Dynamics of solids and fluids and their applications in agricultural technology. Prerequisite: AE 421.

AE 423. Heat Energy Processes.
3 hours spring. 2 ① 1 ②
Fundamentals of heat energy process and their applications in agricultural technology. Prerequisite: Ph 211.

AE 435. Utilities in the Home. (g)
3 hours spring. 3 ①
Use, economy, and function of heating, air conditioning, plumbing, and electricity. Prerequisite: AE 361 or AA 178, or senior standing. CROPSEY.

AE 441. Food Engineering.
3 hours fall. 3 ①
Engineering graphics and mechanics of solids and fluids fundamental to food plant operations. Prerequisite: Mth 211; 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. Environmental Housing. (g)
3 hours winter. 1 ① 2 ②
Structural materials, design, 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

See also courses marked (*g*) and (*G*) above.

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

The field of animal science relates to the production of livestock and livestock products including beef and dairy cattle, swine, sheep, horses, and mink. Essential to this science is knowledge in the areas of animal breeding, genetics, reproductive physiology, nutrition, livestock management, meats, and judging. These areas are included as fundamentals in a diverse curriculum which enables the student from rural or urban background to select an option which will emphasize either livestock science, business, or technology. Animal Science faculty members will assist students in selecting a particular option and in developing a program of study. The increasing demand for meat and other livestock products by a geometrically expanding human population insures job opportunities for well-trained individuals from the field. Students who graduate with a good grade-point average encounter many opportunities for employment. Recent graduates from this department have been employed in such areas as:

- Agricultural appraisers for banking firms and real estate companies.
- Salesmen for commercial feed, seed, and chemical companies and also for veterinary products.
- Managers of milk and meat processing plants.
- Representatives for railroads and agricultural commodity groups.
- Agricultural extension agents.
- Peace Corps and various other federal agencies.
- U.S.D.A., farm, ranch, and feed lot operators.

Today many young women are graduating from this department. They are encouraged to choose their elective courses in the School of Business, the School of Humanities and Social Sciences, or in the School of Science.

Graduate students in Animal Science have the opportunity to pursue research projects through the Agricultural Experiment Station as part of their programs for the M.S. or Ph.D. degrees. Graduate programs may be organized in: animal genetics, animal nutrition, animal physiology, or range management. Range management is supported by both the Animal Science and Farm Crops departments. Strong minor programs for those majoring in some phase of animal science are encouraged in other departments of the schools of Agriculture, Science, or Forestry.

Science Option

This option is designed for students intending to prepare for professional careers in animal science teaching and/or research. A broadened opportunity is provided for training in the biological and physical sciences necessary for understanding the basic mechanisms involved in animal functions. Within this option, one of three areas may be emphasized: nutrition, genetics, or physiology. Foundation courses and a major portion of the elective courses are taken in the School of Science; skill in application of fundamental scientific principles is developed through advanced courses in the Department of Animal Science. During the senior year, students selecting this option may engage in scientific investigations under the direction of animal science faculty members.

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 economics, accounting, finance, marketing, statistics, business and real estate law, investments, salesmanship, and human relations in business. Also, a minimum of three 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.

Technology Option

This option stresses the basic principles of animal breeding, feeding, management, and marketing of farm animals and their products. General and specialized training is available according to the student's needs and desires. Well-equipped laboratories and small animal facilities supplement extensive purebred herds and flocks of dairy and beef cattle, sheep, swine, and mink used to demonstrate the principles of livestock production.

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. OLIVER.

AnS 231. **Selection of Farm Animals.**
2 hours winter. 2 ③
RALSTON, KLIEWER.

Upper Division Courses

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

AnS 311. **Animal Nutrition.**
3 hours fall and winter. 3 ①
Digestion and metabolism; nutritional deficiencies. Prerequisite: Ch 103. CHURCH.

AnS 313. **Ration Formulation and Feed Processing.**
3 hours spring. 3 ①
Nutritional implications of feed processing and storage; formulating rations for specific animal requirements including application of computer techniques. Prerequisite: AnS 311. RALSTON.

AnS 316. **Reproduction in Domestic Animals.**
3 hours winter. 2 ① 1 ②
Male and female reproductive systems; fertility complex and factors affecting it. Prerequisite: Z 200 or Z 202 or GS 103. WU.

AnS 320. **Dairy Cattle Evaluation.**
2 hours spring. 2 ②
Selection of purebred and commercial dairy cattle on basis of conformation and milk production. Prerequisite: AnS 231 or equivalent. KLIEWER.

AnS 321. **Evaluation of Livestock.**
4 hours spring. 2 ① 2 ③
Phenotypic characteristics in live animals related to their carcass merit and production efficiency. Prerequisite: AnS 231 or equivalent. RALSTON, KENNICK.

AnS 327. **Artificial Insemination.**
3 hours spring. 1 ① 2 ②
Consent of instructor required. Prerequisite: AnS 316. WOLBERG.

AnS 351. **Meats.**
3 hours fall or spring. 1 ① 2 ②
Slaughtering, cutting, sanitation and inspection, packing house, retail markets. Prerequisite: junior standing. KENNICK.

AnS 352. **Wholesale and Retail Meat.**
3 hours winter. 2 ① 1 ②
Identification, selection, and utilization. Prerequisite: junior standing. Offered alternate years. Offered 1964-65. 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. **Ruminant Nutrition.** (G)
3 hours fall. 3 ①
Nutritional principles as applied to ruminants. Prerequisite: AnS 311; Ch 251. CHURCH.

AnS 413. **Comparative Nutrition.** (G)
3 hours winter. 3 ①
Comparative nutrient requirements of domestic animals and factors modifying these requirements with emphasis upon similarities and differences among the various species. Prerequisite: AnS 311; Ch 252; Physiology. OLDFIELD.

AnS 421. **Dairy Production.** (g)
3 hours winter. 2 ① 1 ②
Production and management factors which will result in efficient production of milk. Prerequisite: AnS 311; Z 341 or GS 103. JONES.

AnS 422. **Sheep Production.** (g)
3 hours winter. 2 ① 1 ②
Prerequisite: AnS 311 or 411; GS 103 or Z 341. FOX.

AnS 423. **Swine Production.** (g)
3 hours fall. 2 ① 1 ②
Prerequisite: AnS 311 or 411; GS 103 or Z 341. England.

AnS 424. Beef Cattle Production. (g)
3 hours spring. 2 ① 1 ②
Prerequisite: AnS 311 or 411; GS 103 or Z 341. RALSTON.

AnS 426. Livestock Judging.
1 hour fall. 1 ③
Swine, sheep, horses, beef, and dairy cattle. Prerequisite: AnS 321 or 320. RALSTON, KLIEWER.

AnS 432. Physiology of Lactation.
(G) 3 hours spring. 2 ① 1 ②
Physiological factors concerned with mammary gland development and functional activity. Prerequisite: VM 321; Ch 251 or equivalent. Offered alternate years. Offered 1965-66. 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 1965-66. JONES, WOLBERG.

AnS 476. Reproduction Problems.
(G) 3 hours fall. 1 ① 2 ②
Problems in reproduction and progress made in solving them. Prerequisite: AnS 316. ELLINGTON, WU, WOLBERG.

AnS 478. Animal Improvement. (G)
5 hours spring. 5 ①
Genetics, breeding systems, and selection principles. Prerequisite: Z 341. BOGART, ENGLAND, JONES.

AnS 481. Wool Production. (g)
3 hours fall. 2 ① 1 ②
Preparation, sorting, grading, scouring, and manufacturing. Offered alternate years. Not offered 1966-67. FOX.

AnS 483. Wool Technology. (G)
2 hours spring. 1 ① 1 ③
Techniques in evaluating physical properties. Prerequisite: AnS 481. Offered alternate years. Offered 1966-67. FOX.

Graduate Courses

See also courses marked (g) and (G) above.

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. Offered 1966-67. HAAG.

AnS 550,551,552. Topics in Animal Nutrition.
3 hours each term. 3 ①
Recent advances. Different topic each term. Prerequisite: AnS 411 or AnS 413. OLDFIELD, CHURCH.

AnS 570,571,572. Topics in Animal Breeding. 2 hours each term. 2 ①
Nonsequence courses designed to acquaint student with recent advances in animal breeding. Different topic each quarter. Prerequisite: AnS 478 or equivalent. BOGART, FOX, ENGLAND.

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. Not offered 1966-67. 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. Offered 1966-67. 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.

EXTENSION METHODS

Instruction in Extension Methods provides training for positions as Extension subject-matter specialists and as county extension agents in agriculture, 4-H, and home economics. Training in Extension Methods can also be useful for those entering other professions relating to agriculture, home economics, and community service which call for skills in teaching and consulting with adults and young people.

An Extension worker must not only be thoroughly trained in the technology of agriculture and home economics but must be adept at communicating with others. He must know the sources of new scientific knowledge and how to work with people; also how to develop and conduct programs that apply new knowledge for improved living, citizenship, and community development. Majors in agriculture and home economics interested in Extension as a career are encouraged to choose electives in humanities and social sciences, as well as the courses in Extension Methods.

Upper Division Courses

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

EM 405. Reading and Conference.
Terms and hours to be arranged.
SMITH.

EM 411. Extension Methods. (G)
3 hours fall. 3 ①
Organization, scope, and responsibilities of Cooperative Extension Service; adult learning; diffusion and communication processes; overview of Extension Methods in agriculture and home economics. SMITH, BERGER.

EM 412. Extension Methods. (G)
3 hours winter. 3 ①
Further explorations into Extension Methods in agriculture and home economics, program planning and development of skills in selecting and using methods. Prerequisite: EM 411. SMITH, BERGER.

EM 453. Field Work in Extension.
(g) Terms and hours to be arranged.
Field practice in county extension work in agriculture and home economics under supervision of professor of Extension Methods and county extension agents. Prerequisite: EM 411,412. SMITH.

Graduate Courses

See also courses marked (g) and (G) above.

EM 505. Reading and Conference.
Terms and hours to be arranged.
SMITH.

FARM CROPS

Farm Crops offers opportunity for study in specialized, scientific areas of agriculture. These courses lead to an understanding of principles and processes involved in growing, protecting, developing, and improving plants which supply our population's food, livestock feed, seed, industrial raw materials, soil and watershed protection, lawns, turf, and wildlife crops. The courses integrate the scientific principles of soils, physics, chemistry, botany, and genetics as the student deals with the theories and practices of crop production, management, and improvement.

Undergraduate Curricula offered in the Department of Farm Crops include three options: agricultural science, agricultural business, and agricultural technology. Each curriculum is flexible enough to provide for the student's individual professional needs and interests and also allows for the selection of electives in humanities and social sciences. A farm crops graduate is qualified to engage in business, industry, farming, research, communications, conservation, and education. Positions are available in organizations such as agricultural experiment stations, agricultural extension services, state departments of agriculture, food processing companies, insurance agencies, and commercial concerns dealing in the manufacture, processing, or sale of farm products, chemicals, and seed.

Counselors within the Department of Farm Crops provide experienced curriculum guidance, aid in professional extracurricular activities, and assist in career decisions and job placement for farm crops majors.

Under the guidance of a departmental adviser the following courses or their equivalent will normally be used to satisfy part of the minimum requirements in the agriculture and biological and physical science curricula of the categories of the School of Agriculture and when so used will constitute the minimum departmental requirements for a Bachelor of Science degree in farm crops:

For all options

FC 211. **Crop Production.** 5 hours.

FC 317. **Weed Control.** 4 hours.

FC 322. **Cereal Production.** 4 hours.

FC 324. **Forage Production.** 3 hours.

FC 332. **Seed Identification.** 3 hours.

RM 341. **Range Management.** 3 hours.

FC 407. **Seminar.** 3 hours.

FC 414. **Seed Production.** 3 hours.

FC 415. **Plant Breeding.** 3 hours.

FC 419. **Industrial Crops.** 3 hours.

Sls 210. **Soils.** 5 hours.

Science option

Bot 321. **Systematic Botany.** 4 hours.

Bot 331. **Plant Physiology.** 5 hours.

Bot 351. **Plant Pathology.** 5 hours.

Mb 204. **Bacteriology.** 4 hours.

Ent 314. **Entomology.** 4 hours.

Business option

Sls 314. **Soil Management.** 4 hours.

Technology option

AEc 211. **Farm Business Management.** 5 hours.

AEc 341. **Agricultural Marketing.** 3 hours.

Bot 331. **Plant Physiology.** 5 hours.

Bot 351. **Plant Pathology.** 5 hours.

Soils. 7 hours.

Animal Science. 7 hours.

Horticulture. 7 hours.

Special interests and goals or other educational background of some students may require limited modification of these minimum requirements with the approval of the student's departmental adviser.

Students interested in range management should turn to RANGE MANAGEMENT section for information on programs of study, facilities, and course offerings.

Graduate Programs for the Master of Science and Doctor of Philosophy degrees provide intensive training under the guidance of nationally known progressive scientists. Crop programs are available in cereal, forage, and turfgrass breeding; production and management; weed control; pasture production and management, and range management; seed production and technology; and crop physiology. Agricultural Experiment Station equipment and facilities and Oregon's unusual diversity of crops, soils, and climates provide an opportunity for extensive research in many phases of crop science.

Lower Division Course

FC 211. **Crop Production.**
5 hours fall or spring. 3 ① 2 ②
Fundamental principles and illustrative facts; planting, culture, rotation, production, hazards, quality, and improvement of cereals, forages, and other agronomic crops. Identification of crop and weed plants and seeds. For all students. Prerequisite: Bot 201.

Upper Division Courses

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

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 or Hrt 111, or Bot 201.

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 or Hrt 111, or Bot 201. Offered alternate years. Not offered 1965-66.

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. **Pasture Production and Management.**
3 hours spring. 2 ① 1 ②
Cultivated forage species, varieties, and mixtures; pasture establishment, production, and grazing management; hay and silage production. Prerequisite: FC 211.

FC 331. **Seed Testing Technique.**
3 hours spring. 2 ① 1 ②
Determining quality of agricultural and vegetable crop seeds and seeds of range and forest lands using standard methods for physical and physiological evaluations; factors which modify quality; laws and regulations. Prerequisite: Bot 203. Not offered 1965-66.

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 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
An introduction with emphasis on genetic and cytological principles used in plant improvement. Prerequisite: Z 341.

FC 419. **Industrial Crops.** (g)
3 hours winter. 3 ①
Production; emphasis on adaptation, agronomic practices, and special qualities. Prerequisite: FC 322.

Graduate Courses

See also courses marked (g) and (G) above.

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 cereal 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; polyploidy; qualitative and quantitative inheritance. Prerequisite: Z 341.

FC 518. **Herbicide Science and Technology.**
4 hours fall. 4 ①
Use of herbicides in weed control and other agronomic practices; physiological effects; research methodologies. Prerequisite: FC 317; Ch 252; Bot 331; senior standing. Offered alternate years. Offered 1966-67.

FC 519. **Crop Seed Physiology.**
4 hours winter. 2 ① 1 ②
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. Offered alternate years. Offered 1966-67.

FC 521. **Concepts of Crop Science.**
3 hours spring. 3 ①
History and current literature. Offered 1966-67.

FISHERIES AND WILDLIFE

Major students in this department are prepared for professional careers in wildlife science and 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 **wildlife** science curriculum has similar emphasis, but in addition orients the student for graduate study and research. The **fishery** science curriculum is designed for students planning to enter graduate study or the research and management fields of commercial and game fisheries. Flexibility in course requirements as outlined in the CURRICULUM OPTIONS allows for specialized study programs in 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, 3 hours; Economic Ichthyology, 3 hours; Fish Biology and Culture, 6 hours; Fishery Limnology, 3 hours. Fisheries science majors take, in addition, 6 hours of Economic Ichthyology, 3 hours of World Fishery Resources, 3 hours of Commercial Fisheries, and 3 hours of Invertebrate Fisheries, whereas wildlife management students complete the following: Wildlife Management, 6 hours; Biology and Management of Game Birds and Waterfowl, 9 hours; Biology and Management of Big Game, 6 hours. Copies of the curricula may be obtained by writing to the Department of Fisheries and Wildlife, Extension Hall 315.

Strategically located for the study of fisheries and wildlife, Oregon State University has within easy access state fish hatcheries, a game farm, refuges, the E. E. Wilson Game Management Area, the Pacific Cooperative Water Pollution and Fisheries Research Laboratories, an experimental stream, experimental ponds, and the new Marine Sciences Laboratory. 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

Wld 251. **Wildlife Conservation.**
3 hours fall and winter. 3 ①
Wildlife as a valuable economic and recreational resource, need for its conservation and utilization through scientific administration and manipulation; career opportunities in wildlife conservation and management.

Wld 261. **Wildlife Technique.**
3 hours fall or spring. 3 ① 1 ②
Equipment and techniques used by sportsmen and biologists in harvest, field care, and utilization of the fish and game crops.

Fsh 274. **Economic Ichthyology.**
3 hours fall. 2 ① 1 ②
Anatomy and identification of certain fishes, emphasizing those of significance from economic and recreational standpoints; important Oregon and Northwest species. Prerequisite: Z 203 or Z 200.

Fsh 275. **Economic Ichthyology.**
3 hours winter. 3 ① 1 ②
Classification, distribution, and uses of orders and families of fishes having economic or other significance. Prerequisite: Fsh 274.

Fsh 276. **Economic Ichthyology.**
3 hours spring. 2 ① 1 ②
Functional and ecological aspects of fish biology with examples drawn from commercial and sport species. Prerequisite: Fsh 274.

Wld 281,282. **Wildlife Management.**
3 hours fall and spring. 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; Wld 251.

Upper Division Courses

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

Wld 310,311,312. **Wildlife Resources.**
3 hours each term. 3 ①
Identification; life histories; environmental relationships; management principles and techniques for North American wildlife. *Fall:* big game, furbearers, predators, and rodents. *Winter:* waterfowl and upland game birds. *Spring:* fishes. Not open to fish and game majors.

Wld 319. **History and Literature of Wildlife Management.**
3 hours winter. 3 ①
Brief history of wildlife and fishery management; literature and its sources; author information. Prerequisite; junior standing.

Fsh or Wld 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 SPECIAL FEES section of the General Catalog.

Fsh or Wld 341. **Wildlife Law Enforcement.** 3 hours winter. 2 ① 1 ②
State and Federal fish and game laws and regulations and the scientific methods used to collect, preserve, and present evidence in the enforcement of these laws and regulations. Prerequisite: Wld 281 or 2 years of biology.

Fsh or Wld 401. **Research.**
Terms and hours to be arranged.

Fsh or Wld 405. **Reading and Conference.** Terms and hours to be arranged.

Fsh or Wld 407. **Seminar.**
Terms and hours to be arranged.

Wld 420. **Vertebrate Pest Control.** (G)
4 hours winter. 3 ① 1 ②
Techniques, methods, and procedures used to control vertebrate pests including fish, fur-bearing animals, birds, and rodents where they become nuisance animals or important in transmitting disease, damaging property, or destroying agricultural or forest crops. Prerequisite: Z 372; Wld 282.

Fsh or Wld 440. **Field Studies.** (G)
1 to 6 hours to be arranged.
Meets specific needs of senior and graduate students assigned to field stations. Prerequisite: Wld 282 or equivalent.

Wld 451. **Biology of Waterfowl.**
3 hours fall. 2 ① 1 ②
Identification, distribution, life histories, and ecology of waterfowl. Prerequisite: Z 371; Wld 282.

Wld 452. **Migratory Game Bird Management.** 3 hours winter. 2 ① 1 ②
Waterfowl management practices and techniques; identification, distribution, life histories, and ecology of associated waterbirds and shorebirds. Prerequisite: Z 371; Wld 451.

Wld 453. **Upland Game Bird Management.** 3 hours spring. 2 ① 1 ②
Resident and migratory upland game birds, identification, distribution, life histories, ecology, and management. Prerequisite: Z 371; Wld 282.

Fsh 454. **Fishery Biology.** (G)
3 hours fall. 2 ① 1 ②
Life histories, distribution, and identification of freshwater game fishes of North America; relationship of biology to management. Prerequisite: Fsh 274.

Z 454. **Principles of Symbiosis.** (G)
4 hours. 2 ① 2 ②
For course description see Zoology.

Fsh 455. **Fish Culture.** (G)
3 hours winter. 2 ① 1 ②
Theories and practices underlying the use of hatcheries and ponds to produce fish for sport and other purposes; environmental modifications affecting fish production and management. Prerequisite: Fsh 274.

Fsh 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: Fsh 454.

Wld 457. **Biology of Big Game Animals.** (G) 3 hours fall. 2 ① 1 ②
Biology, taxonomy, distribution, importance, sex and age classification of North American big game mammals. Prerequisite: Z 372; Wld 282.

Wld 458. **Management of Big Game Animals.** (G)
3 hours spring. 2 ① 1 ②
Practices and procedures including census, food habits, damage controls, limiting factors. Prerequisite: Wld 457.

Wld 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; W 282. Not offered 1966-67.

Fsh 464. **World Fishery Resources.**
3 hours fall. 2 ① 1 ②
Important species, socio-economic problems, harvesting, regulating resources. Prerequisite: Fsh 276.

Fsh 465. **Commercial Fisheries.**
3 hours winter. 2 ① 1 ②
Classical commercial fishery management techniques, international problems, two-day field trip. Prerequisite: Fsh 276.

Fsh 466. **Invertebrate Fisheries.**
3 hours spring. 2 ① 1 ②
Economic invertebrates, life histories, harvesting, values, management problems and procedures. Prerequisite: Fsh 276.

Fsh 470. **Water Pollution Biology.** (G)
3 hours fall. 2 ① 1 ③
Application of biological principles to the solution of water pollution problems taking into account both engineering and economic considerations. Prerequisite: senior standing. WARREN.

Fsh 471. **Wildlife Conservation.**
3 hours summer.
Economically and recreationally important game birds and mammals in the Pacific Northwest. Identification, distribution, life histories, ecology, and management; conservation agencies concerned; sources of literature available. Prerequisite: senior standing.

Fsh 490. **Parasites and Diseases of Fish.** (G) 4 hours fall. 2 ① 2 ②
Identification, life histories, economic importance, treatment, and control of the more common parasites and parasitic diseases of fish. Prerequisite: two years of biology.

Graduate Courses

See also courses marked (g) and (G) above.

Fsh or Wld 501. **Research.**
Terms and hours to be arranged.

Fsh or Wld 503. **Thesis.**
Terms and hours to be arranged.

Fsh or Wld 505. **Reading and Conference.** Terms and hours to be arranged.

Fsh or Wld 507. **Seminar.**
Terms and hours to be arranged.

Fsh or Wld 567,568,569. **Research Methods.** 4 hours each term. 4 ①
Ecology of fish and wildlife populations. *Fall:* environment, physiology, and growth. *Winter:* behavior, distribution, and energy relations. *Spring:* population dynamics and exploitation.

Fsh 570. **Pollution Problems in Fisheries.** 3 hours winter. 2 ① 1 ②
Polluted waters as they affect fisheries; sources, measures, biological indices, and abatement of water pollution; water requirement and toxicology of fishes and associated aquatic organisms. Prerequisite: Fsh 470.

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 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. STEIN, BEAVERS.

FST 221. Food Processing.
3 hours fall. 2 ① 1 ③
Fruit and vegetable processing with related unit operations and unit processes. WILDER.

FST 222. Food Processing.
4 hours winter. 3 ① 1 ③
Cereal foods, confections, beverages, meats, and seafood processing with related unit operations and unit processes; food plant sanitation and waste disposal. WILDER.

FST 223. Food Processing.
3 hours. 2 ① 1 ③
Milk and dairy food processing with related unit operations and unit processes. STEIN.

FST 271. Food Grades and Standards.
2 hours. 2 ②
Food inspection; standards and quality grading. For students in fields other than food science and technology. STEIN, BEAVERS.

Upper Division Courses

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

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 111 or 271. STEIN.

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 biological principles governing processing, preservation, and deterioration of non-dairy foods. Prerequisite: FST 221,222; Mb 204; Ch 351,353. SAMUELS.

FST 350. Food Technology.
4 hours fall. 3 ① 1 ③
Principles of preservation and deterioration. For students in fields other than food science and technology. Prerequisite: one year of general chemistry; Mb 204. SAMUELS.

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 413. Food Science. (g)
4 hours fall. 3 ① 1 ③
Physical, chemical, and biological principles governing processing, preservation, and deterioration of milk and dairy foods. Prerequisite: FST 223; Ch 340,351,353. DAY.

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. WILDER.

FST 423. Food Analysis. (g)
5 hours winter. 3 ① 2 ③
Chemical and physical analysis. Prerequisite: FST 343,413; Ch 234,351,353. LINDSAY.

FST 424. Quality Control Systems. (G)
3 hours spring. 2 ① 1 ③
Principles, organization, sampling plans, and statistical applications in food processing plants. Prerequisite: FST 111,423; St 422. VARSEVELD.

FST 431. Food Packaging. (G)
3 hours winter. 2 ① 1 ②
Objectives and requirements of packaging; composition, characteristics, chemical and physical properties, selection and adaptation of packaging materials and packages. Prerequisite: FST 221,223,342; Ch 226. SAMUELS.

AE 441,442,443. Food Engineering.
See DEPARTMENT OF AGRICULTURAL ENGINEERING.

Mb 411. Food Sanitation Microbiology.
See DEPARTMENT OF MICROBIOLOGY.

Mb 412. Dairy Microbiology.
See DEPARTMENT OF MICROBIOLOGY.

Mb 460. Food Microbiology.
See DEPARTMENT OF MICROBIOLOGY.

Graduate Courses

See also courses marked (g) and (G) above.

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.
1 hour each term. 1 ①

FST 531. Carbohydrates in Foods.
3 hours spring. 2 ① 1 ③
Change during processing and storage; significance of changes. Prerequisite: Ch 234,351, 353. Offered alternate years. Not offered 1966-67.

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. Not offered 1966-67. DAY.

FST 533. Lipids in Foods.
3 hours fall. 2 ① 1 ③
Function, composition, preservation, deterioration, and analysis. Prerequisite: Ch 351,353, 428. Offered alternate years. Not offered 1966-67. SINNHUBER.

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 111; Ph 212. Offered alternate years. Not offered 1966-67. WILDER.

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. Offered 1966-67. CAIN.

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. Offered 1966-67. ANGLEMIER.

FST 563. Enzymes of Foods.
3 hours spring. 2 ① 1 ③
Effect of processing methods on enzymes of foods; use of enzymes in food processing. Prerequisite: Ch 451. Offered alternate years. Offered 1966-67. MONTGOMERY.

HORTICULTURE

The Department of Horticulture offers two types of curricula within the School of Agriculture options in science, business, and technology. One type covers production, marketing, and distribution of fruits, nuts, vegetable crops, flowers, and ornamental shrubs. The other prepares for professional careers in the laying out, planting, care, and supervision of parks, playground areas, and highway and home landscaping.

All majors in horticulture, except those in landscape construction and maintenance, must complete the following courses:

	Hours
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

They must also take one of the following groups of courses, depending on their areas of specialization:

Nursery Management

	Hours
Plant Propagation (Hrt 311)	3
Nursery Management (Hrt 361,362)	8

Pomology

	Hours
Plant Propagation (Hrt 311)	3
Small Fruit Production (Hrt 332)	4
Fruit and Nut Production (Hrt 333)	4
Fruit Handling and Distribution (Hrt 431)	4

Vegetable Crops

	Hours
Vegetable Production (Hrt 341)	4
Commercial Veg Production (Hrt 342)	4
Vegetable Handling and Dist (Hrt 441)	3
Systematic Vegetable Crops (Hrt 443)	3

Floriculture

	Hours
Plant Propagation (Hrt 311)	3
Commercial Floriculture (Hrt 351,352,353)	9

Majors in landscape construction and maintenance must fulfill the following minimum requirements:

	Hours
Agriculture	36
Communications	9
Humanities and social science (includes landscape)	64
Business	6
Biological and physical science	36
Engineering	6
Physical education	6
Electives	29

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.

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.

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. Offered 1966-67.

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

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

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. Offered 1966-67.

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. Offered alternate years. Not offered 1966-67.

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. Offered 1966-67.

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; adopted 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. Not offered 1966-67.

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. Not offered 1966-67.

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. Not offered 1966-67.

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. Offered alternate years. Not offered 1966-67.

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. Offered 1966-67.

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.

Hrt 431. Fruit Handling and Distribution. (g)
4 hours winter. 3 ① 1 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. Offered 1966-67.

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. Offered 1966-67.

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. Not offered 1966-67.

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. Offered 1966-67.

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. Offered 1966-67.

Graduate Courses

See also courses marked (g) and (G) above.

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. Not offered 1966-67.

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. Not offered 1966-67.

Hrt 513. Horticultural Genetics Lectures. 3 hours winter. 3 ①
Continuation of Hrt 511. Offered alternate years. Not offered 1966-67.

Hrt 514. Horticultural Genetics Laboratory. 2 hours winter. 2 ②
Continuation of Hrt 512. Offered alternate years. Not offered 1966-67.

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. Offered 1966-67.

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. Offered 1966-67.

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. Not offered 1966-67.

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 1966-67.

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. Offered 1966-67. 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 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, 23 hours. 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 anatomy and physiology and 3 hours in avian diseases, both of which may be used to partially satisfy the biological and physical science requirements. Through the generous use of electives, the poultry science curricula are flexible enough to meet the individual needs and abilities of the students.

Lower Division Course

P 121. Poultry Production.
3 hours any term. 3 ①
Various phases of poultry industry; physiology, reproduction, feeding, housing, brooding, and management practices. PARKER.

Upper Division Courses

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

P 321. The Chick Embryo.
3 hours winter. 3 ①
Development and environmental requirements of embryos of the domestic fowl. Prerequisite: P 121 or Z 200 or GS 101. Offered alternate years. Not offered 1965-66.

P 322. Chick Embryo Laboratory.
2 hours spring. 2 ②
Laboratory work to complement P 321. Offered alternate years. Offered 1966-67.

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.

P 341. Poultry Judging.
3 hours winter. 2 ① 1 ②
Judging poultry for standard and production qualities. Prerequisite: P 121. Offered alternate years. Not offered 1966-67. PARKER.

P 351. Turkey Management.
3 hours fall. 2 ① 1 ②
Practical details in the breeding, feeding, rearing, and marketing of turkeys. Offered alternate years. Offered 1966-67.

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 winter. 3 ①
Systems of feeding poultry, and nutritional requirements; formulation of rations; common nutritional deficiences. Prerequisite: P 121 or GS 101 or Z 200 or Ch 251. 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: P 411 or AnS 311 or Ch 251. ARSCOTT.

P 421. 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 or GS 101 or Z 200. Offered alternate years. Not offered 1966-67. HARPER.

P 441. Poultry Breeding. (g)
3 hours fall. 3 ①
Inheritance of egg and meat production in domestic fowls. Prerequisite: P 121 or GS 102 or Z 200. Offered alternate years. Not offered 1966-67. 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

See also courses marked (g) and (G) above.

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.

RANGE MANAGEMENT

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 providing 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.

Special training in range management is offered at the B.S., M.S., and Ph.D. levels. The range management curriculum is offered under the science option in the School of Agriculture.

Range management is organized as an interdepartmental program administered through the departments of Animal Science and Farm Crops. The facilities of both departments available to range management students 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. See ANIMAL SCIENCE AND FARM CROPS sections.

Upper Division Courses

Courses numbered (g) and (G) may be taken for graduate credit.

Rng 341. **Range Management.**
3 hours fall or winter. 3 ①
Range and pasture management; land-use management. Prerequisite: junior standing.

Rng 342. **Range Improvement.**
3 hours winter. 2 ① 1 ②
Range development, cultural treatment, and management systems used to improve grazing lands. Field trip. Prerequisite: RM 341.

Rng 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; RM 341.

Rng 401. **Research.**
Terms and hours to be arranged.

Rng 405. **Reading and Conference.**
Terms and hours to be arranged.

Rng 406. **Projects.**
Terms and hours to be arranged.

Rng 407. **Seminar.**
Terms and hours to be arranged.

Rng 408. **Workshop.**
Terms and hours to be arranged.
Biological principles and/or management practices as they relate to selected topics in range and related resource management.

Graduate Courses

See also courses marked (g) and (G) above.

Rng 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; field trip. Prerequisite: RM 341.

Rng 442. **Range Management.** (g)
3 hours winter. 1 ① 2 ②
Current technical developments, both domestic and foreign. Prerequisite: RM 341.

Rng 443. **Range Management Planning.** (G)
3 hours spring. 2 ① 1 ②
Administration and management of range lands; actual problems and plan execution; field trip. Prerequisite: RM 441.

Rng 501. **Research.**
Terms and hours to be arranged.

Rng 503. **Thesis.**
Terms and hours to be arranged.

Rng 505. **Reading and Conference.**
Terms and hours to be arranged.

Rng 506. **Projects.**
Terms and hours to be arranged.

Rng 507. **Seminar.**
1 hour winter.

Rng 541. **Range Research Methods.**
3 hours winter. 3 ①
Problem analysis approach; integration of plant and animal research. Prerequisite: St 421,422; RM 441. Offered alternate years. Not offered 1966-67.

Rng 542. **Range Ecology.**
4 hours spring. 2 ① 2 ②
Application of ecology in range and related resource management; field trip. Prerequisite: Systematic botany, Bot 441,442. Offered alternate years. Not offered 1966-67.

Rng 543. **Range Management.**
3 hours winter. 1 ① 2 ②
Physiological, sociological, and nutritional problems. Land-use philosophies on a worldwide basis. Offered alternate years. Offered 1966-67.

SOILS

The study of soil, one of the basic natural resources, is based on knowledge of geology, chemistry, physics, biology, and mathematics. The objective of the curricula in soils is to give students a scientific and practical understanding of soils and their management.

Students may elect any one of the three School of Agriculture options—agricultural science, agricultural business, or agricultural technology. Those planning to take graduate work leading to research or college teaching or in working in soil surveys should elect the science option. Those preparing for work in chemical industries, other commercial organizations, and farming may wish to elect the business option. The technology option leads to careers in soil conservation planning, extension, land appraisal, field work for industrial and commercial organizations, and farming.

Soils majors must take 18 to 25 hours of courses in soils and at least one course each in quantitative analysis, plant physiology, general microbiology, and geology.

Graduate work in soils may lead either to the M.S. or Ph.D. degree or graduate minors for students in other fields. Soil fertility, soil physics, soil chemistry, irrigation, forest soils, plant nutrition, 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 103; Mth 101; F 254. YOUNGBERG.

Upper Division Courses

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

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. One all-day field trip required. Prerequisite: Sls 210.

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. Weekend field trip to be arranged. 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; Ph 211. 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. (g)
4 hours winter. 3 ① 1 ③
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 432. Soil Morphology and Survey. (g) 4 hours spring. 3 ① 1 ③
Soils in place; distribution patterns; morphology of major groups; soil survey techniques. Saturday field trips required. Prerequisite: Sls 210 and course in geology. KNOX.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

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
Genetic features and their formation; mineral weathering principles of classification; classification systems. One all-day field trip required. Prerequisite: Sls 432. Offered alternate years. Offered 1966-67. KNOX.

Sls 512. Soil Colloids.
3 hours winter. 3 ①
Physical and colloidal chemistry of soils: hydration, BET theory, application of thermodynamics, theory of ion exchange phenomena, electrochemical behavior, double layer theory, membrane phenomena, theory of pH determinations. Prerequisite: Sls 412; Ch 442. Offered alternate years. Not offered 1966-67. MOORE.

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. Offered 1966-67. MOORE.

Sls 514. Forest Soils.
3 hours winter. 3 ①
Soil as a medium for forest growth. Relation of physical, chemical, and biological properties of soil to site and the occurrence and growth of forest vegetation. Soil survey and forest ecology courses recommended. Offered alternate years. Not offered 1966-67. 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. Not offered 1966-67. BOERSMA.

Sls 522. Soil Physical Conditions and Plant Growth. 3 hours spring. 3 ①
Relations of soil moisture, temperature, air, and mechanical impedence to seed germination, shoot emergence, and plant growth. Prerequisite: Sls 421. Offered alternate years. Offered 1966-67. BOERSMA.

Sls 523. Clay Mineralogy.
3 hours spring. 2 ① 1 ③
Principles of structure; structure of phyllosilicates; theory and practice of identification by X-ray diffraction, differential thermal analyses, chemical and physical properties; formation, alteration, and occurrence of clays. Chemistry, physics, and mineralogy courses recommended. Offered alternate years. Not offered 1966-67. HARWARD.

VETERINARY MEDICINE

Courses in veterinary medicine are designed for students who expect to handle or manage both domestic and game animals. Anatomy and physiology of animals familiarize the student with the normal form, structure, and function of the animal body. Comparisons are made between the domestic and the common species of game animals. Diseases are considered from viewpoint of owner or manager of animals. The epizoology and diagnosis of disease, hygiene and sanitation, care of sick animals, quarantine and segregation, and the importance of State and Federal programs for the control and eradication of contagious infectious animal diseases are considered. Students are not trained to enter the veterinary profession.

Upper Division Courses

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

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, epizoology, 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.

Z 454. Principles of Symbiosis. (g)
4 hours spring. 2 ① 2 ②
(See Zoology)

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

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.

THE OBJECTIVE OF THE SCHOOL OF BUSINESS AND TECHNOLOGY AT Oregon State University 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, through services rendered to the business community, and through professional activity and scholarly research on the part of the faculty.

The School is accredited by the American Association of Collegiate Schools of Business.

Business and Technology

FACULTY

As of January 1966

CLIFFORD ELGES MASER, Ph.D., Dean of the School of Business and Technology.

LOUIS L. EDWARDS, M.E., Head Adviser and Placement Director.

Business Administration: Professors EASTON (department chairman), CAMPBELL, CRAIG, LE MASTER, MASER, NEWTON, PFANNER, SEATON.

Associate Professors ALLAN, DAVIDSON, EDWARDS, HOPEMAN, MILLER, O'ROURKE, RETTIG, SCHREIMA, SJOGREN, STRICKLER.

Assistant Professors BOURQUE, DALBEY, FAUX, GRAHAM, GRAY, JORDAN, MCFARLANE, PARK, SHIRLEY, SNYDER, WIDICUS.

Instructors BOWLBY, CHAMBERLAIN, CURRY, HALL, LAMPRECHT, PASCHKE, STEILEN, WOLFF.

Business Education: Professors YERIAN (department head), LARSE, WINGER.
Assistant Professors JONES, LARSON.

Secretarial Science: Professors YERIAN (department head), LARSE, WINGER.
Assistant Professors HAZEL, JONES, LARSON.
Instructors MARKSHEFFEL, SCHERICH.

EDUCATIONAL OBJECTIVE

In working toward its objective the School of Business and Technology 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 enterpreneurial 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.

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 scientific and technological aspects of the enterprise in which they may be engaged and may adequately communicate concerning them. Minors in science, science-technology, and mathematics have been designed to serve these purposes.

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. Courses in the humanities and general studies 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. Courses in the biological and physical sciences are included in the curriculum to help achieve this objective.

7. To provide advanced professional education through graduate programs in business administration and business education.

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; mathematics, four 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 in the General Catalog. 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

The Master of Business Administration (M.B.A.) degree and the Master of Arts or Master of Science degree in Business Education are offered. General regulations and requirements for all advanced degrees are printed under GRADUATE SCHOOL.

MAJOR FIELDS

Business Administration

The major curriculum in business administration consists of a core of required courses: Accounting, Statistics, Quantitative Business Methods, Finance, Production, Marketing, Business Managerial Economics, Organization and Management Theory, Business Law, Human Relations in Business, Government Relations in Business, and Business Policy. In addition, the student must complete, during his junior and/or 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 at Oregon State University combine any one of the major business curricula with 27 or more term hours in a minor selected from one or more of the professional Schools of Agriculture, Engineering, Forestry, and Home Economics or the School of Science.

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 indicate that a scientific-technological emphasis is needed or desired.

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 norms, 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.

Degrees Offered

The Bachelor of Arts (B.A.) and Bachelor of Science (B.S.) degrees are offered in all curricula, the Master of Business Administration (M.B.A.) in business administration, and the Master of Arts (M.A.), Master of Science (M.S.), and Master of Education (M.Ed.) in business education.

Business Administration

Freshman Year	Term hours F	W	S
Introduction to Business (BA 101)	4	----	----
[1] Mathematics sequence	4	4	4
[2] English Composition (Wr 111,112,113)	3	3	3
History of Western Civilization (Hst 101,102,103)	3	3	3
[3] Officer education or electives	0–3	6	6
[4] Physical education (PE 190,190,190)	1	1	1
	15–18	17	17

Sophomore Year	F	W	S
Principles of Economics (Ec 201,202,203)	3	3	3
Business Statistics (BA 201,202)	3	3	----
Quantitative Business Methods (BA 203)	----	----	3
Principles of Accounting (BA 211,212,213)	3	3	3
[5] Minor	3	3	3
[3] Officer education or electives	3	3	3
Physical education (PE 190,190,190)	1	1	1
	16	16	16

Junior Year	F	W	S
Business Managerial Economics (BA 301)	3	----	----
Organization and Management Theory (BA 302)	----	3	----
Production (BA 311)	4	----	----
Marketing (BA 312)	----	4	----
Finance (BA 313)	----	----	4
Business Law (BA 411,412)	3	3	----
Minor	3	3	3
[4] Electives	3	3	9
	16	16	16

Senior Year	F	W	S
Human Relations in Business (BA 497)	3	----	----
Government Relations in Business (BA 498)	----	3	----
Business Policy (BA 499)	----	----	3
[6] Business administration (concentration)	3	3	3
[6] Business administration (concentration)	3	3	3
Minor	3	3	3
[3] Electives	3	3	3
	15	15	15
[7] Electives (optional)	(3)	(3)	(3)
	(18)	(18)	(18)

[1] All new students are required to take the mathematics placement test.

[2] Students observe current requirements regarding placement in proper section or need for additional work.

[3] At least 12 of the total elective credits must be in the social sciences, excluding Psy 111.

[4] 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).

[5] Beginning with their sophomore year, students in business administration are required to register in an approved minor in science or science-tech or mathematics (see pages 95-96). Courses in the following areas are *not* acceptable in fulfillment of the minor requirements: geography, nursing, photography, science education.

[6] Students majoring in business administration and technology are required to choose an area of concentration at beginning of senior year.

[7] 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 [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 senior 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.

II. FUNCTIONAL AREAS OF BUSINESS

Some substitution of courses may be permitted for exceptionally well-qualified students or for students with unusual objectives.

ACCOUNTING AND COST CONTROL [A]

Junior Year	Term hours F	W	S
[1] Advanced Accounting (BA 417,418,419)	3	3	3

Senior Year	F	W	S
Cost Accounting (BA 421,422)	3	3	----
Auditing (BA 427)	3	----	----
Auditing (BA 428) or Tax Accounting (BA 425)	----	3	----

RELATED COURSES

Cost Accounting (BA 423)
Anal of Fin Statements (BA 424)
The Federal Tax System (BA 425)
Accounting Theory (BA 426)
Auditing (BA 428)
Controllership (BA 429)
Bus Data Processing (BA 431,432)
Tech Report Writing (Wr 227)

FINANCIAL MANAGEMENT [F]

Senior Year	Term hours F	W	S
Financial Institutions (BA 441)	3	----	----
Related course	----	3	----
Investments (BA 443)	----	----	3
Financial Management (BA 447,448)	3	3	----
Case Problems in Financial Management (BA 449)	----	----	3

RELATED COURSES

Credit Management (BA 442)
Ins and Risk Mgmt (BA 444)
Property Management (BA 445)
Taxation and Business (BA 446)
Economic Fluctuations (Ec 421)
Money and Banking (Ec 423)

PRODUCTION MANAGEMENT [P]

Senior Year	Term hours F	W	S
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 Prog in Bus (BA 433)
Industrial Purchasing (BA 453)
Labor Problems (Ec 425)
Labor Legislation (Ec 426)
Labor Economics (Ec 427)
Meth and Motion St (IE 391)
Time Study (IE 392)
Oper Research (St 471,472,473)

MARKETING MANAGEMENT [M]

Senior Year	Term hours F	W	S
Selling and Promotion (BA 471)	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)
Industrial Purchasing (BA 453)
Advertising (BA 472)
Sales Management (BA 473)
Retail Management (BA 474)
Marketing Research (BA 475)
International Business (BA 476)

[1] Replaces BA 411,412 which is then deferred to the senior year.

PERSONNEL MANAGEMENT AND INDUSTRIAL RELATIONS [Pe]

Senior Year	Term hours F	W	S
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
Courses in sociology
Courses in industrial engineering
Office Organization and Management (SS 422)

AGRICULTURAL BUSINESS MANAGEMENT [Ag]

Senior Year	Term hours F	W	S
Marketing Farm Products (AEc 341)	3	....	....
Agricultural Cooperatives (AEc 342)	3	....	....
Plant Efficiency Analysis (AEc 421)	....	3	....
Land and Water Economics (AEc 461)	....	3	....
Agricultural Policy (AEc 411)	....	....	3
Agricultural Prices (AEc 451) or Farm Finance (AEc 431)	....	....	3

RELATED COURSES

Agri Econ Anal (AEc 312)
Con and the Market (AEc 412)
Livestock Economics (AEc 440)
Pric Arr for Farm Prod (AEc 444)
International Agri Dev (AEc 462)
Money and Banking (Ec 423,424)

Minors

Schools in which minors are authorized are: agriculture, engineering, forestry, home economics, and science. In addition to the minors in these fields, similar minors within these authorized fields may be arranged where necessary to meet the objectives of individual students.

For a naval science minor consult dean's office, School of Business and Technology, for course requirements.

SCIENCE [SCI]

Sophomore Year	Term hours F	W	S
[1] Natural science sequence	3	3	3
Junior Year			
[1] Three natural science courses, dependent upon or related to the sophomore-year natural science courses or Natural science sequence in another area	3	3	3
Senior Year			
Natural science courses, related to each other and dependent upon or related to the sophomore-year and/or the junior-year natural science courses or [2] Science in Antiquity (GS 411) and [2] The Scientific Revolution (GS 412) and [2] Nineteenth-Century Scientific Thought (GS 413)	3	3	3

[1] Chemistry and physics especially recommended. Courses in geography, mathematics, nursing, photography, science education, and statistics are not acceptable.

[2] Business students enrolled in the science minor will be permitted to submit 18 hours of natural science and 9 hours of History of Western Civilization in fulfillment of the prerequisites listed for GS 411,412, and 413.

INDUSTRIAL CHEMISTRY [IC]

Professor Bert E. Christensen, Adviser

Sophomore Year	Term hours F	W	S
General Chemistry (Ch 201,202,203) or General Chemistry (Ch 101,102,103) and Chemical Theory (Ch 241)	3	3	3
Junior Year			
Organic Chemistry (Ch 226,227)	5	5	....
Elementary Physical Chemistry (Ch 340)	....	....	3
Senior Year			
Industrial Chemistry (Ch 324,325,326)	3	3	3

MINING OR PETROLEUM GEOLOGY [MPG]

Professor W. D. Wilkinson, Adviser

Sophomore Year	Term hours F	W	S
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	....	....
Economic Geology (G 421,422)	....	3	3

APPLIED MATHEMATICS [AM]

Professor Edward Kaplan, Adviser

Freshman Year	Term hours F	W	S
Mathematics for business and social science	4	4	....
Trigonometry (Mth 102)	....	....	4
Sophomore Year			
Calculus with Analytic Geometry (Mth 111,112,113)	4	4	4
Junior Year			
Related courses in mathematics *or* statistics	4–3	4–3	4–3
Senior Year			
Natural science sequence (may be completed any time from the freshman year forward)	3	3	3

RELATED COURSES

It is permissible to take any three courses from the Mathematics list *or* any one of the three course groupings from the Statistics list. The related course requirement may *not* be fulfilled through an intermixing of courses from the Mathematics and Statistics lists.

MATHEMATICS

Programing Digital Computers (Mth 151)
Determinants and Matrices (Mth 341)
Theory of Equations (Mth 342)
Computer Principles (Mth 351)
Computer Operation (Mth 352)
Symbolic Language Programing (Mth 353)
Probability (Mth 361)
Finite Differences (Mth 362)
Linear Programing and Games (Mth 363)

STATISTICS

Statistical Inference (St 421,422, 423)
or
Statistical Inference (St 421,422) *and* Sampling Methods (St 441)
or
Basic Statistics and Operations Research (St 371,372,373) (Prerequisite: Mth 113; Mth 211 not necessary)
or
Theory of Statistics (St 481,482, 483) (Prerequisite: Mth 211)

AGRICULTURE [AGR]

Sophomore Year	Term hours F	W	S
Science courses related to junior- and/or senior-year minor courses	3	3	3
Junior Year			
Science courses basic to, or prerequisite to, senior-year minor courses	3	3	3
Senior Year			
Related courses	3	3	3

RELATED COURSES

The related courses must be chosen from *one* of the following departments of the School of Agriculture: ANIMAL SCIENCE, FARM CROPS, FISHERIES AND WILDLIFE, HORTICULTURE, POULTRY SCIENCE, SOILS, or AGRICULTURAL ENGINEERING

FOOD TECHNOLOGY [FT]

Professor C. E. Samuels, Adviser

Sophomore Year	Term hours F	W	S
General Chemistry (Ch 101,102,103)	3	3	3
Junior Year			
Food Processing (FST 221)	3	....	....
Food Processing (FST 222 or 223)	....	3	....
Food Grades and Standards (FST 271)	....	....	2
Senior Year			
[1] General Microbiology (Mb 204) or Introductory Microbiology (Mb 130)	4–3	....	....
Food Technology (FST 350)	....	4	....
Elements of Horticulture (Hrt 111)	....	....	3

RELATED COURSES

Animal Science (AnS 121)
Meats (AnS 351)
Nutrition (FN 225)
Federal and State Food Regulations (FST 421)

[1] All students who are capable of completing General Microbiology (Mb 204), rather than Introductory Microbiology (Mb 130), are strongly urged to do so.

FORESTRY [FO]

Professor W. I. West, Adviser

Sophomore Year	Term hours F	W	S
Natural science sequence, chemistry, or physics recommended (geography, nursing, photography, and science education not acceptable to fulfill this requirement)	3	3	3
Junior Year			
General Botany (Bot 201)	3	....	....
Conservation of Natural Resources (F 260) or Trigonometry (Mth 102) if student intends to take FE 123, F 224, or FE 292	....	3–4	....
Tree Identification (F 153)	....	....	3
Senior Year			
Related courses — Conservation of Natural Resources (F 260), Mensuration (F 224), Forest Protection (F 231), Forest Valuation (F 324), Forest Economics (F 412), Wood Technology (FP 210), Wood Utilization (FP 310), Forest Engineering (FE 123), or Logging Methods (FE 392)	3	3	3

INDUSTRIAL ENGINEERING [IE]

Professor James Riggs, Adviser

Freshman Year	Term hours F	W	S
Mathematics for business and social science	4	4	....
Trigonometry (Mth 102)	....	....	4
Sophomore Year			
Calculus with Analytic Geometry (Mth 111,112)	4	4	....
Probability (Mth 361)	....	....	3
Junior Year			
Engineering Economy (IE 381)	3	....	....
Abridged General Physics (Ph 211,212)	....	3	3
Senior Year			
Related courses — Systems Analysis (IE 371,372,373), Materials Handling (IE 394), Production Planning and Control (IE 397), Environmental Design (IE 473), or Quality Control (IE 491)	3	3	3

INSTITUTION MANAGEMENT [IM]

Professor Margaret L. Fincke, Adviser

Sophomore Year	Term hours F	W	S
Chemistry (Ch 101,102,103)	3	3	3
Junior Year			
Nutrition (FN 225)	3	....	....
Food Preparation (FN 211,212)	....	3	3
Senior Year			
Related courses — Microbiology (Mh 130 or 204), Meal Management (FN 313), Principles of Food Preservation (FST 350), Quantity Cookery (IM 311), Institution Organization and Administration (IM 430), Purchasing for Institutions (IM 440), or Institution Experience (IM 450)	3	3	3

Business Education

Freshman Year	Term hours 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
	16	15	15
Sophomore Year			
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
School in American Life (Ed 310)	3	(3)	(3)
Business English (Wr 214)	3	(3)	(3)
[3] Physical education	2	1	1
Fundamentals of Speech (Sp 111)	(3)	(3)	3
Electives	....	3	....
	16	16	16
Junior Year			
Office Procedure (SS 311,312,313)	4	4	4
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)	....	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
Business Statistics (BA 201)	(3)	(3)	3
Psychology of Adolescence (Ed 461)	(3)	3	(3)
Electives	6	....	....
	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 311)	4	(4)	(4)
Marketing (BA 312)	4	(4)	(4)
Finance (BA 313)	(4)	(4)	4
Student Teaching (Ed 416)	(12)	12	(12)
Seminar (Student Teaching, BEd 407)	(1)	1	(1)
Seminar (Student Teaching—observation and high school activities, BEd 407)	(3)	3	(3)
[5] Electives	6	....	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 the 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 norms (excluding business administration) listed in the School of Education. Elective hours can be used toward the teaching norm.

Secretarial Science

Freshman Year	Term hours F	W	S
[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
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
Business Statistics (BA 201)	....	....	3
Science or social science electives	3	3	3
Electives	3	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
Retail Management (BA 474)	3	(3)	(3)
Production (BA 311)	4	(4)	(4)
Marketing (BA 312)	(4)	(4)	4
Finance (BA 313)	(4)	4	(4)
Science or social science electives	....	3	3
Electives	6	3	3
	17	16	16

[1] See notes 1 and 2 under Business Education.

[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.

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 Coures

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 201,202. Business Statistics.
3 hours each term. 3 ①
Sources and collection of business data, tabular and graphic presentation and analysis, frequency distributions, averages and dispersion, probability and statistical inference. Statistical decision making, correlation and regression, index numbers, time series analysis, and business forecasting. Prerequisite: Mth 50 or 101.

BA 203. 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 programing. Prerequisite: BA 201.

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 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

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

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. Production.
4 hours. 4 ①
Decision making in production, plant location, plant layout, materials handling, research and development, production control, procurement, inventory control, statistical quality control, motion study, time study, operations research, and computers. Prerequisite: BA 201,202.

BA 312. 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 313. 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 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
History, nature, and function of law in our business society; lawmaking and legal reasoning.

BA 412. Business Law.
3 hours. 3 ①
Formation, performance, and discharge of obligations arising out of contracts, torts, and the agency relationship.

BA 413. Business Law.
3 hours. 3 ①
Legal aspects of property rights, commercial transactions, and forms of business organizations.

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.

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 417,418, 419.

BA 425. The Federal Tax System. (G)
3 hours. 3 ①
Taxation principles; economics and philosophies of the federal system, current and historical; processes of tax legislation, administration, and judicial review at federal level with reference to overlap at state level; determination of tax liabilities; revenue-raising sources; taxation of incomes. Prerequisite: BA 213; Ec 203.

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. Controllership. (G)
3 hours. 3 ①
The controller and his organization; coordination and control of accounting, budgeting, and planning; controllership'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: one term of statistics; BA 211,212 or 217.

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 203.

BA 441. Financial Institutions. (G)
3 hours. 3 ①
Environment in which the financial manager functions; monetary conditions; the Federal Government; financial organization; money and capital markets. Prerequisite: BA 313.

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. Prerequisite: BA 313.

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. Prerequisite: BA 313.

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. Prerequisite: BA 313.

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 313.

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 313. 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 313.

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 311. 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: Survey of the field, including analysis of personnel objectives, functions, and practices as they relate to overall objectives of an organization.
Second Term: Deeper study of key areas covered in BA 467, with emphasis on the professional periodical literature in the field. Either term may be taken separately.

BA 469. Case Problems in Personnel Management. (G)
3 hours. 3 ①
Cases involving personnel problems and policy, drawn from real situations in business and industry. The student is given an opportunity to apply material learned in BA 467 and BA 468. Prerequisite: BA 467 or BA 468.

BA 471. Selling and Promotion.
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 472. 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 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 312.

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 312.

BA 477,478. Marketing Management.
(G) 3 hours each term. 3 ①
BA 447: For planning purposes, the study of marketing channels, marketing enterprises, and their functions. Prerequisite: 471. *BA 478:* Pricing, organizing, and control activities. Prerequisite: BA 477.

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 478.

BA 481. Distribution Management.
3 hours. 3 ①
Interrelationship of traffic management, warehousing, materials handling, and packaging.

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

See also courses marked (*g*) and (*G*) above.

BA 501. Research.
Terms and hours to be arranged.

BA 505. Reading and Conference.
Terms and hours to be arranged.

BA 507. Seminar.
Terms and hours to be arranged.

BA 511. Analytical Techniques in Business Decision Making.
3 hours fall. 3 ①
Analytical techniques and concepts necessary in making business decisions concerning marketing, costs, profits, pricing, competition, production, and capital management. Forecasting techniques as related to decision making under conditions primarily of uncertainty.

BA 512. Administrative Organization.
3 hours. 1 ③
Study of organization theories and concepts with the purpose of developing an organized philosophy of management and organization and management principles. Reading and discussion of business and related literature.

BA 513. Behavior in Business Organizations.
3 hours. 1 ③
A study of various aspects of formal and informal organizations, communications, motivation, leadership, individual and group behavior, and the administrator's role in interpersonal relationships as they influence and are influenced by business organizations.

BA 520. Administrative Accounting.
3 hours. 3 ①
The adaptation of accounting to managerial operational planning, decision-making, and control. Concepts of cost, profits, value, control, planning, decision-making, uncertainty are inter-related. Prerequisite: 8 to 9 quarter hours of basic accounting.

BA 531,532,533. Quantitative Business Analysis.
3 hours each term. 3 ①
Survey of quantitative methods of analysis of business data; unified business data systems; data processing equipment and methods; model building and business management problem simulation, game theory, linear programing, and advanced business and industrial statistics; management uses of quantitative methods. Prerequisite: Reasonable proficiency in differential and integral calculus.

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 norm. The requirements for a State High School Teacher's Certificate are listed under SCHOOL OF EDUCATION.

Upper Division Courses

BEd 401. Research.
Terms and hours to be arranged.

BEd 403. Thesis.
Terms and hours to be arranged.

BEd 405. Reading and Conference.
Terms and hours to be arranged.

BEd 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.

BEd 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.

BEd 536. Problems and Research Techniques in Business Education.
3 hours. 3 ①
Philosophy and trends in business education; methods and available research studies. Prerequisite: Ed 408 or teaching experience in business subjects.

BEd 537. Measurements in Business Education.
3 hours. 3 ①
Objectives and principles; testing in specific areas; construction of sample tests; available testing materials; use of tests in diagnostic and remedial teaching. Prerequisite: Ed 408; BEd 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; BEd 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

BEd 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 remedial 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.

THE SCHOOL OF EDUCATION at Oregon State University 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 the highest degree approved. The school offers both undergraduate and graduate work in elementary and secondary education and provides instruction, principally at the graduate level, in guidance and personnel work. It cooperates with the Graduate School in the preparation of college and university teachers.

Distinctive elements of the school include its Department of Industrial Education and joint departments of Agricultural Education, Business Education, Home Economics Education, and Science Education, which are departments in the respective schools as well as in the School of Education.

Education

FACULTY

As of January 1966

FRANKLIN ROYALTON ZERAN, Ph.D., Dean of the School of Education.

KATHRYN SMITH, Teacher Placement Secretary.

Emeritus: Professors CLINTON, LANGTON, SEEN; Assistant Professor WORKINGER.

Education: Professors ZERAN (department head), BARON, BEALS, BERGSTROM, DIXON, GOODE, MARKSHEFFEL, MUNFORD, SLEZAK.
Associate Professors MILLIKEN, OWEN, OWENS, RYAN.
Assistant Professors GAWER, LASSWELL, LEMON, LUMPKIN, MEEKS, K. SMITH.
Instructors MARSTON, SHIRTS.

Agricultural Education: Professor TEN PAS (department head), State Supervisor and Teacher Trainer KUNZMAN.
Associate Professor DAVIS.

Art Education: Associate Professor LINDERMAN.

Business Education: Professors YERIAN (department head), LARSE, WINGER.
Assistant Professor LARSON.

Elementary Education: Professors HALL (department head), LEELAND.
Associate Professor REES.
Assistant Professors BATES, SEVEREIDE, STROWBRIDGE, WALLEN, WHITE.
Instructors DEARDORFF, MACHAFFIE.

English Education: Instructor PATTY.

Home Economics Education: Professor DUBOIS (department head).
State Supervisor and Teacher Educator GOODWIN.
Associate Professor MCQUESTEN.
Assistant Professor GALLAGHER.

Industrial Education: Associate Professor E. E. SMITH (acting department head).
State Director of Vocational Education LOOMIS.
State Supervisor and Teacher Trainer GILLES.
Assistant Professor STORM.
Instructors HAYES, HORNIG, RUITER.

Journalism Education: Professor SHIDELER (department head).

Modern Language Education: Assistant Professor RICARD.

Music Education: Associate Professor WILSON.

Science Education: Professors WILLIAMSON (department head), FOSTER, KOSKI.
Associate Professors ANDERSON, FOX.
Assistant Professors CRAVEN, WILSON.
Instructor BEARD.

Social Science Education: Assistant Professor WUBBEN.

Speech Education: Assistant Professor WALLACE.

DEGREE PROGRAMS

The School of Education provides both undergraduate and graduate work in elementary and secondary education, with the B.A., B.S., M.A., M.S., Ed.M., Ed.D., and Ph.D. degrees offered, and provides graduate instruction in guidance and personnel work with the M.A., M.S., Ed.M., Ed.D., and Ph.D. degrees available.

Degrees in physical education are granted through the School of Education (see DIVISION OF PHYSICAL EDUCATION).

Regulations and requirements for completing work for an advanced degree are given in the GRADUATE SCHOOL section of this catalog and in the separate Graduate School catalog. Briefly, for the Ed.M. degree the candidate must complete a graduate major and one graduate minor. For the M.A. or M.S. degree he must complete a graduate major in education and a graduate minor in a subject-matter field. For the M.A. he must also have a reading knowledge of a relevant foreign language.

To qualify for the Ph.D. or Ed.D. degree, a candidate must complete a graduate major and two graduate minors, one of which must be in a field outside education. For the Ed.D. degree, he 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. Transcripts, 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.

GUIDANCE AND PERSONNEL WORK

Oregon State University offers a comprehensive graduate program in guidance and personnel work, preparing students for work as counselors in schools and colleges, as deans of boys and girls and men and women, and as directors of student personnel, counselor educators, and state supervisors of guidance.

Doctoral programs

A candidate for the Doctor of Education degree in guidance and personnel work 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. A candidate for the Doctor of Philosophy degree in guidance and personnel work 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.

For further requirements in the doctoral programs, see GRADUATE SCHOOL.

Master's degree program

A candidate for a master's degree in guidance must elect Option B under Master of Education, as outlined on page 166. Course work must include 24 term hours of prescribed courses and 6 additional hours in guidance for the major and 15 term hours in psychology for the minor.

Prescribed courses in guidance

		Hours
Ed 485.	Principles and Practices of Guidance Services	3
Ed 486.	Occupational and Educational Information	3
Ed 487.	Counseling Techniques	3
Ed 468.	Diagnostic and Remedial Techniques in Reading	3
Ed 588.	Supervised Counseling Techniques	6
Ed 512.	Research Procedures in Education; Ed 424. Measurement in Education; or St 421. Statistical Inference	3
Ed 589.	Organization and Administration of Guidance Services	3

Recommended courses in guidance

Ed 460.	Psychology of Childhood; Ed 461. Psychology of Adolescence; Ed 470. Education of the Exceptional Child; Ed 533. Psychological-Sociological Aspects of Vocations; Ed 555. Student Personnel Work in Higher Education; Ed 577. Counselor Training: Group Procedures; Sp 493. Principles and Techniques of Speech Correction; CC 556. The College Student; FL 422. Family Relationships; FL 423. Parent Education; Soc 474. Social Psychology; Soc 475. Community Organization; Soc 411. Social Problems; Soc 468. Sociology of Urban Life	6

Psychology Minor

Psy 413.	Advanced General Psychology (g)	3
Psy 435.	Personality Theories (g)	3
Psy 421,423.	Psychological Assessment	6
Psy 481.	Prepracticum in Psychological Services or Psy 482 Practicum in Psychological Services	3
		15

TEACHER EDUCATION

High school graduates who plan to teach will find certain advantages in enrolling in the School of Education as freshmen. In this way they will meet requirements most easily and certainly; 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 students' programs.

Students desiring to teach in elementary, junior high, or high school must be admitted to the teacher education program. They undergo evaluation, and in their fifth term of college work (or first term after admission to the School of Education for transfer students) they make formal application for admission to a teaching credential program. Permission to take professional courses leading to a credential is based on several qualifications —academic, professional, personal, social, and ability to speak adequately. Further information and application forms may be obtained in the office of the dean of the School of Education.

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. See GRADUATE SCHOOL.

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 at least two terms 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.

Psychology Requirement

General Psychology (Psy 201,202) is prerequisite to all upper division education courses. Psy 201,202 are the only psychology courses that may be counted as part of the education major of 36 term hours.

Placement Office

The School of Education maintains a Teacher Placement Office to assist OSU graduates in teacher education and other teachers who meet the required attendance at OSU in obtaining teaching positions suited to their preparation and qualifications. This office handles placement credentials for kindergarten, elementary, junior high school, senior high school, and college placement. Qualified undergraduate students who are completing degree requirements in teacher preparation are given initial placement service without charge. Others who have had teacher preparation and have completed 12 hours of work at OSU may register for a fee of $5. A fee of $5 is charged for reregistration or activation of papers. Initial and reregistration placement service is for a 12-month period or one placement, whichever occurs first.

CERTIFICATION

On July 1, 1965, new teacher certification regulations became effective in Oregon, and the following types of teacher's certificates are granted:

a. Basic teaching certificate
b. Standard teaching certificate
c. Administrative certificate
d. Restricted teaching certificate
e. Educational specialty certificate

As published by the Department of Education for the State of Oregon these are the regulations governing the new certification program.

Requirements for Basic Certificates

1. A Basic Teaching Certificate valid for three consecutive years from date of issuance shall be issued to an otherwise qualified applicant who:

a. Has the baccalaureate degree from a standard teacher education institution.

b. Has completed the first four years of a standard teacher education program.

c. Has completed one of the basic four-year general norms established by the State Board of Education for either elementary, junior high school, or high school teaching.

d. Presents evidence of recent educational experience either by official verification of 12 quarter hours of preparation in teacher education in a standard teacher education institution or one year (8 consecutive months, full-time) of legal, successful teaching experience, such preparation or such experience to have been had in the five-year period immediately prior to date of application for certification.

e. Is recommended by the standard teacher education institution in which the major part of the standard teacher education program was completed; or by the administrator of the school district in which the one year (8 consecutive months, full-time) of legal teaching was completed as having the academic preparation and, in their judgment, the personal qualities essential to serve as a teacher.

Requirements for Standard Certificates

A Standard Teaching Certificate valid for a period of five years shall be issued to an otherwise qualified applicant who:

1. Has completed a five-year standard teacher education program, the fifth year of which is a planned program culminating either with the master's degree or with the completion of 45 quarter hours of upper division and graduate study.

The fifth year may be completed in a standard teacher education institution or in an inservice program offered by a first-class school district for which credit is given by a standard teacher education institution, or by some combination of both in keeping with rules and regulations established by the State Board of Education.

2. Officially verifies completion of two years of successful, legal teaching experience (two periods each of 8 consecutive months, full-time) on a Basic Teaching Certificate.

3. Presents evidence of recency of experience or preparation by officially verifying either one year of successful teaching experience (8 consecutive months, full-time) or completion of 12 quarter hours of study in a standard teacher education institution in the five-year period immediately prior to the date of application for certification.

4. Has completed one of the general Standard five-year teaching norms established by the State Board of Education for elementary, junior high school, or senior high school teachers.

5. Is recommended by the standard teacher education institution in which the Standard teacher education program was completed or by the administrator of the school district in which one year (8 consecutive months, full-time) of legal, successful teaching was completed as having the academic preparation and, in their judgment, the personal qualities essential to serve as a teacher.

General Norms

A. ELEMENTARY TEACHERS (Kindergarten through grade 8 of the elementary school)

1. *Standard Norm* (five-year)

a. 30 quarter hours of elementary teacher education taken in a standard elementary teacher education institution, to include:
(1) Child psychology
(2) Educational psychology
(3) Elementary school methods, including the teaching of reading
(4) Elementary supervised teaching

b. 15 quarter hours in Education to be distributed in the following areas:
(1) Philosophy and/or history of education
(2) Elementary teaching methods in addition to those required for the Basic Norm
(3) Adolescent psychology
(4) Any two of the following: (a) Curriculum, (b) Evaluation of learning, (c) Guidance and counseling, (d) Social foundations of education, (e) Education of the exceptional child, (f) Educational teaching media

c. College preparation in each of the following areas, with a concentration of 30 quarter hours or more in one of the areas:
(1) Language arts
(2) Social science
(3) Mathematics
(4) Health and physical education
(5) Art
(6) Music
(7) Science
(Foreign language is not required of elementary teachers; however, they may have an area of concentration in this field.)

2. *Basic Norm* (four-year). Thirty quarter hours in elementary teacher education taken in a standard elementary teacher education institution, to include:

a. Child psychology
b. Educational psychology
c. Elementary school methods, including the teaching of reading
d. Elementary supervised teaching

B. JUNIOR HIGH SCHOOL TEACHERS (Grades 7 and 8 or 7, 8, and 9 of a regularly organized junior high school; grades 8 and 9 of a five-year high school or 7, 8, and 9 of a six-year high school)

1. *Standard Norm* (five-year)

a. 45 quarter hours in teacher preparation taken in a standard teacher education institution, to include:
(1) Educational psychology
(2) Child psychology
(3) Adolescent psychology
(4) Teaching of reading
(5) Methods of teaching including special emphasis in a subject taught in junior high school
(6) The junior high school, its role in education, and its curriculum
(7) Guidance and counseling
(8) Philosophy and/or history of education
(9) Diagnostic and remedial techniques in the basic skills
(10) Supervised teaching in the junior high school

b. Two Basic Norms or one Standard Norm in subject fields taught in junior high school, or a Basic Norm in language arts—social studies.

2. *Basic Norm* (four-year)

a. 30 quarter hours of secondary teacher preparation taken in a standard teacher education institution, to include:
(1) Educational psychology
(2) Child psychology
(3) Adolescent psychology
(4) Teaching of reading
(5) Methods of teaching including special emphasis in a subject taught in junior high school
(6) The junior high school, its role in education, and its curriculum
(7) Junior high school supervised teaching

b. One Basic Norm in a subject field taught in junior high school, or a Basic Norm in language arts—social studies

C. SENIOR HIGH SCHOOL TEACHERS (Three- and four-year high schools)

1. *Standard Norm* (five-year)

a. 36 quarter hours of secondary teacher preparation to be completed in a standard teacher education institution and to include:
(1) Educational psychology
(2) Child psychology
(3) Adolescent psychology
(4) Methods of teaching including special emphasis in a subject taught in senior high school
(5) Philosophy and/or history of education
(6) Teaching of reading (required as of July 1, 1968)
(7) Two of the following areas: (a) Curriculum, (b) Evaluation of learning, (c) Guidance and counseling, (d) Social foundations of education, (e) Education of the exceptional child, (f) Educational teaching media
(8) High school supervised teaching which may be completed in grades 7-12 when grades 7 and 8 are departmentalized

b. A Standard Norm or college major in a subject taught in high school

2. *Basic Norm* (four-year)

a. 21 quarter hours of secondary teacher preparation taken in a standard secondary teacher education institution and to include:
(1) Educational psychology
(2) Adolescent psychology
(3) Methods of teaching including special emphasis in a subject taught in senior high school
(4) High school supervised teaching which may be completed in grades 7-12 when grades 7 and 8 are departmentalized

b. A Basic Norm or a college major in a subject taught in high school

ELEMENTARY EDUCATION

A student preparing to teach in elementary schools must complete the courses listed in the curriculum below and in one of the areas of concentration following.

Since General Psychology (Psy 201, 202) is prerequisite for upper division education courses, students should be sure to complete this two-term sequence by the end of the sophomore year. These are the only courses in psychology which may be counted as part of the education major of 36 term hours.

Freshman Year	Hours
English Composition (Wr 111,112,113)	9
Hist of Am Civ (Hst 224,225,226)	9
Mathematics for Elementary Teachers (Mth 191,192)	6
Introductory Geography (Geog 105,106)	6
Speech (Sp 111,120, or 121)	3
Physical education and hygiene	4
* Electives, officer education, area of concentration	11
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Sophomore Year	
Literature	6
General Psychology (Psy 201,202)	6
Educ Psych: Learning (Ed 312)	3
General Biology (GS 101,102)	8
Music for Elem Tchrs (Mus 371, 373)	6
† School in American Life (Ed 310)	3
Physical education	3
* Electives, officer education, area of concentration	13
	48

Junior Year	
Methods in Reading (Ed 350)	3
Methods and Materials: Social Science (Ed 369)	3
Methods and Materials: Science and Math (Ed 368)	5
Methods and Materials: Language Arts (Ed 367)	3
Art in the Elementary Schools (AA 311,313)	6
Physical Science (GS 104 and 105 or 106)	8
School Health Education (SEd 321)	3
* Electives and/or area of concentration	17
	48

Senior Year	
‡ Student Teaching: Elementary (Ed 415)	12
‡ Student Teaching: Seminar (Ed 407)	3
Psychology of Childhood (Ed 460)	3
Elementary Physical Education (PE 420)	3
Children's Literature (Lib 490)	3
Principles and Techniques of Speech Correction (Sp 493)	3
* Electives and/or area of concentration	21
	48

Areas of Concentration in Elementary Education

At least one area of concentration is required for graduation.

Art

	Hours
Basic Design I (Art 196,197)	6
Survey of Visual Arts (Art 201,202,203)	9
Drawing (Art 251)	3
Painting (Art 275 or 291)	3
Sculpture (Art 295)	3
Crafts (Art 231 or 235 or 255)	3
Art in the Elementary Schools (Art 313)	3
Art Problems in Elementary Schools (Art 429)	3
Elective in an art studio course (drawing, painting, printmaking, sculpture, crafts)	3
	36

English

Appreciation of Literature (Eng 104,105,106)	9
World Literature (Eng 107,108,109)	9
Advanced Writing (Wr 233,234,235)	9
American Literature (Eng 253 or 254 or 255)	3
Children's Literature (Lib 490)	3
English Composition for Teachers (Wr 411)	3
	36

* Recommended electives: 3 hours to meet the institutional requirement of 45 hours science/social science. First Aid (PE 358), Recreational Use of Arts Crafts (Art 205), Audio-Visual Aids (Ed 435), English Composition for Teachers (Wr 411), Diagnostic and Remedial Techniques in Reading (Ed 468), History of the Pacific Northwest (Hst 478), Creative Drama for Elementary Teachers (Sp 240), Elementary School Library (Lib 379), Games and Relays for the Elementary School (PE 321).

† Prerequisite: Two weeks of scheduled observation in the public schools in September to be arranged the preceding April.

‡ Prerequisite: All courses listed in freshman, sophomore, and junior years.

Mathematics

	Hours
Intermediate Algebra (Mth 50)	4
College Algebra (Mth 101)	4
Trigonometry (Mth 102)	4
Finite Mathematics (Mth 107,108)	8
* Math for Elem Teachers (Mth 191,192,193 or Mth elective)	9
Calculus with Analytic Geometry (Mth 111)	4
Theory of Numbers (Mth 343)	3
History of Elementary Math (Mth 495)	3
	36

Additional Electives to Strengthen Math Concentration:

Calculus with Analytic Geometry (Mth 112)	4
Coordinate Geometry (Mth 331)	3
Foundations of Elem Math (Mth 494)	3
Math for Secondary Teachers (Geometry) (Mth 493)	3

Modern Languages

German:

Second-Year German (GL 101,102,103)	9
German Conversation (GL 111,112,113)	6
Survey of German Literature (GL 343,344,345) or German Literature of the Twentieth-Century (GL 421,422,423)	9
Intermediate German Composition and Conversation (GL 334,335,336)	6
Foreign Languages for Teachers (Ed 408m)	3
Electives in German: directed reading, literature, composition, linguistics for language majors	3
	36

French:

Second-Year French (RL 101,102,103)	9
French Conversation (RL 114,115,116)	6
Survey of French Literature (RL 311,312,313) or Twentieth-Century French Literature (RL 423,424,425)	9
Intermediate French Composition and Conversation (RL 314,315,316)	6
Foreign Languages for Teachers (Ed 408m)	3
Electives in French: directed reading, literature, composition, phonetics and diction, linguistics for language majors	3
	36

Spanish:

Second-Year Spanish (RL 107,108,109)	9
Spanish Conversation (RL 117,118,119)	6
Survey of Spanish Literature (RL 341,342,343) or Spanish-American Literature (RL 444,445,446)	9
Intermediate Spanish Composition and Conversation (RL 347, 348,349)	6
Foreign Languages for Teachers (Ed 408m)	3
Electives in Spanish: directed reading, literature, composition, linguistics for language majors	3
	36

Russian:

Second-Year Russian (SL 101,102,103)	9
Russian Conversation (SL 111,112,113)	6
Readings in Russian Literature (SL 311,312,313)	9
Intermediate Russian Composition and Conversation (SL 314, 315,316)	6
Foreign Languages for Teachers (Ed 408m)	3
Electives in Russian: directed reading, Russian culture, composition, linguistics for language majors	3
	36

Music

All students must demonstrate reasonable proficiency on the piano.

Vocal and/or Piano

	Hours
Applied Music (Mus 190,290), or Class Lessons in Voice or Piano, (Mus 181,182) as directed	8
Music Theory I (*Mus 112,113)	8
Introduction to Music Literature (Mus 221)	3
History of Music (Mus 360,361)	6
Conducting (Mus 323)	2
Music for Elementary Teachers (Mus 371,373)	6
Approved elective from the following: Chorus (Mus 197,397), Music Theory II (Mus 211), Choral Conducting (Mus 324,325)	3
	36

Suggested additional electives to strengthen concentration: Chorus (Mus 197,397), Music Theory II (Mus 212,213), Applied Music (Mus 390,490), Class Lessons in Strings (Mus 183), Class Lessons in Wind Instruments (Mus 184), Class Lessons in Percussion (Mus 185).

Band/Orchestra

Applied Music (Mus 190,290, or Class Lessons in Piano, Strings, Winds, Percussion (Mus 182,183,184,185) as directed	8
† Music Theory I (Mus 112,113)	8
Introduction to Music Literature (Mus 221)	3
History of Music (Mus 360,361)	6
Conducting (Mus 323)	2
Music for Elementary Teachers (Mus 371,373)	6
Approved elective from the following: Band (Mus 195,395), Orchestra (Mus 196,396), Music Theory II (Mus 211), Instrumental Conducting (Mus 326,327)	3
	36

Suggested additional electives to strengthen concentration: Band (Mus 195, 395), Orchestra (Mus 196, 396), Music Theory II (Mus 212,213), Applied Music (Mus 390,490), Class Lessons in Voice (Mus 181), Band Arranging (Mus 354,355).

* Math may be replaced by one of the above electives.

† Prerequisite: Rudiments of Music (Mus 111) (or qualifying examination) 4

Physical Education and Health

Option 1

Physical Education — Hours

Games and Relays for the Elementary School (PE 321)	2
Rhythms for the Elementary School (PE 322)	2
Posture and Conditioning for the Elementary School (PE 323)	2
Elementary School Physical Education (PE 420)	3
Organization of Elementary School Physical Education (PE 441)	3
Evaluation of Physical Education (Elementary School) (PE 443)	3
Professional Activities (PE 194-294) Gymnastics, Rhythm Patterns, Physical Fitness-Track and Field, Sport Skills, Pool and Playground Programs	10

Health

General Hygiene (PE 160)	2
First Aid (PE 358)	3
School Health Education (SEd 321)	3
School Health Services (SEd 322)	3
	36

Suggested electives: Physical Education: (PE 240; Ed 366, 426)
Health: (Ed 360; SEd 442; Mb 424,425,426; FN 225)

Option 2

Health — Hours

General Hygiene (PE 160)	2
First Aid (PE 358)	3
School Health Education (SEd 321)	3
School Health Services (SEd 322)	3
Safety Education (Ed 360)	3
Community Health Problems (Mb 424 or 425 or 426)	3
Health Education (SEd 442)	3
Health of the School Age Child (SEd 451)	3

Physical Education

Games and Relays for the Elementary School (PE 321)	2
Rhythms for the Elementary School (PE 322)	2
Posture and Conditioning for the Elementary School (PE 323)	2
Elementary School Physical Education (PE 420)	3
Organization of Health and Physical Education (PE 441)	3
	36

Suggested electives: Health (FN 225)
Physical Education (PE 194,294,240,340; Ed 366,426)

Science

Biological Science — Hours

General Zoology (Z 201,202,203)	9
General Botany (Bot 201,202,203)	9
Either Nat Hist of Oregon (Z 374,375,376) or Physiology (Z 331,332) and Genetics (Z 341)	9–10
Electives	8–9
Economic Entomology (Ent 314) 4 hours or Aquatic Entomology (Ent 433) 4 hours	
General Microbiology (Mb 204) 4 hours	
Plant Physiology (Bot 331) 5 hours or Plant Ecology (Bot 341) 4 hours	
Bioecology (GS 341) 3 hours or Biogeography (GS 342) 3 hours	
	35–37

General Science

Physical Science (GS 104,105,106)	12
General Biology (GS 101,102,103)	12
Rudiments of Meteorology (PH 191)	1
Minimum of 13 hours selected from at least three of the following options	13
Astronomy (PH 204, or TV course), 3 hours	
Introduction to Oceanography (Oc 331) 3 hours	
Physiology (Z 331,332) 6 hours	
Genetics (Z 341) 3 hours	
Physical Geology (G 200) and Geology Lab (G 204) 4 hours	
Geology of Oregon (G 352) 3 hours	
Physical Geography (NR 327) 3 hours	
Physical Geography (NR 329) 3 hours	
History of Science (411, or 412 or 413) 4 hours	
	38

Physical Science

General Chemistry (Ch 101,102,103 or Ch 201,202,203)	9
General Physics (Ph 201,202,203) (Prerequisite or concurrent Mth 101)	12
General Geology (G 201,202,203, Lab 204,205,206)	12
Minimum of three hours selected from the following options	3
Astronomy (Ph 204 or TV course)	
Introduction to Oceanography (Oc 331)	
Rudiments of Meteorology (Ph 191) 1 hour or Basic Meteorology (Ph 390) 3 hours	
Modern Concepts in Physical Science (GS 321 or 322 or 323) 3 hours	
History of Science (GS 411 or 412 or 413) 3 hours	
	36

Social Sciences

	Hours
History of American Civilization (Hst 224,225,226)	9
History of Western Civilization	9
Geography (not including Introductory Geography)	6
Electives: 3 hours of work in each: economics, political science, sociology or anthropology. Other recommended electives: History of the Pacific Northwest (Hst 478) and Geography of the Pacific Northwest (Geog 313)	18
	42

Speech

	Hours
Fundamentals of Speech (Sp 111)	3
Fundamentals of Speech (Sp 112) or Voice and Articulation (Sp 120)	3
Interpretation (Sp 121)	3
Creative Drama for Elementary Teachers (Sp 240)	3
Speech Pathology (g) (Sp 481,482,483)	3
Radio Speaking (Sp 361)	3
Basic Television (Sp 367)	3
Group Discussion Processes (Sp 323)	3
Electives in Speech (Selected from following courses, with some courses from two of the three groupings required)	12
	36

General Oral Communication: Fundamentals of Speech (Sp 113); Reasoning and Evidence in Controversy (Sp 321); Persuasion (Sp 322); Conduct of Meetings (Sp 231)

Speech Correction: Speech Science (Sp 371); Clinical Methods in Speech Correction, Sp 484,485,486 (g); Phonetics (Sp 370); Seminar (Ed 408); Audiology, Sp 487,488,489 (g); and Speech Pathology, Sp 481,482,483 (g)

Interpretation and Dramatics: Puppetry (Sp 243); Interpretation (Sp 122); Advanced Interpretation (Sp 311); Fundamentals of Acting (Sp 248)

SECONDARY EDUCATION

A student preparing to teach in secondary schools must complete the courses listed below and also complete requirements for a Basic Norm in a teaching field. If he can supervise at least one student activity, he will find job opportunities better when he graduates. Activities which provide excellent training and experience for prospective teachers include intercollegiate and intramural sports, journalism, art, dramatics, debating, oratory, orchestra, band, chorus and other vocal groups, writing and producing radio programs, and student government. The electives recommended for freshmen and sophomores help broaden the educational experience and preparation and may be used as a starting point in student activities.

Freshman Year

	Hours
English Composition (Wr 111,112,113)	9
Mathematics or a laboratory science other than psychology with laboratory	9–15
Officer education or elective	3–9
Physical education and hygiene	3
Courses in Basic Norm	9–15
Other electives	9–15

Sophomore Year

	Hours
School in American Life (Ed 310)	3
General Psychology (Psy 201,202)	6
Literature	9
Speech	3
History of American Civilization (Hst 224,225,226)	9
Officer education or elective	3–9
Physical education	3
Courses in basic teaching norms	6–12

Junior Year

	Hours
Educational Psychology: Learning (Ed 312)	3
Methods in Reading (Ed 350)	3
Outlines of Economics (Ec 212) or Economic Development of U. S. (Ec 215)	3
American Governments (PS 201)	3
Introduction to Sociology (Soc 212)	3
Electives in teaching norms	18
Other electives	15

Senior Year

	Hours
Phychology of Adolescence (Ed 461)	3
Special Secondary Methods (Ed 408)	3
Student Teaching: Secondary (Ed 416)	9–15
Electives	30

Fifth Year

Students preparing to enter counseling, guidance, and personnel work must qualify for a master's degree. Fifth-year students desiring only to meet certification requirements need not work toward a master's degree, but they should realize that a master's degree is desirable for most high school positions.

BASIC AND STANDARD NORMS

To be recommended for a Basic Teaching Certificate or a Standard Teaching Certificate by his subject-matter department, a student must complete a Basic Norm or a Standard Norm as outlined below. The norm must be in one of the fields in which Oregon State University offers student teaching, that is, in one of the fields listed below. In art, modern languages, journalism, speech, and music only Basic Norms are offered. In all other fields listed both Basic Norms and Standard Norms are offered.

Agricultural Education

BASIC NORM

Animal Industries: AnS 121,200,311 or 411, 341; P 121; and electives	18
Plant Industries: FC 211, Sls 210, Hrt 111, and electives	18
Agricultural Economics: AEc 111,211,341, and electives	14
Agricultural Engineering: AE 211,221,222,311,391, and electives	18
Genetics (Z 341)	3
Program Report Analysis (AEd 411)	2
	72

STANDARD NORM

Subject matter field or fields in agriculture	18
Thesis (AEd 503) or English Composition for Teachers (Wr 111), Development of the English Language (Eng 490), and a research paper	9
Approved electives	3
	30

INTERNSHIP

An intern must hold a bachelor of science degree in agriculture or be within one term of completing such a degree. The internship consists of a minimum of six months clinical experience in a public high school on at least one-half time basis (3 periods per day). The employment is arranged in a public high school with an individualized program developed in cooperation with the State Department of Education, the hiring district, and Oregon State University.

The normal academic load for an intern is nine hours per term for a total of 27 hours over the academic year.

Business Education

BASIC NORM

Stenography (9* hours), typewriting (6*), applied stenography (9), office procedures (12), office organization and management (3), secretarial problems (3), and business fundamentals including introduction to business (4), business law (6), retail management (3), principles of accounting (9), and principles of economics (9)	64

* Training in high school may permit 9 to 13 of these hours to be replaced by electives.

STANDARD NORM

Basic Norm in business education	64
Electives in graduate courses in economics or business administration	6
Current trends in typewriting (3), in shorthand (3), in basic business (3), in office procedure (3). Measurements in business education (3), practicum in business education (3), administration and supervision of business education (3), problems and research techniques in business education (3)	24
	94

Counseling

The Basic Norm in counseling consists of a total of 24 hours with at least one course in each of the following areas:

Basic Principles of Guidance
- Ed 485. Principles and Practice of Guidance Services.

Educational, Occupational, Social, and Personal Information
- Ed 486. Occupational and Educational Information.
- Ed 533. Psychological-Sociological Aspects of Vocations.

Counseling Techniques
- Ed 487. Counseling Techniques.
- Ed 577. Counselor Training: Group Procedures.

The Individual
- Psy 413. Advanced General Psychology.
- Psy 435. Personality Theories.
- Psy 485. Counseling and Psychotherapy.
- Psy 462. Behavior Deviations.

School Programs and the Community
- Ed 589. Organization and Administration of Guidance.

Research and Measurements
- Ed 512. Research Procedures in Education.
- St 421. Statistical Inference.
- Ed 424. Measurements in Education.
- Psy 421,422,423. Psychological Assessment.

Supervised Counseling Experience
- Ed 588. Supervised Counseling Techniques.
- Psy 481. Prepracticum in Psychological Services.
- Psy 482. Practicum in Psychological Services.

The Standard Norm in counseling consists of a total of 48 hours with at least one course in each of the above areas.

English Education

BASIC NORMS

English

Survey of English Literature (Eng 101,102,103)	9
World Literature (Eng 107,108,109)	9
Shakespeare (Eng 201,202,203)	9
Survey of American Literature (Eng 253,254,255)	9
Literary Criticism (Eng 414,415,416)	9
Literature for Teachers (Eng 488)	3
Advanced Expository Writing (Wr 316 or Wr 317)	3
Composition for Teachers (Wr 411)	3
Journalism (J 111)	3
Development of the English Language (Eng 490)	3
Speech courses including Sp 248	6
	66

Language Arts-Social Studies

Survey of American Literature (Eng 253,254,255)	9
Survey of English Literature (Eng 101,102,103)	9
World Literature (Eng 107,108,109)	9
Shakespeare (Eng 201,202,203)	9
Advanced Expository Writing (Wr 316 or Wr 317)	3
Composition for Teachers (Wr 411)	3
Development of the English Language (Eng 490)	3
Speech	3
History of American Civilization (Hst 224,225,226)	9
History of Western Civilization (Hst 101,102,103)	9
Introductory Geography (Geog 105,106,107)	9
Six quarter hours in one or more of the following fields: political science, economics, sociology, anthropology	6
	81

STANDARD NORMS

English

Basic Norm in English	66
Graduate courses in English, to include at least 3 hours in advanced writing, composition, grammar, or linguistics	21
Additional hours, with approval of adviser	9
	96

Language Arts-Social Studies

Basic Norm in language arts-social studies	81
Advanced writing, linguistics, and other language arts	21
Upper division and graduate courses in history	9
Other upper division and graduate courses in social studies	3
	114

Health and Physical Education

BASIC NORMS

Health Education

Human Biology (Z 114,115,116)	9
Human Biology Lab (Z 117,118,119)	3
Elementary Human Anatomy (Z 321,322)	6
Physiology (Z 331,332)	6
General Chemistry (Ch 101,102,103)	9
General Microbiology (Mb 204)	3
Nutrition (FN 225)	3
Safety Education (Ed 360)	3
First Aid (PE 358)	3
General Hygiene (PE 170)	3
Introduction to Health Education (SEd 123)	3
Community Health Problems (Mb 424)	3
Family Relationships (FL 422)	3
Communicable and Noncommunicable Diseases (Mb 322)	3
School Health Education (SEd 321)	3
School Health Services (SEd 322)	3
Driver Education and Training (PE 480)	3
	69

Health and Physical Education

Human Biology (Z 114,115,116)	9
General Chemistry (Ch 101,102,103)	9
Elementary Human Anatomy (Z 321,322)	6
Applied Human Anatomy (Z 423)	3
Physiology (Z 331,332)	6
Applied Human Physiology (Z 433)	3

Introduction to Physical Education (PE 131)	3
Professional Activities (PE 194)	18
Physical Education Technique (PE 333,334 or 335)	4
Coaching Courses (men) (PE 365,366 and 367 or 368)	6
Sports Officiating (women) (PE 362)	3
Physical Education Curriculum (PE 442)	3
Org of Health and Physical Education (PE 441)	3
Evaluation of Physical Education (PE 443)	3
Corrective Physical Education (PE 444)	3
Principles of Physical Education (PE 447)	3
General Hygiene (PE 170)	3
School Health Education (SEd 321)	3
School Health Services (SEd 322)	3
First Aid (PE 358)	3
Safety Education (Ed 360)	3
Family Relationships (FL 422)	3
Nutrition (FN 225)	3
Communicable and Noncommunicable Diseases (Mb 322)	3
Community Health Problems (Mb 424)	3
(Women) 106 (Men)	109

Physical Education

Introduction to Physical Education (PE 131)	3
Physical Education Technique (PE 333,334,335)	2–4
Coaching Courses (Men) (PE 365,366 or 369, and 367 or 368)	6
Sports Officiating (Women) (PE 362)	3
Organization of Health and Physical Education (PE 441)	3
Physical Education Curriculum (PE 442)	3
Evaluation of Physical Education (PE 443)	3
Corrective Physical Education (PE 444)	3
Principles of Physical Education (PE 447)	3
Elementary Human Anatomy (Z 321,322)	6
Applied Human Anatomy (Z 423) Kinesiology)	3
Physiology (Z 331,332)	6
Applied Human Physiology (Z 433) (Physiology of Exercise)	3
Total in physical education	44–45
Professional Activities (PE 194, 6 hours; PE 294, 6 hours; PE 394, 4-6 hours)	16–18
General Hygiene (PE 170)	3
Family Living (FL 223)	2
Nutrition (FN 225)	3
School Health Services (SEd 321)	3
School Health Education (SEd 322)	3
First Aid (PE 358)	3
Communicable and Noncommunicable Diseases (Mb 322)	3
Community Health Problems (Mb 424,425, or 426)	3
Total in health education	23

STANDARD NORMS

Health Education

Basic Norm in health education	69
Health Education (SEd 441,442)	6
School Health Administration (SEd 461)	3
Health of the School Age Child (SEd 451)	3
Physical Growth and Development (SEd 452)	3
Community Health Problems (Mb 425)	3
Epidemiology (Mb 453)	3
Mental Hygiene (Psy 411)	3
	93
Basic Norm in health and physical education	106–109
Health Education (SEd 441,442)	6
Health of the School Age Child (SEd 451)	3
Physical Growth and Development (SEd 452)	3
Community Health Problems (Mb 425)	3
Epidemiology (Mb 453)	3
Mental Hygiene (Psy 411)	3
Applied Human Anatomy (Z 423)	3
Applied Human Physiology (Z 433)	3
Evaluation of Physical Education (PE 443)	3
Corrective Physical Education (PE 444)	3
	139–142

Physical Education

Basic Norm in physical education	84–85
Tests and Measurements in Physical Education (PE 446)	3
Administration of Physical Education (PE 448)	3
Current Trends and Problems (PE 449)	3
Electives in physical education approved by adviser	12
	105–106

Home Economics Education

BASIC NORM

Home Economics

Child Development (FL 225,311,413)	9
Nursery School Child (FL 425)	3
Clothing Construction (CT 210,212)	6
Clothing Selection (CT 211)	3
Textiles (CT 250)	3
Family Relationships (FL 322)	3
Nutrition (FN 225)	3
Foods (FN 211,212) or for students having Chemistry (FN 220, 221)	6–8
Meal Management (FN 313)	3
Management for Family Living (HAd 240)	2
Personal and Family Financial Management (HAd 341)	3
Home Management for House (HAd 450) or Management of the Home (HAd 460—for married women)	4
Household Equipment (HAd 330)	3
Home Furnishings (CT 331)	3
Introduction to Home Economics (HEc 101)	1
Upper division elective	3
	58–60

STANDARD NORM

Home Economics

Students may take any of these courses any time within their 5-year programs. With approval of the Home Economics Education Department, any of these courses which carry graduate credit or equivalent graduate courses may be submitted as a part of a program for a master's degree.

Family Nutrition (FN 325)	2
Issues and Family Living (FL 433)	3
Consumer Economics (HM 412) (g)	3
Seminar: Home Economists Role in Society (HEc 407)	3
House Planning in Relation to Function (HAd 335), Socio-Psychological Aspects of Clothing (CT 515), Flat Pattern and Draping (CT 310), or Tailoring (CT 312) if no more than six hours of clothing construction have been taken previously	3
	14

INTERNSHIP

An intern must have the equivalent of the Basic Norm in Home Economics Education and may be required to take at least one course in each of the four subject-matter departments in home economics (Clothing and Textiles, Family Life, Home Administration, and Foods and Nutrition) to bring the intern's background up to date. The intern must have had laboratory experience of 2 to 4 weeks prior to the Summer Term before the internship.

The intern takes the following courses:

In first Summer Term: Ed 310,312, Ed 408d, Ed 416, Ed 507, and elective	18
During internship: Ed 416,350,461, HEd 507	21
In second Summer Term: Ed 460,484,485, HEd 422	12

Science Education

BASIC NORMS

Biology

General Botany (Bot 201,202,203)	9
General Zoology (Z 201,202,203)	9
General Microbiology (Mb 204)	4
Elementary Human Anatomy (Z 321,322)	6
Physiology (Z 331,332)	6
Plant Physiology (Bot 331) or Plant Ecology (Bot 341)	5–4
Genetics (Z 341)	3
Evolution (Z 345)	3
Ecology and Natural History (Z 374,375,376)	10
	54–55

Chemistry

General Chemistry (Ch 204,205,206) including qualitative analysis and some quanitative analysis	15
Physical Chemistry (Ch 440,441,442)	9
Physical Chemistry Laboratory (Ch 443,444,445)	3
Radioactive Tracer Methods (Ch 419)	4
Organic Chemistry (Ch 334,335,336)	9
General Physics (Ph 201,202,203)	12
	52

Physics

General Physics (Ph 201,202,203)	12
Meteorology (Ph 390)	3
Electricity and Magnetism (Ph 331,332), or Thermodynamics and Heat Measurement (Ph 353), or Mechanics (Ph 424,425,426)	12
Modern Physics (Ph 311,312,313)	9
General Chemistry (Ch 204,205,206)	15
	54

Physical Science-General Science

General Biology (GS 101,102,103)	12
General Chemistry (Ch 201,202,203)	9
General Physics (Ph 201,202,203)	12
Modern Concepts in Physical Science (GS 321,322,323) or Natural History of Oregon (Z 374,375,376)	9–10
Introduction to Oceanography (Oc 331)	3
Geology of Oregon (G 352)	3
Basic Meteorology (Ph 390)	3
	51–52

Mathematics

College Algebra (Mth 101) or Algebra and Trigonometry (Mth 104)	4
Linear Algebra (Mth 341)	3
Mathematics for Secondary Teachers (Mth 492)	3
Calculus with Analytical Geometry (Mth 200-203)	16
Trigonometry (Mth 102) or Algebra and Trigonometry (Mth 104)	4
Probability (Mth 361)	3
Finite Differences (Mth 362)	3
Theory of Numbers (Mth 362)	3
Theory of Equations (Mth 342)	3
Elective	3
Mathematics for Secondary Teachers (Mth 491,493)	6
	51

STANDARD NORMS

Biology

Basic Norm in biology	54–55
Approved upper division and graduate courses in biological sciences	30
	84–85

Chemistry

Basic Norm in chemistry	52
Approved upper division and graduate courses in chemistry and related sciences	30
	82

Physics

Basic Norm in physics	54
Approved upper division and graduate work in physics and related sciences	30
	84

Physical Science-General Science

Basic Norm in physical science-general science	51–52
Approved upper division and graduate courses in physical, biological, and earth sciences and mathematics	30
	81–82

Mathematics

Basic Norm in mathematics	51
Approved upper division and graduate courses in mathematics and related sciences	30
	81

Social Studies Education

BASIC NORM

Social Studies

History of Western Civilization (Hst 101,102,103)	9
History of American Civilization (Hst 224,225,226)	9
Introductory Geography (Geog 105,106,107)	9
Principles of Economics (Ec 201,202, or 203)	6
American Governments (PS 201,202, or 203)	6
General Sociology (Soc 204,205, or 206) or Anthropology (Soc 214, 215, or 216)	6
Seminar (SSc 407)	6
Upper division history electives	9
Social science electives, at least 6 of which must be upper division hours. No more than 6 may be in history	15
	75

STANDARD NORM

Social Studies

Basic Norm in social studies	75
Required upper division or graduate courses in history	9–12
Required upper division or graduate courses in history, geography, sociology or anthropology, political science or economics	18–21
	105

Fields in Which Only Basic Norms are Offered

BASIC NORMS

Art

Basic Design I (Art 195,196,197)	6
Survey of Visual Arts (Art 201,202,203)	9
History of Art (Art 361,362,363)	9
Total of 27 hours in studio courses, a minimum of 3 hours in each and 9 hours in one of the following; Drawing (Art 251), Painting (Art 291), Printmaking (Art 381), Sculpture (Art 285), Advertising Design (Art 245,246,247), Ceramics (Art 255), or Jewelry and Metalsmithing (Art 235), or Art Craft (weaving) (Art 231)	27
	51

Journalism

Students taking a Norm in Journalism are advised also to have a Basic Norm in another teaching field, e.g., English.

Journalism (J 111,112)	6
Journalism Laboratory (J 121)	1
Copyediting (J 214)	3
The Press and Society (J 450)	3
Editorial Writing (J 223)	3
Public Information Methods (J 318)	3
Photo-Journalism (J 334)	3
Electives chosen from Special Feature Articles (J 317), Technical Writing (J 319), Journalism Projects (J 351,352,353), Creative Writing (Wr 319), English Composition for Teachers (Wr 411), Radio-TV Projects (Sp 260,366)	8
	30–31

Modern Languages

French

Second-Year French (RL 101,102,103)	9
French Conversation (RL 114,115,116)	6
Directed Reading in French (RL 301,302,303)	6
Intermed French Comp and Conv (RL 314,315,316)	6
Survey of French Literature (RL 311,312,313)	9
Plus 9 term hours from the following:	
French Pronunciation and Phonetics (RL 331)	3
Twentieth-Century French Literature (RL 423,424,425)	9
	45

German

Second-Year German (GL 101,102,103)	9
German Conversation (GL 114,115,116)	6
Directed Reading in German (GL 311,312,313)	6
Intermed German Comp and Conv (GL 334,335,336)	6
Survey of German Literature (GL 343,344,345)	9
Plus 9 term hours from the following:	
German Pronunciation and Phonetics (GL 331)	3
Twentieth-Century German Literature (GL 421,422,423)	9
	45

Spanish

Second-Year Spanish (RL 107,108,109)	9
Spanish Conversation (RL 117,118,119)	6
Directed Reading in Spanish (RL 214,215,216)	6
Intermed Spanish Comp and Conv (RL 347,348,349)	6
Survey of Spanish Literature (RL 341,342,343)	9
Plus 9 term hours from the following:	
Spanish Pronunciation and Phonetics (RL 350)	3
Spanish-American Literature (RL 444,445,446)	9
	45

Russian

Second-Year Russian (SL 101,102,103)	9
Russian Conversation (SL 111,112,113)	6
Directed Reading in Russian (SL 211,212,213)	6
Intermed Russian Comp and Conv (SL 314,315,316)	6
Readings in Russian Literature (SL 311,312,313)	9
Plus 9 term hours from the following:	
Russian Pronunciation and Phonetics (SL 331)	3
Survey of Russian Culture (Hum 327,328,329)	9
	45

Music

Music Theory I (Mus 112,113)	8
Music Theory II (Mus 211,212,213)	9
Keyboard Harmony (Mus 214,215,216)	3
History of Music (Mus 360,361)	6
Conducting (Mus 323)	2
Choral Conducting (Mus 324)	2
Applied Music (Mus 190-490) or Class Lessons—as directed	12
	42

Speech

The Basic Norm in speech provides three options:

1. General Oral Communication
2. Public Speaking and Group Communication
3. Dramatics

	Option 1	Option 2	Option 3
Fundamentals of Speech (Sp 111,112,113)	6	9	6
Phonetics (Sp 370)	3	3	3
Voice and Articulation (Sp 120)	....	3	....
Interpretation (Sp 121,122)	6	....	6
Radio Speaking (Sp 361)	3	3	3
Fundamentals of Acting (Sp 248)	3	....	3
Fundamentals of Play Direction (Sp 354)	3	....	3
Conduct of Meetings (Sp 231)	....	3	....
Reasoning and Evidence in Controversy (Sp 321)	....	3	....
Persuasion (Sp 322)	....	3	....
Group Discussion Processes (Sp 323)	....	3	....
Scenecrafts (Sp 244)	....	....	3
Stage Make-up (Sp 247), Adv Interp (Sp 311), or Stage and Scene Design (Sp 346)	....	....	3
Speech Science (Sp 371)	3	3	3
Speech in the Secondary School (Sp 414 g)	3	3	3
Electives in speech	3	3	3
	39	39	39

INDUSTRIAL EDUCATION

INDUSTRIAL ARTS EDUCATION

The four-year professional program in industrial arts education, leading to the degree of Bachelor of Science, meets certification requirements of all states except those requiring graduate study as a prerequisite to certification, and at the same time provides an excellent foundation for graduate study. In the curricula which follow, the courses required for a Basic teaching certificate in industrial arts in Oregon are marked with an asterisk. (*) Students should confer with the head of the department for counseling on objectives, program planning, and occupational opportunities.

Freshman Year	Hours
*Methods in Woodworking (PT 112,113)	6
*Forging and Welding (PT 150)	3
*Machine Tool Practices (PT 160)	3
*Graphics (GE 115,116,117)	9
*Industrial Arts Design (AA 281)	3
English Composition (Wr 111,112,113)	9
Mathematics (College Algebra, Mth 101; Trigonometry, Mth 102; and Calculus with Analytic Geometry, Mth 111)	12
Fundamentals of Speech (Sp 111)	3
Physical Education (PE 190)	3
	51

Sophomore Year	Hours
*House Planning and Architectural Philosophy (AA 178)	3
*Machine and Tool Maintenance: Wood Shop (PT 225)	3
*Foundry Practices (PT 340)	3
*General Crafts (IA 321)	3
*Elective in industrial arts	3
General Physics (Ph 201,202,203)	12
General Psychology (Psy 201,202)	6
Physical Education (PE 190) and General Hygiene (PE 150)	3
Literature electives	9
	45

Junior Year	Hours
*Power Mechanics (AE 317)	3
*Millwork: Machine Woodwork (PT 311)	3
*Furniture Design and Construction (PT 313)	3
*Wood and Metal Finishing (PT 316)	3
*Machine Shop Practices (PT 360)	3
*Electricity Technology (PT 370)	3
*Metalcrafts (IA 382)	3
*Electives in industrial arts	6
School in American Life (Ed 310)	3
Educational Psychology (Ed 312)	3
Methods in Reading (Ed 350)	3
History of American Civilization (Hst 224,225,226)	9
General Chemistry (Ch 101,102,103)	9
	54

Senior Year	Hours
*General Metal Processes (IA 381)	3
*Comprehensive General Shop (IA 334)	3
*Industrial Application Lab (IA 335)	3
Special Secondary Methods (Ed 408e)	3
Industrial Arts Organization (IEd 420)	3
Student Teaching: Secondary (Ed 416)	12
Seminar (Ed 407)	3
Psychology of Adolescence (Ed 461)	3
Economic Development of the United States (Ec 215)	3
General Sociology (Soc 204)	3
American Governments (PS 201)	3
	42

BASIC NORM

Courses required in the Basic Norm in industrial arts are marked with an asterisk in the curricula above. Total is 75 term hours.

STANDARD NORM

In addition to the courses in the Basic Norm, a Standard Norm in industrial arts includes History of Industrial Education, IEd 570, or Principles and Objectives of Industrial Education, IEd 571, (3 hours); Tests and Measurements in Industrial Subjects, Ed 532, (3 hours); Graduate thesis, IEd 503, (6 hours) or Problems in Applied Research, IEd 501, (3 hours) and Industrial education elective (3 hours); Shop Planning and Organization, IA 511, (3 hours); and technical subjects to build area of subject matter specialization based on undergraduate preparation; IA 506, IA 508, (15 hours) for a total in the Standard Norm of 105 hours.

TRADE AND INDUSTRIAL EDUCATION NORMS

BASIC NORM

Examination in teaching field plus recommended courses in teaching field based on the examination results.	
Required hours in teaching field	24
Electives in subject	9
	33

STANDARD NORM

Development, Organization, and Use of Industrial Materials (IEd 482)	2
Supervision of Trade and Industrial Education (IEd 485)	3
Industrial and Public Relations for Trade and Industrial Teachers (IEd 487)	3
Design and Layout of Industrial Education Facilities (IEd 490)	2
Psychology of Childhood (Ed 460)	3
Organization and Administration of Vocational Education (Ed 495)	3
Conference Leader Training (Ed 508)	3
The Junior College (Ed 550)	3
	22

Trade and Industrial Education

All students following the professional curriculum for trade and industrial education will report directly to the head of the department for counseling on objectives, program planning, and occupational opportunities. Appropriate electives in industrial education are selected with the approval of the major adviser.

	Hours
Courses required to meet University and School requirements for a bachelor of science degree	72
Required professional courses: Ed 310,312,350,408t; IEd 381, 382, 436,480,482; and 16 hours of approved electives in trade and industrial education	48
Credit through examination: Students with three or more years beyond the standard learning period of trade or industrial experience *may* be granted credit for such experience. The examination covering this experience is based as follows: 10% on length of experience, with a year's experience defined as 48 weeks as a wage earner. (The minimum period of experience acceptable under one employer is three months; in trades or occupations where assignment on short jobs is made through a union hiring hall, the assigning union may be considered the employer; experience in scattered fields is not acceptable.) 10% each on progression in the occupation, spread of experience, method followed to gain competency, and continuous character of occupational experience. 25% each on knowledge of technical content and performance ..... Maximum	48
Upon acceptance to the program and the completion of 45 hours of approved lower division academic course work, an individual may take his trade examination. However, the credits earned as a result of the examination will be entered in the Registrar's Office as *Incompletes* until he has completed 93 academic credit hours, including all lower division courses required in the four-year program.	
General electives	24
	192

Freshman Year	Hours
English Composition (Wr 111,112,113)	9
Laboratory science or mathematics	12
Introduction to Industrial Education (IEd 381)	2
Mathematics	4
Speech (Sp 111)	3
Physical education	2
History of American Civilization (Hst 224,225,226)	9
General Hygiene (PE 150)	1
General Psychology (Psy 201,202)	6
	48

Sophomore Year	Hours
Literature	9
Organization and management of instruction	3
Analysis and Course Construction (IEd 382)	3
Physical education	3
Electives in teaching field	18
Development, Organization, and Use of Instructional Materials (IEd 482)	2
Electives	3
American Governments (PS 201)	3
Economics (Ec 115 or 215)	3
	48

Junior Year	Hours
School in American Life (Ed 310)	3
Educational Psychology (Ed 312)	3
Methods in Reading (Ed 350)	3
General Sociology (Soc 204)	3
Science and/or social science elective	10
Electives in teaching field	20
Audio-Visual Aids (Ed 436)	3
Electives	3
	48

Senior Year	Hours
Psychology	3
Special Secondary Methods (Ed 408t)	3
Tests and measurements	3
Student Teaching (Ed 416)	12
Electives in teaching field	19
Electives	5
	48

COOPERATIVE PROGRAM

Outstanding graduates of two-year technical education curricula may be admitted into an Industry-School of Education cooperative program whereby twenty months are spent in industry as part of the teacher education requirements.

The total program requires a minimum of 144 credit hours of classwork plus a maximum of 48 credit hours earned by completing a written and performance examination in the student's subject area. This examination is scored 50% on knowledge of technical content of subject and 50% on performance. A student must complete six terms of industrial experience, be accepted into the program, and have completed 45 academic hours of approved lower division academic course work before he may take his trade examination. However, the credits earned as a result of the examination will be entered in the Registrar's office as *Incompletes* until he has completed 93 academic credit hours, including all lower division courses required in the program. Credits awarded will be applied toward the fulfillment of teaching field electives.

Phase 1	Hours
English composition	9
Laboratory science or mathematics	12
Intro to vocational educ	2
Mathematics	4
Fundamentals of speech	3
History of American civilization	9
Hygiene and physical educ	3
General psychology	6
	48

Phase 2	Hours
Literature	9
Organization and management of instruction	3
Analysis and course constr	3
Physical education	3
Electives in teaching field	15
Development, organization, and use of instructional material	2
Electives	6
American governments	3
Economics	3
	48

Phase 3	Hours
Work experience (3 terms, 40 hours per week)	
School in American life	3
Educational psychology	3
Methods in reading	3
Introduction to sociology	3
Electives in teaching field	20
Audio-visual aids	3
Electives	13
	48

Phase 4	Hours
Work experience (3 terms, 40 hours per week)	
Psychology	3
Special secondary methods	3
Educ tests and measurements	3
Supervised teaching	15
Electives in teaching field	16
Electives	5
	48

Courses in Education

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 preparation, the history and philosophy of education, guidance, counseling, and personnel work.

Lower Division Courses

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

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

Ed 310. School in American Life.
3 hours. 3 ①
Elementary and high schools from standpoint of teacher; aims, functions, and characteristics. Prerequisite: Psy 201,202; two weeks of scheduled observation in the public schools in September to be arranged the preceding April; and admission to the teaching credential program.

Ed 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 312; junior standing.

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 408.

Ed 362. Campcraft.
3 hours. 3 ①
Leadership preparation for campcraft programs essential for using the natural environment for the campers comfort, welfare, and safety. Course leads to American Camping Association Campcrafter and Advanced Campcrafter's Certificates.

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 312; junior standing. For elementary education majors only.

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 312; junior standing. For elementary education majors only.

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 312; junior standing. For elementary education majors only.

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) English, (k) social science, (l) junior high school science, (m) modern languages, (n) art, (o) music, (p) journalism, (s) speech, (t) trade and industrial education. Prerequisite: Ed 310,312,350. (6 hours maximum allowed toward certification.) Ed 350 prerequisite or concurrent.

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) English, (k) social science, (l) junior high school science, (m) modern languages, (n) art, (o) music, (p) journalism, (s) speech, (t) trade and industrial education. Arrangements to do student teaching must be made during registration for winter term of junior year. Prerequisite: Ed 408 and consent of director of teacher education. *Student must have grade-point average of 2.50 in his teaching norm at the beginning of the term in which he does student teaching and must not be on probation.*

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 429. Principles of Remedial Education. (G)
3 hours. 3 ①
Extreme school learning problems; underachievement; diagnosis and remediation, diagnostic instruments and remedial resources. Applies to both elementary and secondary education. Prerequisite: Ed 350; senior standing.

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 350; senior standing.

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 350; senior standing.

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 350; senior standing.

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 439. The Gifted Child. (G)
3 hours. 3 ①
Psychology, education, and guidance of the mentally superior and the extraordinarily gifted child. Senior standing required.

Ed 450. Kindergarten Education. (G)
3 hours. 3 ①
Building good attitudes toward school; group adjustment, work habits, readiness for first-grade subjects. Prerequisite: Ed 350; senior standing. Elementary education majors only.

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: senior standing in education.

Ed 464. The Mentally Retarded Child.
(G) 3 hours. 3 ①
Psychology, education, and guidance of the mentally retarded child. Prerequisite: senior standing in education.

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: senior standing in education.

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 350; senior standing.

Ed 470. Education of the Exceptional Child. (G)
3 hours. 3 ①
The emotionally disturbed, the mentally accelerated, the slow learner, and the physically handicapped. Visits are made to state institutions and agencies to acquaint students with service available. Prerequisite: senior standing.

Ed 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 350; senior standing.

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.

Phl 446. Philosophy of Education.
(G) See PHILOSOPHY.

Graduate Courses
See also courses marked (*g*) and (*G*) above.

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—BEALS.
Problems in Educational Psychology—RYAN.
Problems in Guidance—ZERAN.
Problems in Higher Education—GOODE and MUNFORD.
Problems in History or Philosophy of Education—WUBBEN, HOVLAND.
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; 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-Sociological Aspects of Vocations.
3 hours. 3 ①
Choice of occupations; adjusting, or aiding others in adjusting; alteration of occupational conditions and demand to meet needs. Prerequisite: graduate standing in education.

Ed 543. History of American Education.
3 hours. 3 ①
Intellectual developments with special reference to education. 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 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 586. Practicum in Student Advising.
3 hours each term, two terms. 3 ①
Philosophy and theory of working with students; college housing programs; relationship of living unit to total college program, and other phases of student personnel services. Case studies and role playing emphasized. Attention to training, supervision, and evaluation of personnel. Limited to those holding an assistantship in area of student personnel.

Ed 587. Laboratory Experiences in Student Personnel.
3 hours each term, two terms. 3 ①
Primarily for those professionally interested in student personnel who have been enrolled in Practicum in Student Advising. Offices providing laboratory experiences include: Dean of Students, Dean of Men, Dean of Women, Registrar's Office, Admissions Office, Counseling Center, Health Service, Housing Office, Financial Aids, Foreign Students, and Memorial Union (activities). Students expected to spend some time each week in offices mentioned and to participate in a seminar meeting each week. Limited to those holding an assistantship in area of student personnel.

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. Ed 485 prerequisite or concurrent.

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. 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.

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

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.
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
See also courses marked (*g*) and (*G*) above.

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 Education.
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.

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 curriculum and description of courses see SCHOOL OF BUSINESS AND TECHNOLOGY.

HOME ECONOMICS EDUCATION

Professional preparation for teachers of home economics is provided by the Department of Home Economics Education, a joint department of the School of Education and the School of Home Economics. A student in either school may meet certification requirements. Before registering for teacher preparation courses, however, every student should consult the home economics education staff.

Since the OSU teacher-education program is approved by the National Council for the Accreditation of Teacher Education, students who have completed the requirements for teaching in Oregon will be certified in other states where NCATE-approved teacher-education programs are required.

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

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.

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
See also courses marked (g) and (G) above.

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. 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. 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 Education in Salem.

Trade and Industrial Education

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 the State Supervisor of Trade and Industrial Education, Salem, Oregon, accepting him into the program.

Graduate Study

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

IEd 311,312. **Elementary School Industrial Arts.**
3 hours each 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.

IA 321. **General Crafts.**
3 hours. 1 ① 2 ③
Basic understandings, technical and teaching skills in general crafts. Crafts as a means of developing student interest in avocational activities.

IA 334. **Comprehensive General Shop.**
3 hours. 1 ① 2 ③
To extend skills and understandings in wood, metal, graphics, power, and electricity. Instructional organization and teaching procedures of a multiple-activity shop that integrates unlike technical fields. Prerequisite: junior standing.

IA 335. **Industrial Applications Laboratory.**
3 hours. 2 ① 1 ③
Experimental adaptation of industrial procedures, materials, and processes to meet industrial arts instructional needs. Instructional procedures, materials, and devices that reflect and interpret modern technology. Prerequisite: junior standing.

IA 381. **General Metals Processes.**
3 hours. 1 ① 2 ③
Application of metal processes in an integrated program representative of modern industrial practices. Prerequisite: junior standing; basic metals courses.

IA 382. **General Metalcrafts.**
3 hours. 1 ① 2 ③
Technical aspects of sheetmetal, artmetal, and benchmetal. Instructional procedures and organization suitable for multiple-activity programs. Prerequisite: Art 281; GE 117; junior standing.

IEd 388. **Lapidary Techniques and Processes.**
2 hours. 1 ① 1 ④
Gem materials and methods used to process rough material into display specimens or mounted jewelry pieces. For industrial arts teachers. Prerequisite: AA 281; IA 382.

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.

IA 406. **Projects.**
Terms and hours to be arranged.

IEd 407. **Seminar.**
Terms and hours to be arranged.

IA 408. **Workshop.**
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 472. **Industrial and Occupational Analysis.** (G)
3 hours. 3 ①
Analysis of industries, occupations, trades; development of jobs into component parts for instructional use. Development of teaching units derived through analysis. Prerequisite: Ed 408e.

IEd 474. **Industrial Arts for the Intermediate Grades.** (G)
3 hours. 3 ①
Scope and sequence of industrial arts curricula. Organization, content, methods, applied learning experiences, materials, and physical setting. Prerequisite: senior standing; teaching experience in industrial arts.

IEd 475. **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 477. **Safety in Industrial Education.** (G)
3 hours. 3 ①
Application of industrial safety procedures in developing safety programs for industrial education laboratory activities. Prerequisite: Ed 408e.

IEd 479. **Adult Programs in Industrial Education.** (G)
3 hours. 3 ①
The role of industrial education in adult education. Content, instructional procedures, and physical facility needs of adult programs. Prerequisite: senior standing.

Graduate Courses

For both industrial arts and trade education students. See also courses marked (*g*) and (*G*) above.

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 506. **Projects.**
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.

IA 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.

IEd 570. **History of Industrial Education.**
3 hours. 3 ①
Development and aims of industrial arts and vocational-industrial education.

IEd 571. **Principles and Objectives of Industrial Education.**
3 hours. 3 ①
Fundamental problems and values in industrial education as it relates to education generally; possible solutions and trends. Prerequisite: graduate standing in education.

IEd 573. **The General Shop.**
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 574. **Curriculum Practices and Trends in Industrial Education.**
3 hours. 3 ①
Principles underlying curriculum research and development; coordination of industrial education programs; trends in state and national programs; long-range planning and improvement. Prerequisite: graduate standing and teaching experience in industrial education.

IEd 576. **Supervision of Industrial Education.**
3 hours. 3 ①
Functions, techniques of supervisor; supervision principles from teacher's viewpoint; teacher-supervisor relationships. Prerequisite: graduate standing and teaching experience in industrial arts.

IA 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; and PT 387.

COURSES FOR TRADE AND INDUSTRIAL EDUCATION STUDENTS

Upper Division Courses

Courses numbered 400-499 and designated (*g*) or (*G*) may be taken for graduate credit. See also IEd 501-507 on previous page.

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

See also courses marked (*g*) and (*G*) above.

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 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 basic and standard norms in science on pages 106, 107 may be supplemented by additional courses in the several fields. Teaching majors in general biology, general science, mathematics, chemistry, and physics 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.

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

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 451. **Health of the School-Age Child.** (G)
3 hours. 3 ①
Special health problems and the school's opportunities and responsibilities. Prerequisite: PE 170 and one year of upper division biological science.

SEd 452. **Physical Growth and Development.** (G)
3 hours. 3 ①
Normal physical changes from birth to adulthood with consideration of deviations; levels of growth and development. Prerequisite: Ed 310,312 and one year of upper division biological science.

SEd 461. **School Health Administration.** (G)
3 hours. 3 ①
Types of administrative control; budgetary problems; school health-public health integration; responsibilities of school health personnel. The case study method and incident process. Studies of actual school health programs. Prerequisite: one year of upper division biological science and one year of upper division school health courses 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
See also courses marked (g) and (G) above.

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.

For more than seventy years the School of Engineering at Oregon State University has been turning out graduates who have enjoyed outstanding success in the various branches of professional engineering. During this time effort has been directed toward excellence of teaching at both the undergraduate and graduate levels. The reputations of more than eight thousand engineering graduates attest the accomplishment.

Accreditation. Since engineering is a licensed profession, educational patterns must meet certain standards. The Engineers Council for Professional Development (E.C.P.D.) is the unified accreditation organization responsible for such standards upon which the State Boards of Engineering Examiners depend. Curricula and all associated University functions and facilities are periodically inspected and evaluated by the E.C.P.D. If inspection determines that a curriculum meets professional standards, the curriculum is "accredited," and it keeps this rating as long as standards are maintained.

Major curricula patterns at Oregon State are E.C.P.D. accredited with Civil, Electrical, and Mechanical Engineering being accredited in 1937, Chemical Engineering in 1942, Agricultural Engineering in 1949, and Industrial Engineering in 1950.

Engineering

FACULTY

As of January 1966

George Walter Gleeson, Ch.E., Dean of the School of Engineering; Director, Engineering Experiment Station.

James George Knudsen, Ph.D., Assistant Dean of the School of Engineering; Professor of Chemical Engineering; In Charge of the Engineering Experiment Station.

Frederick Joseph Burgess, M.S., Assistant to the Dean; Professor of Civil Engineering.

Marvin Reynolds Haith, B.S., Personnel and Placement Officer; Associate Professor of General Engineering.

Professors Emeritus Albert, Cockerline, Cox, Graf, Martin, Meyer, Parkinson, Thomas.

Agricultural Engineering: Professors Rodgers (department head), Cropsey, Kirk, Lunde, Sinnard, Wolfe.
Associate Professors Bonnicksen, Booster, Long, Page.
Assistant Professor Watts.

Chemical Engineering: Professors Walton (department head), Wicks.
Associate Professors Meredith, Mrazek.
Assistant Professors Beynon, Downing.

Civil Engineering: Professors Holcomb (department head), Bell, Burgess, McClellan, Merryfield.
Associate Professors Beecroft, Laursen, Northcraft, Phillips, Schultz.
Assistant Professors Peterson, Pritchett, Seaders, Slotta, Terraglio.
Instructors James, Scholl.

Electrical and Electronic Engineering: Professors L. N. Stone (department head), Feikert, Magnusson.
Associate Professors Alexander, Engle, Michael, Oorthuys, S. A. Stone, Weber.
Assistant Professors Amort, Jensen, Looney, Saugen.
Instructors Corlew, Morgan.

Engineering Physics: Professor Brady (acting department head).

General Engineering: Professors Richardson (department head).
Associate Professors Campbell, Gray, Jarvi.
Assistant Professors Bucy, Croff, Garrard, Staton.

Mechanical and Industrial Engineering: Professors Slegel (department head), Engesser, Heath, Hughes, Olleman, Paasche, Paul, W. W. Smith, Thornburgh.
Associate Professors Boubel, Dahlke, Daly, Johnson, McMullen, Mingle, Riggs, Ringle, C. E. Smith, Welty, Wilson.
Assistant Professors McClure, Zaworski.
Instructors Chamberlain, Cochrane, Edelman, Inoue.

Production Technology: Professor Sheely (department head).
Associate Professors Frazier, Robley.
Assistant Professors Hoeye, LaBaun, Riesland, Wilson.
Instructor Love.

Opportunity in Engineering

For many years, there has been a shortage of properly educated technical people. In spite of periodic fluctuations in employment, the technical nature of the industrial complex indicates extensive opportunities in the future. Companies search constantly for men and women capable of assuming responsibility in production, operation, construction, research and development, maintenance, consulting, administration, and sales and service. Salary and rate of advancement compare favorably with those in other recognized professions.

The Profession

Engineers apply science. They apply scientific knowledge and principles to the design and operation of machines and systems; to the design of structures or public works; to the design of manufacturing processes; to the planning and organization of engineering operations; to the selection of materials; to the most profitable use of manpower and money; and to the generation, distribution, and control of energy.

Most engineers eventually specialize in one of the more than fifty-two branches of the profession or they may specialize in the particular problems of one type of industry. There are many subdivisions of the profession defined by either the general divisions of the technology or the specific areas of application. The basic knowledge required for all areas of engineering provides flexibility and makes it possible to shift from one field of specialization to another. In fact, the strong and rigorous pattern of education for the profession provides sound preparation for many pursuits other than engineering.

Admission

New students must meet the customary requirements of the University for admission. To engage in the regular engineering program at the freshman level, they must have demonstrated by score on the Scholastic Aptitude Tests a satisfactory knowledge of mathematics with which placement in physics is correlated. Students without high school courses in physics and chemistry cannot expect to start the regular program without some remedial preparation. Students with low SAT scores and low high school grades are advised not to attempt the regular freshman year without some additional preparation.

In addition to a satisfactory grade-point average, transfer students from non-E.C.P.D. accredited 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.

Because of the technical and professional requirements of engineering curricula patterns, which in some instances are above the minimum requirements of the University, the administration of the School of Engineering reserves the right of final determination in matters of admission, retention, reinstatement, placement, and transfer of students.

Departments and Degree Offerings

The School of Engineering is divided into several departments. With the exception of technology students, all freshmen enroll in a Common Freshman Year, but in the department of their choice as a major. Such choice is made from among, the curricula of agricultural, chemical, civil, electrical, general, industrial, or mechanical engineering, or engineering physics. Students who have no firm specialized interest will be assigned to the department of General Engineering the first year.

Bachelor of Science (B.S.) degrees are awarded from each of the above-named departments. In addition, the flexibility of the curricular pattern in general engineering makes it possible, by judicious selection of electives in the junior-senior years, to obtain a B.S. degree in engineering in aerospace, automotive, bioengineering, metallurgical, or nuclear specialties.

It should be emphasized that designated degrees, offered either by departments or as optional patterns under general engineering, do not involve a great deal of specialization. Careful examination of the curricula of all departments will show, in addition to the Common Freshman Year, core patterns comprised of basic science, mathematics, engineering science, and humanities and social science. If the student wishes some specialization, about one-fourth of the total credit hours may be chosen from departmental subject matter which is offered largely in the junior and senior years.

Graduate Study

With the increased complexity and sophistication of technology has come a great demand, particularly in the engineering applications, for persons with education beyond the B.S. degree. The School of Engineering offers advanced degrees of Master of Science (M.S.), Master of Arts (M.A.), Master of Engineering, Master of Material Science, Professional degrees, and Doctor of Philosophy (Ph.D.). Advanced degree programs, in all instances, are developed with faculty advisement to meet the interests and objectives of the individual candidate. Students who have established satisfactory undergraduate records and are looking for the greatest opportunity in the professional field should consider continuation of their education at the graduate level. General regulations and requirements for all advanced degrees, including professional degrees and off-campus programs, are printed under the GRADUATE SCHOOL.

Advisement

Each student in the School of Engineering is assigned to a faculty adviser. Details and procedures dealing with registration, course selection, professional opportunities, personal problems, academic regulations, etc., should be discussed with the adviser. All advisement functions are coordinated by the Personnel Officer assigned to the office of the Dean of Engineering. The Personnel Officer is responsible for supervision of registration, and for counseling of persons in academic difficulty.

Such advisement within the School results from many years of experience dealing with similar situations. At times, students do not wish to accept such advisement. In such cases, the student may be requested to sign a waiver of such advice and the waiver will be placed in the student file. The waiver relieves the adviser of the responsibility for the consequences of failure by the student to accept the advisement.

Since the engineering profession has high regard for ethics and personal behavior, it is expected that each student will conduct himself in a corresponding manner. Cases of deviation from expected behavior will be dealt with from the offices of the Dean of Students and Dean of Engineering.

In some cases of academic difficulty, students are permitted to remain in the School upon a contract basis with either the Dean or the Personnel Officer. The terms of such contracts are considered to be binding upon the student.

Placement

The School of Engineering, under the Personnel and Placement Officer, maintains an organized placement service. This service is available to industrial organizations, undergraduate and graduate students, and alumni. Services are not restricted to engineering, but are available to all associated fields. Upon file in the placement office are listings of positions available, descriptions of industrial organizations and governmental agencies, interview schedules, opportunity literature, and guidance material. No charges are made for the placement service.

Curricula in Engineering and Technology

Degrees Offered

Undergraduate curricula in engineering and related technologies lead to the Bachelor of Science (B.S.) or Bachelor of Arts (B.A.) degree. Through the Graduate School the following advanced degrees in Engineering are authorized: The professional degrees of Agricultural Engineer (A.E.), Chemical Engineer (Ch.E.), Civil Engineer (C.E.), Electrical Engineer (E.E.), Industrial Engineer (I.E.), Mechanical Engineer (M.E.), Metallurgical Engineer (Met.E), Mining Engineer (Min.E); the Master of Arts (M.A.), Master of Science (M.S.), Master of Engineering (M.Eng), and Master of Material Science (M.Mat.Sc.) degrees; and the Doctor of Philosophy (Ph.D.) degree.

Common Freshman and Sophomore Years for Engineering

Freshman Year Norm	Term Hours F	W	S
[1]Engineering Orientation (GE 101,102,103)	2	2	2
Calculus (Mth 111,112,113)	4	4	4
General Physics (Ph 207,208,209)	4	4	4
[2]Humanities and social science	3	3	3
English Composition (Wr 111,112,113)	3	3	3
Officer education or other elective	1–3	1–3	1–3
Physical education and general hygiene	1	1	1
Sophomore Year Norm			
Calculus (Mth 114)	4	..	..
Applied Differential Equations (Mth 321)	..	3	..
Officer 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.
[2] Students in ChE and EE will take Ch 201,202,203. Check with adviser.

Agricultural Engineering

E.C.P.D. Accredited

Sophomore Year

	Hours
Sophomore year norm	13
Mechanics of Solids (GE 211,212,213)	9
Electrical Fundamentals (GE 201,202, 203)	9
Farm Mechanics (AE 221)	3
General Chemistry (Ch 201,202,203)	9
General Botany (Bot 201)	3
Elective	3

Junior Year

	Hours
Mechanics of Fluids (GE 301,302)	6
Engines and Tractors (AE 311)	3
[1] Restricted electives	18
Computer Programing (AE 406)	1
Applied Differential Equations (Mth 322)	3
Soils (Sls 210)	5
Physical Geology (G 200)	3
Humanities and social sciences	9

Senior Year

	Hours
Thermodynamics (GE 311,312)	9
Transfer and Rate Processes (GE 332)	3
Power Farming Machinery (AE 491)	3
Rural Electrification (AE 431)	3
Farm Structures (AE 461)	3
Soil and Water Conservation (AE 471)	3
Seminar (AE 407)	1
[1] Restricted electives	21
Humanities and social sciences	9

[1] Restricted electives by departmental advisement of subjects necessary to complete either the power and machinery or soil and water options.

Chemical Engineering

E.C.P.D. Accredited

Sophomore Year

	Hours
Sophomore year norm	13
Organic Chemistry (Ch 334,335,336,337, 338)	13
Mechanics of Solids (GE 211,212,213)	9
Stoichiometry and Thermodynamics (ChE 211,212,213)	6
Humanities and social sciences	9
Elective	3

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
Physical Chemistry Laboratory (Ch 443, 444,445)	3
Humanities and social sciences	9
Field trip	0

Senior Year

	Hours
Unit Operations (ChE 411,412)	6
Chemical Engineering Laboratory (ChE 414,415)	6
Chemical Engineering Calculations (ChE 425,426) or approved math substitute.	6
Instrumental Analysis (Ch 421)	4
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
Humanities and social sciences	9
Unrestricted electives	7
Field trip	0

Civil Engineering

E.C.P.D. Accredited

Sophomore Year

	Hours
Sophomore year norm	13
Plane Surveying (CE 221,223)	6
Civil Engineering Drawing (CE 231)	3
Electrical Fundamentals (GE 201,202,203)	9
Mechanics of Solids (GE 211,212,213)	9
General Chemistry (Ch 201,202,203)	9
*Elective (Math or Statistics)	3

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
Nature and Properties of Materials (GE 321,322,323)	9
Unrestricted electives	9
Humanities and social sciences	9

Senior Year

	Hours
Hydrology (CE 411)	3
Hydraulics (CE 412)	3
Highway Engineering (CE 421)	3
Sanitary Engineering (CE 451,452)	6
Foundations (CE 472)	3
Structural Engineering (CE 481,482,483)	9
Indeterminate Structures (CE 485)	3
Humanities and social sciences	9
* Restricted electives	12
Seminar	1

* Restricted elective subject matter upon advisement with departmental faculty.

Electrical Engineering

E.C.P.D. Accredited

Sophomore year

	Hours
Sophomore year norm	13
Electrical Fundamentals (GE 201,202,203)	9
[1]General engineering elective	9
Physical science elective	9
Humanities or social science elective	9
Elective	3

Junior Year

	Hours
Fields and Energy Conversion (EE 311,312, 313)	12
Circuits and Electronics (EE 321,322,323)	12
[1] General engineering elective	9
Seminar (EE 407)	1
Mathematics (Mth 322,323)	6
Humanities or social science elective	9

Senior Year

	Hours
Electrical Engineering Economy (EE 411)	3
Transmission Systems (EE 421,422)	6
Seminar (EE 407)	3
Departmental electives (see adviser)	18
[1] General engineering elective	9
Humanities or social science elective	9
Field trip	0

[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.

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

	Hours
Sophomore year norm	13
Introductory Modern Physics (Ph 311,312, 313)	9
Electrical Fundamentals (GE 201,202,203)	9
General Chemistry (Ch 201,202,203)	9
* Restricted electives	13

Junior Year

	Hours
Geometrical and Physical Optics (Ph 465, 466)	6
[2] Electronics (Ph 430)	3
Thermodynamics (GE 311,312,313)	9
Mechanics of Solids (GE 211,212,213)	9
Mathematics (Mth 322,323)	6
Elementary Physical Chemistry (Ch 340)	3
Unrestricted electives	3
Humanities or social science elective	9

Senior Year

	Hours
Atomic and Nuclear Physics (Ph 474,475, 476)	9
Introduction to Theoretical Physics (Ph 471, 472,473)	9
Nature and Behavior of Materials (GE 321, 322,323)	9
[1] Restricted electives	12
Humanities or social science elective	9

[1] Restricted elective subject matter upon advisement of departmental faculty.

[2] May be omitted if Ph 437,438,439 is taken as an elective.

General Engineering

Sophomore Year

	Hours
Sophomore year norm	13
Mechanics of Solids (GE 211,212,213)	9
Electrical Fundamentals (GE 201,202,203)	9
Introductory Modern Physics (Ph 311,312, 313)	9
General Chemistry (Ch 201,202,203)	9
Elective	3

Junior Year

	Hours
Thermodynamics (GE 311,312,313)	9
[2] General engineering elective	9
[1] Restricted electives	21
Humanities and social sciences	9

Senior Year

	Hours
Analysis and Design (GE 411,412,413)	9
[2] General engineering elective	9
Seminar (GE 407)	1
Humanities and social sciences	9
[1] Restricted electives	21

[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 42 term hours.

[2] Either Nature and Behavior of Materials or Transfer and Rate Processes or Fluid Mechanics.

Mechanical and Industrial Engineering

MECHANICAL ENGINEERING
E.C.P.D. Accredited

Sophomore Year

	Hours
Sophomore year norm	13
Mechanics of Solids (GE 211,212,213)	9
Electr Fundamentals (GE 201,202,203)	9
Manufacturing Processes (PT 262)	3
Graphics (GE 115)	3
[1] Restricted electives	6
General Chemistry (Ch 201,202,203)	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
Humanities or social science elective	9

Senior Year

	Hours
Mechanical Analysis and Design (ME 411, 412,413)	9
Mechanical Laboratory (ME 437)	3
Mechanical Engineering Economy (ME 460)	3
Seminar (ME 407)	1
[2] Restricted electives	21
Humanities or social science elective	9

[1] Restricted elective subject matter upon advisement with departmental faculty.

[2] Not less than 9 term hours to be in one of the following areas: general mechanical engineering, automotive, aeronautical, or nuclear engineering, metallurgy, or applied mechanics.

INDUSTRIAL ENGINEERING
E.C.P.D. Accredited

Sophomore Year

	Hours
Sophomore year norm	13
Mechanics of Solids (GE 211,212,213)	9
Electrical Fundamentals (GE 201,202,203)	9
Probability Theory (Mth 361)	3
Manufacturing Processes (PT 262)	3
General Chemistry (Ch 201,202,203)	9
Introduction to Scientific Management (IE 290)	3
Elective	3

Junior Year

	Hours
Nature and Behavior of Materials (GE 321, 322,323)	9
Transfer and Rate Processes (GE 331,332)	6
Operations Research (ST 471,472,473)	9
Engineering Economy (IE 381,382)	6
Systems Analysis (IE 371,372,373)	9
Humanities and social sciences	9
Elective	3

Senior Year

	Hours
Management Models (IE 471,472)	6
Environmental Design (IE 473)	3
Quality Control (IE 491)	3
Material Handling and Controls (IE 492)	3
Industrial Supervision Principles (IE 493)	3
Industrial Engineering Analysis and Design (IE 497,498)	6
Industrial Engineering Seminar (IE 407)	1
Mechanical Analysis and Design (ME 411)	3
Humanities and social sciences	9
[1] Restricted electives	9

[1] Restricted elective subjects upon advisement with departmental faculty.

Production Technology
Basic Curriculum

Freshman Year

	Hours
Woodworking Technology (PT 111)	4
Building Construction Technology (PT 121)	4
Foundry Practices (PT 141)	4
Welding and Fabrication (PT 151)	4
Engineering Fundamentals (GE 104)	4
Machine Tool Practices (PT 161)	4
Mathematics (Mth 101,102)	8
Calculus (Mth 111)	4
English Composition (Wr 111,112,113)	9
Physical education and general hygiene	3
Officer education or elective	3

Sophomore Year

	Hours
Graphics (GE 115,116)	6
General Chemistry (Ch 101)	3
Abridged General Physics (Ph 211,212)	6
Principles of Economics (Ec 201,202,203)	9
Extempore Speech (Sp 111)	3
Business English (Wr 214)	3
Tech Report Writing (Wr 227)	3
Restricted electives	12
[1] Physical education	3
Officer education or elective	3

Junior Year

	Hours
Numerical Control Technology (PT 366)	3
Method and Motion Study (IE 391)	3
Time Study (IE 392)	3
Production Planning and Control (IE 397)	3
Field trip	0
Principles of Accounting (BA 211,212)	6
Cost Accounting (BA 421)	3
Restricted elective subject matter upon advisement with departmental faculty	23
Officer education or electives	9

Senior Year

	Hours
Business Law (BA 411 or 413)	3
Field trip	0
Practical Psychology (Psy 212)	3
Labor Problems (Ec 425)	3
Restricted electives	32
Officer education or electives	9

Civil Engineering Technology

With electives in highway, surveying, sanitary, structural, and construction technology

Freshman Year

	Hours
Algebra and Trigonometry (Mth 101,102)	8
Calculus and Analytical Geometry (Mth 111)	4
Drawing and Descriptive Geometry (CT 121)	4
Abridged General Physics (Ph 211,212)	6
History of Western Civilization (Hst 111, 112,113)	9
English Composition (Wr 111,112,113)	9
Technical Problems and Drawing (CT 111, 112,113)	6
Physical education	3

Sophomore Year

	Hours
Plane Surveying (CT 221,222,223)	9
Civil Engineering Drawing (CT 232)	3
Laboratory Techniques (CT 242)	3
Mechanics (Statics, Dynamics, Strength of Materials) (CT 252,253,254)	9
Fundamentals of Speech (Sp 111)	3
Principles of Economics (Ec 201,202,203)	9
Business Statistics (BA 201,202)	6
Basic Accounting and Financial Analysis (BA 217)	3
Physical education	3

Junior Year

	Hours
Production (BA 311)	4
Marketing (BA 312)	4
Finance (BA 313)	4
Business English (Wr 214)	3
Technical Report Writing (Wr 227)	3
Elective in social science or humanities	6
Electives	9
Electives (restricted)	15

Senior Year

	Hours
Business Managerial Economics (BA 301)	3
Business Management Theory (BA 302)	3
Business Law (BA 411)	3
Electives	9
Electives (restricted)	28
Field trips (Seminar) (CT 407)	2

Recommended Restrictive Electives

Hydraulics (CE 322), Highway Location and Control Surveying (CET 334,335,336), Construction Materials Lab (CET 341,342,343), Contracts and Specifications (CET 361), Estimating (CET 362), Computer Technology (CET 381), Technical Projects (CET 406), Construction Methods and Control (CET 441, 442,443), Photogrammetry and Construction Surveys (CET 447,448,449), Structural Problems (CET 451,452), Water and Waste Laboratory (CET 471,472,473), Forging and Welding (PT 150), Production Welding (PT 354, 355), Electrical Circuits Components (EPT 201,202,203).

Electric Power Technology

Freshman Year

	Hours
Electric Power Technology (EPT 101,102, 103)	6
English Composition (Wr 111,112,113)	9
Algebra and Trigonometry (Mth 101,102)	4
Calculus (Mth 111)	8
Abridged General Physics (Ph 211,212)	6
Computer Principles (Mth 351)	3
Elective	9
Physical education and general hygiene	3
Defense education or other elective	3

Sophomore Year

	Hours
Electrical Circuits and Components (EPT 201,202,203)	9
Principles of Economics (Ec 201,202,203)	9
General Chemistry (Ch 101,102,103)	9
Principles of Accounting (BA 211,212, 213)	9
Elective	9
Physical Education	3
Defense education or other elective	3

Junior Year

	Hours
Electrical Equipment (EPT 301,302,303)	9
Electrical Instruments and Protective Equipment (EPT 311,312,313)	9
Statistical Inference (St 421,422,423)	9
Marketing (BA 312)	4
Production (BA 311)	4
Finance (BA 313)	4
Elective	9

Senior Year

	Hours
Electrical Codes, Regulations, and Economy (EPT 411,412,413)	9
Electrical Power Generation, Transmission, and Distribution (EPT 421,422,423)	9
Business Law (BA 411)	3
Human Relations in Business (BA 497)	3
Government Relations in Business (BA 498)	3
Extempore Speaking (Sp 111,112,113)	9
Humanities or social science elective	9
Elective	9

Mechanical Technology in Agriculture

Freshman Year

	Hours
English Composition (Wr 111,112,113)	9
General Chemistry (Ch 201,202,203)	9
Animal or Poultry Science (AnS or P 121)	3
Mathematics (Mth 101,102)	8
A Concept of Agriculture (Ag 100)	2
Physical education and hygiene	3
Mechanical Prob in Agric (AE 101,102)	4
Plane Surveying (CE 226)	3
Graphics (GE 115)	3
Humanities and social science elective	3

Sophomore Year

	Hours
Agricultural Mechanics (AE 221)	3
General Biology (GS 101,102,103)	12
Organic Chemistry (Ch 226)	5
Soils (Sls 210)	5
Abridged General Physics (Ph 211,212)	6
Fundamentals of Speech (Sp 111)	3
Crop Production (FC 211)	5
Principles of Farm Mgmt (AEc 211)	5
Physical education	3

Junior Year

	Hours
Outlines of Economics (Ec 212)	3
Engines and Tractors (AE 311)	3
Pumps and Irrigation Equip (AE 321)	3
Motor Vehicles (AE 313)	3
Farm Buildings (AE 361)	3
Farm Electricity (AE 331)	3
Land Drainage (AE 319)	3
Journalism or Tech Report Writing (J 111 or Wr 227)	3
Farm Implements (AE 391)	3
Soil Mgmt and Conservation (Sls 314)	4
Basic Accounting and Fin Anal (BA 217)	3
Humanities and social science electives	6
Electives	11
Comprehensive English examination	

Senior Year

	Hours
Statics and Strength of Materials (AE 421)	3
Dynamics of Solids and Fluids (AE 422)	3
Heat Energy Processes (AE 423)	3
Business Law (BA 411)	3
Seminar (AE 407)	2
Agricultural Processing (AE 371)	3
Utilities in the Home (AE 435)	3
Agricultural economics elective	3
Humanities and social science electives	6
Electives	18

Mechanical Engineering Technology

Freshman Year

	Hours
English Composition (Wr 111,112,113)	9
College Algebra (Mth 101)	4
Trigonometry (Mth 102)	4
Calculus (Mth 111)	4
General Chemistry (Ch 101,102,103)	9
Forging and Welding (PT 150)	3
Machine Tool Practices (PT 160)	3
Mech Eng Tech Orientation (MT 101)	3
Graphics (GE 115,116,117)	9
Physical education and general hygiene	3

Sophomore Year

	Hours
Abridged General Physics (Ph 211,212)	6
Introduction to Mechanics (MT 211,212, 213)	9
Fundamentals of Accounting (BA 214, 215)	6
Computer Principles (Mth 351)	3
Extempore Speaking (Sp 111)	3
Foundry Practices (PT 140)	3
Descriptive Statistics (St 311)	3
Humanities and social science	9
Mechanisms (MT 201)	3
Physical education	3

Junior Year

	Hours
Electrical Circuits and Components (EPT 201,202,203)	9
Preliminary Design Problems (MT 381)	1
Humanities and social sciences	9
Metallurgy and materials (MT 301,302, 303)	9
Applied Heat Power (MT 321,322,323)	9
Elective	9

Senior Year

	Hours
Humanities and social science	9
Unrestricted electives	9
Electives in technology	18
Business Law (BA 411)	3
Human Relation in Business (BA 497)	3
Elective in business administration	3

Courses in Engineering

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. Agricultural Mechanics.
3 hours any term. 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

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

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 winter and spring. 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.

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 466. **Structural Reliability.** (G)
3 hours winter. 3 ①
Probability review; load and strength probability distributions; reliability of simple and complex structures; reliability designing; student project. Prerequisites: GE 213; Mth 211.

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
Power farming machinery; operation, calibration, selection, and systems of use. 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

See also courses marked (g) and (G) above

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. Offered 1966-67.

AE 525. **Processing Equipment for Agricultural Products.**
3 hours fall. 2 ① 1 ③
Fundamental theory and applications of various methods and equipment used in the processing of agricultural products. Offered alternate years. Not offered 1966-67.

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. Offered 1966-67.

AE 535. **Evapotranspiration.**
3 hours spring. 3 ①
Principles of evaporation, theoretical and empirical methods for estimating potential evapotranspiration and consumptive use, and methods of measurement. Offered alternate years. Not offered 1966-67.

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.

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. Prerequisite: General chemistry; Mth 113.

Upper Division Courses

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

ChE 325,326,327. **Chemical Engineering Problems.**
1 hour each term. 1 ②
Mass, heat, momentum, and electrical transfer phenomena; equilibrium and nonequilibrium systems. Prerequisite or parallel: GE 311, 312,313 and GE 331,332,333; Mth 321.

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 321.

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. Prerequisite: GE 313; GE 333; Ch 442; Mth 321.

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: Ch 411; Mth 321.

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; Mth 321 and ChE 411 parallel.

ChE 432. **Chemical Plant Design.** (g)
3 hours. 2 ① 1 ②
Design of plants and chemical engineering equipment. Reports required. Prerequisite: ChE 412,442,443; Mth 321.

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. Prerequisite: Mth 321.

ChE 443. **Chemical Process Kinetics.** (g) 2 hours. 1 ① 1 ②
Reaction rate; competing reactions; batch and continuous systems; reactor design; catalysis. Prerequisite: Mth 321.

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 456. Radioisotopes in Engineering and Research. (G)
3 hours. 2 ① 1 ③
Problems; theory and applications of nuclear and manufactured radiation in the areas of chemical production, metallurgical problems, instrumentation, and quantitative and qualitative analysis. Laboratory experiments illustrate applications in these fields. Prerequisite: ChE 450 or ME 450 or Ch 516 and Ch 517.

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. Prerequisite: ChE 412; Mth 321.

Graduate Courses

See also courses marked (*g*) and (*G*) above

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 operations. Prerequisite: Mth 321.

ChE 514. Fluid Flow.
3 hours. 2 ① 1 ②
Momentum transfer and related theory; special attention to recent literature. Prerequisite: ChE 426 or Mth 478.

ChE 520,521. Diffusional Operations.
3 hours winter and spring. 1 ① 1 ②
Diffusion in gases, liquids, and solids; interphase mass transfer; macroscopic mass balance. Prerequisite: ChE 426 or Mth 478.

ChE 522. Heat Transmission.
3 hours. 2 ① 1 ②
Mechanisms of transference of heat energy; transport theory. Prerequisite: ChE 426 or Mth 478.

ChE 531,532,533. Electrochemical Engineering.
3 hours each term. 2 ① 1 ②
Fuel cells; electro-organic reactions; electrodialysis and electro-winning; mass transfer and polarization; fused salt electrolysis; cell analogies; theory of electrolytic conduction; electrochemistry in nonaqueous solvents; current distribution. Prerequisite: Mth 478.

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. Prerequisite: ChE 426 or Mth 478.

ChE 539. Thermodynamics of Irreversible Processes. 3 hours. 3 ①
Non-equilibrium systems with finite potential differences but restricted to time invariancy; entropy production in such systems. Prerequisite: ChE 426 or Mth 478.

ChE 540. Applied Reaction Kinetics.
3 hours. 2 ① 1 ②
Fundamental theories of reaction kinetics and catalysis; design of reaction vessels. Prerequisite: ChE 426 or Mth 478.

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 111.

CE 224. Surveying for Landscape Architecture Students.
3 hours. 1 ① 2 ③
Use of engineers tape, level, and transit in planning and layout of projects; topographic mapping.

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. Prerequisite: Mth 111.

Upper Division Courses

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

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 223.

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 102.

CE 362. Modern Construction Methods. 2 hours. 1 ① 1 ③
Equipment and performance factors, plant selection, productivity, and costs.

CE 372. Soil Mechanics.
3 hours. 2 ① 1 ③
Origin, composition, and engineering properties of soils; settlement analysis; stabilization. Prerequisite: GE 213,302.

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 211; GE 213.

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; Mb 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 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 426. Oregon Land Survey Law.
(G) 3 hours. 3 ①
U. S. Public Land Survey System; history, development, Congressional legislation, restoration of corners, and rules of evidence; Oregon supreme court decisions; adverse possession, eminent domain and riparian rights, guarantees of title, descriptions, and plats. Prerequisite: senior standing.

CE 427. Geodesy. (G)
3 hours. 2 ① 1 ②
History and properties of the spheroid; calculation of geodetic position; figure of the earth and isostasy; gravity measurement; geodetic astronomy. Prerequisite: senior standing.

CE 428. Electronic Surveying. (G)
3 hours. 2 ① 1 ③
Electronic surveying equipment, propagation of electromagnetic waves, long line measurements and control point extension, circular and hyperbolic measurement methods. Prerequisite: senior standing.

CE 433. Hydraulic Machinery. (G)
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.
(g) 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: CE 421,451,481.

CE 471. Soil Testing for Engineers.
3 hours. 1 ① 2 ③
Soil sampling; organization of soils laboratory; identification, permeability, consolidation and strength tests. Prerequisite: CE 372.

CE 472. Foundations.
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

See also courses marked (g) and (G) above

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 511. Engineering Properties of Soils. 3 hours. 2 ① 1 ③
Geochemistry of soil formation, clay mineralogy, physical chemistry of clay water systems, permeability. consolidation, shear strength, and soil stabilization.

CE 512. Theoretical Soil Mechanics.
3 hours. 3 ①
Stresses in earth masses, plastic equilibria, lateral earth pressures, slope stability, bearing capacity, conduits and shafts, and ground water flows. Prerequisite: CE 511.

CE 513. Foundations.
3 hours. 3 ①
Subsurface exploration, shallow foundation-footings, rafts and mats, deep foundation-piers and piles, retaining structures, and control of water in excavation. Prerequisite: CE 512.

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. Hydraulic Transients.
3 hours fall. 3 ①
Problems of fluid flow in closed conduits and complex piping systems. Application of numerical methods to problems in water hammer, surge tank design, and pressures in pump discharge lines.

CE 522,523. Fluid Mechanics.
3 hours winter and spring. 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. 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 534,535. Mechanics of Materials.
3 hours each term. 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 485.

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 537,538. Reinforced Concrete.
3 hours each term. 3 ①
Winter: Prestressed concrete, analysis and design, systems of prestressing, material specification, economics. *Spring:* Ultimate strength, theory and design.

CE 539. 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 Processes.
3 hours each term. 2 ① 1 ③
Fall and winter: Unit physical operations and biological processes of water and waste treatment. *Spring:* advanced methods of water and waste treatment.

CE 543. Water Quality Studies.
3 hours. 1 ① 2 ③
Study of stream pollution, oxygen sag, reaeration, and their effects.

CE 544,545,546. Water and Air Analysis. 3 hours each term. 1 ① 2 ③
Chemical and physical principles of the measurement and analyses of the quality of water, liquid and solid wastes, and air.

CE 547. Industrial Wastes.
3 hours spring. 2 ① 1 ③
Industrial processes; strength, quantity, and character of industrial wastes; methods of prevention, treatment, and disposal.

CE 548,549. Sanitary Engineering Design.
3 hours winter and spring. 2 ① 1 ③
Design of water and waste water collection and treatment facilities.

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.

CE 561. **Photogrammetry.**
3 hours. 3 ①
Geometry of aerial and terrestrial photographs; design of cameras; rectification; design, construction, operation, and error theory of photogrammetric plotting instruments; analytical aerotriangulation. Prerequisite: graduate standing.

CE 562. **Photo Interpretation.**
3 hours. 2 ① 1 ③
Air photo interpretation and application to engineering problems; factors responsible for the formation and development of man-made features and geological landforms. Prerequisite: graduate standing.

CE 563. **Space Surveying.**
3 hours. 3 ①
Field astronomy; celestrial mechanics; dynamic and geometrical scientific observation and reduction of artificial satellite data; cislunar and lunar positions. Prerequisite: graduate standing.

ELECTRICAL AND ELECTRONICS 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, solid state, 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

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

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; circuit design and analysis 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.

EE 441,442,443. **Solid-State Electronics.** (*g*)
3 hours each term. 2 ① 1 ③
Semiconductor device fundamentals, models, and characteristics. Introduction to microelectronics. Prerequisite: EE 313,323.

EE 461,462,463. **Communication Engineering.** (*g*)
3 hours each term. 2 ① 1 ③
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

See also courses marked (*g*) and (*G*) above. 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. **Solid-State Devices.**
3 hours each term. 2 ① 1 ③
Fall: Semiconductor device design. *Winter:* Integrated circuit design. *Spring:* Thin-film devices and circuits.

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:* Graph theory and linear network transformations employing matrix methods.

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 551,552,553. **Microwave Circuits.**
3 hours each term. 2 ① 1 ③
Fall: Analysis of waveguide systems of simple geometries. *Winter:* Cavities, waveguide junctions, and lossy systems. *Spring:* Propagation in inhomogeneous media, periodic structures, and non-bilateral elements. Prerequisite: EE 422.

EE 554,555. **Control Systems.**
3 hours each term. 2 ① 1 ③
Winter: Adaptive and sampled-data systems. *Spring:* Non-linear control systems. Prerequisite: EE 560.

EE 556,557,558. **Multivariable Systems.**
3 hours each term. 2 ① 1 ③
Multivariable system analysis, synthesis, and optimization using state concepts; stability criteria; simulation; optimal control; current topics.

EE 560. **Signals and Noise.**
3 hours fall. 3 ①
Stochastic processes, correlation functions, spectral analysis applicable to communication and control systems.

EE 561,562. **Communication Systems.**
3 hours each term. 3 ①
Winter: Factors affecting the design of communication systems. Information theory, coding, detection of signals in noise. *Spring:* Switching theory and systems. Prerequisite: EE 560 or probability and statistics.

EE 571,572,573. **Pulse Circuits.**
3 hours each term. 2 ① 1 ③
Fall: Diode and transistor logic circuits, waveshaping 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. **Advanced Network Analysis.**
3 hours fall. 3 ①
Advanced topics in network theory.

EE 582,583. **Network Synthesis.**
3 hours winter and spring. 3 ①
Synthesis of networks from prescribed driving-point and transfer characteristics. Prerequisite: EE 581.

EE 589. **Reliability of Electrical Equipment.**
3 hours spring. 2 ① 1 ③
Use of probability and statistics in the design of reliable electrical equipment. Prerequisite: EE 560 or probability and statistics.

ENGINEERING PHYSICS

The curriculum in engineering physics offers the basic core of engineering plus the customary undergraduate pattern in physics. The combination is made possible by cooperative arrangement with the Department of Physics of the School of Science. The combination is terminal with the first degree. Students who intend to continue work at the graduate level would normally do so in the School of Science; customarily with a major in physics. The combination of engineering and physics offers opportunity in the more sophisticated industries where the efforts are more distinctly oriented toward physical science. The chairman of the Department of Physics also serves as the department head for engineering physics.

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.

Degrees offered in addition to a General Engineering degree are Aerospace Engineering, Automotive Engineering, Bioengineering, Metallurgical Engineering, and Nuclear Engineering upon completion of respective curricula. Curricula are on file in the departmental office.

* Sometimes designated Engineering Sciences courses.

Lower Division Courses

GE 101,102,103. **Engineering Orientation.** 2 hours each term. 1 ① 1 ②
Departmental engineering orientation. Prerequisite: Mth 111 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 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 113, Ph 209.

CE 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 113.

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 212.

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 212; 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: GE 212; Mth 321 previously or concurrently.

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.

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 demonstration. The aeronautical laboratory contains a small wind 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-administra-

tive 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

Lower Division Course

ME 291. Introduction to Aerospace Engineering.
3 hours. 3 ①
Principles of missile flight, guidance propulsion and control. Prerequisite: GE 212.

Upper Division Courses

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

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 for ME 301 and ME 303; GE 212 for ME 302.

ME 337. Heat Engines.
3 hours. 2 ① 1 ②
Construction, operation, and performance of internal combustion engines with emphasis on Diesel types; fuels and lubrication; fluid torque converters; tractive resistance. Service course for Forest Engineering students only.

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 312, 332.

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
Performance and flight 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: ME 301,302; ME 371 or Mth 321.

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. Stress Analysis. (g)
3 hours each term. 2 ① 1 ②; 2 ① 1 ③
Theory of elasticity and its application to engineering problems which cannot be treated by means of theory of strength of materials; various methods of experimental stress analysis. Prerequisite: ME 301; ME 371 or Mth 321.

ME 419,420. Vibrations. (g)
3 hours each term. 2 ① 1 ②; 2 ① 1 ③
Dynamics applied to vibrating systems; mechanical systems with one and several degrees of freedom; continuous systems; shaft "whirl," vibration isolation, and absorption; machine balancing. Prerequisite: ME 302; Mth 321 or 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, stream, 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: GE 332.

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
Analysis of chemical, nuclear plasma and ion propulsion systems and components. Prerequisite: GE 313.

ME 447,448,449. Theory of Structures. (g)
3 hours each term. 2 ① 1 ②
Theory and methods of solid mechanics used in predicting load carrying capacity of engineering structures; members in bending, torsion; trusses, frames, shells; analysis beyond the elastic range; stability. Prerequisite: ME 301; ME 371 or Mth 321.

ME 450. Principles of Nuclear Engineering. (g)
3 hours. 2 ① 1 ③
Application to engineering problems; reactor technology and design, reactor fuels and byproducts, 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 454,455,456. Aerodynamics. (g)
3 hours each term. 2 ① 1 ②
Theories of flow of perfect, compressible, and viscous fluids; application of these theories to aerodynamic design. Prerequisite: GE 331.

ME 457. Aircraft Performance. (G)
3 hours. 2 ① 1 ②
Performance and flight environment of space vehicles. Prerequisite: GE 213,311.

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 ③
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 371 or Mth 321.

ME 477. Acoustical Measurement and Control. (G)
3 hours. 2 ① 1 ②
Sound generation and propagation; measurements and analysis; acoustical characteristics of materials and configurations; design to reduce noise levels. Laboratory use of sound and vibration measuring equipment to obtain information for analysis of problem situations. Prerequisite: Ph 208.

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 ③
Internal structure, constitution, heat treatment, physical and mechanical properties of ferrous and nonferrous metals and alloys; metallographic specimens; metallurgical 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 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 ③
Fuel-air cycle analysis of piston-type internal-combustion engines; combustion studies; correlation of design with performance; power plant testing; engineering analysis of automobile chassis components; road testing; tractive resistance; fleet operating cost analysis; preventive maintenance and economics. Prerequisite: GE 313 and GE 332.

Graduate Courses

See also courses marked (*g*) and (*G*) above

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. 3 ①
Systematic approach, from first suggestion of the need through preliminary steps leading to initial design; the design itself; cursory treatment of the development, redesign, testing, manufacturing, and servicing aspects. Prerequisite: ME 413 or equivalent.

ME 516,517,518. Elasticity. 3 hours each term. 3 ①; 2 ① 1 ③; 3 ①
Basic equations of linear elasticity, with emphasis on physical interpretations; exact and approximate solutions, and applications to engineering problems; variational principles and methods; experimental determination of strains. Concurrent registration in ME 570 or Mth 423 recommended.

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 and Mth 321 or their equivalent.

ME 543. Controlled Thermonuclear Reactions.
3 hours. 3 ①
Theory of thermonuclear reactions and reactors, criteria for a sustained thermonuclear reaction, present experimental reactor designs. Prerequisite: ME 450 or equivalent.

ME 545. Flight Mechanics.
3 hours. 3 ①
Equations of motion for flight over a flat earth; summary of aerodynamics and propulsion and their application to the performance of aircraft, rockets, and re-entry vehicles. Prerequisite: ME 457,551.

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 549. Aircraft Stability and Control.
3 hours. 3 ①
Static stability and control; the general equations of unsteady motion and stability derivative terminology; dynamic, and automatic stability and control. Prerequisite: ME 458, 551.

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 551,552,553. Advanced Dynamics.
3 hours each term. 3 ①
Fall: Dynamics of particles, rigid bodies, and systems. Generalized coordinates, Hamilton's principle, Lagrange's equations; applications to planetary motions; variational principles applied to performance optimization. *Winter:* Vibrations of discreet and continuous systems. Transfer functions, normal coordinates; response to impulsive loading; wave propagation. *Spring:* Motions of non-linear systems. Free, forced, and self-excited oscillations in mechanical and electrical systems with non-linear characteristics; stability of dynamic systems. Prerequisite: ME 302; Mth 321.

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: GE 331 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 580. Metallurgical Crystallography.
3 hours. 3 ①
Symmetry operations and repetition theory, algebra of operations, point groups and crystal classes, space groups, use of the International Tables for X-ray crystallography. Prerequisite: GE 322.

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.

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.

ME 584. Mechanical Metallurgy.
3 hours. 3 ①
Response of metals to applied forces; elements of elasticity, plasticity, advanced strength of materials, crystal deformation and dislocations; applications to testing and plastic working of metals.

ME 585,586,587. Selected Topics in Engineering Materials Science.
3 hours each term. 3 ①
Theory of alloy phases, solid state reactions, liquid metals and solidification, strengthening mechanisms in solids, mechanisms of flow and fracture in metals, point and line defects, physical properties of metals. Not all topics covered each year. Prerequisite: GE 323 or equivalent.

ME 590. Fundamentals of Air Sanitation.
3 hours. 2 ① 1 ③
The air pollution problem and factors affecting it; properties, sampling, and analysis of atmospheric pollutants.

ME 591,592. Measurement and Control of Air Pollutants.
3 hours each term. 2 ① 1 ③
Atmospheric chemistry; pollutants and control measures; winds, thermal effects, and atmospheric cleaning.

ME 595. Industrial Hygiene.
3 hours winter. 2 ① 1 ③
Man and his health as a function of his work environment; evaluation and control of environmental hazards. Prerequisite: Ch 203.

Courses in Industrial Engineering

Upper Division Courses

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

IE 290. Introduction to Scientific Management.
3 hours. 3 ①
History, development, scope, and limits; basic areas of improvement and alternate means and channels of recording and evaluation.

IE 371,372,373. Systems Analysis.
3 hours each term. 1 ① 2 ②; 1 ① 2 ②; 2 ① 1 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 113; concurrent enrollment in St 371,372,373.

IE 381,382. 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 390. Safety in Industry.
3 hours. 3 ①
History; legislation, organization, services, and training; accident costs and causes; safe practice, safety and health standards, and records. Prerequisite: junior standing.

IE 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.

IE 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.

IE 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.

IE 397. Production Planning and Control.
3 hours. 2 ① 1 ②
Departmental organization and types of techniques; codification and symbolization; forecasting, materials control, routing, scheduling, dispatching, and inspecting. Prerequisite: junior standing.

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 471,472. Management Models. (G)
3 hours each term. 3 ①
Analytical techniques for solution of management problems; schematic, statistical, and mathematical models; application to industrial decisions. Prerequisite: St 473; IE 373.

IE 473. Environmental Design. (G)
3 hours. 3 ①
Design factors for optimum man-machine operations; design features for improving man's data sensing and data transmission capabilities. Prerequisite: IE 373.

IE 491. Quality Control.
3 hours. 3 ①
Manufacturing quality through use of statistical analysis; typical control techniques and underlying theory. Prerequisite: St 373.

IE 492. Material Handling and Controls.
3 hours. 3 ①
Selection of equipment, packaging, and plant layout; control considerations for automated processes. Prerequisite: IE 373.

IE 493. Industrial Supervision Principles. (G)
3 hours. 3 ①
Company, supervisor, and operator objectives and responsibilities, and their relationship to one another; solutions of case problems compared with fundamentals established by industrial leaders. Prerequisite: senior standing. Restricted to engineering students.

IE 497,498,499. Industrial Engineering 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

See also courses marked (*g*) and (*G*) above

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 571. Systems Engineering.
3 hours. 3 ①
Systems engineering and techniques; cybernetics; information and game theory; system dynamics, feedback, and stability. Prerequisite: St 373.

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.

Courses in 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 including a numerical controlled machine, 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, and mechanical and industrial engineering.

In addition to the technology curriculum offered in Production Technology, several other technology curricula are offered in various departments. These curricula are terminal at the B.S. degree level and are comprised of the specific technology, business, and general education subjects distributed through four years. The degree designations are the technology titles as they appear with the curricula outlines.

It is emphasized that the technology curricula are nonprofessional as related to engineering. The courses are not transferable to professional patterns, hence a person who elects to major in a technology cannot, at a later date, transfer to a professional pattern without loss of time and completion of all prerequisites in proper sequence. Transfer from a professional to a technology curriculum is more easily accomplished.

There exists a large and relatively unsatisfied demand for technicians in many areas where emphasis is upon the art rather than upon the science of engineering. Such persons support the professional engineer in a multitude of positions and serve as important members of industrial teams.

The technology curricula are less rigorous than the professional curricula because the latter are designed to prepare for graduate work following a first degree. No such advanced work is contemplated for those who follow the technology patterns, hence the designation "terminal." It is suggested that students who contemplate any of the technology curricula confer with an adviser prior to enrollment so that opportunities and limitations of the technical preparation will be thoroughly understood.

Production Technology

Lower Division Courses

***PT 111. Woodworking Technology.**
4 hours. 2 ① 2 ②
Wood as a material; equipment and processes; use of nonwood materials in construction of wood furnishings.

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 ferrous and nonferrous metals, methods in production of castings.

PT 141. Foundry Practices.
4 hours. 3 ① 1 ③
Properties and design limitations of casting in ferrous and nonferrous metals, the production of castings.

PT 150. Forging and Welding.
3 hours. 2 ① 1 ④
Forging, forming, and heat-treating of steel, followed by gas and electric-arc welding, flame cutting, brazing, and resistance-welding operations.

***PT 151. Welding and Fabrication.**
4 hours. 3 ① 1 ③
Welding processes, including gas, arc, and resistance welding, brazing, and cutting as applied to ferrous and non-ferrous metals. The forming, forging, and heat treatment of steel.

PT 160. Machine Tool Practices.
3 hours. 2 ① 1 ④
Prescribed projects representative of industrial operations. Prerequisite: Mth 50.

* In courses designated by asterisks, in addition to the regularly scheduled meetings, the student may be required to attend three general meetings during the term.

***PT 161. Machine Tool Practices.**
4 hours. 3 ① 1 ③
Metalworking projects representative of industrial operations and methods. Prerequisite: Mth 50.

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 education. 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. 3 ①
Metal casting, welding and brazing, machining, and plastic flow of metals and nonmetals; quality control; 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.

PT 270. General Metals Laboratory.
3 hours. 1 ① 2 ③
Forging, heat-treating, welding, nonferrous metal casting, and machine tool work. For industrial education.

Upper Division Courses

PT 310. Production Millwork.
3 hours. 2 ① 1 ②
Production methods in contract millwork industries; special machines for multi-unit production; standard practices in the cabinet, furniture, and millwork industries. Laboratory work in design and construction of quantity, and quality-control devices for specific production problems. Prerequisite: PT 111 and/or PT 121, depending upon major.

PT 311. Millwork: Machine Woodwork. 3 hours. 1 ① 2 ③
Design and construction of jigs and fixtures, and their use with common woodworking machines for mass production of a millwork project; organization of laboratory facilities and personnel for production; methods of quality control for items produced in limited quantities. Prerequisite: PT 112,113. (For industrial education students.)

PT 312,313,314. Furniture Design and Construction.
3 hours each term. 1 ① 2 ③
Design, planning, and construction of furniture items with emphasis on original design, materials use, and construction of major furniture pieces and groupings. Prerequisite: AA 281; PT 310 or 311.

PT 316. Wood and Metal Finishing.
3 hours. 1 ① 2 ③
Application of modern finishes to old and new work on 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
Safety, high utility, performance, and stability. Typical plans and actual construction under practical conditions. For industrial education. Prerequisite: PT 112,333.

† Three facilities tours per term may be scheduled.

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
Nature and characteristics of building materials through laboratory experimentation, and the techniques employed in their application to residential and commercial construction. Prerequisite: PT 121 and AA 179.

PT 332. Pattern Making.
2 hours. 2 ① 1 ③
Problems in production pattern, factors influencing production costs.

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 full-size 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 education.

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.

PT 350. Welding and Fabrication.
3 hours. 2 ① 1 ④
Techniques; heat treating, general fabrication, equipment selection, and maintenance problems oriented to instruction in school and small shops. For industrial education. Prerequisite: PT 150 or PT 151.

PT 354,355. Production Welding.
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. Prerequisite: PT 150 or PT 151.

PT 360. Machine Shop Practices.
3 hours. 2 ① 1 ④
Individual and group projects. For industrial education. Prerequisite: PT 160 or PT 161.

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 262.

PT 364. Nonmetallic Materials Technology. 3 hours. 3 ①
Manufacturing, production methods, and processes applied to plastics, ceramics, and other nonmetallic engineering materials for consumer products; chemical composition of these materials.

PT 365. Materials Technology.
4 hours. 3 ① 1 ②
Elements of products design; determination of strength of tooling elements used in manufacturing processes. Prerequisite: Mth 102; junior standing in production technology.

PT 366. Numerical Control Technology. 3 hours. 3 ①
Application of numerical control to manufacturing processes and product design; control systems for machine tools; manual and computer-assisted programing techniques for point-to-point and continuous-path machining. Prerequisite: Mth 102 and junior standing.

PT 370. Electricity Technology.
3 hours. 1 ① 2 ③
Electricity technology, electrical circuits and controls, wiring for light and power circuits, communication and control systems. 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 education. Prerequisite: PT 350 or PT 380.

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. Construction Operations 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 of residential and light-commercial buildings. Prerequisite: IE 397; PT 421.

PT 464,465,466. Tool Engineering.
3 hours each term. 2 ① 1 ②
Tools, jigs, fixtures, and die design; operation sequences, dimensional and quality control. Power press applications on the plastic working of metals and nonmetals. Prerequisite: senior standing.

Civil Engineering Technology

Lower Division Courses

CET 111,112,113. Technical Problems and Drawing.
2 hours each term. 1 ① 1 ②
Elementary technical problems related to civil engineering field, methods of work, use of slide rule, graphical representation.

CET 121. Drawing and Descriptive Geometry. 3 hours. 1 ① 2 ②
Fundamentals of engineering drawing, orthographic projection, study of lines, planes, and solids.

CET 221,222,223. Plane Surveying.
3 hours each term. 1 ① 2 ③
CET 221: Care and use of theodolite, transit, level, electronic distance measuring equipment, and tapes; effect of errors of observations; traverse and area surveys; machine computations. *CET 222:* U. S. public land survey system; metes and bounds descriptions; deeds as legal documents; use of state plane coordinate systems; theory of adjustment of survey equipment. *CET 223:* Stadia and other tachymetry methods; topographic mapping techniques; profile surveys; borrow pit and highway earthwork measurement and estimates. Prerequisite: Mth 102.

CET 232. Civil Engineering Drawing.
3 hours winter. 1 ① 2 ③
Drawing techniques applied to civil engineering projects. Prerequisite: CET 121.

CET 242. Laboratory Techniques.
3 hours spring. 1 ① 2 ③
Care and use of laboratory instruments commonly used in soils, highway, and structural laboratories; elementary testing projects. Prerequisite: Ph 211,212.

CET 252,253,254. Mechanics: statics, dynamics, strength of materials.
3 hours each term. 2 ① 1 ②
Fundamental concepts of mechanics applied to elementary civil engineering problems.

Upper Division Courses

CET 334,335,336. Highway Location and Control Surveying.
3 hours each term. 1 ① 2 ③
CET 334: Geometry of highway location: circular, compound vertical, and spiral curves; field problems. *CET 335:* Curve problems in highway design; earth distribution analysis; preliminary office studies and paper location procedures; machine compilation of field data. *CET 336:* Second-order control surveys by traverse and triangulation; three-wire leveling astronomic determination of position. Prerequisite: CET 223.

CET 341,342,343. Construction Materials Laboratory.
3 hours each term. 1 ① 2 ③
CET 341: Origin of soils, standard soil tests for engineering projects. *CET 342:* Standard tests for structural elements, timber, steel, concrete. *CET 343:* Highway materials standard tests, asphalt, concrete, base and subbase materials.

CET 361. Contracts and Specifications.
3 hours fall. 3 ①
Elementary principles of Laws of Contracts as applied to engineering work; correlation of blueprints and specifications.

CET 362. Estimating.
3 hours winter. 2 ① 1 ③
Quantity surveying, establishment of unit prices, overhead, profits; concrete, steel, and timber.

CET 371. Construction Engineering Economy. 3 hours fall. 3 ①
Engineering economy used as a decision-making tool to evaluate proposed investments in money terms; use of compound interest and depreciation calculations to compare the relative economy of alternatives in construction engineering.

CET 381. Computer Technology.
3 hours fall. 2 ① 1 ③
Elementary computer coding instruction, language, and laboratory work. Prerequisite: Mth 102.

CET 441,442,443. Construction Methods and Control.
3 hours each term. 2 ① 1 ③
CET 441: Earth moving, grading, classifications, methods, and equipment. *CET 442:* Construction of concrete, steel, and timber structures, specific construction projects and equipment; equipment maintenance.

CET 447,448,449. Photogrammetry and Construction Surveys.
3 hours each term. 1 ① 2 ③
CET 447: Terrestrial photogrammetry, aerial cameras, geometry of the aerial photograph, ground control requirements and principles of radial-line plotting and planimetric mapping, mosaics. *CET 448:* Orientation of a photograph, stereoscopy and parallax, geometry of overlapping vertical photographs, rectification of tilted photographs, stereoscopic plotting instruments, oblique photography, point identification. *CET 449:* Theory and practice in construction survey problems; highways, buildings, and special situations; evaluation of different methods and equipment used.

CET 451,452. Structural Problems.
4 hours winter, spring. 2 ① 2 ③
Study and design of building elements of concrete, steel, and timber; detailing and fabrication. Prerequisite: CET 254.

CET 471,472,473. Water and Waste Laboratory.
3 hours each term. 1 ① 2 ③
Chemical, physical, and microbiological analysis applied to domestic water supplies; waste water and control and operation of treatment plants. Prerequisite: Ch 101.

Electric Power Technology

Lower Division Courses

EPT 101,102,103. Electric Power Technology. 2 hours each term. 1 ① 1 ②
Fundamentals of electric power technology.

EPT 201,202,203. Electrical Circuits and Components.
3 hours each term. 1 ① 2 ②
Electrical circuit fundamentals, characteristics of electrical components, economic and reliability evaluation of components.

Upper Division Courses

EPT 301,302,303. Electrical Equipment. 3 hours each term. 1 ① 2 ②
Characteristics of various electrical equipment; evaluation of total cost of operation.

EPT 311,312,313. Electrical Instruments and Protective Equipment.
3 hours each term. 1 ① 2 ②
Principles of electrical instruments, electrical measurements, and electrical circuit protection; characteristics of electrical circuit protective devices.

EPT 411,412,413. Electrical Codes, Regulations, and Economy.
3 hours each term. 1 ① 2 ②
National, state, and local electrical codes and regulations; power utility economy; plant investment, rates, and profit.

EPT 421,422,423. Electrical Power Generation, Transmission, and Distribution. 3 hours each term. 1 ① 2 ②
Principles and economic evaluation of various methods.

Mechanical Engineering Technology

Lower Division Courses

MT 101. Mechanical Engineering Technology Orientation.
3 hours. 2 ① 1 ②
Scope of technology and position of the technologist in relation to the scientist and the engineer; logical solution to problems; familiarization with equipment; use of common instruments and devices for problem solution.

MT 201. Mechanisms.
3 hours. 1 ① 2 ②
Analysis of mechanisms and linkages; kinematics of machines. Prerequisite: Mth 101, 102; MT 212.

MT 211,212,213. Introduction to Mechanics.
3 hours each term. 2 ① 1 ②
Applications of mechanics principles to prediction of effects of forces on mechanical systems. Prerequisite: Mth 111.

Upper Division Courses

MT 301,302,303. Metallurgy and Materials. 3 hours each term. 2 ① 1 ②
Structure and properties of engineering materials; modification of properties through changes in structures; effect of service environments on properties and stability of materials; metallic, organic, and ceramic materials and processes.

MT 321,322,323. Applied Heat Power.
4 hours each term. 2 ① 2 ②
Energy and power sources and methods of conversion; laws governing gases, vapors, processes, cycles, fuels, and combustion; operation, testing, and maintenance of mechanical equipment including fans, blowers, pumps, compressors, boilers and burners, engines and turbines, heat exchangers, refrigeration, and air conditioning systems; instrumentation, testing procedures, and evaluation of performance tests on heat power machinery. Prerequisite: Ph 212; Ch 103; Mth 111.

MT 381. Preliminary Design Problems.
1 hour. 1 ③
Projects emphasizing determination and organization of design project requirements and criteria and use in preliminary designs. Student is assigned project at beginning of each three-hour period and submits proposed preliminary design at end of period. Prerequisite: junior standing.

MT 411. Mechanical Design.
3 hours. 1 ① 2 ②
Application of principles of mechanism, mechanics, and strength of materials to design of machine elements and mechanical systems. Prerequisite: MT 201,213,381.

MT 421,422. Air Conditioning and Ventilation.
3 hours each term. 2 ① 1 ③
Calculation of heating and cooling loads; air and temperature distribution; properties of dry and moist air; air washers and humidity control; heating and refrigerating requirements; matching components and systems characteristics. Prerequisite: MT 323.

MT 423. Refrigeration and Heat Pumps. 3 hours. 2 ① 1 ③
Vapor compression refrigeration cycles; direct expansion and brine-cooled cooling coils; condensing units and cooling towers; heat pumps and heat sources; controls and operation of vapor compression systems; adsorption refrigeration systems. Prerequisite: MT 421,424.

MT 424. Refrigeration.
3 hours. 1 ① 2 ③
Operation, maintenance, and trouble shooting of refrigeration systems. Prerequisite: MT 323.

MT 425. Mechanical and Electrical Equipment of Buildings.
3 hours. 2 ① 1 ③
Mechanical and electrical equipment of buildings, especially for those interested in their installation, adjusting, and maintenance; checking and maintaining typical equipment; field trips. Prerequisite: MT 323; EPT 203.

MT 426. Automatic Control Systems.
3 hours. 2 ① 1 ③
Process instrumentation and system analysis in automatic process control; operation of various types of control systems. Prerequisite: MT 323.

MT 428. Refrigeration for Food Processing and Preservation.
3 hours. 2 ① 1 ③
Refrigeration systems, cooling-load calculation, system controls, plant layout, and problems in plant construction and operation in food processing and preservation. Prerequisite: MT 424.

MT 429. Special-Purpose Refrigeration Systems.
3 hours. 2 ① 1 ③
Heat pumps, air cycle systems, absorption refrigeration cycle, low temperature systems, and systems used for solidification and liquification of gases. Prerequisite: MT 424.

MT 431,432,433. Power Plants.
3 hours each term. 2 ① 1 ③
Power plants and energy conversion systems; installation and operation of the equipment; steam, internal-combustion engine, gas turbine, hydroelectric, nuclear, solar, and others; fuels and combustion, heat transfer, fluid flow, and auxiliary equipment; field trips. Prerequisite: MT 323.

MT 435. Power Plant Economics.
3 hours. 2 ① 1 ③
Construction, operating, and maintenance costs of power plants; fuel, labor, maintenance, and overhead items; accounting systems. Prerequisite: MT 432.

MT 481,482,483. Metallography.
3 hours each term. 2 ① 1 ③
Metallographic laboratory technique; preparation of samples; the metallurgical microscope, photomicrography; macroscopic examination; pyrometric practice; thermal analysis; radiographic technique; special metallurgical tests. Prerequisite: MT 303.

MT 486,487,488. Materials Testing Laboratory.
3 hours each term. 2 ① 1 ③
Standard test procedures; importance of methods on accuracy and significance of results; metallic and nonmetallic materials, stress analysis and nondestructive testing. Prerequisite: MT 213; 303.

MT 491. Internal Combustion Engines.
3 hours. 2 ① 1 ③
Cycles, mechanical and thermodynamic; engine construction, operation and performance; fluid flow as applied to carburetion; fuel systems and combustion in spark-ignition and compression-ignition engines; electrical systems; lubrication fundamentals. Prerequisite: MT 323.

MT 492,493. Automotive Chassis.
3 hours each term. 2 ① 1 ③
Construction and design of automobile chassis and drive line components; purpose, function, operation, and performance. Prerequisite: MT 212,323.

MT 494. Fleet Operation.
3 hours. 2 ① 1 ③
Economics of motor fleet operation; cost analysis, vehicle taxation, preventive maintenance practices, laws governing size and weight restrictions, fuel economy, and tractive ability as applied to equipment selection.

MT 495. Fuel and Lubricant Technology. 3 hours. 2 ① 1 ③
Properties and application of fuels and lubricants to combustion devices and machines.

For description of courses in Mechanical Technology in Agriculture, see School of Agriculture.

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.

By far the greatest industry in Oregon, forestry is also 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. Forestry is a highly satisfying occupation with expanding possibilities.

Forestry

FACULTY

As of January 1966

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 Dean, Professor.

ROBERT RAY REICHART, Ed.D., Director, Improvement of Forestry Instruction Project; Professor of Forestry Education.

WILLIAM PERRY WHEELER, M.F., Personnel Director, School of Forestry; Professor of Forest Management.

Professor Emeritus PATTERSON.

Forest Engineering: Professors DAVIES (department head), O'LEARY.

Associate Professor WILSON.

Assistant Professor MCLAREN.

Forest Management: Professors DILWORTH (department head), FERRELL, KENISTON, ROBINSON, WHEELER, YODER.

Associate Professors BELL, JAENICKE, KRYGIER, RANDALL, SUTHERLAND.

Assistant Professors IRGENS-MOLLER, NEWTON, PAINE.

Forest Products: Professor WEST (department head).

Associate Professors MCKIMMY, 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.

Associate Professors CHING, HERMANN, LAVENDER.

Assistant Professors BLACK, HOOVEN, KANGUR, WARING, ZAERR.

Assistants in Forest Management Research CARMICHAEL, CLEARY, DOERKSEN, ELFERS.

Forest Products: Professors ELLIS (department head), ESPENAS, SNODGRASS.

Associate Professors ATHERTON, CORDER, CURRIER, GRAHAM, JOHNSON.

Assistant Professors AFT, KOZLIK, KRAHMER, LEHMANN, MILLER, MOLYNEUX, OVERHOLSER, SCHROEDER.

Instructors KUNESH, MOTHERSHEAD.

Assistants in Forest Products Research MANNERS, POLENSEK, ROSS, SIEBEN.

Entrance

All new students must complete Oregon State University and School of Forestry requirements for entrance, including the Scholastic Aptitude Test. All freshmen take placement tests in English and mathematics. Transfer students who do not have academic credit for college-level English and/or mathematics will also take the appropriate placement tests. Deficiencies shown by these tests should be corrected by the student before enrolling in regular courses in the subjects concerned. 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 may be required because of difficulties in scheduling sequence and prerequisite courses. Transfer credits in general education courses accepted by the University may be used to satisfy the School's general education requirements. Courses in forestry subjects, other than general forestry, from two-year or from four-year institutions with unaccredited forestry programs may be accepted only after the student demonstrates an adequate grasp of the subject matter concerned by examination or other adequate evidence. Appropriate courses from accredited forestry schools will be accepted without examination to fulfill the School's curricular requirements. The University does not grant credit for work done in vocational or technical training programs.

Graduation

Academic requirements: Minimum requirements for bachelor's degree include the University stipulations listed in the *General Catalog:* 204 term hours of university-level courses in an approved curriculum, 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. The student is personally responsible for fulfilling all curricular requirements in proper sequence. 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 School's Forest Research Laboratory, 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 vital area of resource management.

Curricula in Forestry

B.S., B.F., M.S., M.F., Ph.D.

The Bachelor of Science (B.S.) or Bachelor of Forestry (B.F.) 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 areas. A student may combine engineering and management and earn degrees in both departments. See next page for options in forest science and forest recreation and the five-year program in engineering in cooperation with the Civil Engineering Department.

Through the Graduate School the three departments offer the Master of Science (M.S.) and Master of Forestry (M.F.) degrees. The Forest Management and the Forest Products departments also grant the Doctor of Philosophy (Ph.D.) degree.

FRESHMAN YEAR[1] ..... Common to all programs

	Term: Fall	Term: Winter	Term: Spring	Total hours
General Botany (Bot 201,202)	3	3	..	6
Mathematics (Mth 101,102,111)	4	4	4	12
Chemistry (Ch 101,102,103 or Ch 201,202,203)	3	3	3	9
English Composition (Wr 111,112,113)	3	3	3	9
Graphics (GE 115)	..	..	3	3
General Forestry (F 111)	(3)	3	(3)	3
Forest Engineering (FE 123)	..	..	3	3
Forest Orientation (F 101)	1	(1)	..	1
Physical education, general hygiene	1	1	1	3
Defense education or electives	1	1	1	3
	16	18	18	52

[1] Students who give evidence of less than average ability in writing courses may be required to take a comprehensive examination to determine their need for additional work in this area.

Forest Engineering

Accredited by Society of American Foresters

FOUR-YEAR CURRICULUM

Sophomore Year

	Hours
Forest Engineering (FE 223)	4
Tree Identification (F 153)	3
Mensuration (F 224)	5
Forest Protection (F 231)	3
Wood Technology (FP 210)	3
Calculus with Anal Geom (Mth 112)	4
General Physics (Ph 201,202,203)	12
Fundamentals of Speech (Sp 111)	3
Technical Report Writing (Wr 227)	3
Humanities or social science elective	3
Basic Geology (G 221)	3
Physical education	3
Defense education or other elective	3
	52

Junior Year

	Hours
Forest Engineering (FE 323)	3
Logging Roads (FE 361)	3
Northwest Logging (FE 360)	4
Aerial Photointerpretation (F 320)	3
Forest Valuation (F 324)	3
Silvicultural Practices (F 342)	4
Timber Mechanics (FP 321)	4
Principles of Accounting (BA 211,212)	6
Principles of Economics (Ec 201,202,203)	9
Heat Engines (ME 337)	3
Electives	9
	51

Senior Year

	Hours
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	9
	49

FIVE-YEAR CURRICULUM

Second Year

	Hours
Forest Engineering (FE 223)	4
Tree Identification (F 153)	3
Mensuration (F 224)	5
Forest Protection (F 231)	3
Wood Technology (FP 210)	3
General Physics (Ph 201,202,203)	12
Calculus with Anal Geom (Mth 112,113, 211)	12
Physical education	3
Defense education or other elective	3
	48

Third Year

	Hours
Forest Engineering (FE 323)	3
Silvicultural Practices (F 342)	4
Mechanics of Solids (CE 211,212,213)	9
Fundamentals of Speech (Sp 111)	3
Principles of Accounting (BA 211,212)	6
Basic Geology (G 221)	3
Technical Report Writing (Wr 227)	3
Applied Differential Equations (Mth 321)	3
Principles of Economics (Ec 201,202,203)	9
Humanities or social science electives	9
	52

Fourth Year

	Hours
Logging Roads (FE 361)	3
Northwest Logging (FE 360)	4
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
Business Law (BA 411)	3
Electives	9
	46

Fifth Year

	Hours
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 by Society of American Foresters

Sophomore Year

	Hours
Dendrology (F 254)	4
Mensuration (F 224)	5
[1]Forest Protection (F 231)	3
Forest Engineering (FE 223)	4
Wood Technology (FP 210)	3
Fundamentals of Speech (Sp 111)	3
Principles of Economics (Ec 201,202,203)	9
Forest Soils (Sls 214)	4
Basic Geology (G 221)	3
Plant Physiology (Bot 330)	3
Technical Report Writing (Wr 227)	3
Physical education	3
Defense education or other electives	3
	50

Junior Year

	Hours
Aerial Photointerpretation (F 320)	3
Mensuration: Timber Growth (F 327)	5
Forest Valuation (F 324)	3
Forest Ecology (F 341)	4
Silvicultural Practices (F 342)	4
Forestation (F 343)	3
Forest Recreation (F 364)	3
Forest Engineering (FE 323)	3
Logging Methods (FE 392)	3
Abridged General Physics (Ph 211,212)	6
Basic Accounting and Financial Analysis (BA 217) or Principles of Accounting (BA 211,212)	3–6
Electives	9-12
	52

Senior Year

	Hours
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 (RM 341)	3
Wood Utilization (FP 310)	3
Business Law (BA 411) or Real Estate Law (BA 414)	3
Humanities or social science electives	9
Electives	9
	50

FOREST SCIENCE OPTION

Sophomore Year

	Hours
Dendrology (F 254)	4
Mensuration (F 224)	5
Forest Engineering (FE 223)	4
Wood Technology (FP 210)	3
Fundamentals of Speech (Sp 211)	3
Principles of Economics (Ec 201,202,203)	9
Forest Soils (Sls 214)	4
Basic Geology (G 221)	3
Plant Physiology (Bot 331)	5
Technical Report Writing (Wr 227)	3
Physical education	3
Defense education or other electives	3
	49

Junior Year

	Hours
Forest Entomology (Ent 423)	4
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
Humanities or social science electives	9
Approved science electives	4
Electives	9
	52

Senior Year

	Hours
Seminar (F 407)	1
Forest Economics (F 412)	3
Forest Administration (F 415)	3
Forest Management (F 425)	5
Forest Pathology (Bot 415)	4
Statistics	3
Foreign language sequence	12
Approved science electives	11
Electives	9
	51

FOREST RECREATION OPTION

Freshman Year: Common freshman year.

Sophomore Year: Same as regular forest management curriculum.

Junior Year

Forest Recreation (F 364)	3
Forest Recreation Planning (F 365)	3
Landscape Design Theory (LA 280)	3
Applied Landscape Design (LA 290)	3
Aerial Photointerpretation (F 320)	3
Forest Valuation (F 324)	3
Forest Ecology (F 341)	4
Forest Practices (F 342)	4
Forestation (F 343)	3
Forest Engineering (FE 323)	3
Logging Methods (FE 392)	3
Applied General Physics (Ph 211-212)	6
Approved electives	10
	51

Senior Year

Seminar (F 407)	1
Forest Economics (F 412)	3
Forest Administration (F 415)	3
Watershed Management (F 424)	3
Forest Managemnt (F 425)	5
Fire Control (F 431)	4
Forest Recreation Management (F 464)	3
Forest Engineering (FE 423)	4
Approved social science electives	12
Approved electives	13
	51

Forest Products

Sophomore Year

	Hours
Tree Identification (F 153)	3
Mensuration (F 224)	5
[2]Forest Protection (F 231)	3
Wood Identification (FP 311)	3
Principles of Accounting (BA 211,212)	6
General Physics (Ph 201,202,203)	12
Fundamentals of Speech (Sp 111)	3
Technical Report Writing (Wr 227)	3
Humanities or social scienc elective	3
Physical education	3
Defense education or other elective	6
	50

Junior Year

	Hours
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 201,202,203)	9
Humanities or social science electives	6
[3]Electives	18
	51

Senior Year

	Hours
Forest Economics (F 412)	3
Forest Administration (F 415)	3
Seminar (FP 407)	1
The 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
[3]Electives	26
	51

[1] May substitute Ent 423 *and* Bot 415.
[2] May substitute Ent 423 *or* Bot 415.
[3] See paragraph under Forest Products.

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.

Because of the close proximity of the Peavy Arboretum, the McDonald Forest, the Dunn Forest, and other timber-growing tracts owned or administered by the School of Forestry, a good many of the laboratory periods for courses in Forest Engineering are conducted under field conditions.

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

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

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 111; 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 223.

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 323,360,361.

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.

FE 481. Production Planning and Control in Logging. (G)
4 hours. 3 ① 1 ③
Collecting and analyzing field data. Mathematical models of cost and performance of principal phases of logging. Work scheduling procedures; inventory control; mechanics of yarding; new and experimental logging equipment.

Graduate Courses

See also courses marked (g) or (G) above.

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 development 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.

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 101. Orientation.
1 hour. 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.

Sls 214. Forest Soils.
See School of Agriculture.

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 254.

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 254.

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

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

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 213; Sls 214; G 221; plant physiology.

RM 341. Range Management.
See School of Agriculture.

F 342. Silvicultural Practices.
4 hours. 3 ① 1 ③
Treatment of stands to insure perpetuation of forest resources. Prerequiste: 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 1965-66.

F 364. Forest Recreation.
3 hours. 2 ① 1 ③
Development of outdoor recreation in U. S.; recreation demands and resource needs; policies and practices of land management agencies; legislative proposals.

F 365. Forest Recreation Planning.
3 hours. 2 ① 1 ③
Inventory and evaluation of forests and other wild lands as bases for recreation policy, planning, and management decisions. Prerequisite: F 364.

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. 2 ① 1 ②
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.

Bot 415. Forest Pathology.
See School of Science.

Ent. 423. Forest Entomology.
See School of Science.

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; F 342; senior standing in forestry; for forest management majors, except forest science, 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.

F 464. Forest Recreation Management.
(g) 3 hours. 3 ①
Management of public and private outdoor recreation areas. Integration of recreation with other land management objectives. Prerequisite: F 365.

Graduate Courses

See also courses marked (*g*) or (*G*) above.

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.

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 each term, three terms.
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. Forest Hydrology.
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.

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 254.

Upper Division Courses

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

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 111; 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.

Ch 470. Forest Products Chemistry.
See School of Science.

Ch 472,473. Pulp and Paper Chemistry.
See School of Science.

Graduate Courses

See also courses marked (*g*) or (*G*) above.

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.

THE SCHOOL OF HOME ECONOMICS AT OREGON STATE UNIVERSITY provides both liberal and professional education. It is aimed at helping the student develop a better understanding both of himself as a thinking, feeling individual and of the world in which he lives, as well as to prepare him for gainful work.

The program of studies therefore includes a broad background in the arts and humanities, the physical and biological sciences, and the social sciences. These fundamental disciplines form the basis for professional work in home economics.

Home Economics represents a group of studies centered around the needs of the home, the family, and its individual members. The principles derived from the basic disciplines are applied to problems of food, shelter, clothing, management of resources, and interpersonal relations.

Professional fields for which students are prepared include teaching at various levels, e.g., nursery school, secondary school, and continuing education for adults; promotion, experimentation, writing, and advertising of foods, equipment, and textiles; merchandising and fashion; hospital dietetics and institutional food service; extension service at home or abroad; social work and public health. Students are also prepared for graduate study leading to research and college and university teaching.

Home Economics

FACULTY

As of January 1966

BETTY E. HAWTHORNE, Ph.D., Dean of the School of Home Economics.

WINNIFRED KEIL FULMER, M.S., Head Counselor.

Emeritus Professors BAKER, BRANDON, CLARK, FRITCHOFF, GARRISON, GATTON, INGALLS, MACK, PRENTISS, TANK, VAN HORN, WILSON.

Clothing, Textiles, and Related Arts: Professors EDABURN (acting department chairman), GATTON, INGALLS, PATTERSON, WILLOUGHBY.
Associate Professors DIEDESCH, LEDBETTER, MOSER.
Assistant Professors BUBL, GRANT, V. WELLS.
Instructor SNYDER.

Family Life: Professors HAWTHORNE (acting department chairman), KIRKENDALL.
Associate Professors AIKIN, SCHALOCK, WIGGENHORN.
Assistant Professors D. A. MILLER, SIMMONS.
Instructors PLANTS, POOLE, VAN LOAN.

Foods and Nutrition: Professors FINCKE (department head), CHARLEY, HAWTHORNE, MACKEY, STORVICK.
Assistant Professors BARTE, BECKER, BUSSARD, EAST, JOHNSON, PETERS, WALLACE.
Instructors HOLMES, PELTO.

Home Economics Education: Professor DUBOIS (department head); Supervisor and Teacher Educator GOODWIN.
Associate Professor MCQUESTEN.
Assistant Professor GALLAGHER.

Home Economics Research: Professors STORVICK (chairman), CHARLEY, MACKEY.
Assistant Professors BUBL, PETERS.
Senior Instructors BENSON, EDWARDS.

Home Management: Associate Professors H. WELLS (acting department chairman), PLONK.
Assistant Professors D. S. MILLER, SINNARD.
Instructors KARIKKA, TEITZEL.

Institution Management: Professors FINCKE (acting department chairman).
Associate Professor CLEAVELAND.
Assistant Professors BOKORNEY, WIARD.
Instructors MATSUO, PELTO.

Home Economics Extension: Professors TASKERUD (assistant director, Federal Cooperative Extension Service), FRASIER (family life specialist), SCALES (State agent).
Associate Professors ABBOTT (State agent), BRASHER (State agent, 4-H Clubs), BROWN (home furnishing specialist), FUNK (State agent), JOHNSTON (family economics specialist), REDMAN (State 4-H agent), STRAWN (home management specialist).
Assistant Professors CARLSON (clothing specialist), HOLTHOUSE (food marketing specialist), JOHNSON (State 4-H agent), SEAT (food marketing specialist).

Curricula in Home Economics

Degree Programs

The Bachelor of Science (B.S.) and Bachelor of Arts (B.A.) degrees are offered in all departments. Advanced degrees in home economics offered through the Graduate School are the Master of Arts (M.A.), Master of Science (M.S.), Master of Home Economics (M.H.Ec.), and Doctor of Philosophy (Ph.D.). Master's degrees are offered with a major in any of the departments. A student may work toward the M.H.Ec. degree in general home economics as well as in one of the departments. The Ph.D. is offered in foods, nutrition, child development, family relations, and home management.

Transfer students who have taken some of their home economics courses elsewhere must take at least one course in each of the basic home economics subject matter areas at Oregon State University to qualify for a degree. They must also take the Level I Mathematics Achievement Test unless they have satisfactorily completed a college course in algebra.

Graduate students in home economics have an opportunity to work with the faculty in research projects. The School cooperates with the Agricultural Experiment Station in research programs and undertakes studies supported by federal, state, private, and general research funds.

Special Programs

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 capabilities and interests. In such special programs students may elect a variety of courses in other schools and departments on the campus.

Correspondence Study. Home economics courses are also offered by correspondence through the Division of Continuing Education 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 for 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.

Core 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.

12-14 hours in foods and nutrition: FN 225; 211,212 or 220,221; 313.

9 hours in child development and family life: FL 225, 311,322.

12 hours in household equipment, home management, and finance: HM 240,330,341,450 or alternate.

1 hour in home economics orientation: HEc 101.

9 hours of upper division electives in home economics subjects. See AREAS OF CONCENTRATION listed on next pages.

Science and Social Science

15 hours in science, of which 9-12 are a laboratory sequence (not a survey). See AREAS OF CONCENTRATION on next page.

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.

6 hours of electives in science or social science. See below.

Other combinations of social science courses may be taken for specific areas of concentration.

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.

4 hours of art: Basic Design I.

2 hours of art or music.

3 hours of architecture: House Planning and Architectural Philosophy.

Other requirements

Mathematics 50 or exempt by the Level I Mathematics Achievement Test.

Physical Education: five terms in activity courses and one term in general hygiene required for senior standing.

Additional courses chosen from AREAS OF CONCENTRATION listed on next page to meet graduation requirements.

Freshman Year

	Hours
Basic Design I (AA 195, 196)	4
Art or Music	2
Science sequence with laboratory (not a survey)	9-15
English Composition (Wr 111,112,113)	9
Intro to Home Economics (HEc 101)	1
Nutrition (FN 225)	3
Clothing Construction (CT 210 or 216)	3
Clothing Selection (CT 211)	3
Textiles (CT 250)	3
Literature or speech	3
Physical education	3–4
Electives	1–5

Sophomore Year

	Hours
Foods (FN 211,212) or (220,221)	6–8
Child Development (FL 225)	3
Management in Family Living (HM 240)	2
House Planning and Architectural Philosophy (AA 178)	3
General Psychology (Psy 201,202)	6
History of Western Civilization (Hst 101,102,103)	9
Literature or literature in a foreign language	6
Physical education	3–4
Electives	7–10

Junior Year

	Hours
Meal Management (FN 313)	3
Personal and Family Finance (HM 341)	3
Child Development (FL 311)	3
Household Equipment (HM 330)	3
[1]Outlines of Economics (Ec 115)	3
General Sociology (Soc 204)	3
Political science	3
Home Furnishing (CT 331)	3
Science	3–6
Electives or courses in area of concentration	21–24

Senior Year

	Hours
Family Relationships (FL 322)	3
Home Management House (HM 450) or alternate	3–4
Upper division electives in home economics	9
Electives	32

[1] Course may also be first term of a sequence if the sequence is to be completed.

AREAS OF CONCENTRATION

Students elect an area of concentration to prepare for professional work. Six hours of approved home economics courses in the core requirements (only three from any one department) may be replaced (except for home economics education and general home economics) with courses that have been approved. Students should consult their advisers as soon as possible in their college careers to plan their total programs.

Child Development and Family Life

Hours

Core in home economics, exclusive of upper division electives 46

Family Life and Home Management.. 15
Child Development (FL 413); The Nursery School Child (FL 425); Selected Topics in Family Life (FL 481); Management Problems in Home-Community Relations (HM 445); choice of FL 430 or any FL seminar.

Science 28
Chemistry or biological science sequence; Physiology (Z 331, 332); Genetics (Z 341); Descriptive Statistics (St 311).

Social science in core 24

Additional social science 18
Anthropology (Anth 214,215,216); upper division hours in sociology and/or psychology.

Humanities in core 27

Physical education and hygiene in core 7

Electives 27

192

Clothing, Textiles, and Related Arts*

Hours

Core in home economics, exclusive of upper division electives 46

Clothing, textiles, and related arts.... 15
Historic Costume (CT 309); Consumer Buying (CT 350); Approved CT courses.

Additional approved courses 21
Accounting (BA 211 or 217); Marketing (BA 312); Advertising (BA 472); Retail Management (BA 474); Business Statistics (BA 201)
Graphics (AA 111,211,212); Design Studio (AA 187); Basic Design I (AA 197); Survey of Visual Arts (AA 201,202,203); Fashion Illustration (AA 291); Basic Design II (AA 295); History of Art (AA 363,364,365); Organization and Use of Household Space (HM 335)
Anthropology (Anth 215)*
General Physics (Ph 201,202, 203)*
Chemistry (Ch 221,222, or 226, 227; 234).*
Descriptive Statistics (St 311)
Technical Report Writing (Wr 227)

Science in core 15
General chemistry required for textiles

Social science in core 24

Science or social science 6
Required for clothing and interior design: Sociology (205,206) or Economics (Ec 201 in place of Ec 115, and Ec 202,203).

Humanities in core 27

Physical education and hygiene in core 7

Electives 31

192

* Emphasis may be placed on clothing, textiles, or interiors.

Foods and Nutrition

Hours

Core in home economics, exclusive of foods and nutrition courses and upper division electives 34

Foods and nutrition 30
Nutrition (FN 225,381); Foods (FN 220,221); Meal Management (FN 313).

Foods and nutrition electives .....(12)
Science of Foods (FN 335), Food Demonstrations (FN 410); Family Food Buying (FN 411), Food Management (FN 412), Home Food Preservation (FN 414), Nutrition in Disease (FN 420), Child Nutrition (FN 421), Experimental Food Studies (FN 435), Research (FN 401), Reading and Conference (FN 405), Quantity Cookery (IM 311).

Science 30–42
General Chemistry (Ch 201,202, 203), or (Ch 204,205,206), or (Ch 101,102,103,241), Organic Chemistry (Ch 221,222), or (Ch 226,227), Biochemistry (Ch 350), Microbiology (Mb 204), Physiology (Z 331,332)

Social science in core 24

Humanities in core 27

Physical education and hygiene in core 7

Electives 40–28

192

* May be counted as part of science or social science requirement.

Home Economics Education

Hours

Core in home economics exclusive of upper division electives 46

Clothing Construction (CT 212) 3

Upper division home economics 9
*Child Development (FL 413 or Ed 460), *Nursery School Child (FL 425), elective.

Science 15–18
General chemistry or general biology; Physiology (Z 331,332).

Social science in core 24

Science or social science electives in core 6–3

Humanities in core 27
To include Basic Design (AA 197) 6 hours, speech 3 hours.

Physical education and hygiene 7

Education for:
Senior high school certification 21–36
School in American Life (Ed 310), †Educational Psychology (Ed 312), Methods in Reading (Ed 350), †Special Secondary Methods (Ed 408d), †Student Teaching (Ed 416), Seminar: Student Teaching (Ed 407), Seminar: Problems of Beginning Teachers (HEd 407), Organization and Administration of Homemaking Education (HEd 422), †Psychology of Adolescence (Ed 461), Homemaking Education in the Community High School (HEd 440) optional.
Junior high school certification.....6–3
Psychology of Childhood, Ed 460 (or FL 413), Junior High School (Ed 430 or Ed 484).

Electives 28–16

192

Home Economics with Communications

Hours

Core in Home Economics, exclusive of upper division electives 46

Home Economics Upper Division Electives 14–18
For Clothing and Textiles emphasis: Consumer Buying in Clothing and Textiles (CT 350); Historic Costume (CT 309) or Historic Textiles (CT 460); Approved electives in clothing and textiles, 9 hours.
For Foods and Nutrition emphasis: Family Nutrition (FN 325); Food Demonstrations

* Other home economics courses may be substituted if student has over 192 hours and wishes to reserve these for graduate credit or teaching certification.

† These 21 hours in education are the minimum required to have Home Economics-Education on diploma. All others except HEd 440 are required by Home Economics Education Department, Oregon State University for basic norms to teach home economics in junior or senior high schools.

(FN 410); Family Food Buying (FN 411); Approved electives, 6 hours from the following: Science of Foods (FN 335); Food Management (FN 412); Home Food Preservation (FN 414); Quantity Cookery (IM 311).

For general home economics emphasis: upper division electives from at least four subject matter areas, 18 hours.

Science 15–19

For foods and nutrition emphasis: General Chemistry (Ch 101, 102,103 or Ch 201,202,203); Physiology (Z 331-332); General Microbiology (Mb 204).

For other emphases: Biology, chemistry, microbiology, physiology recommended.

Social science in core 24

Science or social science electives ..2–6

Humanities in core 27

Physical education and hygiene in core 7

Choice of one of following options 18–22

Option A (Journalism emphasis, 22 hours): Journalism (J 111); Journalism Laboratory (J 121); Public Information Methods (J 318); Special Feature Articles (J 317); Technical Writing (J 319); Photo-Journalism (J 334); 6 hours from following: Creative Writing (Wr 218); Fundamentals of Speech (Sp 111); Radio Speaking (Sp 361, 363); Advertising (BA 472); Basic Television (Sp 367).

Option B (radio and television emphasis, 21 hours): Fundamentals of Speech (Sp 111); Journalism (J 111); Radio Speaking (Sp 361); Basic Television (Sp 367); Television Programing (Sp 368); 6 hours from following: Radio-Television Projects (Sp 366); Radio and Television Writing (Sp 363); Advertising (BA 472); Public Information Methods (J 318); Voice and Diction (Sp 120); Interpretation (Sp 121).

Option C: Any combination of courses in Options A and B above.

Electives 27–35

192

Institution Management and Dietetics

Hours

Core in home economics, exclusive of foods and nutrition courses and upper division electives 34

Foods and nutrition 18

Nutrition (FN 225,381); Foods (FN 220,221); Meal Management (FN 313).

Science 30–34

General Chemistry (Ch 201,202, 203), or (Ch 101,102,103,241); Organic Chemistry (Ch 221, 222); Biochemistry (Ch 350); Physiology (Z 331,332); Microbiology (Mb 204).

Business administration 6

Personnel Management (BA 467); Accounting (BA 217).

Institution management 14

Quantity Cookery (IM 311); Institution Organization and Administration (IM 430); Purchasing for Institutions (IM 440); Institution Experience (IM 450).

Approved electives 6

Reading and Conference (FN 405); Food Management (FN 412); Nutrition in Disease (FN 420); Child Nutrition (FN 421); Recent Advances in Foods (FN 425); Experimental Food Studies (FN 435); Personnel Management (BA 468), Human Relations in Business (BA 497); Institutional Management (IM 405,407).

Educational psychology (Ed 312) .. 3

Social science in core 24

Humanities in core 27

Physical education and hygiene in core 7

Electives 20–16

192

Management, Family Economics, and Housing

Hours

Core in home economics, exclusive of upper division electives 46

Home Management 9

Management in Family Living (HM 440); Economics of the Family (HM 441); Organization and Use of House Space (HM 335).*

Home Management Electives 6

House Planning in Relation to Function (HM 435); Functional Design of Dwellings (HM 436); Family Housing (HM 439); Management Problems in Home-Community Relations (HM 445); HM 407 Seminars: THE FAMILY AND ECONOMIC CHANGE, WORK SIMPLIFICATION, CASE STUDIES IN FAMILY DECISION MAKING, CONSUMER BUYING DECISIONS.

Science in core 15

Social science in core exclusive of economics and sociology 18

General Sociology (Soc 204,205, 206) 9

* Persons emphasizing Family Economics may substitute HM 439 for HM 335.

Principles of Economics (Ec 201, 202,203) 9

Humanities in core 27

Physical education and hygiene in core 7

Electives 42

192

Nursery School Teaching

Hours

Core in home economics, exclusive of upper division electives 46

Family Nutrition (FN 325) 2

Family life 16-17

Parent Education (FL 423); Nursery School Child (FL 425); Nursery School Children (FL 427); Supervised Nursery School Experience (FL 429); choice of FL 428,413,430, or 481.

Science 22

Chemistry sequence plus one term of biological science *or* biological science sequence plus one term of physical science; Physiology (Z 331,332).

Social science in core 24

Humanities in core 27

Additional courses in humanities 9

art (3); Children's Literature (Lib 388); music (3).

Physical education and hygiene in core 7

Electives 39

192

General Home Economics

Students may take general home economics if they are interested in extension or other special programs.

MINORS

Students in home economics may take minors in:

- Humanities
- Biological science
- Physical Education, recreation, or camping education
- Physical science
- Secretarial science
- Social science
- Business and technology

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 areas of clothing, textiles, and home furnishings.

Advanced courses are offered in consumer problems, textile analysis, historic, sociological, and psychological aspects of textiles and costume, clothing design and construction, and interior design. Students are prepared for positions in retailing or for graduate work leading to research and college teaching. Classes are open to all students on the campus who have the required prerequisites.

Graduate work is offered in the three areas leading to the Master of Arts, Master of Science, and Master of Home Economics degrees.

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. Prerequisite: CT 210, CT 211.

CT 216. Clothing Construction (Men).
3 hours. 3 ②
Principles and types of construction of men's, women's, and children's garments.

CT 231. Home Furnishing.
3 hours. 2 ① 1 ②
Selection of a plan for a home and its furnishings wiith emphasis on function, beauty, and cost.

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

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

CT 309. Historic Costume.
3 hours. 3 ①
The relation of clothing to the social and cultural environment. Prerequisite: CT 250; junior standing. History recommended.

CT 310. Flat Pattern and Draping.
3 hours. 3 ②
Flat pattern and draping on half-size dress forms; practical applications of principles of fitting and construction of afternoon and evening garments. Prerequisite: CT 212,250.

CT 311. Costume Design.
1 hour. 1 ②
Designing fashionable and appropriate ensembles for various occasions and figure types. Prerequisite: CT 210,211,250; AA 195,196. AA 291 strongly recommended.

CT 312. Tailoring. 4 hours. 2 ④
Principles of tailoring applied to the construction of a coat or suit. Prerequisite: CT 212, 250, and junior standing.

CT 320. Clothing for Children.
3 hours. 2 ③
Selection and construction of garments with emphasis on child development, good design, and the saving of time, money, and energy. Prerequisite: CT 212,250.

CT 331. Home Furnishing.
3 hours. 1 ① 2 ②
Furnishing a small house from standpoint of comfort, beauty, convenience, and economy; influence of historic design. Prerequisite: CT 250; AA 178, AA 195,196.

CT 332. Home Furnishing.
3 hours. 2 ③
Aesthetic and economic problems dealing with the construction and renovation of home furnishings. Prerequisite: CT 210; CT 231 or 331. CT 212 recommended.

CT 333. Home Furnishing.
3 hours. 1 ① 2 ②
Practicum in home furnishing and decoration. Prerequisite: CT 331,332.

CT 335. Textile Design.
3 hours. 3 ②
Line, texture, and color; contemporary weaving techniques. Prerequisite: AA 195,196; CT 250.

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 201 or 115; junior standing.

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.

CT 355. Textile Processing.
3 hours. 3 ①
Processing and manufacturing of fibers, yarns, and fabrics. Prerequisite: CT 250.

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
Fitting experiences with varied designs and figures. Creative use of fabrics. 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 412. Comparative Tailoring. (G)
4 hours. 2 ④
A comparison of tailoring methods used in the production of commercial and custom-made garments. Prerequisite: CT 312. LEDBETTER.

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. GRANT.

CT 451. Textile Fibers. (G)
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; senior standing. BUBL.

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.

CT 470. The Clothing Buyer.
3 hours. 1 ① 1 ②
Selection, buying, promotion, and selling of ready-to-wear clothing. Management and personnel responsibilities of buyers. Prerequisite: CT 350; senior standing.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

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 513. Readings in Clothing and Textiles Research. 3 hours fall. 3 ①
Technical literature in the several areas of clothing and textiles.

CT 514. Research Methods in Clothing and Textiles.
3 hours winter. 3 ①
Research philosophy and methodology with particular emphasis on techniques useful for clothing and textiles research.

CT 515. Socio-psychological Aspects of Clothing. 3 hours spring. 3 ①
Application of theories in the social sciences to clothing selection and use.

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: CT 451. BUBL.

FAMILY LIFE

The Department of Family Life offers courses in the areas of marriage, family relationships, and child development. Advanced courses prepare students for nursery school teaching, work in social service agencies and youth agencies, and graduate work leading to research and college teaching. Two nursery schools on campus are used as laboratories for instruction. Men and women in any school are welcome in courses for which they have the prerequisites.

Lower Division Courses

FL 222. Marriage Preparation.
2 hours. 2 ①
Open to men and women. Courtship period, factors in mate selection.

FL 223. Family Living. 2 hours. 2 ①
Open to men and women. Marriage and relationships in the beginning family.

FL 225. Child Development.
3 hours. 3 ① 1 ①
The infant and young child; observations in nursery school.

Upper Division Courses

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

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.

FL 312. Studies in Child Development.
3 hours. 3 ①
Theory and basic research in the area of child development. Prerequisite: FL 311.

FL 322. Family Relationships.
3 hours. 3 ①
Stages and adjustments in the family cycle; the family and the community. Prerequisite: FL 311.

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.
WOMAN'S ROLE TODAY. 1 ②
One-half term. Field experiences.

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.

FL 421. Behavior of Young Children.
2 hours. 2 ①
For men. Understanding development problems of young children; observations in nursery school. Prerequisite: senior standing or consent of instructor.

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.

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.

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.

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.

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.

FL 430. Understanding Child Behavior. (G) 3 hours. 3 ①
Observation of young children as a basis for developing insight into human behavior. 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 311,322.

Graduate Courses

See also courses marked (*g*) and (*G*) above.

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. Field experiences.
MATERIALS-CONTENT IN FAMILY LIFE EDUCATION. KIRKENDALL.
PHILOSOPHY AND METHODS OF BEHAVIOR RESEARCH. SIMMONS.
AGING IN THE LIFE CYCLE.
PSYCHO-SEXUAL DEVELOPMENT IN FAMILY LIFE CYCLE. KIRKENDALL.
DYNAMICS OF SOCIAL BEHAVIOR.
INDIVIDUAL DYNAMICS AND FAMILY INTERACTION.

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.

HOME MANAGEMENT

The Department of Home Management offers instruction in general areas of family living—home management, housing, family economics, and household equipment. Advanced courses are offered in all of these areas, leading to advanced degrees and positions in industry, research, and college teaching. Laboratories for instruction include two home management houses on campus and housing and equipment laboratories in the Home Economics Building.

Courses are open to students in other schools.

Lower Division Course

HM 240. Management in Family Living. 2 hours. 2 ①
Management as decision making. Emphasis on time problems.

Upper Division Courses

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

HM 330. Household Equipment.
3 hours. 2 ① 1 ②
Selection, placement, use, and care.

HM 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.

HM 341. Personal and Family Finance.
3 hours. 3 ①
Open to men and women. Management of income, expenditures, credit, savings, insurance, Social Security, taxes, etc.

HM 401. Research.
Terms and hours to be arranged.

HM 403. Thesis.
Terms and hours to be arranged.

HM 405. Reading and Conference.
Terms and hours to be arranged.

HM 407. Seminar.
Terms and hours to be arranged. (See titles listed under HM 507.)

HM 408. Workshop.
Terms and hours to be arranged.

HM 435. House Planning in Relation to Function. (G) 3 hours. 2 ① 1 ②
Functional design applied to various types of family dwellings and their surroundings. Prerequisite: HM 335. SINNARD.

HM 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: HM 435. SINNARD.

HM 439. Family Housing. (G)
3 hours. 3 ①
Socio-economic aspects in relation to family living. Prerequisite: Ec 115; Soc 204; senior or graduate standing.

HM 440. Management in Family Living. (G) 3 hours. 3 ①
Decision making throughout the family life cycle; case studies. Prerequisite: HM 240, 341; Psy 202.

HM 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.

HM 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: HM 240; Soc 204. PLONK.

HM 450. Home Management House.
4 hours. 3 ① and residence
Applying principles of home economics courses in a family-size group and in a family-type house. One-half term residence. Prerequisite: FN 313; FL 311; HM 240.

HM 460. Management in the Home.
4 hours. 3 ① and laboratory
Supervised experience with student's home used as laboratory. Open to married students only. Students who are married and living at home may substitute HM 460 for HM 450. Prerequisite: FN 313; FL 311; HM 240.

Graduate Courses

See also courses marked (g) and (G) above.

HM 501. Research.
Terms and hours to be arranged.

HM 503. Thesis.
Terms and hours to be arranged.

HM 505. Reading and Conference.
Terms and hours to be arranged.

HM 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.

HM 508. Workshop.
Terms and hours to be arranged.

FOODS AND NUTRITION

The Foods and Nutrition Department offers basic work in nutrition, in the application of scientific principles to the preparation of foods, and in meal management for all majors in home economics. Advanced and specialized upper division courses are offered for students with professional interests in areas such as food service and hospital dietetics, product testing and promotion, high school teaching, and in graduate work and research. Students in any school may take any courses in foods and nutrition for which they have the prerequisites.

Graduate courses are available for programs leading to the Master of Science, Master of Arts, or the Doctor of Philosophy degrees for those students interested in high school teaching, research, college teaching, or public health 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, meal planning and service.

FN 220,221. Foods.
4 hours each term. 2 ① 2 ②
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

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

[1]**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. Prerequisite: FN 212 or 221.

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.

[1] Practical experience in food preparation is recommended for students who have completed FN 313 before an advanced course in foods is taken.

FN 381. Nutrition.
4 hours fall. 3 ① 1 ②
Fundamentals; application of biochemistry and physiology to nutrition of the individual and family. Prerequisite: FN 225; Ch 222; Z 331. Prerequisite or parallel; Ch 350; Z 332.

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]**FN 410. Food Demonstrations.** 3 hours 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.

[1]**FN 411. Family Food Buying.** (g)
3 hours fall or spring. 1 ① 1 ② 1 ③
Principles of economics applied to buying food for the home; laws protecting the consumer, criteria for selection of food at different income levels. Prerequisite: FN 313; Ec 115 or 215. BUSSARD.

[1]**FN 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.

[1]**FN 414. Home Food Preservation.**
(g) 3 hours spring. 1 ① 1 ② 1 ③
Principles and methods, including freezing, canning, curing, pickling, and preserving with sugar. Prerequisite: FN 212 or 221; Mb 204. Offered alternate years. Offered 1966-67. 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 or 335; Ch 222.

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.

[1] Practical experience in food preparation is recommended for students who have completed FN 313 before an advanced course in foods is taken.

Graduate Courses

See also courses marked (g) and (G) above.

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. **Techniques 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. STORVICK.

FN 531,532. **Food Preparation Investigation.** 3 or 5 hours each term. 2 ③
Independent investigations. Prerequisite: FN 435. Offered alternate years. Not offered 1966-67. 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 1966-67. CHARLEY.

FN 551. **Selected Topics in Nutrition.**
3 hours. 3 ①
Prerequisite: FN 521. Offered alternate years. Not offered 1966-67.

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 Ed 460. (For requirements for the State Teachers' Certificates and listing of courses see SCHOOL OF EDUCATION.)

HOME ECONOMICS EXTENSION

Professional preparation for the position of extension agent in home economics is offered by the School of Home Economics. Courses taught by staff members of the Cooperative Extension Service include classroom work in methods used by Extension to disseminate information, as well as practical experience with a county extension staff. Majors in home economics interested in extension as a career are urged to include electives in humanities and social sciences as well as the courses in extension methods. For full description of courses see EXTENSION METHODS, School of Agriculture.

Upper Division Courses

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

EM 405. **Reading and Conference.**
Terms and hours to be arranged.

EM 411,412. **Extension Methods.**
(G) 3 hours each, fall, winter. 3 ①

EM 453. **Field Work in Extension.**
(g) Terms and hours to be arranged.

Graduate Course

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. 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 American Dietetic 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 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. CLEAVELAND.

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

See also courses marked (g) and (G) above.

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.

Upper Division Courses

HEc 407. **Seminar.**
Terms and hours to be arranged.
HOME ECONOMISTS IN SOCIETY.

HEc 408. **Workshop.**
Terms and hours to be arranged.

Graduate Course

HEc 508. **Workshop.**
Terms and hours to be arranged.

THE SCHOOL OF PHARMACY AT OREGON STATE UNIVERSITY IS A member of the American Association of Colleges of Pharmacy and is fully accredited by the American Council on Pharmaceutical Education. Its objective is to contribute to the improvement of public health and welfare through dissemination, expansion, and application of knowledge. In so doing the School provides an instructional program assuring academic and technical proficiency in the basic sciences and their pharmaceutical application.

A petition from the pharmacists of the State of Oregon led to the first establishment of a Department of Pharmacy at Oregon State College in 1898. From its inception, the department grew steadily and in 1917 became the School of Pharmacy. Since 1925, it has occupied the Pharmacy Building, which was designed and constructed specifically for pharmaceutical education. During 1965-1966 an extensive remodeling and building program was completed.

Holders of the Bachelor of Science in Pharmacy degree can qualify for a wide variety of professional positions. By far the greatest proportion of graduates engage in the community practice of pharmacy with approximately half being owners or part-owners of pharmacies. Opportunities also exist for pharmacists in hospital and clinic pharmacies; as medical representatives for pharmaceutical manufacturers; as production, control, and research pharmacists in the manufacture of medicinal and pharmaceutical products; as personnel in wholesale drug distribution; as food and drug control chemists or inspectors for local, state, and federal health agencies; as pharmacists in the United States Public Health Service, the Veterans Administration, the Armed Forces, and other government departments; and in pharmaceutical journalism.

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.

Pharmacy

FACULTY

As of January 1966

CHARLES O. WILSON, Ph.D., Dean of the School of Pharmacy; Professor of Pharmaceutical Chemistry

HERMAN C. FORSLUND, M.S., Assistant Dean, Head Counselor, Director of Continuing Education, Professor of Pharmacy Law

HARRIET E. SISSON, M.S., Alumni Director and News Correspondent of the School of Pharmacy, Assistant Professor of Pharmaceutical Science

Pharmaceutical Science: Professor SAGER (department head)
Assistant Professors MUHLHAUSER, SISSON
Instructors HERMANN, MEZEI

Pharmaceutical Chemistry: Professors DOERGE (department head), WILSON
Assistant Professors BLOCK, SCHULTZ
Instructor HARRELL

Pharmacology: Professors FINK (department head), KRUEGER
Assistant Professor LARSON
Instructor KULA

Pharmacognosy: Professor SCIUCHETTI (department head)
Assistant Professor CATALFOMO

Pharmacy Administration: Professor FORSLUND (department head)
Assistant Professor JOHNSON

Preparation

The School of Pharmacy has no special admission requirements. Any student accepted for admission to Oregon State University may register in the School of Pharmacy.

High school preparation should include courses in mathematics, chemistry, physics, biology, as well as English and speech. However, there are no specific course requirements. Students not having high school chemistry, physics, or mathematics are accepted and can do well.

A pharmacist needs a fair amount of business sense and training, some of which can be obtained in college. A pharmacist needs to be clean, orderly, accurate, and careful with details because a careless person filling prescriptions could endanger lives. Since a pharmacist meets the public continually, he should have a pleasing personality and should like to work with people.

Transfer Students

Transfer students who do not have academic credit for college level English and/or mathematics will take the appropriate placement tests. Deficiencies shown by these tests should be corrected by the student before enrolling in regular courses in the subjects concerned. 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 may be required because of difficulties in scheduling sequence and prerequisite courses. Transfer credits in most courses accepted by the University may be used to satisfy the School's elective requirements. A transfer student normally enters the pharmacy program as a sophomore, regardless of amount of previous education.

Licensure

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, of good moral character, and a graduate of an accredited school or college of pharmacy that is recognized by the Board of Pharmacy. He must also complete internship requirements and successfully pass an examination given by the Board of Pharmacy.

One calendar year of internship in the various areas of pharmacy under the supervision of a registered pharmacist is a basic requirement. A student who interns in a pharmacy concurrently with school attendance can not have the time count. No internship may count until after the student has finished the freshman year in pharmacy at OSU. At least one-fourth of the internship must be obtained after graduation; all of it may be gained after graduation if desired.

The examination consists of two parts: a theoretical part, which may be taken upon completion of the educational requirement, and a practical part, which may be taken only after completion of the internship requirement.

Course of Study

The curriculum for the School of Pharmacy is a five-year program 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 another accredited college or university.

Students should register for a regular sequence of work as outlined in the five-year curriculum on the next page. The proper sequence of both the professional and nonprofessional 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. The student who plans to enter Graduate School should select his electives accordingly. Too frequently the graduate student spends his first year in Graduate School taking courses he could have taken as an undergraduate.

Students are required to abide by the Code of Ethics of the American Pharmaceutical Association and to conduct themselves as befits professional pharmacists. Departure from these ethical requirements may be reason for terminating a student.

Each year upperclassmen make several field trips. Annually the fifth-year students tour several pharmaceutical plants in the Midwest 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.

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.

Continuing Education

The School of Pharmacy provides a program in continuing education for the pharmacists of the state. A director of Continuing Education is a member of the pharmacy faculty. A number of seminars are conducted each year in the major cities. A Pharmacy Bureau of Information and Service is available to all pharmacists. The quarterly *Pharmacy School Reporter* contains vital information for the profession.

Professional Associations

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. Open to all students in 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.

For financial aids, see the last page of this section.

Degree Programs

The Bachelor of Arts (B.A.) and the Bachelor of Science (B.S.) degrees are offered in the five-year undergraduate program in Pharmacy.

A candidate for a degree must satisfy the University requirements (see page 14). He must have a minimum of 240 term hours of university-level courses in the approved pharmacy curriculum, which includes one preprofessional year and four years of professional study. He must have a grade-point average of 2.00 (C) or higher in all professional pharmacy course work to register as a fourth-year student in pharmacy and must have a 2.00 average in these courses to graduate.

A combined premedical or predental and pharmacy curriculum may be arranged for a student planning to enter medical or dental school.

Graduate Study

Graduate work leading to the degrees of Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) is offered in pharmaceutical chemistry, pharmaceutical science, pharmacognosy, and pharmacology. The M.S. is offered in pharmacy administration and hospital pharmacy. The Master of Pharmacy (M.Phar.) degree with a major in hospital pharmacy is offered in pharmaceutical science and pharmacy administration.

Candidates for admission to graduate study must hold a bachelor's degree in pharmacy from OSU or its equivalent, except that for advanced study in pharmacology acceptance is determined by the Graduate Studies Committee. Candidates must have attained a creditable scholastic average in undergraduate work and have determined a definite objective to be attained through advanced study. All advanced degrees are granted through the Graduate School.

Undergraduates who have decided to pursue graduate work may expedite their programs by selection of pertinent electives. Although the choice of electives will vary with the student's selected field in the pharmaceutical sciences, it should be emphasized that studies in the School of Pharmacy require adequate preparation in the physical and biological sciences, mathematics, and foreign language. Physical chemistry (calculus is a prerequisite), qualitative organic chemistry, biochemistry, and courses in the pharmaceutical sciences are basic. Students who have not completed certain courses during their undergraduate work may be permitted to do so during their graduate programs.

Preprofessional Year
(May be taken at any accredited college or university)

	F Lecture	F Lab	W Lecture	W Lab	S Lecture	S Lab
English Comp (Wr 111,112,113)	3	.....	3	.....	3	.....
Algebra (Mth 101,102,111)	4	.....	4	.....	4	.....
General Zoology (Z 201,202,203)	2	1(3)	2	1(3)	2	1(3)
[1] History and Ethics of Pharmacy (PAd 201)	..	.....	..	.....	2	.....
[2] General Chemistry (Ch 204,205,206)	3	2(3)	3	2(3)	3	2(3)
Physical education	1	.....	1	.....	1	.....
Total	16		16		18	

PROFESSIONAL CURRICULUM

First Professional Year
(Must be taken at Oregon State University)

	F Lecture	F Lab	W Lecture	W Lab	S Lecture	S 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	.....
Fundamentals of Speech (Sp 111)	3	.....	..	.....	..	.....
Outlines of Economics (Ec 115)	..	.....	..	.....	3	.....
[3] Elective	3	.....	3	.....	3	.....
Physical education	1	.....	1	.....	1	.....
Total	15		15		17	

Second Professional Year

	F Lecture	F Lab	W Lecture	W Lab	S Lecture	S 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)	..	.....	..	.....	3	1(3)
Physiology (Z 431,432)	..	.....	3	1(3)	3	1(3)
Microbiology (Mb 204)	2	2(2)	..	.....	..	.....
Pharm Science (PSc 318)	3	.....	..	.....	..	.....
Pharmacology and Toxicology (Phc 350)	..	.....	..	.....	3	.....
Basic Acc and Fin Anal (BA 217)	..	.....	..	.....	3	.....
Org Manag Theory (BA 302)	..	.....	3	.....	..	.....
[4] Electives	3	.....	3	.....	..	.....
Total	17		17		17	

Third Professional Year

	F Lecture	F Lab	W Lecture	W Lab	S Lecture	S Lab
Pharmaceutical Science (PSc 319,320,321)	2	1(3)	2	1(3)	2	1(3)
Pharmacology (Phc 410,411,412)	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	.....	..	.....
Drug Marketing (PAd 447)	..	.....	..	.....	3	.....
[4] Electives	3	.....	3	.....	3	.....
Total	15		15		16	

Fourth Professional Year

	F Lecture	F Lab	W Lecture	W Lab	S Lecture	S Lab
Prescriptions (PSc 454,455,456)	3	1(3)	3	1(3)	3	1(3)
Seminar (PAd 407)	1	.....	1	.....	1	.....
Biological Products (Pcg 495)	..	.....	3	.....	..	.....
Pharmacognosy (Pcg 333)	3	.....	..	.....	..	.....
Pharmacy Law (PAd 450,451)	..	.....	3	.....	3	.....
Pharmacy Management (PAd 448,449)	3	.....	..	.....	3	.....
[4] Electives	5	.....	5	.....	5	.....
Total	16		16		16	

[1] Students not attending Oregon State should take Sp 111 or Ec 115.
[2] Or Ch 101,102,103 and 241.
[3] Transfer students must take PAd 201. All electives must be approved by the adviser.
[4] Electives must include 9 term hours of foreign language *or* 9 term hours of social science *or* 9 term hours of literature. All electives must be approved by the adviser.

PHARMACEUTICAL CHEMISTRY

The Department of Pharmaceutical Chemistry offers undergraduate and graduate 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.

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 or 241. 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.

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.**
4 hours spring. 3 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.

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

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. SISSON.

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 412. SCHULTZ.

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. SCHULTZ

Graduate Courses
See also courses marked (g) or (G) above.

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.

PCh 527,528,529. **Pharmaceutical Chemistry.** 3 hours each term. 3 ①
Natural and synthetic sources of medicinal agents; theoretical bases of biological responses to applied agents; correlation of molecular structure with biological activity. Prerequisite: PCh 325; Phc 412. Offered alternate years. Not offered 1966-67. DOERGE, SCHULTZ.

PCh 530,531,532. **Pharmaceutical Chemistry Laboratory.**
2 hours each term. 2 ③
To be taken in conjunction with PCh 527, 528,529.

PCh 540,541,542. **Phytopharmaceutical Chemistry.** 3 hours each term. 3 ①
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 412. Offered alternate years. Offered 1966-67. DOERGE, SCHULTZ.

PCh 543,544,545. **Phytopharmaceutical Chemistry Laboratory.**
2 hours each term. 2 ③
To be taken in conjunction with PCh 540, 541,542.

PHARMACEUTICAL SCIENCE

The Department of Pharmaceutical Science offers undergraduate and graduate courses in the various areas related to professional practice and dosage formulation of therapeutic agents.

PSc 212. **Pharmaceutical Calculations.**
3 hours any term. 3 ①
Systems of weights and measures; dilution and concentration of solutions; calculations of dosages. Prerequisite: Mth 101; Ch 204 or equivalent. SISSON.

PSc 318. **Pharmaceutical Science.**
3 hours. 3 ①
Introduction to the practice of pharmacy. Prerequisite: third-year standing; PCh 312. SAGER.

PSc 319,320,321. **Pharmaceutical Science.**
3 hours each term. 2 ① 1 ③
Physico-chemical principles and laws applied to pharmaceutical systems. Prerequisite: PSc 212, PSc 318, ability to type 35 words per minute.

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

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, Pcg, and Phc. SISSON.

PSc 454,455,456. **Prescriptions.**
4 hours each term. 3 ① 1 ③
Supervised compounding and dispensing of a wide variety of prescriptions selected from current files of practicing pharmacists. Prerequisite: Phc 412. SAGER, HERMANN.

PSc 460. **Hospital Pharmacy.**
3 hours any term. 3 ①
The specialized area of hospital pharmacy. Prerequisite: fourth-year standing, permission of instructor. SAGER and Clinical Instructors.

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. SISSON.

Graduate Courses
See also courses marked (g) or (G) above.

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, Pcg, and PAd.

PSc 510. **Physical Pharmacy.**
3 hours fall. 2 ① 1 ③
Physico-chemical properties of pharmaceutical systems.

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. Offered 1966-67. SISSON.

PSc 520,521,522. **Hospital Pharmacy.**
3 hours each term. 3 ①
The organization, administration, and operation of a hospital pharmacy. SAGER, JOHNSON, and Clinical Instructors.

PSc 554,555,556. **Product Development.** 3 hours each term. 1 ① 2 ③
Current and novel dosage forms; product stability; therapeutic designs. Offered alternate years. Offered 1966-67.

PHARMACOGNOSY

The Department of Pharmacognosy offers undergraduate and graduate courses that deal with drugs of biological origin.

Pcg 330,331,332. **Pharmacognosy.**
3 hours each term. 2 ① 1 ③
Official and important nonofficial drugs of biological origin; macroscopic, microscopic, and micro-chemical identification. Prerequisite: Ch 227; Z 203; PCh 322 concurrently. SCIUCHETTI.

Pcg 333. **Pharmacognosy.**
3 hours fall. 3 ①
Antibiotics and hormones. Prerequisite: Pcg 332. SCIUCHETTI, CATALFOMO.

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

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. SISSON.

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 471,472. **Pharmacognostical Techniques.** (G)
3 hours fall and winter. 1 ① 2 ③
Pcg 471: Microscopic techniques. *Pcg 472:* Chromatographic techniques. Prerequisite: Pcg 333. CATALFOMO.

Pcg 480,481. **Effects of Growth Regulators on Drug Plants.** (G)
3 hours each term. 1 ① 2 ③
Effects of auxins, gibberellins, kinins, and growth retardants on production of active constituents of medicinal plants. Prerequisite: Pcg 333. SCIUCHETTI.

Pcg 495. **Biological Products.**
3 hours winter. 3 ①
Vaccines, serums, antitoxins, and related products. Prerequisite: Pcg 333. CATALFOMO.

Graduate Courses
See also courses marked (g) or (G) above.

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.

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. Not offered 1965-66. CATALFOMO.

Pcg 544. **Biological Products.**
3 hours. 1 ① 2 ③
Problems involved in preparation and standardization. Prerequisite: Pcg 495; Mb 432. Offered alternate years. Offered 1966-67.

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, or equivalent. Offered alternate years. Not offered 1966-67.

Pcg 550,551,552. **Biogenesis of Medicinal Plant Constituents.**
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: Ch 450,451,452, or equivalent. Offered alternate years. Not offered 1966-67. SCIUCHETTI

PHARMACOLOGY

The Department of Pharmacology offers undergraduate and graduate courses that deal with the action of drugs and other chemicals on living things. The physiological responses, mode of action, toxic properties, therapeutic uses, standardization, and other phenomena are considered.

Phc 315. **Safety in Use of Drugs.**
2 hours any term. 2 ①
Origin and development of drugs, their purpose, uses and shortcomings, dangers, and misuse. Prerequisite: sophomore standing, nonpharmacy major. KULA.

Phc 350. **Introduction to Pharmacology and Toxicology.**
3 hours spring. 3 ①
General principles of pharmacology and toxicology. Prerequisite: PCh 323. FINK, LARSON.

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

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. SISSON.

Phc 410,411,412. **Pharmacology.** (g)
4 hours each term. 3 ① 1 ③
Pharmacodynamics, toxicology, and therapeutic uses of drugs. Prerequisite: Z 432; Phc 350; or consent of instructor.

Phc 425. **Veterinary Therapeutics.**
3 hours winter. 3 ①
Pharmacology of drugs and agents pertaining to animals. Prerequisite: Phc 412.

Phc 454. **Commercial Poisons.** (G)
3 hours fall. 3 ①
Toxicology of common household, medicinal, industrial, and economic poisons. Prerequisite: Phc 412. LARSON.

Phc 455,456. **Pharmacotherapeutics.** (G)
3 hours winter and spring. 3 ①
The more important disease states and symptoms; pharmacological basis for their therapy. Prerequisite: Phc 412. LARSON.

Graduate Courses
See also courses marked (g) or (G) above.

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.

Phc 520,521,522. **Advanced Pharmacology.** 2 hours each term. 2 ①
Lectures and conferences on advanced concepts and applications of pharmacologic actions of drugs. Prerequisite: Phc 412; Ch 352, or equivalent. Offered alternate years. Not offered 1966-67.

Phc 523,524,525. **Advanced Pharmacology Laboratory.**
1 hour each term. 1 ③
To be taken in conjunction with Phc 520,521, 522. FINK.

Phc 530,531. **Advanced Toxicology.**
3 hours fall and winter. 1 ① 2 ③
Lectures, conferences, and laboratories on advanced concepts and mechanisms of toxicity of drugs and other chemicals. Prerequisite: Phc 522; Ch 452, or equivalent; or consent of instructor. Offered alternate years. Offered 1966-67.

Phc 535. **Pharmacometrics.**
3 hours spring. 2 ① 1 ③
Evaluation of drug activity by various pharmacologic techniques, screening methods, official and other bioassays. Prerequisite: St 423, or equivalent; Phc 522. Offered alternate years. Offered 1966-67.

PHARMACY ADMINISTRATION

The Department of Pharmacy Administration offers undergraduate and graduate courses concerned with the economic, socio-economic, and legal aspects pertaining to and associated with the practice of pharmacy.

PAd 201. **History and Ethics of Pharmacy.**
2 hours fall or spring. 2 ①
SISSON.

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

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. SISSON.

PAd 447. **Drug Marketing.**
3 hours spring. 3 ①
Distribution of pharmaceuticals and related products. Prerequisite: fourth-year senior standing. JOHNSON.

PAd 448,449. **Pharmacy Management.**
3 hours fall and spring. 2 ① 1 ③
Activities involved in planning, organizing, financing and controlling a pharmacy practice. Prerequisite: PAd 447. JOHNSON.

PAd 450,451. **Pharmacy Law.**
3 hours winter and spring. 3 ①
Federal, state, and local laws applicable to pharmacy. Prerequisite: fifth-year senior standing. FORSLUNN.

PAd 453. **Pharmacy Socio-Economics.**
3 hours winter. 3 ①
Social and economic forces which affect the practice of pharmacy. Prerequisite: fifth-year senior standing. JOHNSON.

Graduate Courses
See also courses marked (*g*) or (*G*) above.

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.

PAd 587. **Pharmaceutical Marketing: Analysis and Techniques.**
3 hours spring. 3 ①
Marketing policies and practices of manufacturers in distribution of drug products restricted by law to prescription use only. Prerequisite: BA 447, 448. JOHNSON.

PAd 589. **Pharmaceutical Finance.**
3 hours winter. 3 ①
Analysis of costs, margins, and profits of institutions engaged in distributing drug products. Prerequisite: PAd 449. Offered alternate years. Not offered 1966-67. JOHNSON.

PAd 599. **Drug Trade Regulations.**
3 hours winter. 3 ①
Anti-trust laws and methods of resale price maintenance, regulatory agencies, related to distribution of drug products. Prerequisite: PAd 449, PAd 451. Offered alternate years. Not offered 1966-67. FORSLUNN.

FINANCIAL AIDS

Students of ability and promise may have part of their college expenses paid through one of the scholarship funds. In addition to general scholarships awarded to OSU students, the ones listed below are available to pharmacy students. Special loan funds are also available exclusively for pharmacy students.

Scholarships and Loans

Berman Scholarship. $50 annually to a deserving upper division pharmacy student selected by the faculty of the School. In memory of A. K. Berman, Corvallis pharmacist.

Martha Kiger Dixon Fund. Students who exhibit traits of professional promise may obtain financial aid.

Lane County Scholarship. $150 annually to a deserving student in pharmacy from Lane County or surrounding area provided by the registered pharmacists of that county.

Dargavel Scholarship and Loan Fund. $200 annually for an Oregon senior in pharmacy who has stimulated professionalism among his fellow students. Loans are also available for pharmacy students from the John B. Dargavel Foundation. They are administered by the National Association of Retail Druggists and may be repaid after graduation.

Women's Auxiliary, OSPA Fund. The Women's Auxiliary of the Oregon State Pharmaceutical Association provides loans for senior women in pharmacy, the amount varying according to need with repayment after graduation.

Golden Fund. The Frank and Esther Golden Student Aid Fund, established by the will of Esther L. Golden, provides several modest grants for pharmacy students who have demonstrated superior scholastic ability and a need for financial assistance.

Payless Drug Stores Educational Fund. Selected Oregon students in their last three years of pharmacy may borrow from this fund. Preference is given to students who show promise of professional service and financial need.

Corbett Fund. Selected Oregon students, preferably from Harney County, who are in their last three years of pharmacy may borrow from a fund established in memory of Orville Corbett.

Honors and awards

Several national undergraduate awards are given to students in pharmacy schools for the best essays in various fields of pharmacy such as pharmacognosy and pharmacy administration. Outstanding scholarship or notable achievement in the School of Pharmacy at Oregon State University is recognized by the awards listed:

Bristol Laboratories Award. A personalized copy of a medical dictionary awarded annually to a senior who has combined scholarly achievement with professional service.

Johnson and Johnson Award. To the senior who exhibits interest and excellence in pharmacy administration.

Kappa Psi Award. A reference book given each year to the senior who, in the opinion of his classmates, has most outstandingly displayed qualities of character, leadership, and service. The recipient's name is engraved on a plaque in the School of Pharmacy.

Kappa Psi Grand Council Gold Key and Certificate. Awarded to the graduating senior member of Kappa Psi having the highest scholastic standing in the class.

Kappa Psi Gavel from Portland Graduate Chapter. Awarded to the regent of Kappa Psi.

Lambda Kappa Sigma Award. Awarded to a graduating senior selected on the basis of high academic achievement, leadership, and professional interest.

Lilly Achievement Award: A gold medal awarded to a senior student for superior scholastic and professional achievement.

Linn-Benton Pharmaceutical Association Award. A monetary award for library improvement to the senior who shows the greatest scholastic improvement during the last three years.

McKesson and Robbins Presidential Plaque. Awarded to the president of the Student Branch of Oregon—American Pharmaceutical Association.

McKesson and Robbins Award. $50 awarded annually by the Portland Branch of the company to the senior scoring highest in a comprehensive examination in pharmacy. The recipient's name is engraved on a plaque in the School of Pharmacy.

Merck Awards. Two sets of reference books awarded annually to seniors having highest scholastic averages in pharmacy and in pharmaceutical chemistry.

Portland Retail Druggists Association Plaque. Awarded annually to the graduating senior who attains the highest scholastic rank in his class.

Rexall Trophy. Awarded annually to the senior who presents the most outstanding record of service to the School of Pharmacy while maintaining a high scholastic average.

Rho Chi Award. An advanced reference work in pharmacy or related field awarded each year to a junior having the highest scholastic rating in professional studies.

Senior Class Service Award. Awarded annually to the senior who has best served the school and his class by his activities while at OSU.

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 an option in recreation which prepares graduates for this rapidly expanding field. 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 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.

Physical Education

FACULTY

As of January 1966

James Victor Dixon, M.S., Acting Director of the Division of Physical Education, Professor of Physical Education.

Emeritus Assistant Professor McAllester.

Physical Education for Women: Associate Professors Hupprich, Masilionis, Milliken, Seymour, Thompson, Weir (acting department head). Assistant Professor J. A. Dixon. Senior Instructor H. Poling. Instructors Brust, Dobie, Frolich, Pye, Swim, Winkler.

Physical Education for Men: Professors Adrion, Andros, Allman, Bergstrom (chairman of Professional Physical Education), Coleman (chairman of Men's Service Program), Dailey, Gill, Valenti. Associate Professors Cox, Drlica, Flood, McKalip, Moe, Swan, Thomas. Assistant Professors Cramer, Harper, Martinson, Megale, J. P. O'Shea, D. Poling, Tanselli, Wagner, Winkler. Instructors Holley, McNeil.

Health Education: Professors C. L. Anderson (department head), Foster, Koski. Associate Professor Ellis. Assistant Professors G. W. Anderson, Gawer, Johnson, Phelps.

Recreation: Professor Slezak (department head). Associate Professor Owen.

Intercollegiate Athletics: Director Gill, Assistant Director Barratt: COACHES: *Football:* Andros (head coach), Boghosian, Brooks, Easterbrook, Felker, Knecht, Riley. *Basketball:* Valenti (head coach), Anderson, Harper. *Baseball:* Coleman. *Track:* Wagner (head coach), McNeil. *Tennis:* Megale. *Swimming:* Winkler. *Wrestling:* Thomas. *Golf:* Kennick. *Trainers:* Robertson, Semon.

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 Recreation Association, which offers competitive 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.

Normally hygiene and physical education classes are not 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.

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

	Hours
Human Biology (Z 114,115,116)	9
English Composition (Wr 111,112,113)	9
General Chemistry (Ch 101,102,103)	9
Introduction to Physical Education (PE 131)	3
General Hygiene (PE 170)	3
Introduction to Health Education (SEd 123)	3
Professional Activities (PE 194)	6
Officer education or other elective	3–9

Sophomore Year

	Hours
Elementary Human Anatomy (Z 321,322)	6
Applied Human Anatomy (Z 323)	3
Professional Activities (PE 294)	6
Social Science (Ec 212, PS 201, Soc 212)	9
Literature	9
General Psychology (Psy 201, 202)	6
Speech	3
Organization and Administration of Intramural Sports (PE 340)	2
Officer education or other elective	3–9

Junior Year

	Hours
Physiology (Z 331,332)	6
Applied Human Physiology (Z 336)	3
School in American Life (Ed 310)	3
Educational Psychology: Learning (Ed 312)	3
Special Secondary Methods (Ed 408h)	3
Psychology of Adolescence (Ed 461)	3
Methods in Reading (Ed 350)	3
Physical Education Technique (PE 333,334 or 335)	4
Football Coaching (PE 365) (men)	2
Basketball or Wrestling Coaching (PE 366 or 369) (men)	2
Baseball or Track and Field Coaching (PE 367 or 368) (men)	2
Professional Activities (PE 394)	6
Sports Officiating (PE 362) (women)	3
Recreation courses (PE 240, Ed 263 or 426)	3

Senior Year

	Hours
School Health Education (SEd 321)	3
School Health Services (SEd 322)	3
First Aid (PE 358)	3
Organization of Health and Physical Education (PE 441)	3
Physical Education Curriculum (PE 442)	3
Evaluation of Physical Education (PE 443)	3
Conditioning and Care of Injuries (PE 359) (men)	2
Corrective Physical Education (PE 444)	3
Student Teaching: Secondary (Ed 416)	12
Seminar (Ed 407)	3
Community Health Problems (Mb 424 or 425 or 426) or Nutrition (FN 225)	3

For the option in recreation, consult with advisers in the Division.

COURSES IN PHYSICAL EDUCATION

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; for 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
Fall: team sports (men); fundamental body movement, rhythms, body mechanics, posture, relaxation (women); sports skills (elementary).
Winter: swimming, gymnastics (men); fundamental body movements, rhythms, body mechanics, posture, relaxation (women); gymnastics (elementary).
Spring: swimming, gymnastics (men); aquatics (women); rhythms (elementary).

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; opportunity 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
Fall: body mechanics, track and field (men); archery, bowling, golf, (women); physical fitness, track and field (elementary).
Winter: relays and stunts, wrestling (men); dance (women).
Spring: individual and dual sports (men); tennis, badminton, track and field, (women); pool and playground programs (elementary).

Upper Division Courses

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

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 or junior standing.

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 records. Prerequisite: SEd 123 or junior standing.

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: junior standing or permission of department chairman.

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 310,312,408.

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 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. 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, or camp counseling experience.

PE 364. Swimming and Diving Coaching. 2 hours. 2 ① 1 ②
Stroke mechanics, coaching psychology, swimming physiology, meet operation, rule interpretations, pool design, and training programs.

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, stunts, relays, advanced modern dance (women); *Winter:* gymnastics (women). *Spring:* weight training, boxing (men); team sports (women). Prerequisite: PE 294.

PE 405. Reading and Conference. (g)
Terms and hours to be arranged.

[1]**PE 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

[1] Credit for PE 405 plus 407 must not exceed 9 term hours.

Ed 423. Organization and Administration of Recreation. (g)
3 hours. 3 ①
(For description of Ed 421,422,423 see page 110.)

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, junior standing

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.

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, Ed 310,312.

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 or junior standing.

PE 441. Organization of Health and Physical Education.
3 hours. 3 ①
Historical background, state and local requirements, administrative practices, class organization and procedures, operational policies. Prerequisite: Ed 408h; PE 294.

PE 442. Physical Education Curriculum. 3 hours. 3 ①
Factors in selecting activities, program variations, planning instructional units, interschool athletics, intramural sports, program standards, and evaluation. Prerequisite: PE 441.

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 or PE 420.

PE 444. Corrective Physical Education.
(g) 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.

SEd 451. Health of the School-Age Child. (G)
3 hours. 3 ①
Special health problems and the school's opportunities and responsibilities. Prerequisite: PE 170 and one year of upper division biological science.

SEd 452. Physical Growth and Development. (G)
3 hours. 3 ①
Normal physical changes from birth to adulthood with consideration of deviations; determination and appraisal of levels of growth and development. Prerequisite: Ed 310,312, and one year of upper division biological science.

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.

SEd 461. School Health Administration.
(G) 3 hours. 3 ①
Types of administrative control; budgetary problems; school health-public health integration; responsibilities of school health personnel. Case study method and incident process; studies of actual school health programs. Prerequisite: one year of upper division biological science and one year of upper division school health courses or equivalent.

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. Prerequisite: Ed 310,312.

Graduate Service Courses

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.

THE MILITARY AT Oregon State University has progressed with the growth of the University. About 1872 Corvallis College began teaching military tactics as required by the Morrill Act of 1862 which established land-grant universities. Cadets trained in the early years served in the Spanish-American War. On June 3, 1916, Congress passed an act which caused the Cadet Regiment to reorganize in 1917 as a Reserve Officer Training Corps unit. In World War I, World War II, and the Korean and Viet Nam conflicts former students have served with distinction in our armed forces and have given proof of the high quality of their preparation and the value to the nation of such military instruction. In 1962 the ROTC programs all became voluntary. In 1965 OSU added a two-year program to open ROTC to junior college graduates.

Oregon State University is one of the 33 colleges and universities that offer AROTC (Army); NROTC (Navy and Marine Corps); and AFROTC (Air Force). Training in the Department of Military Science leads to a commission as an officer in one of the fourteen branches of the U. S. Army. 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. Training in the Department of Aerospace Studies, activated on July 1, 1949, as one of the first AFROTC units established, leads to active duty aerospace flight training in a commissioned status or to other careers on the aerospace team.

Mission and Objectives. The ROTC selects and prepares young men, through a program of instruction coordinated with the students' normal academic curriculum, to serve as officers in the Regular and Reserve components of the Army, Navy, Air Force, and Marine Corps. Each of the units on this campus strives to develop in the student a capacity for leadership, to develop him morally, mentally, and physically, and to provide him with the basic working knowledge required of a young officer.

Membership in ROTC does not preclude registration under the Universal Military Training and Service Act of 1951. Each student enrolled and of age must register with his draft board. In all programs, however, while participating in training, students are deferred from military service.

Reserve Officers Training Corps

Armed Forces Officer Education

Uniforms and allowances. Students in each of the units receive uniforms to be worn at drill periods and on special occasions. During the final two years students receive $40 per month retainer pay for up to 600 days. Travel to and from any summer camps or cruises is paid. While at camp or on cruise the members receive food and quarters at government expense in addition to basic pay. See the individual service sections for further information on the various camps and cruises. Those selected for the financial assistance program receive tuition, books, and fees plus $50 per month retainer pay.

Flight training. Eligible students in each of the three units may request and be selected for flight training during their senior year. This training, provided at government expense, leads to a private pilot license and an opportunity to continue flight training in a commissioned officer status.

How to enroll. See the Army, Navy, or Air Force sections for enrollment details for the various ROTC programs. All three departments are manned throughout the year during normal school hours to answer any inquiries regarding the ROTC programs.

Department of Aerospace Studies

Personnel detailed from the United States Air Force as of January 1966

Professor FROSS (Lieutenant Colonel), Commander.

Associate Professors: Major ANDERSON; Captains KINSLEY, HANSEN.

Instructors: Master Sergeant GIBSON; Airmen First Class GORDON, KRUEGER.

The Air Force now accepts only college graduates as officers. Eligible students desiring to be officers in the United States Air Force through Air Force ROTC may take either the two-year or the four-year program. The three parts of the two-year program are AS 214 (a six-week summer camp) Aerospace Studies III, and Aerospace Studies IV (the Professional Officer's Course); a total of 30 credit hours. The four-year program consists of Aerospace Studies I, II, III, and IV plus AS 314 (a four-week summer camp); a total of 33 credit hours. Pilot trainees in either program take AS 450, Flight Ground School.

In deciding between the two- or four-year program you must weigh these factors:

1. The financial assistance program which offers tuition, books, and fees is open *only* to students in the four-year program.

2. The two-year program's six-week summer camp *must* be taken one summer while a student is in college, but the four-year program's four-week summer camp may be delayed until after graduation. (This affects summer employment.)

3. The two-year program may be completed if you have two years remaining in school *after* the six-week summer camp. This may be undergraduate work, graduate work, or a combination. (This allows you to delay your officer career decision.)

4. In neither program are you committed to accept a commission in the Air Force, if offered, until you enroll in your first course in the Professional Officer's Course, AS 311.

5. Previous military experience (ROTC experience, Academy, or military service) may allow the Professor of Aerospace Studies to waive all or part of the Basic Military Course for students in the four-year program.

A student may include PS 441, 442, and 443 to provide a comajor in Aerospace Studies with the major he submits for a baccalaureate degree.

The financial assistance program is available for a limited number of qualified four-year program students on a competitive basis. Competition is based equally upon accumulative grade-point average, Air Force Officer Qualification (Aptitude) Test scores, and a board's evaluation. It is not based upon need. The program pays tuition, books, and fees for the two years of the advanced Air Force ROTC.

How to enroll: To enroll in the four-year program, enroll in the fall in AS 111 just as you would for any other course. To enroll in the two-year program a student must apply to AFROTC early in winter term of the year before he plans to enroll in AFROTC.

Field Training: Under either program the student takes only one summer camp. The two-year program requires a six-week camp two academic years before leaving school. This camp pays an Airman Basic's pay and at present totals about $117. The four-year program requires a four-week camp between the junior and senior years. The total pay for this camp is about $120.

Commissioning: Students must be male U. S. citizens, under age 28, of sound physical condition and moral character. They must have received a baccalaureate degree to be recommended for commissions as Air Force officers. Students receiving the financial assistance program must be able to complete the AFROTC program by age 25.

Outstanding advanced course cadets are designated Distinguished Air Force ROTC Cadets and are given the opportunity to apply for commissions as regular officers in the Air Force.

The flight program, the retainer pay, and the entrance requirements are described under General Remarks. These programs are flexible—for information contact the Air Force ROTC.

Lower Division Courses

AS 111,112,113. Aerospace Studies I.
2 hours fall and spring; 1 hour winter. 3 ①, 1 ①, 3 ①
General Military Course (GMC). FOUNDATIONS OF WORLD MILITARY SYSTEMS: Exploring causes of present world conflict, role of military power and relationship to that conflict, and responsibility of the Air Force officer. Tridimensional analysis of political philosophies which have guided segments of society in twentieth century; objectives of nations in world development; individual military systems with emphasis upon U.S. Department of Defense and U.S. Air Force.

AS 211,212,213. Aerospace Studies II.
1 hour credit fall and spring; 2 hours winter.
1 ①, 3 ①, 1 ①
General Military Course (GMC). WORLD MILITARY SYSTEMS: Continues study of world military forces and political-military issues surrounding their existence. U. S. Armed Forces' doctrines, missions, and employment concepts; the military force of joint commands (NATO, CENTO, SEATO) and their role in free-world security; investigation of USSR, Soviet satellites, and the Chinese Communists' military forces. Trends and implications of world military power.

AS 214. Field Training Unit.
6 hours summer.
DEFENSE OF THE UNITED STATES AND WORLD MILITARY SYSTEMS: Causes of world conflict as affecting security of United States; mission of U. S. Air Force; U. S. power position in world affairs; and world commitments. World military forces and military discipline, military courtesy and traditions. Students attend this training at an Air Force base designated by the Defense Department. Prerequisite: application prior winter term.

Upper Division Courses

AS 311,312,313. Aerospace Studies III.
3 hours each term. 4 ①
Professional Officer's Course. GROWTH AND DEVELOPMENT OF AEROSPACE POWER. Nature of war; development of airpower; mission and organization of Defense Department; Air Force concepts, doctrine, and employment; astronautics and space operations; and future development of aerospace power. Space programs, vehicles, systems, and problems in space exploration. Prerequisite: AS I and II or AS 214.

AS 314. Summer Camp.
6 hours summer.
Junior Officer Training. FIELD TRAINING UNIT (for four-year program students). 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. Students attend this training at an Air Force base designated by the Defense Department. Prerequisite: AS 311,312,313.

AS 411,412,413. Aerospace Studies IV.
3 hours each term. 4 ①
Professional Officer's Course. THE PROFESSIONAL OFFICER. Professionalism, leadership, and management. Professional responsibilities, the military justice system, leadership theory, functions, and practices, management principles and functions, problem solving and management tools, practices, and controls. Prerequisite AS 311,312,313.

AS 450. Aerospace Studies.
3 hours. 2 ②
PRINCIPLES OF FLIGHT, WEATHER, AND NAVIGATION. Aerodynamic reactions, meteorology, flight computers, navigation, flight planning, and associated federal air regulations.

Department of Military Science

Personnel detailed from United States Army as of January 1966.

Professor: Colonel HANCOCK (artillery) Commandant.

Associate Professor: Lieutenant Colonel BUCKLEY (Infantry).

Assistant Professors: Major BURTCHETT (Corps of Engineers), Captains DELUMPA (Armor), FITZPATRICK (Signal), and VANTURE (Artillery).

Instructors: Sergeant Major BERRY, Master Sergeant CARTER, Sergeant First Class BRUMBELOW, Staff Sergeant BONHAM, Specialist SMITH.

Instruction in the Military Science Department is designed to produce junior officers for the United States Army in both the reserve and regular components. The basic military education this department provides, in conjunction with the student's regular course of study, provides the background and attributes essential to the Army officer.

The Army ROTC commissioning program is comprised of: (1) either the Basic Course or Basic Summer Camp; (2) the Advanced Course; (3) the Advanced Summer Camp; and (4) authorized electives from other schools of the University. Upon completion of the four-year military science course, the student will have received 33 credit hours, 27 of which are applicable as electives toward graduation and all of which are reflected in his university grade-point average. Those students taking the "two-year" course, that is, substituting Basic Summer Camp for the Basic Course, will have received 30 credit hours at completion of the Military Science Course.

a. The Basic Course consists of freshmen classes each term for which the student receives one credit hour each, and classes each term of the sophomore year for which he receives 2 credit hours per term. (Students who have not taken the Basic Course may attend a six-week Basic Summer Camp at the end of their sophomore year and also be eligible for the Advanced Course. This provision allows students transferring from junior colleges, or who for other reasons have not taken the Basic Course, to get into the commissioning program.)

b. Students in the Advanced Course, the junior and senior years, receive 3 credit hours per term.

c. The Advanced Summer Camp, which normally is attended between the junior and senior years, is six weeks in duration and 6 credit hours are awarded for it by the University.

d. While enrolled in the Advanced Course, the cadet will take 9 credit hours of selected electives. Credit for these electives is in addition to the Military Science Advanced Course and will satisfy requirements for ROTC and for the student's primary course of study. Electives will be selected with the advice of the departmental faculty from electives approved by the PMS. Only subjects which are not required in the student's normal academic curriculum during the freshman and sophomore years will be selected to meet this requirement. By including SSc 441, 442, and 443 as the selected electives, a student may submit Military Science as a comajor for a baccalaureate degree.

Successful completion of the program in Military Science leads to a commission as an officer in one of fourteen branches of the Army. A student who successfully completes the cadet flight training program may be selected for Army Flight Training which will qualify him as an Army Aviator.

Enrollment in the Advanced Course. Each student enrolled in the Advanced Course of the ROTC must:

1. Be selected by the professor of Military Science and the President of Oregon State University.
2. Be able to complete requirements for commission before reaching 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 the Basic Summer Camp, or received credit in lieu thereof for having had 12 months or more previous honorable active service in the Army, Navy, Marine Corps, Coast Guard, or Air Force or have completed 4 or more months active duty for training or active service in the National Guard or Armed Forces reserves.
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 $132 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.

Scholarships. Army ROTC offers two types of scholarships. Each pays full tuition, book costs, laboratory and incidental fees, and $50 each month subsistence pay for the term of the scholarship. (This is not paid in addition to the subsistence pay that all Advanced Course cadets get, but is an alternative financial aid program.) The four-year scholarships are awarded to selected applicants from among high-school seniors.

Two-year scholarships are effective for junior and senior years and are awarded to selected students who are in the sophomore year of the Basic Course Army ROTC classes at the University. Students who substitute the Basic Summer Camp for the Basic Course are not eligible for a scholarship. Full information on Army ROTC Scholarships may be obtained by contacting the Military Science Department of the University.

Lower Division Courses

MS 111,112,113. Military Science I.
1 hour each term. 2 ①
Leadership laboratory: organization of the Army and ROTC; individual weapons and marksmanship; U. S. Army and National Security; 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. Military Science II.
2 hours each term. 3 ①
Leadership laboratory; map and aerial photo reading; introduction to operations and basic tactics; counter insurgency; American military history.

MS 214. Basic Summer Camp.
6 hours.
Six weeks of instruction at Fort Knox, Kentucky; substitute for the first two years of the ROTC program.

Upper Division Courses

MS 311,312,313. Military Science III.
3 hours each term. 3 ①, 3 ①, 4 ①
Leadership laboratory; military teaching principles; branches of the Army; small unit tactics and communications; precamp orientation; counter insurgency operations; selected academic subjects.

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. Military Science IV.
3 hours each term. 3 ①, 4 ①, 3 ①
Leadership laboratory; operations, logistics; role of the United States in world affairs; army administration; military law, service orientation; review of map reading; selected academic subjects.

Department of Naval Science

Personnel detailed from United States Navy and Marine Corps as of January, 1966.

Professor LOCKE (Captain, USN) Commanding Officer.

Associate Professor FREDERICKS (Lieutenant Colonel, USMC) Executive Officer.

Assistant Professors: SPERLING (Lieutenant Commander, USN); BENCH (Major, USMC); BOWER (Lieutenant, USN); RYAN (Lieutenant, USN); REECE (Lieutenant, USNR).

Instructors: ADAMS (Chief Quartermaster); CAIN (Chief Gunner's Mate); ADAMS (Chief Fire Control Technician); CONNORS (Storekeeper First Class); PHILLIPS (Gunnery Sergeant, USMC); REBER (Chief Yeoman).

Contract students are selected by the Department of Naval Science at Oregon State University from among voluntary applicants during the new student orientation period. They are paid subsistence amounting to $40 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.

Students presently enrolled at junior colleges or non-NROTC colleges and universities who expect to transfer to Oregon State University for their final two years may be eligible for the *special two-year contract program.* Details regarding this program are available at any NROTC unit or U. S. Navy Recruiting Station. This information must be obtained early in the sophomore year in order that timely application may be made for the summer training session which is a prerequisite for enrollment in this special program.

The active duty obligation in both foregoing categories defers participating students from military service during university training.

Any undergraduate student may, with the prior approval of the Professor of Naval Science, undertake science courses for credit. Such students, however, are classified as Naval Science students and are not actually enrolled in the NROTC program which leads to a commission upon graduation.

Requirements. *Every acceptable NROTC 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 or tentatively accepted 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 4 inches, maximum 6 feet 6 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 NROTC 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 minimum 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 411,412).

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 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 will 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.

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.

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 and 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.

Organization and Administration. The Graduate Faculty consists of the President of the University, the academic deans, the chairmen of the 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 Graduate Committees of the several schools. 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 an ex-officio member of all graduate committees.

Oregon State College granted its first advanced degrees (A.M.) in 1876. In 1897 residence requirements for the master's degree were announced. In 1910 graduate study was placed under a standing committee of the faculty. In 1933 all graduate work in the State System of Higher Education was placed in an interinstitutional Graduate Division; graduate work at Oregon State was placed under immediate charge of an associate dean and an institutional graduate council. The first degrees of Doctor of Philosophy were conferred by Oregon State in 1935. In October 1946, the State Board of Higher Education returned to the institutions direct responsibility for their programs of graduate study, and assigned graduate work on this campus to the Graduate School.

Graduate School

Henry P. Hansen, Ph.D., Dean

Wendell H. Slabaugh, Ph.D., Associate Dean

Ira W. Deep, Ph.D., Assistant Dean

GRADUATE COUNCIL

H. P. HANSEN (chairman), L. M. BEALS, R. BOGART, J. R. DILWORTH, E. J. DORNFELD, J. G. KNUDSEN, H. H. PLAMBECK, R. W. SAGER, W. H. SLABAUGH, C. A. STORVICK, L. B. STRICKLER, E. A. YUNKER.

GRADUATE COMMITTEES

Science: E. J. DORNFELD (chairman), H. T. EASTERDAY, H. FREUND, D. GUTHRIE, J. G. JENSEN, A. T. LONSETH, L. W. PARKS, J. G. PATTULLO, P. O. RITCHER, W. D. WILKINSON, S. E. WILLIAMSON, D. L. WILLIS, R. A. YOUNG.

Business and Technology: L. B. STRICKLER (chairman), D. D. BOURQUE, D. D. MCFARLANE, V. T. SNYDER, W. W. WIDICUS.

Agriculture: R. BOGART (chairman), C. E. BOND, R. F. CAIN, M. E. HARWARD.

Education: F. R. ZERAN (chairman), L. M. BEALS, MAY DUBOIS, N. D. MARKSHEFFEL, H. A. TEN PAS, S. E. WILLIAMSON.

Engineering: G. W. GLEESON (chairman), J. G. KNUDSEN, T. J. MCCLELLAN, L. SLEGEL, L. N. STONE, J. S. WALTON.

Forestry: J. R. DILWORTH (chairman), D. N. BEVER, G. H. BARNES, W. A. DAVIES, E. ELLIS, W. I. WEST.

Home Economics: CLARA A. STORVICK (chairman), MARIAN AIKEN, MAY DUBOIS, MARGARET FINCKE, N. MARIE LEDBETTER, HELEN WELLS.

Pharmacy: R. W. SAGER (chairman), R. F. DOERGE, G. B. FINK, H. C. FORSLUND, L. A. SCIUCHETTI.

General Studies and Nonmajor Fields: H. H. PLAMBECK, Sociology (chairman); W. R. CROOKS, Psychology; R. F. FUQUAY, Political Science; L. G. HARTER, JR., Economics; T. R. MEEHAN, History; H. D. JENKINS, English.

JOINT-CAMPUS PROGRAM

Regularly enrolled graduate students at Oregon State University may enroll in graduate courses of the University of Oregon in Eugene when these courses are a part of their approved graduate programs. The joint-campus program offers the graduate student enrolled at OSU access to the specialized instructional and research resources of two major universities through a single matriculation and registration.

In a similar manner, graduate students at the University of Oregon may take graduate courses at Oregon State University without additional tuition. Students participating in the joint-campus program are considered students of their home university.

Students follow the standard advising and registration procedures, irrespective of whether work is taken on one or both campuses. Courses to be taken at the University of Oregon will be identified on registration materials by the symbol "JC 510 UO" preceding the course prefix, number, and title as listed in the U of O catalog. Credit earned on either campus by OSU students will be recorded in the OSU Registrar's Office. Tuition and fees will be the same as if all courses were taken at Oregon State University. Students participating in this program are responsible for their own transportation.

ADVANCED DEGREES

The degrees granted through the Graduate School of Oregon State University and the fields in which programs of study leading to the respective degrees are offered are listed below.

Doctor of Philosophy (Ph.D.)

School of Science fields

BOTANY: anatomy, cytology, ecology, genetics, morphology, mycology, nematology, plant pathology, palynology, phycology, physiology, physiology of parasitism, systematic botany

CHEMISTRY: analytical chemistry, biochemistry (including agricultural chemistry), forest products chemistry, inorganic chemistry, organic chemistry, physical chemistry, radiochemistry (organic and inorganic)

ENTOMOLOGY: applied entomology, forest entomology, general entomology, systematic entomology

GENERAL SCIENCE: radiation biology, radiological physics, biophysics, physical science, biological science

GENETICS: formal genetics, cytology and cytogenetics, evolution and speciation, quantitative genetics, microbial genetics, fungus genetics, plant genetics and improvement, animal genetics and improvement, forest genetics

GEOLOGY: areal geology, economic geology, geomorphology, invertebrate paleontology, micropaleontology, palynology, petrology, sedimentology, stratigraphy, volcanology

MATHEMATICS: analysis, algebra, applied mathematics, computer science and technology, geometry

MICROBIOLOGY AND HYGIENE: dairy microbiology, food microbiology, hygiene and sanitation, industrial microbiology, marine microbiology, microbial genetics, microbial physiology, microbiology of water and sewage, pathogenic bacteriology, soil microbiology, virology, molecular biology

OCEANOGRAPHY: biological oceanography, chemical oceanography, geological oceanography, physical oceanography, geophysics

PHYSICS: applied physics, atomic physics, meteorology, modern physics, nuclear physics, solid state, theoretical physics

STATISTICS: statistics

ZOOLOGY: cellular biology, embryology and anatomy, genetics, invertebrate zoology, natural history and ecology, parasitology, physiology

School of Agriculture fields

ARGICULTURAL ECONOMICS: agricultural finance and taxation, agricultural marketing, agricultural prices, farm management, econometrics and mathematical economics, natural resource development, production economics, transportation economics

ANIMAL SCIENCE: dairy production, genetics, livestock management, nutrition, physiology, range management, reproduction

FARM CROPS: crop breeding and genetics, crop physiology and ecology, farm crop production, genetics, pasture production and management, range management, seed physiology, seed technology, weed control

FISHERIES AND WILDLIFE: fisheries, wildlife management

FOOD SCIENCE AND TECHNOLOGY: food science

GENETICS: (See School of Science fields above)

HORTICULTURE: floriculture, nursery management, ornamental horticulture, pomology, vegetable crops

POULTRY SCIENCE: breeding, genetics, management, nutrition, reproduction physiology

RANGE MANAGEMENT: interdepartmental major

SOILS: irrigation, forest soils, soil chemistry, soil fertility, soil genesis, soil physics

School of Education fields

EDUCATION: education, guidance

SCIENCE EDUCATION

School of Engineering fields

CHEMICAL ENGINEERING: chemical engineering

CIVIL ENGINEERING: highway engineering, hydraulic engineering, sanitary engineering, soils engineering, structural engineering, and engineering surveying

ELECTRICAL AND ELECTRONICS ENGINEERING: communication, computers, control, digital systems, electrical engineering, electronics, instrumentation, medical electronics, network synthesis, power, solid state electronics

MECHANICAL AND INDUSTRIAL ENGINEERING: (Mechanical) aeronautics, applied mechanics, automotive design, heat, metallurgy and materials, nuclear engineering, power; (Industrial) production control, plant layout, materials handling, methods analysis, work simplification, operations research

School of Forestry fields

FOREST MANAGEMENT: fire control, forest economics, forest genetics, forest management, forest photogrammetry, forest tree physiology, silviculture, watershed management

FOREST PRODUCTS: wood conversion, wood science

School of Home Economics fields

FAMILY LIFE: child development, family relationships

FOODS AND NUTRITION: foods, nutrition

HOME MANAGEMENT: home management

School of Pharmacy fields

PHARMACEUTICAL CHEMISTRY
PHARMACEUTICAL SCIENCE
PHARMACOGNOSY
PHARMACOLOGY

Doctor of Education (Ed.D)

School of Education fields

EDUCATION: education, guidance

SCIENCE EDUCATION

Master of Arts (M.A.)

School of Science fields

BOTANY
CHEMISTRY
ENTOMOLOGY
GENERAL SCIENCE: history of science, radiological health
GENETICS
GEOLOGY
MATHEMATICS
MICROBIOLOGY AND HYGIENE
METEOROLOGY: biometeorology, radar, meso, and micrometeorology
GEOGRAPHY: resource geography, physical geography
OCEANOGRAPHY
PHYSICS
STATISTICS
ZOOLOGY

School of Education fields

AGRICULTURAL EDUCATION
BUSINESS EDUCATION
EDUCATION
GUIDANCE
HEALTH EDUCATION
HOME ECONOMICS EDUCATION
INDUSTRIAL ARTS EDUCATION
SCIENCE EDUCATION

School of Engineering fields

CHEMICAL ENGINEERING
CIVIL ENGINEERING
ELECTRICAL ENGINEERING
ENGINEERING SURVEYING
INDUSTRIAL ENGINEERING
MECHANICAL ENGINEERING
NUCLEAR ENGINEERING

School of Home Economics fields

CLOTHING, TEXTILES, AND RELATED ARTS
FAMILY LIFE
FOODS AND NUTRITION
HOME MANAGEMENT
INSTITUTIONAL MANAGEMENT

School of Pharmacy fields

PHARMACEUTICAL CHEMISTRY
PHARMACEUTICAL SCIENCE
PHARMACOGNOSY
PHRMACOLOGY
PHARMACY ADMINISTRATION

Master of Science (M.S.)

The Master of Science degree is offered in the same fields as listed above for the Master of Arts degree with the following additions:

School of Agriculture fields

AGRICULTURAL ECONOMICS
AGRICULTURAL ENGINEERING: crop processing, farm structures, power and machinery, soil and water
ANIMAL SCIENCE: livestock management, dairy production, meats, wool technology
FARM CROPS
FISHERIES
FOOD SCIENCE AND TECHNOLOGY
GENETICS
HORTICULTURE
WILDLIFE MANAGEMENT
MECHANICAL TECHNOLOGY IN AGRICULTURE: farm machinery, irrigation and drainage, farm buildings, crop processing, farm electrification
POULTRY SCIENCE
RANGE MANAGEMENT
SOILS
VETERINARY MEDICINE: microbiology, parasitology, virology

School of Forestry fields

FOREST ENGINEERING
FOREST MANAGEMENT
FOREST PRODUCTS

Other Master's Degrees

The following additional master's degrees are offered in the fields indicated:

Master of Agriculture: AGRICULTURE

Master of Arts in General Studies: (See page 167)

Master of Bioengineering: (See page 171)

Master of Business Administration: (See page 167)

Master of Education: AGRICULTURAL EDUCATION, BUSINESS EDUCATION, EDUCATION, GUIDANCE, HEALTH EDUCATION, HOME ECONOMICS EDUCATION, INDUSTRIAL ARTS EDUCATION, SCIENCE EDUCATION

Master of Engineering: (See page 171)

Master of Forestry: FOREST ENGINEERING, FOREST MANAGEMENT, FOREST PRODUCTS

Master of Home Economics: CLOTHING, TEXTILES, AND RELATED ARTS; FAMILY LIFE; FOODS AND NUTRITION; GENERAL HOME ECONOMICS; HOME ECONOMICS EDUCATION; HOME MANAGEMENT; INSTITUTION MANAGEMENT

Master of Material Science: (See page 168)

Master of Pharmacy: PHARMACY ADMINISTRATION, HOSPITAL PHARMACY

Engineer Degrees

Degree	*Department*
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

Minors

Any of the fields listed above may be offered as minor fields of study as a part of a student's graduate study program. In addition graduate minors in the following fields are also offered.

Biometry
College and University Teaching
Economics
English
Extension Methods
History
Music
Operations Research
Physical Education
Political Science
Psychology
Sociology
Speech
Trade and Industrial Education
Water Resources

GENERAL REGULATIONS

Admission

A student desiring to enter the Graduate School at Oregon State University will send (or arrange to have sent) to the Office of Admissions: (1) 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 $10 admission fee. 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 department 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:

Regular Graduate students

Those who have met the academic requirements may be either classified or unclassified.

a. *Classified* are those who have been accepted by a major department to work toward an advanced degree.

b. *Unclassified* are 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.

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 full 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 prior to and while 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. Normally, 15 hours with grades of B or better are required for reconsideration.

Reserving Credits

Graduate credit is not granted for undergraduate courses taken in excess of the requirements for a baccalaureate degree, but undergraduate students taking graduate courses in excess of baccalaureate requirements may have such credits reserved for possible future use under the following conditions:

(a) Only credits with A or B grades, earned within 45 hours (60 hours for five-year baccalaureate programs) of graduation, may be reserved for graduate credit.

(b) Request for reservation must be made early in the term in which the student completes baccalaureate requirements.

(c) A maximum of 18 hours may be reserved for graduate credit.

(d) Before more than 15 term hours of credit are earned, the student must select a graduate major and minor, pass qualifying examinations, be assigned a major professor, and formulate an approved graduate program.

(e) A minimum of two terms of residence in the Graduate School is required regardless of the number of credits reserved.

Preparation Required

Preparation for a graduate major must be an undergraduate major in the same subject or a fair equivalent. Preparation for a graduate minor must be at least one year of upper division work in addition to foundation courses in the subject. Graduate credit may not be earned in courses for which the student does not show proper preparation by previous record or special examination.

Qualifying Examinations

Graduate students working for advanced degrees in many departments 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.

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 teaching and research assistants the maximum load is 12 term hours; for part-time assistants the maximum load is 15 term hours; fellows may carry the maximum load.

A graduate student using space and facilities or under supervision of a major professor must register for a minimum of 3 term hours.

The graduate program of each candidate should include a substantial amount of work with at least three faculty members offering graduate instruction.

Grade Requirement

A grade-point average of 3.00 (a B average) is required in both the major and the minor(s). Grades below C are not accepted for graduate credit.

Graduate Courses

All courses numbered in the 500's carry graduate credit, as do those in the 400's which have been approved by the Graduate Council. Approved courses in the 400's 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, 506, 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) and Projects (506) are used for special work not given under a formal course number. They may include specified reading, laboratory work, field work, or compilation of information essential in the student's program. The work done under these numbers may be reported either in writing or orally to the instructor concerned. Seminar (507) is used both for departmental seminars and for special group work not given in a formal course.

Oral Examination Schedule

Oral examinations, both preliminary and final, will not be scheduled during any period when classes are not in session, including between the summer session and fall term.

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 the meeting following receipt of the petition presented in proper form. 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 should apply for graduation at the Graduate School Office by the first week of spring term preceding Commencement. Students in residence spring term are required to attend Commencement. Students who complete their work previous to the spring term but who cannot attend Commencement must petition the Academic Requirements Committee to receive their degrees in absentia.

Students who complete degree requirements in the summer term should apply for graduation at that time. Diplomas will be mailed early in September.

Graduate Fees

Graduate students registered for 8 term hours of work or more pay tuition and fees in accordance with the schedule printed in the General Information section of this Catalog. Graduate students do not pay the nonresident fee. Students holding teaching or research assistantships pay fees totaling $32 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 Oregon State for the benefit of students.

Deposits. Persons who enroll for academic credit (except staff members) must make a deposit of $25 payable once each year at the time of first registration. This is required as a protection against loss or damage of institutional property such as dormitory 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 University. 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. Approval for registration must be obtained from the Executive Office.

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. Graduate assistants render service to the institution through teaching duties or research and pay fees amounting to $32 per term, which admit them to all services maintained by the university for the benefit of students. Graduate 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 graduate assistant varies from $2,200 to $2,800.

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 $2,880 to $3,600 on a twelve-month basis.

Oregon State Game Commission Research Assistantships. Research assistantships in fisheries and wildlife are supported by the Oregon Game Commission with stipends of $6,000 for two full years for the M.S. and $9,600 over a three-year period for the Ph.D. degree. Apply to the Oregon State Game Commission, Division of Wildlife Research, 303 Extension Hall, OSU.

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 $2,300 on a nine-month appointment.

Fellowships. A number of Fellowships sponsored by industry, foundations, and government agencies are available to superior graduate students for graduate study in various departments at Oregon State University. These fellowships are awarded through the departments concerned, and application should be made by writing to the department. Fellows render no service to the institution, may carry 16 credit hours, and pay the full fee of $110 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: $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.

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: $1,200 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 $4,000 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 FELLOWSHIP: $1,800 plus fees provided by Fellowship Committee of the Shell Oil Company Foundation for single student in chemistry; $2,100 for married student with one or more children.

SOUTH SANTIAM EDUCATIONAL RESEARCH PROJECT FELLOWSHIPS: Two $2,000-$3,000 fellowships for students in forest management provided by the Louis W. and Maud Hill Foundation.

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.

WEYERHAUSER 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.

CHESTER M. WILCOX MEMORIAL SCHOLARSHIP: Income from a trust fund left by A. D. Wilcox in honor of his brother to a graduate student for research in poultry science. Approximately $4,000 annually.

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 AND TRAINEESHIPS: 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.

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 including thesis and 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. Of the 45 term hours, a maximum of 6 term hours may be earned under "in absentia" registration, but no thesis credit may be thus registered. A minimum of 3 hours of small "g" courses are allowed on major.

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 Division of Continuing Education 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.

Transferred Credit

A maximum of 15 term hours of graduate work done at another accredited institution, or in the Division of Continuing Education 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. Credit for out-of-state extension courses is not acceptable.

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 the first term of the 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. Courses more than ten years old are obsolete.

Qualifying Examinations. (see page 162)

Thesis

A copy of the master's thesis in final form must be presented to the Graduate Office for collating at least one week prior to the final oral examination. 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 the major professor, the head of the major department, and the Dean of the Graduate School.

Full information concerning the prescribed style for theses may be obtained at the office of the Graduate School.

The credit allowed for the thesis, including the research and the preparation of the manuscript, varies from 6 to 12 term hours. The Master of Science degree with a major in General Science is offered either with or without the 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.)

Final oral examinations must be scheduled in the Graduate Office six weeks before June Commencement and must be completed four weeks before Commencement. Corrected copies of the thesis with three copies of the abstract must be in the Graduate School Office not later than two weeks before Commencement.

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 theses based on research. Forty-five hours are required with a minimum of 9 hours in each of at least three agricultural fields with not more than 21 hours in any one field. At least 15 hours must be in 400 (G) or 500 courses.

An advisory committee selected from these departments will select the major professor from the department of the student's major interest. The program must be approved by the committee within three weeks from the date the student registers under the program. No thesis is required but a paper demanding 3 to 5 hours of work must be submitted to be registered as Reading and Conference 505.

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 program 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 Business Administration

The Master of Business Administration degree is designed for the individual holding an undergraduate degree either in business administration or in a nonbusiness area who seeks professional education which will aid him ultimately to develop into a competent and responsible executive in business, industry, or government, or to carry on research related to business problems and operations. The program involves a broad study of the field of business administration rather than intensive work in any one specialized area.

The M.B.A. program consists of 45 term hours of graduate work, 12 of which may be devoted to a nonbusiness minor. Prerequisite to the MBA graduate courses is a body of undergraduate work in business and economics totaling 40 to 45 term hours.

The time required by a full-time student to complete the program varies from one to two years, depending upon the extent to which the prerequisites are met prior to admission. M.B.A. candidates whose undergraduate degrees were earned in the field of business administration normally will be able to complete the requirements for the M.B.A. degree within one year.

The M.B.A. degree requires a comprehensive final written examination but no thesis is required.

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 earning credit through the Division of Continuing Education of the State System of Higher Education, but a minimum of 24 term hours (not to include thesis or field studies) must be earned on the Corvallis campus in two complete eight- or eleven-week summer terms or two academic-year quarters.

Credit for extension courses from outside the State System of Higher Education is not accepted except under unusual circumstances. In instances where it is accepted, *prior approval* must be obtained from the Dean of the Graduate School if such courses are to be submitted for program purposes. Where credit is transferred from another institution and the major is education or guidance, at least 12 term hours must be earned in the major on this campus. Where the minor is in education, administration, or guidance, at least 12 term hours must be earned in the minor on this campus. When the major *and* minor are in education or guidance, a minimum of 12 term hours in each must be earned on this campus.

A candidate for the Master of Education degree must qualify under one of these options:

a. He must submit 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 24 hours in prescribed courses and 6 hours selected from related courses. A minor of 15 hours in psychology is required with at least 6 hours in psychological tests and testing.

c. He completes 45 term hours with 24 term hours in specific courses. The remaining 21 hours are elective under the direction of an adviser. No thesis or field studies are required. The final examination will be either oral or a written comprehensive examination covering all courses in the student's program. Under Option 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 or Diagnostic and Remedial Instruction in Reading 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 department 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 or departments concerned.

General requirements, except for those relating to the thesis and written report, are the same as for the Master of Science degree.

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 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 nuclear engineering degree has been approved by the Atomic Energy Commission for its graduate fellowship program.

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:

a. Those who hold a baccalaureate or master's degree from Oregon State University must have at least five years of successful professional practice following graduation. Graduate study, through the Division of Continuing Education 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.

b. Those who do not hold baccalaureate or master's degrees from Oregon State University are subject to the same requirements as (a) with the additional stipulation that at least 12 term hours of graduate work must be completed in residence on 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 applies for the degree with the Registrar of Oregon State University either in person or by mail not later than March 1.

Doctor of Philosophy

The degree of Doctor of Philosophy is granted primarily for attainments and proved ability. There is no rigid credit requirement. Normally, a student who has had all of his undergraduate training and also has completed his master's degree at Oregon State, may not become a candidate for a doctoral degree at this institution. In justified cases, however, he may petition to the Graduate Council to do all of his work through the doctorate 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 or one integrated minor. Normally, one minor must be outside the major

department, but in certain areas all graduate work may be done in the department of the major. The study program is formulated under the guidance of the student's doctoral committee which is composed of two professors from the major field, 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, including the thesis, is devoted to the major, 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 set. 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 next page.

Residence

For the doctor's degree, the equivalent of at least three years of fulltime work beyond the bachelor's degree is required, of which at least one year (usually the last) must be spent in continuous residence at Oregon State University with a minimum of 36 hours of formal course work.

Qualifying Examinations. (see page 162)

Language Requirements

1. THE TWO-LANGUAGE OPTION. For the Doctor of Philosophy degree a reading knowledge of two languages, French and German or suitable substitutes, must be demonstrated. Substitutes must be approved by the major professor and the Graduate Council. A foreign student may not substitute his native language for German. He must demonstrate ability to translate his native language into English if substituted for French.

Either or both language requirements may be satisfied by examination involving the translation of materials in the student's research fields, conducted by approved examiners; or by a special one-year course in each language taken at Oregon State University, as set up and approved by the Graduate Council, with a B average for the year sequence.

2. THE ONE-LANGUAGE OPTION. The language requirement may be met by a thorough knowledge of one language, approved by the student's committee. The examination will test the ability to read fluently and to translate the language into English and vice versa. The native language of a foreign student will not satisfy the one-language requirement.

Foreign language requirements should be completed as early as possible after the beginning of graduate work and must be completed before the oral preliminary examination may be taken.

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. Advancement to candidacy is contingent on passing these preliminary examinations. Most departments require a written comprehensive examination to be taken before the oral preliminary examination. Oral preliminary examinations *will not be scheduled* for the period between *four and six weeks before June Commencement.*

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. Credit for the doctoral dissertation may range from 25 to 45 term hours, although the preparation of an acceptable dissertation will require not less than one academic year. Thesis preparation directions are available in the Graduate School Office.

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 final examination.

An abstract of the doctoral thesis of not more than six hundred words will be published by University Microfilms in *Dissertation Abstracts.*

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 the 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 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 written examination, if given, is expected to cover aspects of the major and minor fields with which the thesis is not directly concerned.

The final oral examination must be taken within five years after the preliminary examination. If more than five years elapse, the candidate will be required to take another preliminary examination.

Final oral examinations must be scheduled in the Graduate Office *approximately five weeks before June Commencement* and must be *completed about three weeks before Commencement.* Exact dates will be publicized. Two corrected copies of the dissertation with three copies of the abstract must be in the Graduate School Office not later than *two weeks* before Commencement. Oral preliminary examinations *will not be scheduled* for the period between *six and four weeks before June Commencement.*

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. There is no rigid credit requirement, but the total number of term hours of graduate credit including thesis will approximate 135.

Along with the education major, one minor in a 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.

The following special and interdepartmental programs are offered by the Graduate School of Oregon State University. Courses and degrees which apply specifically to these programs are listed here rather than in other sections of this catalog.

COLLEGE TEACHING MINOR

Delmer M. Goode, coordinator
C. L. Anderson, F. M. Beer, J. K. Munford, H. D. Schalock

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.

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 College Student (CC 556), College and University Teaching (CC 557), American Higher Education (CC 558), College Teaching Procedures Seminar (.... 507), and College Teaching Studies (CC 506).

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.

Courses in Studies in College and University Teaching and Curriculum are as follows:

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: CC 556,557,558.

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

..... 507. **Seminar** (College Teaching Procedures). 3 hours.
Student registers for this seminar in his major department and meets during the term with students from other fields and the instructor to study teaching procedures applicable at the college level.

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.

CC 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.

CC 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.

CC 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. Prerequisite: graduate standing.

GENERAL STUDIES

The General Studies program at Oregon State University is supervised by a special committee of which Dr. H. H. Plambeck 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.

Graduate Courses

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.

GENETICS

Ralph Bogart, Director of Genetics Institute
Genetics Board: K. K. Ching, chairman, K. L. Chambers, P. E. Bernier, Ralph Bogart, R. V. Frakes, J. D. Mohler.

Graduate work in Genetics as a major or a minor can lead to the degrees of Master of Arts, Master of Science, and Doctor of Philosophy. Graduate studies in genetics are coordinated by the Genetics Board and the Director of the Genetics Institute, representing the genetics graduate faculty who are attached to many departments in the schools of Agriculture, Forestry, and Science.

In addition to the specific courses carrying a Genetics (Gen) number, graduate courses in formal genetics, cytology and cytogenetics, evolution and speciation, quantitative genetics, microbial genetics, plant genetics and improvement, animal genetics and improvement, and forest genetics are offered in various departments.

The following undergraduate courses in genetics are offered: Genetics (Z 341), Plant Breeding (FC 415), Horticultural Plant Breeding (Hrt 413), Poultry Breeding (P 441).

Graduate Courses

Gen 501. **Research.** Terms and hours to be arranged.

Gen 503. **Thesis.** Terms and hours to be arranged.

Gen 505. **Reading and Conference.** Terms and hours to be arranged.

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

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 which is located in Richland, Washington. Qualified employees of Battelle Northwest and other contractors at the Hanford Atomic Products Operation may earn graduate credits toward advanced degrees at Oregon State University.

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.
GS 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.

GRADUATE WORK AT PORTLAND

Twenty-one of the 45 term hours of work required for the Master of Education degree may be earned at the Portland Continuation Center of the Division of Continuing Education. In a number of fields, one-third of the work for the Master of Arts 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. 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 Continuation Center) 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 at the Portland Continuation Center. 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.

GRADE TRANSCRIPTS

Students who complete graduate courses through the Portland Continuation Center must make arrangements to have transcripts of their grades sent to the Graduate School Office and the Registrar's Office at Oregon State University. Students expecting to complete degree requirements for the June Commencement must have transcripts in the Graduate Office not later than two weeks before Commencement. Students expecting to complete degree requirements during the regular summer term and to receive diplomas in September, must have their transcripts in the Graduate Office not later than two weeks before the end of the regular eight-week summer term.

Research and Extension

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. These include the General Research Fund administered by the Graduate Council and the following separately organized research facilities:

Agricultural Experiment Station
Engineering Experiment Station
Genetics Institute
Institute of Nuclear Science and Engineering
Marine Science Laboratory
Nutrition Research Institute
Science Research Institute
Transportation Research Institute
Water Resources Research Institute

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

WILBUR TARLTON COONEY, M.S., Dean of Agriculture.

G. BURTON WOOD, Ph.D., Associate Dean and Director.

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 (department head), BULLIS, HAAG, TERRIERE, WESWIG; Associate Professors FANG, LIKENS, TINSLEY; Assistant Professor MORRIS; Instructor ZIMMERMAN; Research Associates ADAMS, BOUDREAU, CLAEYS, DEENEY, LU, WAGNER.

Agricultural Economics: Professors BLANCH (acting department head), BROWN, GAROIAN, HALTER, MUMFORD, SITTON; Associate Professors EDWARDS, LANGMO, SUTHERLAND; Assistant Professors CONKLIN, FARNESS, MILLER, REEDER, SMITH, STOEVENER, YOUDE; Instructor BAKER.

Agricultural Engineering: Professors RODGERS (department head), CROPSEY, FROST, HARMOND, KIRK, SINNARD, WOLFE; Associate Professors BONNICKSEN, BOOSTER, BRANDENBURG, KLEIN, LONG, PAGE, PARK; Instructors WATTS, WHALEY.

Agricultural Information: Associate Professor MASON.

Animal Science: Professors MILLER (department head), BOGART, HEDRICK, OLDFIELD, POULTON, RALSTON; Associate Professors CHURCH, ENGLAND, FOX, OLIVER, WOLBERG; Assistant Professors ELLINGTON, KENNICK, KLIEWER, STOUT, WU; Instructor ADAIR; Research Associate KAUFMES.

Botany and Plant Pathology: Professors YOUNG (department head), BARTSCH, BISHOP, CHILCOTE, EVANS, HARDISON, HORNER, JENSEN, MCWHORTER, MILBRATH, MILLER, PHINNEY, ROTH, VAUGHAN, ZAK; Associate Professors ALLEN, CAMERON, CORDEN, CULVER, DOBIE, HAMPTON, JONES, LEACH, POWELSON, TRIONE; Assistant Professors DOOLEY, NELSON, TRAPPE; Instructor NEMEC.

Biometeorology: Associate Professor BLACK; Assistant Professor LOWRY.

Entomology: Professors RITCHER (department head), BUTT, JONES, MARTIGNONI, RUDINSKY, STEPHEN, SWENSON, TERRIERE, THOMPSON; Associate Professors CROWELL, DICKASON, GOULDING, KRANTZ, MAKSYMIUK, MORRISON, ROSENSTIEL, WITTIG; Assistant Professors ANDERSON, NAGEL, RYAN, SCHMIDT; Instructor KOONTZ; Research Associates SCHRICKER, ZETHER-MOLLER.

Farm Crops: Professors COWAN (department head), BROOKS, FOOTE, FURTICK, HEDRICK, MCGUIRE, POULTON; Associate Professors CALHOUN, CHILCOTE, CHING, FRAKES, HAUNOLD, JENSEN, LEACH, METZGER, RAMPTON; Assistant Professors APPLEBY, HARDIN, KRONSTAD, LEE, MACLAUCHLAN; Instructors CALLIHAN, SWANSON, ZIMMERMAN.

Fisheries and Wildlife: Professors SCOTT (department head), BOND, DOUDOROFF, KRUEGER, PHINNEY, RAYNER, WARREN; Associate Professors GASHWILER, HORTON, KUHN, MILLEMAN, WIGHT; Assistant Professors ANDERSON, BREESE, CAMPBELL, CHADWICK, DAVIS, FRYER, GARRISON, HALL, LIGHTFOOT, MCINTIRE, SHUMWAY, VERTS, WAGNER; Instructors EASLEY, HANSEN.

Food Science and Technology: Professors SCHULTZ (department head), CAIN, SAMUELS, SINNHUBER; Associate Professors ANGLEMIER, HARVEY, ONSDORFF, SATHER, WALES, YANG; Assistant Professors BEAVERS, BILLS, LAW, LINDSAY, MONTGOMERY, VARSEVELD, WILLITS, YU; Research Associates CRAWFORD, LEE, LIBBEY, PEREIRA, SIEK, WROLSTAD, YOSHIKAWA.

Forest Research Laboratory (Forest Management): Professors BEVER (department head), BERG; Associate Professors CHING, HERMANN, LAVENDER; Assistant Professors BLACK, HOOVEN, IRGENS-MOLLER, KANGUR, NAGEL, NEWTON, WARING, ZAERR, ZAVITKOVSKI.

Forest Research Laboratory (Forest Products): Professors ELLIS (department head), ESPENAS, SNODGRASS; Associate Professors AFT, ATHERTON, CORDER, CURRIER, GRAHAM, JOHNSON; Assistant Professors KOZLIK, KRAHMER, LEHMANN, MILLER, MOLYNEUX, OVERHOLSER, SCHROEDER; Instructors KUNESH, MOTHERSHEAD.

Forestry Science: Professors BARNES (department head), FERRELL, KENISTON, REICHART, WHEELER; Associate Professors JAENICKE, KRYGIER, MCKIMMY; Assistant Professor MCLAREN.

Home Economics Research: Professors STORVICK (department head), MACKEY; Assistant Professors BUBL, PETERS; Instructors BENSON, EDWARDS.

Horticulture: Professors APPLE (department head), COMPTON, FRAZIER, HANSEN, PAINTER, ROBERTS, ZIELINSKI; Associate Professors BAGGETT, BLANEY, GARREN, MACK, WADSWORTH, WESTWOOD; Assistant Professors CRABTREE, LAGERSTEDT, LAWRENCE, THOMPSON; Research Associate KLEMM.

Irrigation Water Forecasting: Professor FROST; Instructor WHALEY.

Microbiology: Professors ELLIKER (department head), ANDERSON, BOLLEN, GILMOUR, MORITA, PILCHER; Associate Professors PARKS, SANDINE; Assistant Professor FRYER; Research Associate LU.

Poultry Science: Professor PARKER (department head), ARSCOTT, BERNIER, HARPER; Associate Professor MCCLUSKEY.

Soils: Professors CHENEY (department head), DAWSON, HARWARD, JACKSON, KNOX, TARRANT, YOUNGBERG; Associate Professors BOERSMA, MOORE, D. G., MOORE, D. P. SIMONSON, YOUNG; Assistant Professors BALSTER, DYRNESS, PARSONS; Research Associates DEBACKER, PECK, WOLLUM.

Statistics: Professors CALVIN (department head), OVERTON, PETERSEN; Associate Professor BLACK; Assistant Professors LOWRY, ROWE.

Veterinary Medicine: Professors DICKINSON (department head), MUTH, PETERSON; Associate Professors BONE, KNAPP, SMITH; Assistant Professors HARR, HELFER, MATTSON, STEVENS; Research Associates BROWN, CLARY, KELSAY.

Water Resources Research Institute: Research Associate KARR.

Branch Experiment Stations: Professors BULLOCK, OVESON, MCARTHUR, MELLENTHIN, SAWYER; Associate Professors GROSS, HOFFMAN, JOHNSON, LOMBARD, RALEIGH, ROHDE, RUMBERG, TICKNOR; Assistant Professors CARTER, CLAYPOOL, DAVIDSON, ELLER, FITCH, HALL, MCDERMID, PUMPHREY, RYDRYCH, SNEVA, WALLACE, WESTIGARD, YUNGEN, ZWICK; Instructor SHEETS.

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 twelve 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 management integrated 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 twelve 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 190 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 in areas 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, Fisheries and Wildlife, 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), 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 on logs was established 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. Lieuallen, Ed.D., Chancellor, Oregon State System of Higher Education.

James Herbert Jensen, Ph.D., President, Oregon State University.

George Walter Gleeson, 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

Gordon William Beecroft, C.E., Highway Engineering.

Charles Edward Behlke, Ph.D., Hydraulics.

J. Richard Bell, Ph.D., Soil Mechanics and Foundations.

Richard William Boubel, Ph.D., Air Pollution.

Fredrick Joseph Burgess, M.S., Water Resources Engineering.

Hans Juergen Dahlke, Ph.D., Stress Analysis.

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.

Arthur Douglas Hughes, M.S., Heat, Power, and Air Conditioning.

John Granville Jensen, Ph.D., Industrial Resources.

James Chester Looney, M.S., E.E., Solid State Electronics.

Philip Cooper Magnusson, Ph.D., Electrical Engineering Analysis.

Thomas John McClellan, M.Engr., Structural Engineering.

Robert Eugene Meredith, Ph.D., Electrochemical Engineering.

Fred Merryfield, M.S., Sanitary Engineering.

Robert Ray Michael, M.S., Electrical Materials and Instrumentation.

John Glenn Mingle, M.S., Automotive Engineering.

Roger Dean Olleman, Ph.D., Metallurgical Engineering.

Olaf Gustav Paasche, M.S., Metallurgical Engineering.

Donald Charles Phillips, Ph.D., Sanitary Engineering.

James Lear Riggs, Ph.D., Industrial Engineering.

John Clayton Ringle, Ph.D., Nuclear Engineering.

Jefferson Belton Rodgers, A.E., Agricultural Engineering.

John Louis Saugen, Ph.D., Control Systems.

Robert James Schultz, M.S., Surveying and Photogrammetry.

Milton Conwell Sheely, B.S., Manufacturing Processes.

Louis Slegel, Ph.D., Mechanical Engineering.

Charles Edward Smith, Ph.D., Applied Mechanics.

Louis Nelson Stone, B.S., High Voltage and Computers.

Jesse Seburn Walton, B.S., Chemical and Metallurgical Engineering.

Leonard Joseph Weber, M.S., Communications Engineering.

James Richard Welty, Ph.D., Transport Phenomena.

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 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.

Genetics Institute

RALPH BOGART, Ph.D., Director.

Professors: P. E. BERNIER, S. N. BROOKS, L. D. CALVIN, J. R. COWAN, E. J. DORNFELD, W. H. FOOTE, W. A. FRAZIER, J. A. HARPER, IRWIN, ISENBERG, W. S. OVERTON, R. M. STORM, CHIH H. WANG.

Associate Professors: J. R. BAGGETT, H. R. CAMERON, K. L. CHAMBERS, K. K. CHING, D. C. ENGLAND, C. W. FOX, D. K. FRASER, ALFRED HAUNOLD, R. J. METZGER, J. D. MOHLER, A. OWCZARZAK, L. W. PARKS, W. E. SANDINE, E. R. SCHWINGHAMER, R. R. SILEN, W. P. STEPHEN, and Q. B. ZIELINSKI.

Assistant Professors: ANNETTE BAICH, R. V. FRAKES, PATRICIA HARRIS, H. IRGENS-MOLLER, R. H. KLIEWER, W. E. KRONSTAD, KENNETH ROWE, MAXINE M. THOMPSON, and F. M. STOUT.

Established in 1963, the Genetics Institute serves to integrate the research activities in genetics carried on by personnel in the biological science departments of the University. The function of the Institute is to strengthen genetics as a unifying discipline for biology, biochemistry, and biophysics. The Genetics Institute is administered by a director, assisted by an elected Genetics Board. The Institute staff comprises some 33 geneticists from the several departments in the Schools of Agriculture, Forestry, and Science.

Extensive facilities for genetics research are provided by the departments with which the geneticists are affiliated. Active research is under way in the following areas: formal genetics, cytology and cytogenetics, evolution and speciation, quantitative genetics, microbial and fungal genetics, plant genetics and improvement, animal genetics and improvement, and forest genetics. These facilities and the competent faculty provide outstanding opportunities for graduate teaching and research.

Marine Science Laboratory

Newport, Oregon

Administrative Officers

WAYNE V. BURT, Ph.D., Sc.D., Director.

THOMAS G. SCOTT, Ph.D., Co-director.

Resident Staff

Marine Biology and Oceanography

Professor: JOEL W. HEDGPETH, Ph.D., Resident Director.
Assistant Professor: J. J. GONOR, Ph.D.
Research Associates: R. G. REDMOND, D. A. YOUNG.

Fisheries and Wildlife

Associate Professor: W. J. MCNEIL, Ph.D., Resident Co-Director.
Assistant Professor: W. P. BREESE.
Assistant in Fisheries: N. E. STEWART; G. A. GEBHARDT.
Assistant in Water Pollution Biology: R. C. COURTRIGHT.

Oregon State University is becoming a regional center for all types of marine research and instruction. Off-campus activities are concentrated at a new 47-acre laboratory site on the south shore of Yaquina Bay about a mile from the ocean. A new dock has been built to accommodate research vessels up to 250 feet in length.

The new laboratory which opened February 1, 1965, has 38,000 square feet of floor space. One wing has facilities for research and instruction in marine biology and oceanography while a second wing houses fisheries and engineering research. An auditorium and public aquarium-museum is located in the third or central wing along with a library and classroom. A nontoxic sea-water system provides sea water free of metallic contaminants to all biological laboratories. Dormitory-type sleeping accommodations are available for eight men and six women.

A program of research and instruction is being developed in cooperation with the departments of Zoology, Botany, Microbiology, Civil Engineering, Fisheries and Wildlife, and Oceanography. The laboratory is operating on a twelve-month basis.

Research workers have the opportunity to sample open-ocean organisms from the 180-foot oceanographic vessel *Yaquina*, and estuarine organisms from half a dozen small boats operated by the laboratory. Research units from the U. S. Public Health Service, Oregon State Game Commission, and the Fish Commission of Oregon are housed in the laboratory.

Nuclear Science and Engineering Institute

The Institute is charged with the responsibility of coordinating curricular matters at the graduate and undergraduate level in the areas of nuclear science and engineering. The institute will coordinate various fellowship programs and graduate training programs in pertinent disciplines.

Another function of the Institute is to make long range plans in developing institutional research facilities such as the research reactor and other major radiation sources. In coordination with the Radiation Center it will provide assistance to research workers in carrying out research endeavors involving the use of radioisotopes and ionizing radiation.

Nutrition Research Institute

CLARA A. STORVICK, Ph.D., Director.

Professors: V. H. CHELDELIN, O. C. COMPTON, M. D. DAWSON, E. M. DICKINSON, P. R. ELLIKER, H. J. EVANS, M. L. FINCKE, V. H. FREED, J. R. HAAG, B. E. HAWTHORNE, T. L. JACKSON, H. M. KRUEGER, J. C. MILLER, O. H. MUTH, J. E. OLDFIELD, H. W. SCHULTZ, R. O. SINNHUBER, C. A. STORVICK, L. C. TERRIERE, P. H. WESWIG, G. B. WOOD.

Associate Professors: A. F. ANGLEMIER, G. H. ARSCOTT, G. H. BEAUDREAU, R. R. BECKER, W. G. BROWN, D. P. MOORE, A. T. RALSTON, R. L. SMITH, G. TANK, I. J. TINSLEY.

Assistant Professors: F. W. ADAMS, D. O. CHILCOTE, D. C. CHURCH, F. M. STOUT.

This new Institute had its origin on the campus in 1964, recognizing that food needs and resources constitute a basic and continuing problem of civilization. It has as its broad objectives the stimulation, encouragement, facilitation, and coordination of research efforts in the varied fields of nutrition as practiced in the departments and schools of Oregon State University. These objectives will be served through the sponsorship of interdepartmental and institutional seminars, symposia, and workshops; through coordination of nutrition course offerings, and through facilitating the entry of qualified scientists and graduate students into nutrition research through their particular disciplines. The Institute is headed by a Director and administered by an Advisory Board under the deans of Agriculture, the Graduate School, Home Economics, and Science.

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: V. H. CHELDELIN, IRVIN ISENBERG, T. E. KING, E. F. KURTH, D. L. MACDONALD, R. W. NEWBURGH, A. B. SCOTT, and C. H. WANG.
Associate Professors: R. R. BECKER, V. J. BROOKES, F. W. DECKER, W. D. LOOMIS, R. A. MACHAFFIE, E. J. TRIONE.
Assistant Professors: A. BAICH, D. J. BAISTED, F. N. DOST, W. GAMBLE.
Research Associates: SPENCER L. BAIRD, JR., C. BHUVANESWARAN, MARY ANN DANKLEFF, MARGARET S. GIBSON, R. L. HOWARD, L. D. MENDENHALL, CATHERINE MEZEI, RAJA ROSENBLUTH, P. N. D. TSAO.

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.

Principal quarters of the Institute are in the Physics-Chemistry Building, with supplemental quarters in the Chemistry Building and Covell Hall. 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. Extension activities are administered through the Division of Continuing Education and the Federal Cooperative Extension Service.

Division of Continuing Education

JAMES W. SHERBURNE, Ph.D., Vice Chancellor for Continuing Education.
WILLIAM BARROWS, B.A., Manager, Business Affairs.
R. DUANE ANDREWS, Ph.D., Director, Continuation Centers.
DANIEL W. FULLMER, Ph.D., Director, Development and Evaluation.
LUKE F. LAMB, Ed.D., Director, Educational Media.
VIRON A. MOORE, Ed.D., Director, State Wide Services.
JAMES M. MORRIS, Ed.D., Head, Information Services.
RALPH W. STEETLE, M.A., Director, Divisional Relations.

The Division of Continuing Education 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 programs 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, university civil defense education, industry, government, international affairs, and alcohol studies are offered in local communities. Divisional services such as printing, duplicating, mailing, and recording functions are managed by State Wide Services.

Educational Media is responsible for operating educational radio and television networks for the Oregon State System of Higher Education. Instruction, information, and enrichment are the goals of the stations with studios for two radio stations and two television stations located in Eugene, Corvallis, Salem, and Portland. Educational Media also operates audiovisual services which make available to schools, colleges, community groups, and other organizations the following: motion picture films, tape recordings, slides, and such professional and consulting services as planning and production of films, art work, graphics, demonstrations, and workshops. Audiovisual libraries are located in Corvallis, Ashland, and La Grande.

Offices of the Vice Chancellor of the Division of Continuing Education are at Coliseum 219, University Campus, Corvallis, Oregon. Other Division offices on the campus include: Corvallis Continuation Center, room 304 Covell Hall; Information Services, room 220 Agricultural Hall; Educational Media, room 219 Coliseum; Audiovisual Services, room 131 Coliseum; and KOAC-AM-TV, room 303 Covell Hall.

Federal Cooperative Extension Service

Administration

WILBUR T. COONEY, M.S., Dean.
GENE MAURICE LEAR, M.P.A., Associate Dean and Director.
JOSEPH REW COX, M.S., Assistant Director.
JEAN WILLARD SCHEEL, M.A., Assistant Director.
ESTHER A. TASKERUD, Sc.D., Assistant Director.
C. G. WEEDMAN, Administrative Assistant.

State Leaders and State Agents

CLIFFORD LOVEJOY SMITH, Ph.D., State Training Leader.
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).
GLENN A. KLEIN, M.A., State Extension Agent (4-H Club).
MARY EUNICE ABBOTT, M.A., State Extension Agent.
EVELYN AMANDA FUNK, M.Ed., State Extension Agent.
MURLE SCALES, M.S., State Extension Agent.
TURNER BOND, M.S., State Extension Agent.
WILLIAM GERALD NIBLER, M.Ed., State Extension Agent.
LOUIS MILTON OESTER, Ed.M., State Extension Agent.
JACKSON ROSS, M.S., State Extension Agent.
MURLE SCALES, M.S., State Extension Agent.
BURTON E. BERGER, M.S., State Extension Agent.

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 the Division of Continuing Education.

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—provide the basis for conducting the extension program at the county level.

Faculty

As of January 1966

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 listed separately 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, "(1939-46, 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)
Senior Instructor in Animal Science.
B.S., Oregon State, 1950.

EARL ROGER ADAMS (1963)
Chief Fire Control Technician, USN, Instructor in Naval Science.

FRANK WILLIAM ADAMS (1953)
Research Associate (Assistant Professor) in Chemistry, Agricultural Chemistry.
B.S., Montana State, 1948; M.S., Oregon State, 1950, Ph.D., 1965.

RICHARD ALTON ADAMS (1947)
Director of Physical Plant (Professor).

THOMAS FRANCIS ADAMS (1946)
Director of Housing (Professor).
B.S., Oregon State, 1930.

WALTER NICHOLS ADAMS (1965)
Chief Quartermaster, Instructor in Naval Science.

LEONARD ALLEN ADOLF (1955)
Associate Professor of History.
B.A. Ed., Central Washington College, 1943; B.A., Washington, 1946, Ph.D, 1953.

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.
On leave through September 30, 1966.

MARIAN CUSHING AIKIN (1954)
Associate Professor of Family Life.
B.Sc., Nebraska, 1939; M.Sc., Iowa State, 1943.

ARTHUR LEMUEL ALBERT (1923)
Professor Emeritus of Communication Engineering.
B.S., Oregon State, 1923, M.S., 1926, E.E., 1939.

SUSAN ANNETTE ALDRICH
Instructor in Geography.
B.A., Texas, 1964.

GERALD CORWIN ALEXANDER (1955)
Associate Professor of Electrical Engineering.
B.S., Oregon State, 1951; Sc.M., 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.
On leave 1965-66.

LEONARD JOHN ALLEN (1915)
State 4-H Club Leader (Emeritus.)
B.S., Oregon State, 1914, M.S., 1915.

THOMAS CORT ALLEN, JR. (1962)
Associate Professor of Plant Pathology.
B.S., Wisconsin, 1953; Ph.D., California (Davis), 1956.

LAURA MARY ALLHANDS (1965)
Counselor, Instructor, Counseling Center.
B.S., Oregon State, 1960; M.A., Arizona State, 1965.

IRA SHIMMIN ALLISON (1928)
Professor Emeritus of Geology.
A.B., Hanover College, 1917; Ph.D., Minnesota. 1924.

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)
Professor Emeritus; Manager Memorial Union 1925-1963.
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)
Marion County Extension Agent (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. Eng.), 1960.

WILBERT LOWELL ANDERSEN (1950-51, 1956)
Curry County Extension Agent (Assistant Professor).
B.S., Oregon State, 1950.

ARTHUR WALLACE ANDERSON (1953)
Professor of Food Microbiology.
B.S., North Dakota Agricultural College, 1942; M.S., Wisconsin, 1947; Ph.D., Oregon State, 1952.

CARL LEONARD ANDERSON (1949)
Professor; Head of Hygiene and Environmental Sanitation.
B.S., Michigan, 1928, M.S., 1932, Dr.P.H., 1934.

DONALD EUGENE ANDERSON (1944-45, 1950)
Extension Dairy Specialist (Associate Professor).
B.S., Iowa State, 1939.

GORDON WILCOX ANDERSON (1962)
Associate 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.

JAMES EDWARD ANDERSON (1964)
Assistant Basketball Coach (Assistant Professor).
B.S., Oregon State, 1959, M.Ed., 1962.

JOHN ANDERSON (1965)
Instructor in Mathematics.
B.S., Illinois, 1956; M.S., Montana State, 1960.

NELSON CHRISTIAN ANDERSON (1946)
Morrow County Extension Agent (Professor).
B.S., North Dakota Agricultural College, 1942.
On leave 1965-1966.

NORMAN HERBERT ANDERSON (1962)
Assistant Professor of Entomology.
B.S.A. (Honors), British Columbia, 1955; M.S. Oregon State, 1958; D.I.C., Imperial College, 1961; Ph.D., London, 1961.

RICHARD EUGENE ANDERSON (1964)
Associate Professor of Aerospace Studies.
B.S., Oregon State, 1953.

R. DUANE ANDREWS (1965)
Director, Campus Centers for Continuing Education, Professor of Education.
B.Ed., Colorado State University, 1951; M.A., Wyoming, 1956, Ph.D., 1960.

DEE GUS ANDROS (1965)
Head Coach of Football (Professor), Intercollegiate Athletics.
B.S., Oklahoma, 1950, M.S., 1952.

ALLEN FRANCIS ANGLEMIER (1956)
Associate Professor of Food Science and Technology.
B.S., Fresno State, 1953; M.S., Oregon State, 1955, Ph.D., 1957.

PHILIP MARSHALL ANSELONE (1963)
Professor of Mathematics.
B.S., Puget Sound, 1949, M.A., 1950; Ph.D., Oregon State, 1957.

PETER ANTON (1956)
Associate Professor of Philosophy.
A.B., Indiana, 1952, M.A., 1954, Ph.D., 1960. On leave 1965-66.

SPENCER BUTLER APPLE, JR. (1950)
Professor of Horticulture; Head of Department.
B.S., Texas A & M, 1933, M.S., 1936; Ph.D., Washington State, 1953.

ARNOLD PIERCE APPLEBY (1959)
Assistant Professor of Agronomy
B.S., Kansas State, 1957, M.S., 1958; Ph.D., Oregon State, 1962.

BRADFORD HENRY ARNOLD (1947)
Professor of Mathematics.
B.S., Washington, 1938, M.S., 1940; Ph.D., Princeton, 1942.

GEORGE HENRY ARSCOTT (1953)
Professor of Poultry Nutrition.
B.S., Oregon State, 1949; M.S., Maryland, 1950, Ph.D., 1953.

BETTY JANE ASHBAUGH (1963)
Washington County Extension Agent (Instructor).
B.S., Oregon State, 1945.

GEORGE H. ATHERTON (1961)
Associate Professor of Mechanical Engineering, Forest Research Laboratory.
B.S., Oregon State, 1950.

WINFRED McKENZIE ATWOOOD (1913)
Professor Emeritus of Botany.
A.B., Cornell College, 1907, A.M., 1910; M.S., Chicago, 1911, Ph.D., 1913.

DARREL DON AUFENKAMP (1965)
Professor, Director Computer Center, Mathematics, Electrical and Electronic Engineering.
B.A., Southwestern at Memphis, 1949; Doctorat D'Universite, University of Paris, 1952.

ZaDEAN AUYER (1963)
Wasco County Extension Agent (Home Economics) (Instructor).
B.S., Colorado State University, 1957.

WILLIAM SAMUEL AVERILL (1930)
County Agent Emeritus, Multnomah County (Professor).
B.S., Oregon State, 1917.

GILBERT ARTHUR BACHELOR (1961)
Instructor in Mathematics.
B.A., Eastern Washington College, 1953; M.S., Oregon State, 1955.

JAMES RONALD BAGGETT (1956)
Associate Professor of Horticulture.
B.S., Idaho, 1952; Ph.D., Oregon State, 1956.

ANNETTE BAICH (1963)
Assistant Professor of Chemistry, Science Research Institute.
B.S., Roosevelt University, 1951; Ph.D., Oregon, 1960.

LEEDS CRIM BAILEY (1941)
Malheur County Extension Agent, (Associate Professor).
B.S., Oregon State, 1941; M.A., Michigan State, 1962.

SAMUEL HALL BAILEY (1947)
Head of News Bureau; 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.

SPENCER L. BAIRD, JR. (1965)
Research Associate (Instructor), Science Research Institute.
A.B., Dartmouth, 1943, A.M., 1945.

DEREK JOHN BAISTED (1963)
Assistant Professor of Chemistry, Science Research Institute.
B.Sc., University of Exeter, England, 1957, Ph.D. (Chemistry), 1960.

BARBARA JANE BAKER (1965)
Instructor in Speech.
A.A., Palomar, 1962; B.S., Brigham Young, 1964; M.S., Southern Illinois, 1965.

FORREST SANDUSKY BAKER, JR. (1960)
Research Associate (Instructor); Coordinator Transportation Research Institute.
B.A., Washington, 1950.

KATHERINE HASKELL READ BAKER (1941)
Professor Emeritus of Family Life.
A.B., Mills College, 1925; M.S., Purdue, 1938.

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), 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 (Professor) Emeritus Federal Cooperative Extension Service.
B.S., Oregon State, 1916.

HOYT BYRON BALLARD (1965)
Assistant Professor of Political Science.
B.S., University of Houston, 1957, M.A., 1959; Ph.D., Texas, 1962.

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.

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.

WILLIAM CHARLES BARNES (1963)
Assistant Professor of Geology.
B.S., Colorado School of Mines, 1956; M.S., Wyoming, 1958; Ph.D., Princeton, 1963.

LLOYD CARL BARON (1945-46, 1957)
Washington County Extension Agent (Associate Professor).
B.S., Oregon State, 1940; M.Ag.Ed., Arizona, 1965.

ROBERT BENJAMIN DENIS BARON (1954)
Professor of Education.
B.A., Alberta, 1940, B.Ed., 1942, M.Ed., 1945; Ph.D., USC, 1948.

JAMES GARNET BARRATT, JR. (1950)
Assistant Athletic Director, 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.

HERBERT BAUMEL (1965)
Professor of Music.
Diploma in Violin, Curtis Institute of Music, 1942; Cert., Accademia Musicale Chigiana, 1955; Member Philadelphia Orchestra; Concertmaster, Orquesta Sinfonica Venezuela; Conductor, Chamber Music Associates Orchestra, New York.

LESTER MILLER BEALS (1962)
Coordinator of Secondary Student Teaching, Director of Oregon Program (Professor), Education.
A.B., Nebraska, 1932, M.A., 1934; Ed.D., Oregon, 1950.

JEAN BEARD (1965)
Instructor in Science Education.
B.A., Iowa State, 1956; M.A., State College of Iowa, 1960.

GEORGE STANLEY BEAUDREAU (1963)
Associate Professor of Chemistry, Agricultural Chemistry.
B.S., Washington State, 1949; M.S., Oregon State, 1951, Ph.D., 1954.

DARRELL V. BEAVERS (1964)
Assistant Professor of Food Science and Technology.
B.S., California, 1940.

JUDITH GRACE BECK (1965)
Harney County Extension Agent, Home Economics (Instructor).
B.S., Linfield, 1965.

WILLIAM MARK BECK (1965)
Assistant Head, Corvallis Continuation Center, Assistant Professor.
B.S., Southern Oregon, 1959; M.S., Oregon State, 1962.

MANNING HENRY BECKER (1948)
Extension Farm Management Specialist; Professor of Agricultural Economics.
B.S., Oregon State, 1947, M.S., 1948.

MARY MISKO BECKER (1963)
Assistant Professor of Foods and Nutrition.
B.S., Kent State, 1949, B.S. (Ed.), 1950; M.S., Columbia, 1954, Ph.D., 1957.

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)
Professor of Biology, 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.
On leave September 15, 1965 to June 30, 1966.

J. RICHARD BELL (1962)
Professor of Civil Engineering.
B.S.C.E., Purdue, 1952; M.S.C.E., 1956, Ph.D., 1963.

JOHN FREDERICK BELL (1959)
Associate Professor of 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.

ARNOLD EUGENE BENCH (1963)
Major, USMC, Assistant Professor of Naval Science.
B.S. in Education, Missouri, 1949; M.S. in Education, 1950.

CLEON VERNON BENNETT (1958)
Assistant Professor of Speech.
B.S., Murray State College (Kentucky), 1955; M.A., Southern Illinois, 1958.
On leave 1965-66.

NOEL LINDSAY BENNION (1937)
Extension Poultry Specialist (Professor).
B.S., Utah State, 1928; M.S., Kansas State, 1932.

EVA MAE BENSON (1958)
Senior Instructor in Nutrition.
B.A., UCLA, 1949; M.A., Los Angeles State, 1955.

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)
State Extension Agent (Associate 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)
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.

CLIFTON ALEX BERRY (1965)
Sergeant Major USAIG (SR ROTC) Oregon, Instructor.

DONALD WILSON BERRY (1954)
Jackson 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.

ARTHUR ERLING BERVIN (1965)
Instructor in English.
B.A., Portland State, 1962; M.A., University of Redlands, 1965.

RALPH STEPHEN BESSE (1922)
Professor Emeritus of Agriculture.
B.S.A., Missouri, 1913, M.S., 1915. Associate Director of Agricultural Experiment Station, 1949-53.

RALPH STEPHEN BESSE, JR. (1963)
Malheur County Extension Agent (Assistant Professor).
B.S., Oregon State, 1943.

GARNET DOUGLAS BEST (1931)
County Agent Emeritus, Wallowa County (Associate Professor).
B.S., Oregon State, 1925.

GRAHAM FREDERICK BETTS (1965)
Research Associate, Assistant Professor, Botany.
B.Sc., University College, London, 1962; Ph.D., 1966.

DALE NESTRUD BEVER (1961)
Professor of Forest Management. Head of Forest Management Research, Forest Research Laboratory.
B.S., Oregon State, 1942, M.F., 1954.

EUGENE THOMAS BEYNON (1965)
Assistant Professor of Chemical Engineering.
B.S., Texas, 1961, M.S., 1962, Ph.D., 1965.

VICTORIA EDWARDS BEYNON (Spring 1965)
Instructor in English.
B.A., Texas, 1960, M.A., 1965.

CHIDAMBARAM BHUVANESWARAN (1965)
Research Associate (Instructor).
B.Sc. (Hons), University of Bombay, 1955, B.Sc. (Tech), 1957, Ph.D., 1963.

AMOS WILBUR BIERLY (1941-44, 1952)
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.

DAVID ETTER BILHORN (1965)
Assistant Professor of Physics.
B.A., Williams College, 1955; M.A., University of Rochester, 1958; Ph.D., Rice University, 1962.

DONALD DUANE BILLS (1961-64, 1965)
Assistant Professor of Food Science and Technology.
B.S., Oregon State, 1959, M.S., 1964.

JULIUS FLOYD BINDER (1952)
Jefferson County Extension Agent, 4-H Club (Assistant Professor).
B.S., Kansas State, 1948.

ROBERT HILL BIRDSALL (1952)
Associate Professor of Journalism.
B.A., Idaho State, 1949; M.A., Stanford, 1952.

NORMAN IVAN BISHOP (1963)
Professor of Plant Physiology.
B.S., Utah, 1951, M.S., 1952, Ph.D., 1955.

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 Wildlife Ecology, Forest Research Laboratory.
B.S., Pennsylvania State, 1950; M.S., Oregon State, 1955.

ROBERT MILTON BLACK (1965)
Associate Professor of Meteorology, U. S. Weather Bureau, Advisory Agricultural Meteorologist, Agricultural Experiment Station.
B.S., Iowa State, 1960.

EVA BLACKWELL (1924)
Assistant Registrar (Assistant Professor) Emeritus.
B.S., Oregon State, 1924.

RICHARD HARRY BLAKELEY (1961)
Assistant Professor of Landscape Architecture.
B.S.L.A., Louisiana State, 1961.
On leave of absence, 1964-65, 1965-66.

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 (Assistant Professor).
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.

WILBUR LEROY BLUHM (1957)
Marion County Extension Agent (Associate Professor).
B.S., Nebraska, 1947; M.S., Purdue, 1964.

CHARLES H. BLUMENFELD (1962)
Assistant Professor, Office of Business Affairs.
A.B., Illinois, 1928, J. D., 1930.

GUNNAR BODVARSSON (1964)
Visiting Professor of Mathematics and Oceanography.
Pro-Dipl., Munich, 1937; Dipl., Berlin, 1943; Ph.D., Cal Tech., 1957.

FLOYD WALTER BODYFELT (1964)
Instructor in Food Science and Technology; Extension Dairy Processing Specialist.
B.S., Oregon State, 1963.

OLAF ALEXANDER BOEDTKER (1963)
Associate Professor of Physics.
B.S., Swiss Federal Institute of Technology, 1949; M.S., California Institute of Technology, 1958, Ph.D., 1961.

LARRY BOERSMA (1960)
Associate Professor of Soils.
M.S., The Netherlands, 1955; Ph.D., Cornell, 1959.

RALPH BOGART (1947)
Professor of Animal Genetics; Director, Genetics Institute.
B.S., Missouri, 1934; M.S., Kansas State, 1936; Ph.D., Cornell, 1940.

SIRAG SAM BOGHOSIAN (1965)
Associate Professor, Assistant Football Coach, Intercollegiate Athletics.
B.S., UCLA, 1956.

GEORGE BAKER BOKORNEY (1963)
Manager Memorial Union Dining Service, Assistant Professor of Institution Management.
B.A., Oklahoma State, 1954, M.S., 1962.

WALTER BENO BOLLEN (1929)
Professor of Soil Microbiology.
B.S., Oregon State, 1921, M.S., 1922; Ph.D., Iowa State, 1924.

CARL ELDON BOND (1949)
Professor of Fisheries.
B.S., Oregon State, 1947; M.S., 1948; Ph.D., Michigan, 1963.

FREDERICK THOMAS BOND (1962)
Assistant Professor of Chemistry.
B.S., MIT, 1958; Ph.D., California, 1961.

TURNER HANKS BOND (1943-48, 1950)
State Extension Agent (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.

SPENCER EUGENE BONHAM (1965)
Instructor in Military Science.

LEROY WAYNE BONNICKSEN (1951)
Associate Professor of Agricultural Engineering.
B.S., Iowa State, 1950, M.S., 1951; Ph.D., Purdue, 1965.

DEAN EMERSON BOOSTER (1956)
Associate Professor of Agricultural Engineering.
B.S., Oregon State, 1954, M.S., 1956.

SUSAN JANE BORDEN (1964)
Instructor, Oceanography.
B.S., Iowa State, 1960; M.A., Oregon State, 1962.

DAVID ARTHUR BOSTWICK (1953)
Associate Professor of Geology.
B.A., Montana, 1942; M.A., 1951, Ph.D., Wisconsin, 1958.

LIDO DAN BOTTI (1965)
Instructor in English.
B.A., University of Portland, 1951; M.A., 1953.

RICHARD WILLIAM BOUBEL (1954)
Associate Professor of Mechanical Engineering.
B.S., Oregon State, 1953, M.S., 1954; Ph.D., University of North Carolina, 1963.

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).

DONALD DUDLEY BOURQUE (1961)
Assistant Professor of Business Administration.
B.A., Washington, 1957, M.B.A., 1958, D.B.A., 1965.

JOHNS HOLLIS BOWER, JR. (1965)
Lieutenant, USN, Assistant Professor of Naval Science.
B.S., Naval Academy, 1961.

WALDO BOWERS (1963)
Assistant Director of Admissions (Assistant Professor).
B.A., American Intl. College, 1956; Ed.M., Oregon State, 1959.

VERNON LEE BOWLBY (1963)
Instructor in Business Administration.
B.S., Oregon, 1960; C.P.A., State of Oregon, 1962.

MARIAN Y. BOWMAN (1964)
Assistant Professor of Art.
B.F.A., Texas, 1946, M.F.A., 1964.

JAMES ROBERT BOYDSTON (1964)
Associate Professor of Civil Engineering; Chief of Technical Services, Pacific Northwest Water Laboratory.
B.S., Oregon State, 1949; M.S., Harvard, 1953.

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.

PATRICIA ELIZABETH BRANDT (1959-1961, 1964)
Assistant Humanities Reference Librarian (Instructor).
B.S., Mt. Angel College, 1955; B. Mus. Ed., Willamette, 1957, M. Mus. Ed., 1958; M.A., Denver, 1959.

WILLIAM HENRY BRANDT (1956)
Associate Professor of Botany.
B.A., Montana, 1950; M.Sc., Ohio State, 1951, Ph.D., 1954.

RUTH ELIZABETH BRASHER (1958)
State Extension Agent, 4-H (Associate Professor).
B.S., Brigham Young, 1951; M.A., Maryland, 1959.
On sabbatical leave 1965-66.

EDWARD BROOKS BRAZEE (1964)
Assistant Reference Librarian (Instructor).
B.A., Oregon, 1962; M. Librarianship, Washington, 1963.

WILBUR PAUL BREESE (1953)
Assistant Professor of Fisheries; at Marine Science Laboratory, Newport.
B.S., Oregon State, 1951, M.S., 1953.

ROBERT NELSON BRENNE (1965)
Instructor in Mathematics.
B.A., Reed College, 1953.

DONALD HADEN BREWER (1957)
Certification Specialist (Assistant Professor).
B.S., Oregon State, 1955.

GERALD WALTER BROG (1956)
Umatilla County Extension Agent (Assistant Professor).
B.S., Oregon State, 1954; M.S., Michigan State, 1964.

RAY FRANKLIN BROKKEN (1965)
Assistant Professor of Agricultural Economics, Economic Research Service, United States Department of Agriculture.
B.S., Iowa State, 1958, Ph.D., 1965.

FLORENCE RYDER BROMLEY (1955)
Tillamook County Extension Agent (Home Economics) (Assistant Professor) Emeritus.
B.S., Oregon State, 1922, M.H.Ec., 1959.

VICTOR JACK BROOKES (1956)
Associate Professor of Entomology, Science Research Institute.
B.A., Michigan, 1950; M.S., Illinois, 1951, Ph.D., 1956.

RICHARD LLEWELLYN BROOKS (1965)
Instructor, Assistant Football Coach, Intercollegiate Athletics.
B.S., Oregon State, 1963, Ed.M., 1964.

STANLEY NELSON BROOKS (1955)
Professor of Agronomy; Research Agronomist, Crops Research Division, ARS, USDA.
B.S., Colorado State University, 1948; M.S., Kansas State, 1949; Ph.D., Oregon State, 1961.

CARL BROWN (1965)
Assistant Professor of Sociology.
B.A., Mexico City College, 1959; M.A., Oregon, 1965.

DEAN ALLEN BROWN (1965)
Instructor in Farm Crops, Extension Agent-at-Large.
B.S., Purdue, 1962.

DOROTHY FURTICK BROWN (1955)
Extension Home Furnishings Specialist (Associate Professor).
B.S., Colorado, 1949; M.S., Oregon State, 1964.

EVELYN STOWELL BROWN (1960)
Lincoln County Extension Agent, Home Economics (Assistant Professor).
B.S. in Education, State Teachers College (Framingham, Massachusetts), 1927.

GORDON GEORGE BROWN (1916)
Associate Professor Emeritus of Horticulture, Mid-Columbia Experiment Station.
A.B., Pacific University, 1910; B.S., Oregon State, 1910.

JAMES RUSSELL BROWN (1962)
Assistant Professor of Mathematics.
B.A., Oregon State, 1953, M.A., 1958; Ph.D., Yale, 1964.

KENNETH NEIL BROWN (1963)
Polk County Extension Agent (Instructor).
B.S., Oregon State, 1961.

ROBERT D. BROWN (1952)
Associate Professor of English.
A.B., Indiana, 1949, M.A., 1950, Ph.D., 1952.
On leave 1965-66.

THOMAS LEE BROWN (1965)
Research Associate (Assistant Professor), Veterinary Medicine.
B.S., Arizona, 1955; M.S., Washington State, 1959, D.V.M., 1963.

WILLIAM GALEN BROWN (1955)
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.

CLIFTON LAMAR BRUMBELOW (1964)
SSgt (E6), Instructor in Military Science.

VELDA JEAN BRUST (1964)
Instructor in Physical Education.
B.S., Oregon State, 1953; Certificate of Occupational Therapy, Southern California, 1955; Registered Occupational Therapist, 1956; Ed.M., Oregon State, 1961.

SYDNEY COLEMAN BRYANT (1963)
Hood River County Extension Agent (Instructor).
B.S., Oregon State, 1963.

JOSEPH CHESTER BRYE (1947)
Professor of Music.
B.M., Northwestern, 1940, M.M., 1941.

JANET LAIRD BUBL (1946-48, fall 1959, 1960)
Instructor in Clothing and Textiles.
B.A., Vassar, 1940; M.S., Minnesota, 1941.

DONALD ALAN BUCHANAN (1964)
Associate Professor of Psychology.
B.S., Washington, 1947, M.S., 1951; Ph.D., Rochester, 1955.

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.

THOMAS R. BUNCH (1961-62, 1964)
Area Extension Agent (Assistant Professor).
B.S., Oregon State, 1961; M.S., Oregon State, 1965.

DAVID STEWART BURCH (1958)
Associate Professor of Physics.
B.S., Washington, 1950, M.S., 1954, Ph.D., 1956.

FREDERICK JOSEPH BURGESS (1953)
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 (Associate Professor).
B.S., Oregon State, 1947.

BRUCE M. BURNETT (1965)
Instructor in X-Ray Science and Engineering, General Science.
B.S., Oregon State, 1962.

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; Sc.D., George Fox College, 1963.

HOWARD DELL BURTCHETT (1964)
Major, Assistant Professor of Military Science.
B.S., Utah State (Forestry Gen), 1950; M.B.A., Lehigh (Business Admin.), 1958.

MARIE HARRIS BUSSARD (1957)
Assistant Professor of Foods and Nutrition.
B.S., Montana State, 1956, M.S., 1957.

JOHN VINCENT BYRNE (1960)
Professor of Oceanography.
A.B., Hamilton College, 1951; M.A., Columbia, 1953; Ph.D., USC, 1957.

JAMES HAROLD CAIN (1965)
Chief Gunner's Mate, Instructor in Naval Science.

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)
Associate 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.

LYLE DAVID CALVIN (1953)
Professor of Statistics, 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.

HOMER JEROME CAMPBELL (1957)
Assistant Professor of Fisheries; Fishery Biologist, Research Division, Oregon State Game Commission.
B.S., Oregon State, 1948, M.S., 1963.

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.

JERRY LEE CANNON (1965)
Lincoln County Extension Agent (Instructor).
B.S., Oregon State, 1965.

LYNN ELTON CANNON (1963)
Coos County Extension Agent (Assistant Professor).
B.S., Oregon State, 1958; M.Agr., Oregon State, 1965.

TILMAN MEADE CANTRELL (1956)
Associate Professor of Sociology.
B.A., Texas, 1947, M.A., 1948.

JOSEPH CAPIZZI (1955-1963, 1965)
Extension Entomology Specialist (Associate Professor).
B.S., State Teachers College, Indiana, Pennsylvania, 1949; M.S., Oregon State, 1955.

GERALD CAPLE (1963)
Research Associate (Assistant Professor), Chemistry.
B.A., St Olaf College, 1957; Ph.D., Florida State, 1963.

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; M.A., Oregon State, 1964.

HERBERT DEYO CARLIN (1951)
Professor of History.
B.S., Oregon, 1940, M.S., 1947.

DAVID HILDING CARLSON (1963)
Assistant Professor of Mathematics.
B.A., San Diego State, 1957; M.S., Wisconsin, 1959, Ph.D., 1963.
On leave, winter, 1965-66.

ELAINE KATHRYN CARLSON (1958)
Extension Clothing Specialist (Assistant Professor).
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.

THEODORE HAROLD CARLSON (1951)
Assistant Professor Journalism, Department of Information—News Bureau.
B.S., Oregon State, 1950.

WILLIAM HUGH CARLSON (1945)
Planning and Research Associate, O.S.S.H.E; Professor.
A.B., Nebraska, 1924; Certificate, New York State Library School, 1926; M.A. (Lib. Sc.) California, 1937.

ROBERT CHARLES CARLSTROM (1965)
Extension Plant Clinic Technician.
B.S., Michigan State, 1954; M.S., Idaho, 1956.

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.

GEORGE EDWARD CARTER (1960)
Assistant Professor of Agronomy, Klamath Experiment Station.
B.S., Purdue, 1956; M.S., Michigan State, 1960.

JAMES CARTER (1964)
M/Sgt (E8), Instructor in Military Science.

RUTH HARRIETT CARTER (1952)
Senior Instructor in English.
B.S., Boston University, 1930, M.Ed., 1934.

EMERY NEAL CASTLE (1954)
Dean of Faculty; 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 CATIZONE (1964)
USFC (E6) Supply Sergeant, Instructor in Military Science.

FREDERICK ARNOLD CERVANTES (1965)
Assistant Professor of Political Science.
B.A., California at Riverside, 1960; M.A., Washington, 1963.

GEORGE GRETE CHADWICK (1958)
Assistant Professor of Fisheries.
B.S., Oregon State, 1954, M.S., 1959.

HOWARD EMIL CHAMBERLAIN (1963)
Instructor in Business Administration and in Mechanical and Industrial Engineering.
B.S., California, 1951; M.S., Oregon State, 1964.

WILLARD JOSEPH CHAMBERLIN (1915)
Professor Emeritus of Entomology.
B.S., Oregon State, 1915, M.S., 1921; Ph.D., Stanford, 1930.

KENTON LEE CHAMBERS (1960)
Professor of Botany; Curator of Herbarium.
A.B., Whittier, 1950; Ph.D., Stanford, 1956.

BERKLEY WARNER CHAPPELL (1963)
Assistant Professor of Art.
B.F.A., University of Colorado, 1956, M.F.A., 1958.

FRANCES HELEN CHAPPLE (1964)
Instructor in Chemistry.
B.Sc., Bristol University, 1959, Ph.D., 1963.

HELEN GENEVA CHARLEY (1944)
Professor of Foods and Nutrition.
A.B., DePauw, 1930; M.S., Chicago, 1941.
On sabbatical leave 1965-66.

VERNON HENDRUM CHELDELIN (1942)
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.

AKIKO KUROIWA CHIBA (1964)
Counselor, Instructor, Counseling Center.
B.A., International Christian University (Tokyo), 1961, M.A., 1963.

ROBERT WILLIAM CHICK (1962)
Dean of Students.
B.A., Missouri, 1946, M.Ed., 1950; Ed.D., Denver, 1960.

DAVID OWEN CHILCOTE (1953)
Associate Professor of Crop Physiology.
B.S., Oregon State, 1953, M.S., 1957; Ph.D., Purdue, 1961.

WILLIAM WESLEY CHILCOTE (1950)
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.

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.
On sabbatical leave, 1965-66.

CLARENCE LEWIS CHURCH (1943-44, 1945)
Assistant Professor of Physics.
A.B., Willamette, 1927; M.A., Southern California, 1936.

DAVID CALVIN CHURCH (1956)
Associate Professor of Animal Nutrition.
B.S., Kansas State, 1950; M.S., Idaho, 1952; Ph.D., Oklahoma State, 1956.

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)
Community Development Specialist (Associate Professor).
B.S., Oregon State, 1939, M.S., 1942; Ph.D., Wisconsin, 1960.

RONALD O. CLARKE (1963)
Assistant Professor of Religion.
B.S., Oregon State, 1950; B.D., Yale, 1953; Th.D., Pacific School of Religion, 1964.

PETER LEDDY CLARY (1965)
Research Associate (Instructor), Veterinary Medicine.
B.S., Seattle University, 1957; D.V.M., Washington State, 1964.

DONALD W. CLAYPOOL (1964)
Assistant Professor of Animal Science; Superintendent of John Jacob Astor Experiment Station.
B.S., Berea, 1952; M.S., Kentucky, 1960.

LAURA MAE CLEAVELAND (1946)
Associate Professor of Institution Management; Manager Residence Halls Food Service.
B.S., Iowa State, 1930; M.S., Oregon State, 1942.
On sabbatical leave, Spring Term, 1965.

PAUL FRANCIS CLEMENTS (1965)
Instructor in English.
B.A., Creighton University, 1963; M.A., Nebraska, 1965.

SCOTT PHILIP CLEVENGER (1945)
County Extension Agent-at-Large (Assistant Professor).
B.S., Oregon State, 1939.

RILEY JENKINS CLINTON (1928)
Professor Emeritus of Education.
A.B., Missouri, 1922, B.S. (in Ed.), 1922, M.A., 1925; Ed.D., Stanford, 1933.

GLENN FRANK COCHRANE, JR. (1963)
Instructor in Mechanical Engineering.
B.S., Oklahoma State, 1957; M.S., Kansas State, 1961.

HAROLD COCKERLINE (1921)
Professor Emeritus of Electrical Engineering.
B.S. (in E.E.), Oregon, 1912.

ROBERT WILLIS COFFIN (1963)
Instructor in Mathematics.
B.A., Oregon, 1958.

RALPH COLBY (1928)
Professor Emeritus of English, Dean of Lower Division 1949-60, Dean of Humanities and Social Sciences 1960-62.
B.A., Minnesota, 1916, M.A., 1917; Ph.D., Illinois, 1928.

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.

CHARLES ROBERT CONNORS (1965)
Storekeeper First Class (E6), Instructor in Naval Science.

FRANK PHILIP CONTE (1961)
Associate Professor of Radiation Biology, General Science.
A.B., California, 1950, Ph.D., 1961.

CLIVE WINSTON COOK (1944)
Clackamas County Extension Agent (Assistant Professor).
B.S., Oregon State, 1933.

GORDON HENRY COOK (1965)
Hood River County Extension Agent (Instructor).
B.S., Oregon State, 1964.

WILBUR TARLTON COONEY (1937)
Dean of Agriculture (Professor).
B.S., Oregon State, 1937, M.S., 1942.

HAL BLUFORD HARRISON COOPER, JR. (1965)
Air Research Engineer (Instructor), National Council for Stream Improvement.
B.S., California, 1963; M.S., Washington, 1965.

MALCOLM ERNEST CORDEN (1958)
Associate Professor of Plant Pathology.
B.S., Oregon State, 1952, Ph.D., 1955.

STANLEY EUGENE CORDER (1961)
Associate 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.

ROBERT WAYNE CORLEW (1963)
Instructor in Electrical Engineering.
B.S.E.E., Washington State, 1959; M.S.E.E., 1964.

CHARLES WILLIAM CORMACK (1963)
Assistant Professor of Sociology and Anthropology.
A.B., California at Los Angeles, 1937; M.S. (Econ.), University of London, 1939.

ELGIN MAC CORNETT (1942)
Wallowa County Extension Agent (Associate Professor).
B.S., Oregon State, 1939; M.S., Michigan State University, 1958.

EVERETT STEWART CORTRIGHT (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)
State Extension Agent (Professor).
B.S., Oregon State, 1939; M.S., Pacific University, 1964.

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.
B.S., Oregon State, 1957, M.S., 1961.

GENE FRANCIS CRAVEN (1958)
Assistant Professor of Education and of General Science.
B.S., Kansas State College (Pittsburgh), 1954; M.S., Oregon State, 1958.

DAVID L. CRAWFORD (1964)
Assistant Professor of Food Science and Technology, Program Director, Seafoods Laboratory, Astoria.
B.S., Oregon State, 1958, M.S., 1961, Ph.D. 1966.

FRED ROY CRAWFORD (1959)
Associate Professor of Psychology.
B.A., Santa Barbara State, 1941; M.S. (Ed.), U.S.C., 1945, Ed.D., 1947.

DENNIS LEE CRAWFORD (1964)
Assistant Professor, Administrator of College Work-Study Program, Y Round Table.
B.A., Linfield College, 1955; B.D., Colgate Rochester Divinity School, 1958.

GRAYDON TALMADGE CREWS (1948)
Science Student Personnel Adviser (Professor).
B.S., Washington, 1938; M.S., Oregon State, 1950, Ed.D., 1957.

RICHARD BYRD CRITTENDEN (1964)
Assistant Professor of Mathematics.
B.A., Willamette, 1957; M.S., Illinois, 1959; Ph.D., Oregon, 1964.

JOSEPH ROBERT CROCKER, JR. (1962)
Assistant Professor of 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 CROPSEY (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.

ELIZABETH SIMPSON CURL (1965)
Instructor in Mathematics.
A.B., Western Maryland College, 1952.

HERBERT CHARLES CURL (1961)
Associate Professor of Oceanography.
B.S., Wagner College, 1950; M.S., Ohio State, 1951; Ph.D., Florida State, 1956.

RAYMOND ALAN CURRIER (1961)
Associate 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.

RONALD HARVEY CURRY (1965)
Instructor in Business Administration.
B.B.A., Niagara University, 1960; M.B.A., University of Denver, 1965.

IMOGENE CUSAC (1949)
(Lib. Sc.) Union Cataloger (Senior Instructor), Library.
B.A., Baylor, 1930; B.A. (Lib. Sc.), Oklahoma, 1931; B.A., Highlands, 1937.

MELVIN CUTLER (1963)
Associate Professor of Physics.
B.S., City College of New York, 1943; A.M., Columbia, 1947, Ph.D., 1951.

NORMAN H. CUTSHALL (1963)
Instructor (Research Associate), Oceanography.
M.S., Oregon State, 1963.

HANS JUERGEN DAHLKE (1963)
Associate Professor of Mechanical Engineering.
B.S., San Diego State, 1957; M.S., Stanford, 1958, Ph.D., 1964.

CHARLES HENRY DAILEY, JR. (1947)
Professor of Physical Education.
B.S., North Central College (Illinois), 1943; M.A., Michigan, 1947.

HOMER MORROW DALBEY (1958)
Assistant Professor of Business Administration.
A.B., Indiana, 1949; M.S., Illinois, 1952; Ph.D., Northwestern, 1965.
On leave 1965-66.

ROBERT D. DALE (1965)
Assistant Professor of Philosophy.
B.S., Oregon State, 1957; M.A., Chicago, 1959.

EDWARD ARCHIE DALY (1957)
Associate Professor of Mechanical Engineering.
B.S., New Mexico State, 1950; M.S., Michigan State, 1951.

EVE-MARY DALY (1960-61, 1963)
Assistant Professor of Modern Languages.
B.A., Incarnate Word College (San Antonio), 1957, M.A., 1959.

VERNON JOHN DAMM (1956)
Assistant Professor of Psychology.
B.A., Houghton College, 1952; M.A., Bowling Green, 1954.

CHARLES WESLEY DANE (1957)
Assistant Dean (Professor), Forestry.
B.S., Oregon State, 1952, M.S., 1958.

MALCOLM DANIELS (1965)
Associate Professor, Chemistry Radiation Center.
B.Sc. (Hons. Chem.), Kings College, University of Durham, 1951, Ph.D., 1955.

MARY ANN DANKLEFF (1963)
Research Associate in Chemistry (Instructor), Science Research Institute.
B.S., State College of Iowa, 1958; M.A., Smith College, 1960; Ph.D., Brown, 1963.

RICHARD ELDEN DANKLEFF (1963)
Assistant Professor of English.
B.S., Columbia, 1949; M.A., Nebraska, 1954; Ph.D., Chicago, 1959.

THOMAS DEAN DARROW (1965)
Instructor in Zoology.
B.A., Nebraska State College (Wayne), 1960; M.A., South Dakota, 1961.

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)
Assistant Professor of Fisheries.
B.S.F., Washington, 1956; M.S., Oregon State, 1960, Ph.D., 1963.

JOEL DAVIS (1963)
Instructor in Mathematics.
B.A., Princeton, 1957; M.S., Wisconsin, 1961.

PHILIP BARR DAVIS (1958)
Associate 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.

MELISSA MARTIN DAWES (1915)
Professor Emeritus of Modern Languages.
A.B., Oregon, 1912; B.S., Oregon State, 1915; A.M., Columbia, 1920.

MURRAY DRAYTON DAWSON (1954)
Professor of Soils.
M.Agr.Sc., University of New Zealand, 1949, M.S., 1952; Ph.D., Cornell, 1954.

SHIRLEY S. DEARDORFF (1965)
Instructor in Education.
B.S. Geology, Oregon, 1944, B.S. Geography, 1944; B.S. Education, Oregon College of Education, 1955, M.S., 1965.

LOUIS WILLY De BACKER (1965)
Research Associate (Assistant Professor), Soils.
Ph.D., Illinois, 1965.

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.

ANNE O'CONNELL DEENEY (1964)
Research Associate (Assistant Professor), Agricultural Chemistry.
B.S., Marylhurst College, 1948; M.S., Oregon State, 1959, Ph.D., 1963.

IRA WASHINGTON DEEP (1953)
Associate Professor of Botany.
B.A., Miami (Ohio), 1950; M.S., Tennessee, 1952; Ph.D., Oregon State, 1956.

KENNETH STOVER DEFFEYES (1964)
Associate Professor of Oceanography.
B.S., Colorado School of Mines, 1953; M.S.E., Princeton University, 1956, Ph.D., 1958.

PETER DEHLINGER (1962)
Professor of Oceanography.
B.S., Michigan, 1940; M.S., California Institute of Technology, 1943, Ph.D., 1950.

FELIX MUNEZ DeLUMPA (1964)
Captain, Assistant Professor of Military Science.
A.B., San Jose State College (Civil Government), 1958.

WILBERTA GEORGENE DERSHON (1965)
Josephine County Extension Agent (Instructor).
B.S., Oregon State, 1965.

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.

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.

DAVID WALLACE DIGBY (1963)
Instructor in Mathematics.
B.A., Reed College, 1957.

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 Emeritus of Fisheries.
B.S., Oregon State, 1926, M.S., 1931.

RUSSELL GROVER DIX (1964)
Assistant to the Director of Housing (Instructor).
B.S., Oregon State, 1962; M.F., 1964.

JAMES VICTOR DIXON (1927)
Professor of Physical Education; Acting Director of Division of Physical Education.
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)
Assistant Professor of English.
B.S., Northwestern, 1929, M.A., 1930.

DOROTHY DOBIE (1965)
Instructor in Physical Education for Women.
B.A. in Physical Education, University of Puget Sound, 1959; M.Ed., Oregon State, 1965.

NORMAN DALE DOBIE (1949)
Associate Professor of Plant Pathology, Extension Certification Specialist.
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.

THOMAS MARSHALL DOGGETT (1965)
Production Manager, KOAC-TV, Instructor, Educational Media, Continuing Education.
B.S., Oregon, 1960.

THURSTON ERMON DOLER (1949)
Associate Professor of Speech.
B.A., Furman, 1948; M.S., Purdue, 1949.
On sabbatical leave 1965-66.

KLAUS HEINZ DOMSCH (1965)
Associate Professor of Plant Pathology.
Ph.D., University of Göttingen, 1953.

HARRISON L. DOOLEY (1965)
Plant Pathologist (Instructor) in Botany and Plant Pathology; ARS, USDA.
B.S., Oklahoma State, 1954, M.S., 1961.

HAROLD CLARENCE DORN (1965)
Associate Professor of Journalism, Department of Information.
B.A., Nebraska, 1950, M.A., 1955.

ERNST JOHN DORNFELD (1938)
Professor of Zoology; Chairman of Department.
B.S., Marquette, 1933; M.A., Wisconsin, 1935, Ph.D., 1937.

FRANK NORMAN DOST (1962)
Assistant Professor of Pharmacology, Chemistry, Veterinary Medicine, Science Research Institute.
D.V.M., Washington State, 1951, B.S., 1953; M.S., Kansas State, 1959.

PETER DOUDOROFF (1953)
Professor of Fisheries.
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.

CARL GORDON DOWNING (1964)
Assistant Professor of Chemical Engineering.
B.S., Washington, 1953; M.S., Wisconsin, 1956, Ph.D., 1959.

WILLIAM HENRY DREESEN (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.

ANDREW ADRIAN DUNCAN (1958)
Extension Vegetable Production Specialist (Professor).
B.S., Maryland, 1950, M.S., 1952; Ph.D., 1956.

BARBARA JEAN DUNCAN (1965)
Multnomah County Extension Agent (Instructor).
B.S., Wyoming, 1963.

JAMES PAUL DUNCAN (1965)
Director of Residence Hall Program, Assistant Professor.
B.A., Indiana, 1959, M.S.. 1961, Ed.D., 1965.

JAMES WESLEY DUNN (1963)
University Development Officer (Assistant Professor), President's Office.
B.S., Oregon State, 1951; M.S., New York U., 1952.

MAXINE ELLEN DURST (1962)
Douglas County Extension Agent, 4-H Club (Instructor).
B.S., Linfield College, 1962.

HELEN MARIE DWELLE (1963)
Malheur County Extension Agent, Home Economics (Instructor).
B.S., Montana, 1963.

PERSIS NYGREN DYER (1963; 1965)
Wheeler County Extension Agent (Instructor).
B.S., Oregon State, 1961.

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.

CHARLES RICHARD EASLEY (1964)
Research Associate (Senior Instructor), Oceanography, (Instructor), Fisheries and Wildlife, Marine Science Center, Newport.
B.S., Oregon State, 1958; M.S., 1962.

DOROTHY MAY EAST (1961)
Assistant Professor of Foods and Nutrition.
B.S., Montana State, 1939; M.S., Oregon State, 1961.

JOHN WILLIAM EASTERBROOK (1965)
Assistant Professor, Assistant Football Coach, Intercollegiate Athletics.
B.S., Illinois, 1962.

HARRY TYSON EASTERDAY (1960)
Associate Professor of Physics.
A.B., California, 1947, Ph.D., 1953.

EDISON ELLSWORTH EASTON (1951)
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.

MELIONEE A. ECHOLS (1965)
Benton County Extension Agent (Home Economics).
B.S., Southern Mississippi, 1958.

CLARA WILLIAMS EDABURN (1939)
Professor of Clothing, Textiles, and Related Arts, Acting Head of Department.
B.S., Iowa State, 1925; M.A., Columbia, 1939.

WALTER EUGENE EDELMAN, JR. (1961)
Instructor in Mechanical Engineering.
B.M.E., Minnesota, 1956, M.S.M.E., 1958.

JOHN A. EDWARDS (1961)
Associate Professor of Agricultural Economics.
B.S. (Agric.), Wisconsin, 1950; M.A., Nebraska, 1952; Ph.D., Chicago, 1963.

LOUIS LAIRD EDWARDS (1955)
Head Adviser and Placement Director, School of Business and Technology; Associate Professor of Business Administration.
B.S., Montana State, 1935; M.E., Montana, 1949.

MARGARET ANN EDWARDS (1951)
Senior Instructor in Nutrition.
B.S., Washington State, 1937.

BETTY JEAN ELDER (1965)
Grant County Extension Agent (Instructor).
B.A. Home Economics, Washington State, 1965.

ROBERT L. ELDER (1965)
Associate Professor of Radiological Physics, General Science.
B.S., Indiana, 1953; M.S., North Carolina, 1955; B.S., Oregon State, 1958; D.Sc., John Hopkins, 1964.

B. RAY ELLER (1961)
Assistant Professor of Animal Science, Eastern Oregon Experiment Station.
B.S., Abilene Christian College, 1959; M.S., Texas A & M, 1961.

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 Physiology, Animal Science.
B.S., Kentucky, 1955, M.S., 1956; Ph.D., California, 1962.

RUTH ANN ELLIOTT (1965)
Instructor in English.
B.A., Northwest Missouri State, 1963; M.A., Colorado State University, 1965.

EVERETT LINCOLN ELLIS (1965)
Professor of Forest Products, Head of Forest Products Research, Forest Research Laboratory.
B.S.F., Washington, 1941; M.S., Michigan State, 1943; Ph.D., Washington, 1956.

JOHN KENNETH ELLIS (1964)
Associate Professor of Hygiene and Health Education.
B.Ed., Southern Illinois, 1943, B.S., 1944; M.P.H., Michigan, 1948, Ph.D., 1963.

RUSSELL EUGENE ELLIS (1949)
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.

EUGENE ELZY (1964)
Instructor in Chemical Engineering.
B.S., Illinois, 1961.

MARY FLORENCE ENGESSER (1946, 1957, and since 1963)
Instructor in English.
B.A., Western Maryland College, 1943; Ed.M., Oregon State, 1963.

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.

HAROLD EUGENE ENLOWS (1963-64)
Associate Professor of Geology.
B.S., Tulsa, 1935; M.S., Chicago, 1936; Ph.D., Arizona, 1939; Aerological Engineer, United States Naval Academy, 1944.

RICHARD KEITH EPPLEY (1965)
Instructor in Entomology.
A.A., Hartnell College, 1954; B.A., San Jose State College, 1957; M.S., Oregon State, 1963.

LEIF DEDRICK ESPENAS (1961)
Professor of Forest Products, Forest Research Laboratory.
B.S., New York State College of Forestry, 1938; M.S., California, 1940.

FLORENCE SARAH EUREN (1946-49, 1957)
Assistant Serials Librarian (Instructor), Library.
B.E., Moorhead State Teachers College, 1937; B.S. (Lib. Sc.), Minnesota, 1946.

HAROLD J. EVANS (1961)
Professor of Plant Physiology.
B.S., Kentucky, 1946, M.S., 1948; Ph.D., Rutgers, 1950.

CURTISS MITCHELL EVERTS (1963)
Professor of Sanitary Engineering; Director, PNW Water Laboratory.
B.S., Texas A & M, 1930; M.S., Harvard, 1939.

ROBERT WILSON EVERY (1946)
Extension Entomology Specialist (Professor).
B.S., Idaho, 1939.

HAROLD PLYMPTON EWALT (1932)
Extension Dairy Specialist (Professor).
B.S., Oregon State, 1932.

CLIFFORD EUGENE FAIRCHILD (1962)
Assistant Professor of Physics.
B.A., Fresno State, 1956; Ph.D., Washington, 1962.

SHENG CHUNG FANG (1948)
Associate Professor of Chemistry, Agricultural Chemistry.
B.S., Fukien Christian University, 1937; M.S., Oregon State, 1944, Ph.D., 1948.

DONALD H. FARNESS (1963)
Assistant Professor of Economics.
B.A., Reed College, 1957.

WILLIAM KING FARRELL (1942)
Grant County Extension Agent (Associate Professor).
B.S., Oregon State, 1942.

GERALD DAVID FAULKENBERRY (1965)
Assistant Professor of Statistics.
B.S., Southeastern State College, 1959; M.S., Oklahoma State, 1962, Ph.D., 1965.

MERRILL CHARLES FAUX, JR. (1964)
Assistant Professor of Business Administration.
B.S., Utah, 1952, M.B.A., Harvard, 1954.

MARY RUTH FECHTIG (1964)
Social Adviser and Program Consultant Memorial Union (Assistant Professor).
B.A., Southern Illinois, 1960; M.S. in Ed., 1963.

GRANT STEPHEN FEIKERT (1929)
Professor of Electrical Engineering; Assistant to Director for Engineering Department of Educational Media.
B.S., Oregon State, 1930, M.S., 1932, E.E., 1937.

EUGENE MARVIN FELKER (1965)
Associate Professor, Assistant Football Coach, Intercollegiate Athletics.
B.S., Wisconsin, 1955.

FRANCISCO R. FERRAN (1965)
Assistant Professor of Spanish.
B.A., Indiana State, 1965; LL.D., University of Havana, 1940.

WILLIAM KREITER FERRELL (1956)
Professor of Forest Management.
B.S.F., Michigan, 1941; M.F., Duke, 1946, Ph.D., 1949.

CYRUS WEST FIELD (1963)
Assistant Professor of Geology.
B.A., Dartmouth, 1956; M.S., Yale, 1957, Ph.D., 1961.

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.

GREGORY B. FINK (1964)
Professor of Pharmacology, Head of Department.
B.S., Montana State, 1950; Ph.D., Utah, 1960.

DAVID FRANCIS FINNIGAN, JR. (1957)
Assistant Professor of English.
B.A., Colorado, 1956, M.A., 1957.

ROLAND ALAN FINSTON (1965)
Associate Professor of Radiological Physics.
A.B., S.B., Chicago, 1957; M.S., Vanderbilt, 1959; Ph.D., Cornell, 1965.

WILLIAM JAMES FIREY (1961)
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.

DEAN FRED FISHER (1965)
Instructor in Mathematics.
B.S., Brigham Young, 1953; M.S., Utah, 1958.

ERMINA JANE FISHER (1952)
Marion County Extension Agent, Home Economics (Associate Professor).
B.S., Kansas State, 1938; M.S., Cornell, 1951.

LUTHER AARON FITCH (1960)
Assistant Professor of Agronomy, Malheur Experiment Station.
B.S. (Agr.), Idaho, 1956; M.S. (Agr.), Michigan State, 1960.

DUANE STANLEY FITZGERALD (1952)
Building Manager (Assistant Professor) Memorial Union.
B.S., Oregon State, 1940.

JAMES JOSEPH FITZPATRICK, JR. (1965)
Captain, Assistant Professor of Military Science.
B.A., Georgetown University, 1960.

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)
Assistant Professor of 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.

WILSON HOOVER FOOTE (1948)
Professor of Agronomy, Assistant Director, Agricultural Experiment Station.
B.S., Utah State, 1942; M.S., Minnesota, 1946, Ph.D., 1948.

DANIEL MORGAN FORD (1964)
Instructor in Biology, General Science.
B.A., Oregon State, 1964.

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.
On leave 1964-66.

WALTER CYRIL FOREMAN (1948)
Professor of English, Chairman, Department of English.
B.A., Union College (Nebraska), 1933; M.A., Nebraska, 1937; Ph.D., California, 1948.

HERMAN CARL FORSLUND (1945)
Assistant Dean of Pharmacy, Professor of Pharmacy Law.
B.S., Washington State, 1938, M.S., 1940.

LEE RUSSELL FOSTER (1947)
Hood River County Extension Agent (Professor).
B.S., Washington State, 1933.

ROY ARCHIBALD FOSTER (1955)
Professor of Hygiene and Health Education.
BA., Concordia College, 1937; M.S., Indiana, 1950, H.S.D., 1953.

WILLIAM ABRAM FOSTER, JR. (1958)
Associate 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.

GERALD ALLAN FOWLER (1963)
Assistant Professor of Oceanography.
B.S., Puget Sound, 1957; Ph.D., Southern California, 1965.

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)
Associate Professor of Plant Breeding.
B.S., Oregon State, 1956, M.S., 1957; Ph.D., Purdue, 1960.

DOROTHY KEPPEL FRASER (1964)
Associate Professor of Microbial Genetics, Microbiology.
B.A., Radcliffe, 1936; M.A., 1938; Ph.D., California, 1954.

ROBERTA C. FRASIER (1959)
Extension Family Life Specialist (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; M.L.A., Louisiana State, 1964.

HAROLD DENIS FREDERICKS (1965)
Lieutenant Colonel, USMC, Associate Professor of Naval Science.
B.S., Holy Cross, 1947; M.A., Maryland, 1953; Ed.S., Stanford, 1959.

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.

ROBERT EDGAR FRENKEL (1965)
Assistant Professor of Geography and Natural Resources.
A.B., Kenyon College, 1950; M.S., California, 1954.

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 Scientist (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.
On leave 1965-66.

HERBERT FARLEY FROLANDER (1959)
Professor of Oceanography.
Ed.B., Rhode Island College of Education, 1946; Sc.M., Brown, 1950, Ph.D., 1955.

HORTON LAWRENCE FROSS (1963)
Lt. Colonel, USAF; Professor of Aerospace Studies.
B.S., Sacramento State, 1954.

WILFRID TUTTLE FROST (1942)
State Snow Survey Supervisor (Professor), Irrigation Water Forecasting, U. S. Department of Agriculture (Portland).
A.B., California, 1933.

JOHN L. FRYER (1963)
Assistant Professor of Medical Microbiology.
B.S., Oregon State, 1956, M.S., 1957, Ph.D., 1964.

HOMER LEE FULKERSON (1963)
Food Services Manager (Assistant Professor), Department of Housing.
B.A., Michigan State, 1949.

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)
Professor of Political Science.
B.A., Florida, 1949, M.A., 1950, Ph.D., 1953.

WILLIAM FURTICK (1949)
Professor of Agronomy.
B.S., Kansas State, 1949; M.S., Oregon State, 1952, Ph.D., 1958.

MARY ALICE GALLAGHER (1964)
Assistant Professor of Home Economics Education.
B.S., Michigan State, 1956; M.S., Western Michigan, 1962.

WILBERT GAMBLE (1962)
Assistant Professor of Chemistry and Science Research Institute.
B.S., Wayne State, 1955, Ph.D., 1960.

ROBERT KEITH GANGER (1962)
County Statistics Specialist (Assistant Professor).
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, (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 GARREN, JR. (1950)
Associate Professor of Horticulture.
B.S., Oregon State, 1950, M.S., 1954; Ph.D., Purdue, 1961.

CHESTER ARTHUR GARRISON (1954)
Associate Professor of English.
B.A., Dartmouth, 1940; M.A., Columbia, 1946, Ph.D., 1964.

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 Wildlife Ecology; 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 Emeritus of Clothing, Textiles, and Related Arts.
B.A., Washington, 1925, M.A., 1933. On active service Fall Term 1964.

CHARLES GERALD GAVIN (1955)
Union County Extension Agent (Associate Professor).
B.S., Wyoming, 1949.

HERMAN A. GAWER (1961)
Assistant Professor of Physical Education.
B.S., Oregon, 1929; M.A., New York University, 1931, Ed.D., 1951.

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.

DONNA RAE GEORGE (1964)
Morrow County Extension Agent (Instructor).
B.S., Montana State, 1963.

WALLACE EUGENE GIBBS (1958)
Registrar and Director of Admissions (Associate Professor).
B.S., Oregon State, 1950, Ed.M., 1959.

FREDERICK LEONARD GIBSON (1964)
Assistant to Medical Director Student Health Service; Assistant Professor of Physical Education and Hygiene.
B.B.A., Golden Gate College, 1957; M.S.H.A., Northwestern, 1959.

HENRY HERBERT GIBSON (1963)
Master Sergeant USAF, Instructor in Aerospace Studies.

MARGARET SARAH GIBSON (1964)
Research Associate (Instructor), Science Research Institute.
B.Sc., University of Manitoba, 1955; M.S., University of Alberta, 1957; Ph.D., Purdue, 1963.

JOHN SEARLE GIFFIN (1964)
Team Physician Student Health Service & Athletic Department.
B.S., Wisconsin, 1934; M.D., Chicago, 1936.

DAVID HEGGIE GILBERT (1957)
Assistant Professor of English.
B.A., University of the Pacific, 1956; M.A., Colorado, 1957.
On leave 1965-66.

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)
Dean, School of Humanities and Social Sciences; Professor of Art.
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)
Director of Athletics (Professor).
B.S., Oregon State, 1925.

JAMES WARREN GILLETT (1964)
Research Associate (Assistant Professor), Agricultural Chemistry.
B.S., Kansas, 1955; Ph.D., California, (Berkeley), 1962.

CAMPBELL MOORE GILMOUR (1951)
Professor of Soil Microbiology.
B.S., British Columbia, 1941, M.S., 1945; Ph.D., Wisconsin, 1949.

WILLIAM RAY GLASS (1956)
Associate Professor of Architecture; registered architect.
B.Arch., Oregon, 1956.

DORIS M. GLASSER (1963)
Assistant Professor of French.
B.A., Miami, 1947; M.A., Wisconsin, 1950.

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.

RUSSELL HOLCOMB GODARD (1950)
Assistant Professor of Mathematics.
B.S., Oregon State, 1938; M.A., Iowa, 1939.

NORMAN RICHARD GOETZE (1959)
Farm Crops Specialist (Associate Professor), Federal Cooperative Extension.
B.S., Oregon State, 1952, M.S., 1955; Ph.D., Purdue, 1960.

CHARLES STEPHEN GOETZINGER (1964)
Professor of Speech.
B.S., Kent State, 1950; M.A., Purdue, 1952, Ph.D., 1954.

HARRY EARL GOHEEN (1955)
Professor of Mathematics.
B.A., Stanford, 1936, M.A., 1938, Ph.D., 1940.

JEFFERSON JOHN GONOR (1964)
Assistant Professor of Oceanography and Zoology.
B.S., Southwestern Louisiana, 1953; Ph.D., Washington, 1964.

DELMER MORRISON GOODE (1919)
Curriculum Consultant; Professor of Higher Education; Editor of Publications.
B.A., Minnesota, 1916; M.A., Oregon State, 1938.

JACK NIEL GOODMAN (1953)
Assistant Professor; Budget Director Educational Media, Library Manager Audiovisual Instruction.
B.S., Pacific University, 1948; M.A., Colorado State College of Education, 1949.

JAMES MELVIN GORDON (1965)
Instructor in Aerospace Studies.

KENNETH LLEWELLYN GORDON (1927)
Professor of Zoology.
A.B., Colorado College, 1923; M.A., Missouri, 1925; Ph.D., Cornell, 1936.

CARROLL PATRICK GORG (1964)
Assistant Professor, Manager of Production, Division of Continuing Education (Assistant Professor).
B.A., Central Washington State College, 1961, M.Ed., 1964.

MARY GUION GOTTLIEB (1965 Fall)
Instructor in English.
B.A., Elmira College, 1953; M.A., New York University, 1962.

ROBERT LEE GOULDING (1955)
Associate Professor of Entomology.
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.

ROBERT GENE GRAHAM (1965)
Assistant Professor of Business Administration.
B.S., Illinois, 1949; M.B.A., Texas, 1963, Ph.D., 1965.

PHYLLIS EMOGENE GRANT (1949)
Assistant Professor of Clothing, Textiles, and Related Arts.
B.S., Minnesota, 1939; M.S., Oregon State, 1950.

CLIFFORD FREDERICK GRAY (1961-2, 1965)
Assistant Professor of Business Administration.
B.S., Millikin, 1959; M.B.A., Indiana, 1961.

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.

JOHN WENDELL GRAY (1965)
Assistant Professor of Business Administration; Program Operations Officer U. S. P.H.S., PNW Water Laboratory.

CLAUDE LANE GRIFFIN (1962)
Instructor in Pharmacology.
B.S. (Pharmacy), Missouri, 1961, M.S. (Pharmacology), 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.

JAMES WILLARD GROSHONG (1946, 1950)
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; M.Agr.Ed., Arizona, 1963.

JANICE ANONA GUMPRECHT (1960)
Washington County Extension Agent (Instructor) (4-H).
B.S., Colorado State University, 1960.

PAUL JAMES GUNN (1948)
Professor of Art; Chairman of Department.
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 (Associate Professor).
B.S., Minnesota, 1939.

DONALD GUTHRIE, JR. (1963)
Associate Professor of Mathematics and Statistics.
B.S., Stanford, 1954; M.A., Columbia, 1955; Ph.D., Stanford, 1958.

JOSEPH ROY HAAG (1927)
Professor Emeritus 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 (Associate Professor).
B.S., Oregon State, 1951.

OSCAR NATHANIEL HAGG (1950)
Extension Dairy Products Marketing Specialist (Associate Professor).
B.S., Oregon State, 1926.

JOHN ALPHEUS HAISLIP (1958)
Assistant Professor of English.
B.A., Washington, 1950, Ph.D., 1965.

MARVIN REYNOLDS HAITH (1943-44, 1946)
Associate Professor of General Engineering; Personnel and Placement Officer.
B.S., Nebraska, 1928.

LUCIA HALEY (1921)
Assistant Librarian (Associate Professor) Emeritus.
A.B., Washington, 1911; Graduate, Pratt Institute, 1912, B.L.S., 1942.

FRANCES ANN HALL (1930-58, 1961)
Klamath County Extension Agent (Associate Professor) Emeritus, Home Economics.
B.S., University of Puget Sound, 1925; M.S., Oregon State, 1930.

JACK VERNON HALL (1954)
Professor of Elementary Education, Head, Department of Elementary Education.
B.A., Central Washington, 1944; M.A., Colorado State College, 1947, Ed.D., 1951.

JAMES DANE HALL (1936)
Assistant Professor of Fisheries.
A.B., California, 1955; M.S., Michigan, 1960; Ph.D., 1963.

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.
On sabbatical leave.

ALBERT NELSON HALTER (1960)
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.
On sabbatical leave 1965-66.

NANCY ANN HAMLIN (1965)
County Extension Agent-at-Large (Instructor).
B.S., Oregon State, 1965.

RICHARD O. HAMPTON (1965)
Research Plant Pathologist, Associate Professor, Botany and Plant Pathology, ARS, USDA.
B.S.A., Arkansas, 1951; M.S., Iowa State, 1954, Ph.D., 1957.

ASTRID FROLICH HANCOCK (1963)
Instructor in Physical Education.
A.B., Mount Holyoke, 1956; M.Sc., Wisconsin, 1959.

JOHN BENJAMIN HANCOCK (1962)
Colonel, Professor of Military Science.
B.A., Texas A & M, 1942.

LINDA LOUISE HANES (1965)
Gift & Exchange Librarian (Instructor) Library.
A.B., Michigan State, 1962; A.M.L.S., Michigan, 1963.

EDWARD LEE HANSEN (1958)
Instructor in Wildlife Ecology.
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.

ERNEST LAIRD HANSEN (1963)
Captain USAF; Associate Professor of Aerospace Studies.
B.A. Business Administration, Washington State, 1956.

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.

ROBERT GEORGE HANSEN (1963)
Assistant Professor of Natural Resources, Assistant Professor of Geography.
Ph.B., North Dakota, 1957; M.A., Southern Illinois University, 1959.

EDWARD EUGENE HARDIN (1957)
Assistant Professor of Seed Technology; Seed Certification Specialist.
B.S., Washington State, 1951.

PHILIP RAYMOND HARDING, JR. (1963)
Assistant Professor of Architecture.
B.Arch., Oregon, 1963.
On leave, 1965-67.

VERA LUCIA HARDING (1962)
Assistant Professor of Modern Languages.
B.A., Catholic University of Rio, Brazil, 1955; M.A., Oregon, 1964.
On leave of absence 1965-67.

JOHN ROBERT HARDISON (1944)
Professor of Plant Pathology; Pathologist, 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.

WELTON DOYLE HARPER (1963)
Assistant Professor of Physical Education.
B.S., Oregon State, 1951.

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)
Professor of Speech.
B.S., Idaho, 1940; M.A., Colorado State College, 1945, Ed.D., 1960.

IRWIN CECIL HARRIS (1945)
Manager of Student Activities; Associate Professor of Journalism.
B.S., Oregon State, 1941; M.S.J., Northwestern, 1943.

PATRICIA JEAN HARRIS (1964)
Assistant Professor of Zoology; Electron Microscopist.
B.A., California, 1954; M.S., Yale, 1958; Ph.D., California, 1962.

CHARLOTTE TOSHACH HARTER (1960)
Instructor in Economics.
B.A., Wellesley College, 1948; M.A., Stanford, 1958.

LAFAYETTE GEORGE HARTER, JR. (1960)
Professor of Economics.
B.A., Antioch College, 1941; M.A., Stanford, 1948, Ph.D., 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; 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.

JANET HARWARD (1965, Fall)
Instructor in English.
B.S., Utah State, 1961; M.A., 1963.

MOYLE E. HARWARD (1955)
Professor of Soils.
B.S., Brigham Young, 1948; M.S., Massachusetts, 1950; Ph.D., North Carolina State, 1952.

BARBARA G. HASKINS (1963)
Lake County Extension Agent, Home Economics (Instructor).
B.S., Oregon State, 1963.

DUANE LEROY HATCH (1959)
Lane County Extension Agent (Assistant Professor).
B.S., Utah State, 1950.

JAMES FRANZ HAUN (1964)
Assistant Director of Housing (Instructor).
B.S., Eastern Oregon College, 1954; M.Ed., Oregon. 1960.

ALFRED HAUNOLD (1965)
Associate Professor of Agronomy; Research Geneticist, Crops Research Division, ARS, USDA.
Diplom Ingenieur, Agriculture University, Vienna, 1951, Dr. Agric., 1952; Ph.D., Nebraska, 1960.

ERNEST MILLARD HAUSER (1930)
Malheur County Extension Agent, 4-H Club (Associate Professor).
B.S., Oregon State, 1928.

BETTY EILEEN HAWTHORNE (1946)
Dean, School of Home Economics; Professor of Nutrition.
B.S., Washington, 1941, M.S., 1944; Ph.D., Michigan State, 1954.

JAMES RONALD HAY (1966).
Union County Extension Agent (Instructor).
B.S., Oregon State, 1964.

HAROLD DEAN HAYES (1963)
Instructor in Industrial Education.
A.A., Coalinga College, 1949; B.A., Fresno State, 1957, M.A., 1962.

SYLVIA ANN HAYES (1965)
Jackson County Extension Agent, 4-H Club (Instructor).
B.S., Phillips University, 1961.

DOROTHY HOFFER HAZEL (1964)
Assistant Professor of Secretarial Science.
B.S. in Bus. Ad., South Dakota, 1948; M.B.A., Denver, 1956.

CHARLES OSWALD HEATH (1946)
Professor of Engineering Materials.
B.S. (in M.E.), Cal Tech, 1936; M.S., Rutgers, 1944.

KENNETH WAYNE HEDBERG (1956)
Professor of Chemistry.
B.S., Oregon State, 1943; Ph.D., Cal Tech. 1948.

JOEL WALKER HEDGPETH (1965)
Professor of Oceanography; Resident Director, Marine Science Laboratory.
B.A., California, 1933, M.A., 1939, Ph.D., 1952.

DONALD WARD HEDRICK (1951)
Professor of Range Management.
B.S., Washington State, 1939; M.S., California, 1949; Ph.D., Texas A and M, 1951.

ORVILLE KENNETH HEESCH (1965)
Grant County Extension Agent.
B.S. Animal Science, South Dakota State, 1961, B.S. Agricultural Education, 1963.

OLIVER HARRY HEINTZELMAN (1949)
Professor of Geography; Professor of Natural Resources.
B.A., Central Washington, 1940; M.A., Washington, 1948, Ph.D., 1952.

WILMA CHARLOTTE HEINZELMAN (1965)
Cooperative Extension Home and Family Educational Coordinator (Associate Professor).
A.B., Coe College, 1931; M.A., Illinois, 1942.

DONALD HAROLD HELFER (1963)
Research Associate (Assistant Professor) in Veterinary Medicine.
B.S., Washington State, 1948; D.V.M., 1949.

CHARLES ALBERT HENDERSON (1922)
Klamath County Extension Agent (Professor) Emeritus.
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.

ELIZABETH ARTIS HENLEY (1959)
Assistant Professor of English.
A.B., Washington, 1934, M.A., 1938.

ELZIE VANCE HERBERT (1920)
Order Librarian Emeritus (Assistant Professor).

FREYA FRIEDERIKE HERMANN (1962)
Instructor in Pharmaceutical Science.
B.S., University of Munich, 1949; B.S., Oregon State, 1959.

RICHARD KARL HERMANN (1961)
Associate 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)
Assistant Professor of 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, Chairman of Department.
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)
Associate Professor of Speech.
B.S., Oregon State, 1950; M.A., Penn State, 1956.
On leave, 1965-66.

HELEN JEAN HILDEBRANDT (1965)
Instructor in Speech.
B.A., 1950, University of Akron; M.A., Pennsylvania State, 1951.

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.

RICHARD DAVID HILL (1965)
Instructor in Mathematics.
B.S., Montana State College, 1961; M.A., Oregon State, 1964.

HOWARD HERBERT HILLEMANN (1946)
Professor of Zoology.
B.S., Marquette, 1933; M.A., Wisconsin, 1939, Ph.D., 1942.

FREDERICK W. HILLER (1964)
Instructor in Chemistry.
B.S., Oregon State, 1950.

IVY ELIZABETH HILTY (1959)
Jefferson County Extension Agent, Home Economics (Assistant Professor).
B.S., Panhandle Agricultural Mechanical College, 1937.

CHARLES ANCEL HINDES (1965)
Polk County Extension Agent (Assistant Professor).
B.S., Oregon State, 1950.

ROBERT C. HINZ (1950)
General Manager, KOAC-AM-TV; Assistant Professor, Educational Media, Division of Continuing Education.
B.A., Oregon, 1950.

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.

FREDERICK DALE HOECKER (1946-58, 1963)
Community Service Coordinator (Assistant Professor).
B.S., Oregon State, 1946.

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.

LYNNE MARIE HOFFMAN (1963)
Deschutes County Extension Agent, Home Economics (Instructor).
B.S., Oregon State, 1963.

WILLIAM CHARLES HOFFMAN (1965)
Professor of Mathematics.
B.A., California, 1943; M.A., UCLA, 1947; Ph.D., 1953.

THOMAS CLARK HOGG (1965)
Assistant Professor of Anthropology.
B.S. History, Oregon, 1958, M.A., Anthropology, 1963, Ph.D., 1965.

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 Emeritus of Agricultural Economics.
B.S., Minnesota, 1923, Ph.D., 1939.

THOMAS GYLES HOLLEY (1965)
Instructor in Physical Education.
B.S., Oregon State, 1965.

ZOE ANN HOLMES (1965)
Instructor in Foods and Nutrition.
B.S., Kansas, 1964, M.S., 1965.

MAURICE PAUL HOLSINGER (1962)
Assistant Professor of History.
A.B., Duke, 1959; M.A., Denver, 1960, Ph.D., 1964.

MARY MARGARET HOLTHOUSE (1965)
Extension Food Marketing Specialist, Assistant Professor.
B.S., Oregon State, 1937.

EDWARD FRANK HOOVEN (1961)
Assistant Professor of Forest Wildlife Ecology, Forest Research Laboratory.
B.S., Washington State, 1948; M.S., Oregon State, 1958.

RICHARD JOHANN HOPEMAN (1960)
Associate Professor of Business Administration.
B.S., Oregon State, 1958; M.B.A., Washington, 1959, D.B.A., 1962.
On leave 1965-66.

CHESTER ELLSWORTH HORNER (1951)
Professor of Plant Pathology; Pathologist, U. S. Department of Agriculture.
B.A., Walla Walla, 1950; Ph.D., Oregon State, 1954.

ELVERA CHARLOTTE HORRELL (1942)
Extension Agricultural Economist, Statistics (Assistant Professor).

HOWARD FRANKLIN HORTON (1958)
Associate Professor of Fisheries.
B.S., California Polytechnic, 1953; M.S., Oregon State, 1955, Ph.D., 1963.

HELEN SCRUGGS HORVATH (1965)
Assistant Catalog Librarian (Instructor).
B.A., Washington University, 1955; M.A., 1957, M.S., 1963.

VIRGINIA THELMA HOUTCHENS (1958)
Lane County Extension Agent, Home Economics (Associate Professor).
B.S., Washington State, 1933, M.A., 1947.

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.
B.S., Oregon State, 1958.

SHIRLEY JEAN HOWARD (1959)
Producer, KOAC-AM-TV; Assistant Professor, Educational Media, Division of Continuing Education.
B.S., Oregon State, 1951; M.A., Michigan State, 1964.

HERBERT BADOLLET HOWELL (1921)
Professor Emeritus, John Jacob Astor Experiment Station.
B.S., Oregon State, 1916.

LYLE TURNER HUBBARD, JR. (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)
Associate 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 Biology, General Science, Chairman of Department.
B.S., Iowa, 1949; M.S., Washington, 1950; Ph.D., Oregon State, 1956.

WILLARD CHARLES HUMPHREYS, JR. (1965)
Assistant Professor of the History and Philosophy of Science.
A.B., Alleghany College, 1961; M.A., Indiana, 1963; M.A., Yale, 1965.

DONALD R. HUNT (1955)
Associate Librarian (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.

BURTON SEYMOUR HUTTON (1935-43, 1948)
State 4-H Club Leader (Professor).
B.S., Oregon State, 1927.

IDA INGALLS (1952)
Professor Emeritus of Clothing, Textiles, and Related Arts.
B.A., Iowa, 1921; M.A., Columbia, 1924.

JOHN JERRY INSKEEP (1926-61)
County Extension Agent (Professor) Emeritus Clackamas County.
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.

MAUD C. IRVINE (1934)
Crook County Extension Agent (Professor) Emeritus, Home Economics.
B.S., Oregon State, 1933.

JANE CATHERINE IRVING (1955)
Marion County Extension Agent, 4-H Club (Assistant Professor).
B.S., Oregon State, 1927.

THELMA JEAN ISAACS (1965)
Assistant Professor of Geology.
B.A., New York University, 1948, M.S., 1952; Ph.D., Chicago, 1962.

IRVIN ISENBERG (1965)
Professor of Biophysics, General Science, Science Research Institute.
A.B., Temple, 1944; Ph.D., Pennsylvania, 1950.

JOHN HOWARD ISENHART (1965)
County Extension Agent-at-Large (Instructor).
B.S., Oregon State, 1964.

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.
On sabbatical leave 1965-66.

ALEX JULIUS JAENICKE (1956)
Associate Professor Emeritus of Forest Management.
B.S., Pennsylvania State, 1912.

WESLEY P. JAMES (1965)
Instructor in Civil Engineering.
B.S., Montana State, 1957; M.S., Purdue, 1961.

DEMETRIOS GEORGE JAMESON (1950)
Professor of Art.
B.F.A., Washington University, 1949; M.F.A., Illinois, 1950.

KATE WETZEL JAMESON (1923-1941)
Dean of Women Emeritus.
A.B., Ohio Wesleyan, 1903, A.M., 1910; A.M., Wisconsin, 1914, Ph.D., 1916.

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.

DEAN PAGET JEFFRESS (1963)
Assistant Professor of English.
B.A., California, 1939; M.A., San Francisco State College, 1962.

HUGH FRANK JEFFREY, JR. (1950)
Business Manager Business Office (Associate Professor).
B.S., Oregon State, 1947.

WALTER JOHN JENDRZEJEWSKI (1938)
Klamath County Extension Agent (Associate Professor).
B.S., Oregon State, 1938.

GEORGE HERRICK JENKINS (1927)
County Agent (Professor) Emeritus, Coos County.
B.S., Oregon State, 1926.

HAROLD DAVID JENKINS (1944)
Professor of English.
B.A., Kansas, 1929, M.A., 1931; Ph.D., Yale, 1943.

WILLIAM CHARLES JENNE (1965)
Assistant Professor of Sociology.
B.S., Illinois State University, 1953; A.M., Illinois, 1958, Ph.D., 1964.

CLYDE MARCUS JENSEN (1957)
Assistant Registrar, Assistant Professor.
B.S., United States Naval Academy, 1925.

HAROLD JAMES JENSEN (1950)
Professor of Nematology (Botany and Plant Pathology).
B.S., California, 1947, Ph.D., 1950.

JAMES H. JENSEN (1961)
President Oregon State University; Professor of Botany.
B.S., Nebraska, 1928, M.A., 1930; Ph.D., Wisconsin, 1935.

JOHN GRANVILLE JENSEN (1946)
Professor of Natural Resources, 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; M.S., Illinois, 1963.

LOUISA AMES JENSEN (1938)
Associate Professor of Seed Technology.
B.S., Colorado State University, 1933.
On leave 1964-65.

DUANE PAUL JOHNSON (1959)
Multnomah County Extension Agent, 4-H Club (Assistant Professor).
B.S., Iowa State, 1959.

ELIZABETH COX JOHNSON (1959-60, 1965)
Assistant Professor of Foods and Nutrition.
B.S., Arizona, 1940, M.S., 1942; Ph.D., Oregon State, 1949.

GLORIA HELEN JOHNSON (1965)
Acting State Extension Agent, 4-H.
B.S., Oregon State, 1958.

GORDON VERLE JOHNSON (1963)
Research Associate (Assistant Professor) Plant Pathology.
B.S., California, 1955, M.S., 1959, Ph.D., 1964.

JAMES WENDELL JOHNSON (1961)
Associate Professor of Forest Products, Forest Research Laboratory.
B.S., Idaho, 1949; M.S., Oregon State, 1950.

JO ANNE JOHNSON (1965)
Assistant Dean of Women, Associate Professor.
B.A., Denison University, 1953; M.A., Indiana, 1956; Ph.D., Michigan State, 1965.

LaVON C. JOHNSON (1965)
Assistant Professor of Physical Education.
B.A., Brigham Young, 1957; M.A., Utah, 1959.

LINWOOD EUGENE JOHNSON (1959)
Associate Professor of Mechanical Engineering.
B.S., Oregon State, 1954, M.S., 1955.

MALCOLM JULIUS JOHNSON (1948)
Associate Professor of Agronomy, Superintendent, Central Oregon Experiment Station.
B.S., Oregon State, 1941, M.S., 1954; Ph.D., Purdue, 1961.

RICHARD ERIC JOHNSON (1964-65, Winter Term)
Assistant Professor of Pharmacy Administration.
B.S., Ohio Northern, 1952; M.S., Pittsburgh, 1961, Ph.D., 1964.

VICTOR WALDEMAR JOHNSON (1928)
Umatilla County Extension Agent (Professor).
B.S., Oregon State, 1928.

ALBERTA BUIS JOHNSTON (1963).
Extension Home Management Specialist. (Associate Professor).
B.S., Nebraska, 1943; M.S., Kansas State, 1957.

LaREA DENNIS JOHNSTON (1959)
Instructor in Botany, Assistant Curator of Herbarium.
B.A., Willamette, 1957; M.A., Oregon State, 1959.

JON FRANKLIN JONASSON (1961)
Assistant Dean of Men (Instructor).
B.S., Oregon State, 1959; Ed.M., 1961.

HILDA MEIUS JONES (1947)
Assistant Professor of Secretarial Science.
B.S.S., Oregon State, 1939; M.A., New York University, 1940.

IDWAL RALPH JONES (1925)
Professor Emeritus 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)
Assistant Professor of 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.

ERIK JORGENSEN (1964)
Visiting Assistant Professor of Mathematics.
Cand. Mag et Mag. Scient., Aarhus, 1961.

DONALD M. JORVE (1961)
Documents Librarian (Senior 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)
Head Reference Librarian (Associate Prosor), Library.
B.A., Willamette, 1932; B.S. (Lib. Sc.), Illinois, 1935.

ANAITA SHELKOVNIKOVA JURGENSON (1946)
Professor of Modern Languages.
A.B., French College, Alexandre Institute, St. Petersburg, 1915.

PHILIP BLAINE KALAR, SR. (1951)
Producer-Announcer, KOAC-AM-TV; Associate Professor, Educational Media, Division of Continuing Education.
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.S., 1934.

JOSEPH RALPH KANTOR (1965)
Surgical Consultant (Professor), Student Health Service.
B.Sc. in Med., M.D., Nebraska, 1958.

EDWARD LYNN KAPLAN (1961)
Professor of Mathematics.
B.S., Carnegie Institute of Tech., 1941; M.A., Princeton, 1950, Ph.D., 1951.

MALCOLM H. KARR (1964)
Executive Secretary Water Resources Research Institute; Research Associate (Assistant Professor).
B.S., Oregon State, 1953.

KATHERINE JOHNSON KARIKKA (Fall, 1965)
Instructor in Home Management.
M.S., 1940, Cornell.

JOHN KAUFMES (1952)
Research Associate (Assistant Professor) Animal Science.
B.S., University of Roumania; M.Agr., Hohenheim College of Agriculture, 1922; Ph.D., Innsbruck, 1946.

ROY SERVAIS KEENE (1947)
Professor Emeritus of Athletics. Director of Intercollegiate Athletics 1947-1964.
B.S., Oregon State, 1921.

TIMOTHY G. KELLEY (1963)
Assistant Professor of Physics.
B.S. in Physics, Washington, 1955.

JOHN WILLIAM KELTNER (1963)
Professor of Speech and Chairman of Department.
B.Ed., Illinois State Normal, 1940; M.A., Northwestern, 1943, Ph.D., 1947.

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.

PHILIP CADDELL KENNEDY (1965)
Assistant Professor of Art.
A.A., Pasadena City College, 1954; B.A., University of Redlands, 1957, M.A., 1959.

WALTER HERBERT KENNICK (1959)
Assistant Professor of Animal Science; Varsity Golf Coach.
B.S., Clemson College, 1948; M.S., Oregon State, 1958, Ph.D., 1959.

CLYDE KERNEK (1955)
Surgical Consultant, Student Health Service (Professor).
B.S., Oklahoma, 1935, M.D., 1937.

HAROLD EDWARD KERR (1960)
Crook County Extension Agent (Assistant Professor).
B.S., Oregon State, 1957.

LAKLO LILARAM KHATRI (1965)
Research Associate (Instructor) in Food Science and Technology.
B.S. (Hons.), Bombay, 1957, B.S. (Tech. Foods), 1959; M.S., Oregon State, 1963.

JOHN LORD KICE (1960)
Professor of Chemistry.
A.B., Harvard, 1950, M.A., 1953, Ph.D., 1954.

JOHN A. KIESOW (1957)
Jackson County Extension Agent (Assistant Professor).
B.S., Oregon State, 1954; M.Ed., Maryland, 1964.

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.

TSOO 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.

OTHO VERNE KINSLEY (1964)
Associate Professor of Aerospace Studies.
B.S. Physical Sci., Arizona State College, 1954.

DALE EARL KIRK (1942)
Professor of Agricultural Engineering.
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.
On sabbatical leave 1965-66.

WILLIAM JOHN KIRKHAM (1929)
Professor of Mathematics.
A.B., Indiana, 1927, A.M., 1928, Ph.D., 1935.

ERNEST JOHN KIRSCH (1946)
Union County Extension Agent (Associate Professor).
B.S., Oregon State, 1940; M.S., Purdue, 1942.

JUTA KOVAMEES KITCHING (1965)
Instructor in Modern Languages.
B.A., British Columbia, 1960.

LAURENCE P. A. KITCHING (1963)
Instructor in Modern Languages.
B.A., Brit. Col., 1961.

CHRIS KELVIN KJELDSEN (1965)
Instructor in Botany.
B.A., University of the Pacific, 1960, M.S., 1962.

GLENN ARTHUR KLEIN (1952)
State Extension Agent, 4-H (Assistant Professor).
B.S., Oregon State, 1951; M.A., University of Maryland, 1962.

LEONARD MARTIN KLEIN (1939)
Associate Professor of Agricultural Engineering; Agricultural Engineer; U. S. Department of Agriculture.
B.S., Oregon State, 1938.

KURT KLEMM (1965)
Research Associate (Assistant Professor), Horticulture.
Diplom Ingenieur, Hochschule Fur Bodenkultur, Vienna, 1962, Ph.D., 1963.

RAY HENRY KLIEWER (1958)
Assistant Professor of Animal Science.
B.S., California State Polytech, 1957; M.S., Oregon State, 1960.

PETER C. KLINGEMAN (1966)
Assistant Professor of Civil Engineering.
B.S., Northwestern, 1957, M.S., 1959; Ph.D., California (Berkeley), 1965.

J. GILBERT KNAPP (1960)
Assistant Professor of Music.
B.S., Bradley University, 1952; M.M., Lewis and Clark College, 1961.
On sabbatical leave 1966-67.

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.

EDWARD THEODORE KNECHT (1965)
Assistant Professor, Assistant Football Coach, Intercollegiate Athletics.
B. of E., Toledo, 1950; M.S., Michigan, 1958.

ELLIS GILBERT KNOX (1954)
Professor of Soils.
B.S., Illinois, 1949, M.S., 1950; Ph.D., Cornell, 1954.

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.

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)
Senior 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)
Professor of Hygiene and Health Education.
B.S., Oregon State, 1949; M.S., Michigan, 1950; Ed.D., Oregon State, 1954; M.P.H., California, 1959.

KAREL SUE KOSTY (1965)
Sherman County Extension Agent (Instructor).
B.S., Montana State, 1965.

CHARLES JAMES KOZLIK (1961)
Assistant Professor of Forest Products, Forest Research Laboratory.
B.A., Doane College, 1952; M.F., Duke, 1957.

WALTER CARL KRAFT (1950)
Professor of Modern Languages; Chairman of Department.
B.A., Oregon, 1938, M.A., 1941; Ph.D., California (Berkeley), 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.

PAUL THEODORE MARTIN KRATZKE (1965)
Instructor in Mathematics.
B.S., Oregon, 1960.

CHARLES ERNST KREMER (1958)
Professor, Director of Student Health Service.
M.D., Harvard Medical School, 1929.

WARREN ERVIND KRONSTAD (1959)
Assistant Professor of Agronomy.
B.S., Washington State, 1957, M.S., 1959; Ph.D., Oregon State, 1963.

BRUCE HERBERT KRUEGER (1965)
Instructor in Aerospace Studies.

HUGO MARTIN KRUEGER (1948)
Professor of Physiology and Pharmacology, Fisheries and Wildlife and Zoology.
A.B., Denver, 1924, M.A., 1926; Ph.D., Michigan, 1930.

JAMES HARRY KRUEGER (1961)
Assistant Professor of Chemistry.
B.S., Wisconsin, 1958; Ph.D., California, 1961.

KENNETH WILLIAM KRUEGER (1962)
Plant Physiologist, Forestry Sciences Laboratory.
B.S., Idaho, 1957; M.S., Oregon State, 1960, Ph.D., 1963.

PAUL HENRY KRUMPERMAN (1966)
Associate Professor of Food Science and Technology.
B.S., Brigham Young, 1949; M.S., Utah State, 1950; Ph.D., California, 1964.

JAMES THEODORE KRYGIER (1954)
Associate Professor of Forest Management.
B.S., Utah State, 1952, M.S., 1955.

FEDOR I. KUDRJAVCEV (1961)
Assistant Professor of Forest Management, Forest Research Laboratory. Retired.
B.S., Seminarium Charkov, Russia, 1918; M.S., University of Prague, 1928.

LEE WALLACE KUHN (1946)
Associate Professor of Wildlife Ecology.
B.S., Iowa State, 1940; M.S., Oregon State, 1942.

NORMAN FREDERICK KUJALA (1960)
Instructor in Oceanography.
B.S., Oregon State, 1959.

JOHN CLIFFORD KULA (1964)
Instructor in Pharmacology; Pharmacist, Student Health Center.
B.S., Nebraska, 1948; B.S., Oregon State, 1960.

LaVERNE DUANE KULM (1964)
Assistant Professor of Oceanography.
B.A., Monmouth College, 1959; Ph.D., Oregon State, 1965.

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; Ph.D., Texas A & M, 1965.

ADELAIDE VALETA LAKE (1939)
Associate Professor Emeritus of Journalism.
B.A., Oregon, 1920; M.A., Oregon State, 1942.

LUKE F. LAMB (1963)
Director (Professor) Educational Media, Division of Continuing Education.
B.A., Idaho State, 1954; M.Ed., Missouri, 1959; Ed.D., 1961.

WILLIAM ROBERT LAMPRECHT (1965)
Instructor in Business Administration.
B.A., Stanford, 1963; M.A., USC, 1965.

JOHN HERBERT LANDERS, JR. (1950)
Extension Animal Scientist (Associate Professor).
B.S., Missouri, 1942, M.S., 1950.

ANDREW S. LANDFORCE (1946)
Extension Wildlife Management Specialist (Associate Professor).
B.S., Oregon State, 1942.

WILLIAM MARTIN LANGAN (1935)
Head Adviser, School of Agriculture (Associate Professor).
B.S., Oregon State, 1945.

R. DONALD LANGMO (1948)
Associate 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)
Physical Education Director (Professor) Emeritus.
B.S., Michigan, 1923, M.S., 1925, Dr. P. H., 1928; Ed.D., Oregon, 1938; LL.D., Eastern Michigan, 1961.

JULES ALPHONSE LARRIVEE (1965)
Associate Professor of Mathematics.
S.B., MIT, 1930; M.A., George Washington, 1935; Ph.D., Catholic University, 1942.

LLOYD QUENDERBILT LARSE (1940)
Professor of Business Education and Secretarial Science.
B.S., Oklahoma State, 1928; Ed.M., Oklahoma, 1935; D.Ed., Oregon, 1954.

ALLAN DELANO LARSON (1963)
Assistant Professor of Business Education and Secretarial Science.
B.S., Mayville State College, 1955; M.S., North Dakota, 1963.

INGEMAR WALLACE LARSON (1963)
Research Associate (Assistant Professor), Zoology.
B.A., Concordia College, 1951; M.S., Kansas State, 1957; Ph.D., 1964.

ROBERT ELOF LARSON (1965)
Assistant Professor of Pharmacology.
B.S., Washington State, 1957, M.S., 1962; Ph.D., Iowa State, 1964.

ANNE LASWELL (1965)
Assistant Professor of Education.
B.A., Willamette University, 1959; M.Ed., Oregon, 1963; Ph.D., Wisconsin, 1965.

JOHN DANIEL LATTIN (1955)
Associate Professor of Entomology; Director, Science Honors Program; Curator of Insect Collection.
B.S., Iowa State, 1950; M.A., Kansas, 1951; Ph.D., California, 1964.
On sabbatical leave 1965-66.

HAROLD IVAN LAURSEN (1963)
Associate Professor of Civil Engineering.
B.S., Oregon State, 1958, M.S., 1960; Ph.D., California, 1964.

DENIS PETER LAVENDER (1961)
Associate Professor of Forest Physiology. Forest Research Laboratory.
B.S., Washington, 1949; M.S., Oregon State, 1958, Ph.D., 1962.

DUNCAN KENNETH LAW (1944)
Assistant Professor of Food Science and Technology; Seafoods Laboratory, Astoria.
B.S., Oregon State, 1944.

FRANCIS JOSEPH LAWRENCE (1965)
Horticulturist United States Department of Agriculture, Assistant Professor of Horticulture.
B.S., Maryland, 1951, M.S., 1958, Ph.D., 1965.

MARGARET LUCILLE LAWRENCE (1945)
Assistant Professor of English.
M.A., Florida State, 1944.

CHARLES MORLEY LEACH (1950)
Associate Professor of Plant Pathology.
B.S., Queens University (Belfast, Ireland), 1949, B.Agri., 1950; Ph.D., Oregon State, 1956.

GENE MAURICE LEAR (1939)
Associate Dean, School of Agriculture; Director, Cooperative Extension Service (Professor).
B.S., Oregon State, 1938; M.P.A., Harvard, 1951.

N. MARIE LEDBETTER (1946)
Associate Professor of Clothing, Textiles, and Related Arts.
B.A., Willamette, 1934; M.S., Oregon State, 1950.

DONALD JACK LEE (1965)
Research Associate (Assistant Professor) in Food Science and Technology.
B.S., Washington State, 1958, M.S., 1960; Ph.D., Illinois, 1965.

JONG SUN LEE (1963)
Research Associate (Assistant Professor) in Food Science and Technology.
A.B., California (Berkeley), 1958; M.S., Oregon State, 1962, Ph.D., 1963.

SYLVIA LEE (1952)
Curry County Extension Agent, Home Economics (Assistant Professor).
B.S., Washington State, 1927.

WILLIAM ORVID LEE (1956)
Assistant Professor of Agronomy; Research Agronomist, U. S. Department of Agriculture.
B.S., Utah State, 1950, M.S., 1954; Ph.D., Oregon State, 1965.

ALBERT LEWIS LEELAND (1954)
Professor of Elementary Education.
A.B., Colorado State College, 1947, M.A., 1949; Ed.D., Columbia, 1952.

JOHN ALVAN LEFFEL (1962)
Washington County Extension Agent (Assistant Professor).
B.S., Ag.Ed., Oregon State, 1955.

WILLIAM FREDRICK LEHMANN (1961)
Assistant Professor of 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.

MORRIS LEE LeMAY (1964)
Assistant Professor of Education; Counselor Counseling Center.
B.S., McMurry College, 1956; M.A., Colorado, 1961.

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.

MARY LOUISE LeSUEUR (1965)
Klamath County Extension Agent, Home Economics (Instructor).
B.S., Montana State, 1942.

DON DAVID LEV (1961)
Instructor in English.
B.A., San Jose State, 1949; M.A., Oregon, 1963.
On leave 1965-66.

J. DANIEL Le VAN (1965)
Assistant Professor of Modern Languages.
B.A., Mexico City College, 1956; M.A., Wisconsin, 1959.

GLORIA ALEDORT LEVINE (1960)
Assistant Professor of Modern Languages.
B.A., Queen's College, 1945; M.A., New Mexico, 1946.

SHEPARD LEVINE (1954)
Associate Professor of Art.
B.A., New Mexico, 1950, M.A., 1951.

EMANUEL RAYMOND LEWIS (1962)
Assistant Professor of Psychology.
B.A., California, 1951, M.A., 1953; Ph.D., Oregon, 1962.

JOHN DAVID LEWIS (1964)
Assistant Professor of Speech.
B.S., Northwestern, 1951; M.S., Oregon, 1960.

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 Wildlife Ecology; Game Biologist, Research Division, Oregon State Game Commission.
B.S., Oregon State, 1941.

WILLARD DEAN LIGHTY (1965)
Multnomah County Extension Agent (Instructor).
B.S., Illinois, 1957; M.S., Colorado State University, 1965.

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.

EARL WILLIAM LINDERMAN (Fall 1965)
Associate Professor of Art and Education.
B.S., New York State, 1953; M.Ed., Pennsylvania State, 1955, D.Ed., 1960.

ROBERT CLARENCE LINDSAY (1964)
Assistant Professor of Food Science and Technology.
B.S., Colorado State University, 1958, M.S., 1960; Ph.D., Oregon State (1965).

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.

GRACE CHENG-TSENG LO (1962)
Reserve Book Librarian (Instructor).
B.A., National Tai Wan University, 1959; M.S., Kansas State Teachers College, 1962.

RALPH FREDERIC LOCKE (1963)
Captain USN Commanding Officer and Professor of Naval Science.
B.S., U.S. Naval Academy, 1939.

ALBERT VICTOR LOGAN (1946)
Professor of Chemistry.
B.A., Willamette, 1924; M.S., Massachusetts Institute of Technology, 1928, Ph.D., 1938.

PORTER BRONSON LOMBARD (1963)
Associate Professor of Horticulture, Superintendent, Southern Oregon Experiment Station.
B.A., Pomona, 1952; M.S., Washington State, 1955; Ph.D., Michigan State, 1958.

DAVID ROBERT LONG (1947)
Associate Professor of Agricultural Engineering.
B.S., Oregon State, 1947, M.S., 1951, B.S. (Agricultural Engineering), 1959.

JAY BASS LONG (1940)
Professor of Wildlife Ecology.
B.S., Oregon State, 1939, M.S., 1948.

DANIEL HENRY LONGWELL (1963)
Development Engineering, National Council for Stream Improvement, Instructor.
B.S. (Chemical Engineering), L.S.U., 1963.

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.
On leave until September 15, 1966.

JAMES CHESTER LOONEY (1957)
Assistant Professor of Electrical Engineering.
B.S., Oregon State, 1954, M.S., 1960, E.E., 1963.

ROLF F. LOTZ (1965)
Instructor in Biology, General Science.
B.A., San Diego State, 1958; M.A., 1960.

JAMES MELVIN LOVE (1965)
Clackamas County Extension Agent (Instructor).
B.S., Oregon State, 1965.

WILLIAM PRESCOTT LOWRY (1961)
Assistant Professor of Biometeorology.
A.B., University of Cincinnati, 1950; M.S., Wisconsin, 1955; Ph.D., Oregon State, 1962.

KUO CHIN LU (1963)
Assistant Professor of Soil Microbiology; Pathologist, U. S. Forest Service Laboratory.
Ph.D., Oregon State, 1953.

SHIH-DZUNG C. LU (1961)
Research Associate, Assistant Professor, Agricultural Chemistry.
M.S., Purdue, 1948, Ph.D., 1951.

MARTIN JAMES LUDWIG (1949)
Assistant Professor of English.
B.A., Northeastern (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.

CAROLINE G. LYBECK (1962)
Education and Fine Arts Librarian. (Assistant Professor).
B.A., Concordia College, 1932; B.S.L.S., University of Denver, 1941; M.A.L.S., Michigan, 1957.

HARRIET M. LYON (1966)
Washington County Extension Agent (Assistant Professor).
B.S., Iowa State, 1955, M.S., 1957.

DONALD LAURIE MacDONALD (1962)
Professor of Chemistry, Science Research Institute.
B.A., Toronto, 1944, M.A., 1946, Ph.D., 1948.

JOHN HOWARD MacDONALD (1951)
Producer-Announcer, KOAC-AM-TV; Senior Instructor, Educational Media, Division of Continuing Education.
B.A., Oregon, 1948.

INGEBORG MacHAFFIE (1963)
Instructor in Education.
B.S., Nebraska, 1931; M.S., Columbia (T.C.), 1941.

REGINALD ANSLOW MacHAFFIE (1961)
Assistant Physician (Professor) Student Health Service; Associate Professor Science Research Institute.
B.S., City College of New York, 1933; M.A., Colorado, 1935; M.D., University of Colorado Medical School, 1948.

HARRY JOHN MACK (1955)
Associate Professor of Horticulture.
B.S., Texas A & M, 1950, M.S., 1952; Ph.D., Oregon State, 1955.

MABEL CLAIR MACK (1928)
Assistant Director Emeritus, Federal Cooperative Extension Service (Professor).
B.S., Oregon State, 1928, M.S., 1940.

ANDREA C. MACKEY (1938)
Professor of Foods and Nutrition.
B.S., M.Sc., Nebraska, 1937; Ph.D., Iowa State, 1945.

ROBERT SCOTT MacLAUCHLAN (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)
Associate Professor of Psychology.
B.A., 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.

VICTOR ARVIEL MADSEN (1963)
Assistant Professor of Physics.
B.S., Washington, 1953, Ph.D., 1961.

PHILIP COOPER MAGNUSSON (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 (1962)
Assistant Professor of Business Administration.
B.S., Seton Hall, 1931; LL.B., Rutgers, 1935.

ROBERT VAUGHN MAIN (1963)
Instructor in Mathematics.
B.S., Oregon State, 1953, M.S., 1960.

BOHDAN MAKSYMIUK (1965)
Research Entomologist Forestry Sciences Laboratory and Associate Professor of Entomology.
B.S.F., Michigan, 1953, M.F., 1955; Ph.D., Maryland, 1965.

VERNON DUANE MALAN (1965)
Associate Professor, Sociology and Anthropology.
B.A., Montana State, 1947, M.A., 1948; Ph.D., Oregon, 1955.

JESSALEE AHRENS MALLALIEU (1948)
Extension Recreation Specialist (Associate Professor) Emeritus.
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.

MARY ANN MALOOF (1965)
Instructor in Mathematics.
B.A., Oregon, 1957.

EVERETT E. MANN, JR. (1962)
Captain, Assistant Professor of Military Science.
B.A. (Psychology), UCLA, 1953.

LESLIE JACK MARKS (1946)
Wheeler County Extension Agent (Associate Professor).
B.S., Oregon State, 1946.

STEPHEN CHESTER MARKS (1956)
Extension Agricultural Economist (Associate Professor).
B.S., Wisconsin State (River Falls), 1948; 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.
On sabbatical leave, winter term, 1965-66.

ROBERT KENDALL MARSH (1956)
Clatsop County Extension Agent, 4-H Club (Assistant Professor).
B.S., Massachusetts, 1941.

HAROLD BEEBE MARSTON (1965)
Instructor in Education.
B.A., Carleton College, 1935; Ed.M., Oregon State, 1965.

DONALD JOSEPH MARTEL (1947)
Professor of Landscape Architecture; Chairman of Department.
B.S., Oregon, 1942.

MAURO EMILIO MARTIGNONI (1965)
Principal Microbiologist Forest Sciences Laboratory and Professor of Entomology.
Dipl. Ing., Swiss Federal Institute of Technology, 1950, Dr. rer. nat., 1956.

CHARLES HERBERT MARTIN (1946)
Professor of Entomology.
B.A., M.A., Kansas, 1927; Ph.D., Cornell, 1939.

GEORGE YOULLE 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.

MATTHEW ANGELO MARTINELLI (1964)
Instructor in English.
B.A., C.W. Post College, 1962, M.A., 1964.

NORMAN HARRY MARTINSON (1958)
Assistant Professor of Physical Education.
B.S., Oregon State, 1948, M.S., 1949.
On sabbatical leave, 1965-66.

ELLIOT NELSON MARVELL (1948)
Professor of Chemistry.
B.S., Brown, 1943; Ph.D., Illinois, 1948.
On sabbatical leave 1965-66.

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 and Associate Professor of Journalism.
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.

ANNE JONES MATHEWS (1965)
Assistant Reference Librarian (Instructor).
A.B., Wheaton College, 1949; M.A., Denver, 1965.

WALTER EDWARD MATSON (1965)
Extension Rural Civil Defense Agricultural Engineer (Professor).
B.S., Washington State, 1947, M.S., 1957; B.S. Electrical Engineering, Washington State, 1957.

KAREN KEIKO MATSUO (1964 Fall term only)
Instructor Institution Management.
B.S., Iowa State, 1962.

DONALD EUGENE MATTSON (1965)
Assistant Professor of Veterinary Medicine.
B.S., California, Davis, 1957, D.V.M., 1959.

EDWARD MAX MATZDORFF (1965)
Instructor in Mathematics.
B.A., Oregon, 1961; M.S., Oregon State, 1964.

DARRELL CLIFFORD MAXWELL (1952-60, 1963)
Umatilla County Extension Agent (Assistant Professor).
B.S., Oregon State, 1952.

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.

JAMES JOSEPH McALISTER (1954)
Regional Extension Rural Civil Defense Coordinator, (Associate Professor).
B.S., Oregon State, 1942.

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)
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 (1959-60, two terms 1963, 1964)
Professor of Sociology.
A.S.T.P. Diploma, Oregon State, 1944; M.A., Chicago, 1949.

GAIL LEROY McCARTY (1963)
Morrow County Extension Agent (Instructor).
B.S., Oregon State (1963).

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.

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.
On leave 1965-66.

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.

THELTON WAYNE McCORCLE (1965)
Research Associate (Instructor), Veterinary Medicine.
B.S. Wildlife Mgt. and B.S. Animal Sc., Texas A&M, 1959, D.V.M., 1961.

PAUL WILLIAM McCORMICK (1965)
County Extension Agent-at-Large (Instructor).
B.S., Oregon State, 1965.

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.

JACK THOMAS McDERMID (1945)
Assistant Professor of Agronomy; Acting Superintendent, Sherman Experiment Station.
B.S., Oregon State, 1942.

MARGUERITA McDONALD (1962)
Assistant Reference 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.

FLOYD BRANT McFARLAND (1963)
Assistant Professor of Economics.
B.A., Texas, 1957, M.A., 1959, Ph.D., 1964.

DALE DONALD McFARLANE (Winter Term 1965)
Assistant Professor of Business Administration.
B.A., Washington, 1960, M.B.A., 1961; D.B.A., Indiana, 1966.

EDWARD GORHAM McGRATH (1965)
Visiting Associate Professor of Government (on leave: Associate Director of Public Affairs Program, The Maxwell Graduate School, Syracuse).
A.B. with Honors, California, 1939, M.A., 1948; D.S.S., Syracuse, 1961.

WILLIAM FREDERICK McGRATH (1954)
Television Program Manager, Oregon Educational Broadcasting; Associate Professor, Educational Media, Division of Continuing Education.
B.S., Minnesota, 1946; M.A., Washington, 1950.

WILLIAM SAXON McGUIRE (1956)
Professor of Agronomy.
B.S., Arkansas, 1947; M.S., University of New Zealand, 1951; Ph.D., Washington State, 1952.

DON EDWARD McILVENNA (1965)
Instructor in History.
A.B., Sacramento State College, 1952; M.A., California (Berkeley), 1956.

CHARLES DAVID McINTIRE (1964)
Assistant Professor of Botany.
B.B.A., Southern Methodist, 1954; B.S., Oregon State, 1958, M.S., 1960, Ph.D., 1964.

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.

LOUIS NORMAN McKOWN (1959)
Director of 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.

ROBERT SCOTT MacLAUCHLAN (1957)
Assistant Professor of Agronomy; Soil Conservation Service, Plant Materials Specialist. U.S. Department of Agriculture.
B.S., Maine, 1949.

JOHN WALTER McLOUGHLIN (1960)
Jackson County Extension Agent (Instructor).
B.S., Rutgers, 1957.

WILLIAM D. McMULLEN (1964)
Associate Professor of Mechanical Engineering.
B.S., Utah, 1955; M.S., Iowa State, 1961; M.S., Lehigh, 1962; Ph.D., Denver, 1964.

CHARLES McNEIL (1965)
Instructor in Physical Education.
B.A., San Jose State, 1959; M.Ed., Oregon State, 1965.

RAY ARTHUR McNEILAN (1958)
Multnomah County Extension Agent (Associate 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.

ROBERT ALLEN MECK (1966)
Assistant Radiation Health Officer, Instructor.
B.S., Oregon, 1964.

THOMAS RICHARD MEEHAN (1962)
Associate Professor of History.
A.B., Rutgers, 1949, M.A., 1951; Ph.D., Wisconsin, 1960.

ANNA RUTH MEEKS (1965)
Assistant Professor of Education.
A.B., Goucher College, 1926; Ed.M., Maryland, 1947; Ed.D., The George Washington University, 1958.

SALLY M. MEEUWSEN (1963)
Malheur County Extension Agent (Instructor).
B.S., Oregon State, 1963.

DONALD MANUELL 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.

WALTER M. MELLENTHIN (1950)
Professor of Horticulture, Superintendent, Mid-Columbia Experiment Station.
B.S., Oregon State, 1950, M.S., 1952.

LAURENCE DAVID MENDENHALL (1964)
Instructor in Physics; Research Associate, Atmospheric Science Branch, Science Research Institute.
B.S., Oregon State, 1960, M.S., 1961.

GLEN U. MEREDITH (1964)
Instructor in English.
B.S., Missouri State College, 1951; M.A., Kansas, 1955.

ROBERT EUGENE MEREDITH (1959)
Associate Professor of Chemical Engineering.
B.S., California, 1956, Ph.D., 1959.

FRED MERRYFIELD (1927)
Professor of Sanitary Engineering.
B.Sc., Oregon State, 1923; M.Sc., North Carolina, 1930.

THEODORE LAWRENCE MESANG (1949)
Professor of Music.
B.M., Wisconsin, 1945; M.Ed., Minnesota, 1949.

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.

STUART MILES METZGER (1962)
Associate Professor of Architecture and Superintendent of Planning and Construction, Physical Plant.
B.Arch., Washington, 1961.

CONSTANCE ANN MEYER (1961)
Clackamas County Extension Agent, 4-H Club (Instructor).
B.S. (Home Economics), Oregon State, 1961; M.Ed. (Adult Education), Maryland, 1965.

EDWIN DAVID MEYER (1925)
Associate Professor Emeritus of Industrial Arts.
B.S., Stout Institute, 1927; M.S., Oregon State, 1940.

CATHERINE MEZEI (1964)
Research Associate, Instructor, Science Research Institute.
Dipl. Pharmacy, Budapest, University of Medicine, Faculty of Pharmacy, 1954; M.Sc., British Columbia, 1961, Ph.D., 1964.

ROBERT RAY MICHAEL (1947)
Associate Professor of Electrical Engineering.
B.S., Oregon State, 1940, M.S., 1947.

OSCAR EDWIN MIKESELL (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.

MYRON ELLIS MILES (1965)
Josephine County Extension Agent (Instructor).
B.S., Oregon State, 1962.

RAYMOND EAGAN MILLEMANN (1963)
Associate Professor of Fisheries.
A.B., Dartmouth, 1948; M.A., California (Los Angeles), 1951, Ph.D., 1954.

DON ABRAHAM MILLER (1962)
Assistant Professor of Family Life.
B.Ed., Northwestern State University, 1946; M.S.W., Washington State, 1949.

DONALD JAMES MILLER (1961)
Assistant Professor of Forest Products, Forest Research Laboratory.
B.S., Connecticut, 1951; M.F., Yale, 1954.

DOROTHY SHERRILL MILLER (1954-1963, 1964)
Assistant Professor of Home Management.
B.S., Texas, 1943; M.S., Oregon State, 1965.

ELLWOOD DALE MILLER (1963)
Tillamook County Extension Agent (Instructor).
B.S., Oregon State, 1960.

JAMES CARLTON MILLER (1958)
Professor of Animal Science, Head of Department.
B.S., Missouri, 1928, M.S., 1929, Ph.D., 1937.

PAUL WILLIAM MILLER (1930)
Professor of Plant Pathology; Research Plant Pathologist, U. S. Department of Agriculture.
B.S., Kentucky, 1923, M.S., 1924; Ph.D., Wisconsin, 1929.

STANLEY FRANK MILLER (1964)
Agricultural Economist, USDA; Assistant Professor of Agricultural Economics.
B.S., Brigham Young, 1960; M.S., Utah State, 1962; Ph.D., Oregon State, 1965.

VERGIL V. MILLER (1962, 1965)
Associate Professor; Editor NORTHWEST BUSINESS MANAGEMENT.
B.S., Oregon State, 1955; M.B.A., Washington, 1959; D.B.A., Oregon, 1963.

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)
Associate 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)
Inter-Library Loan Librarian (Assistant Professor).
B.A., Western Reserve, 1934, M.S. in L.S., 1951.

VELMA ROBERTA MITCHELL (1958)
Lane County Extension Agent, Home Economics (Assistant Professor).
B.S., Oregon State, 1945.

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 MOLTMANN (1956)
Associate Professor of Music.
B.A., Buena Vista College, 1937; M.M., Colorado, 1946.

RUSSELL JOHN MOLYNEUX (1965)
Assistant Professor of Forest Products Chemistry, Forest Research Laboratory.
B.S., Nottingham, U. K., 1960; Ph.D., 1963.

CAL GRAHAM MONROE (1942)
State Extension Agent, 4-H, (Professor).
B.S., Oregon State, 1939; M.S., Cornell, 1952; A.G.S., Maryland, 1963.

MORRIS W. MONTGOMERY (1961)
Assistant Professor of Food Science and Technology.
B.S., North Dakota State, 1951, M.S., 1957; Ph.D., Washington State, 1961.

HELEN STERLING MOOR (1926-28, 1954)
Dean of Women (Professor Emeritus).
A.B., Smith, 1925; M.A., Stanford, 1935.

DAVID P. MOORE (1960)
Associate Professor of Soils.
B.S., North Carolina State, 1953, M.S., 1955; Ph.D., California, 1960.

DUANE GREY MOORE (1965)
Soil Scientist-Chemist (Associate Professor), United States Forest Service.
B.S., Wisconsin, 1953, M.S., 1955, Ph.D., 1960.

THOMAS CARROL MOORE (1963)
Assistant Professor of Botany.
B.A. (Biology), North Texas State; M.A. (Botany), Colorado, 1958; Ph.D. (Botany), 1961.

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.

MAX JOSEPH MORGAN (1964)
Instructor in Electrical Engineering.
B.S., Oregon State, 1959; M.S., Arizona, 1961.

RICHARD Y. MORITA (1962)
Professor of Marine Microbiology and Oceanography.
B.S., Nebraska, 1947; M.S., USC, 1949; Ph.D., California, Scripps Institution of Oceanography, 1954.

TOSHIKO N. MORITA (1965)
Assistant Professor, Research Associate, General Science, Radiation Center.
B.A., UCLA, 1948, M.A., 1950, Ph.D., 1952.

JAMES MADISON MORRIS (1928)
Professor of Education; Head, Information Services, Division of Continuing Education.
B.S. (E. Eng.), Oregon State, 1928, Ed.D., 1956.

ROBERT JAMES MORRIS, JR. (1965)
Assistant Professor of History of Science.
B.S., United States Military Academy, West Point, 1954; M.G.E. (Geological).

ROY OWEN MORRIS (1961)
Research Associate in Chemistry (Assistant Professor).
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)
Wallowa County Extension Agent, 4-H Club (Assistant Professor).
B.S., Oregon State, 1951.

ROY EDGAR MOSER, JR. (1958)
Extension Food Technologist, (Associate 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 (Assistant Professor).
B.S., Oregon State, 1961.

WAYNE DELBERT MOSHER (1948)
Douglas County Extension Agent (Associate 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, 1959, B.S. (Chemistry), 1960.

ROBERT VERNON MRAZEK (1960)
Associate Professor of Chemical Engineering.
B.S. (Ch.E.), Purdue, 1957; Ph.D. (Ch.E.), Rensselaer Polytechnic Institute, 1960.

KEITH W. MUCKLESTON (1963)
Assistant Professor of Geography, Assistant Professor of Natural Resources.
B.A., Washington, 1960; M.A., 1963.

DWIGHT CURTIS MUMFORD (1938)
Professor of Agricultural Economics.
B.S., Illinois, 1923; M.S., Cornell, 1925.

JAMES KENNETH MUNFORD (1939-46, 1948)
Director of Publications and Oregon State University Press; Professor of Education; Secretary of Administrative Council.
B.S., Oregon State, 1934; Ed.D., Stanford, 1948.

ALAN ALEXANDER MUNRO (1962)
Associate Professor of Art.
B.A., George Peabody College, 1952; M.F.A., Wichita, 1956.

THOMAS A. MURPHY (1963)
Assistant to the Dean of Students (Assistant Professor).
B.A., Michigan State, 1959, M.A., 1961.

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., 1935.

WILFRED 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., Michigan State, 1960.

RAYMOND PRESTON NAGEL (1964)
Instructor in English.
B.A., Coe College, 1961; M.A., Southern Illinois University, 1964.

THOMAS SCOTT NAGEL (1961)
Assistant Director of Publications; Instructor in Mathematics.
B.S. (Ed.), Idaho, 1958.

WILLIAM PAYNE NAGEL (1962)
Assistant Professor of Forest Entomology.
B.S., New York State College of Forestry, 1953, M.S., 1957; Ph.D., Cornell, 1962.

EARL EDWARD NELSON (1963)
Plant Pathologist, Assistant Professor, Forestry Sciences Laboratory.
B.S., Oregon State, 1957, Ph.D., 1962.

HERBERT BENJAMIN NELSON (1927)
Professor of English.
A.B., Colorado, 1926, M.A., 1927; Ph.D., Washington, 1944.
On sabbatical leave 1965-66.

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)
Assistant Professor of English.
B.A., Westmar College, 1951; M.A., Colorado, 1955.

STANLEY NEMEC (1963)
Instructor in Plant Pathology.
B.S., Auburn, 1960; M.S., Oklahoma State, 1963.

STEPHEN JOSEPH NESHYBA (1965)
Associate Professor of Oceanography.
B.S., Texas, 1949, M.S., 1954; Ph.D., Texas A&M, 1965.

ROBERT WARREN NEWBURGH (1953)
Professor of Chemistry; Assistant Director, Science Research Institute.
B.S., Iowa, 1949; M.S., Wisconsin, 1951, Ph.D., 1953.

BEN ALLEN NEWELL (1944)
Marion County Extension Agent (Professor).
B.S., Oregon State, 1941.

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)
Assistant Professor of Forest Management.
B.S., Vermont, 1954; B.S., Oregon State, 1959, M.S., 1960, Ph.D., 1964.

WILLIAM GERALD NIBLER (1940)
State Extension Agent (Professor).
B.S., Oregon State, 1938; M.Ed., Maryland, 1962.

ROBERT ALLAN NICHOLS (1965)
Assistant Professor of Education, Division of Continuing Education.
B.A., Wyoming, 1961; M.S., Oregon, 1962; Ed.D., Wyoming, 1966.

DAVID BOWMAN NICODEMUS (1950)
Professor of Physics, Acting Dean School of Science.
A.B., DePauw, 1937; Ph.D., Stanford, 1946.

LINDA GOULD NIERMAN (1965)
Lane County Extension Agent, Home Economics (Instructor).
B.S., Purdue, 1961.

ALFRED HIROTOSHI NISHIKAWA (1965)
Research Associate (Instructor), Microbiology and Science Research Institute.
A.B., California, 1960; Ph.D., Oregon State, 1965.

FAITH GRIGSBY NORRIS (1947)
Associate 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.

RAYMOND E. NOVOTNY (1952)
Harney County Extension Agent (Associate Professor).
B.S., Wyoming, 1946.

ARIE J. NYMAN (1965)
Assistant Professor, Counselor, Counseling Center.
B.A., Temple University, 1960, M.A., 1962; Ph.D., Washington State, 1965.

FRITZ OBERHETTINGER (1958)
Professor of Mathematics.
Staatsexamen, Breslau, 1936; Ph.D., Berlin, 1942; Ph.D., (habil), Mainz, 1945.
On leave 1965-66.

JOHN ALAN O'CONNOR (1949)
Associate Professor of Music.
B.S., Idaho. 1939, M.S., 1948.
On sabbatical leave 1965-66.

LOUIS MILTON OESTER (1955)
Extension Rural Defense Specialist (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)
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.

ALFRED WEAVER OLIVER (1919)
Associate Professor Emeritus of Animal Science.
B.S., Oregon State, 1918; M.S., Wisconsin, 1928.

ROGER DEAN OLLEMAN (1959)
Professor of Mechanical Engineering.
B.S. (Mech. Engr.), Washington, 1948; M.S. (Met.E.), Carnegie Tech, 1950; Ph.D., Pittsburgh, 1955.

MARVIN LYNN OLMSTEAD (1965)
Assistant Professor of Speech.
B.A., Black Hills Teachers College, 1955; M.A., Washington State, 1958.

GLORIA MAXINE OLSON (1965)
Yamhill County Extension Agent (Assistant Professor).
B.S., North Dakota State, 1957.

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 Emeritus of Food Science & Technology.
B.S., Oregon State, 1924; M.S., Massachusetts State, 1935.

PRESTON EUGENE ONSTAD (1956)
Assistant Professor of English.
B.A., University of Puget Sound, 1942, M.A., 1947.

HENDRIK JACOB OORTHUYS (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 Emeritus of Secretarial Science.
B.S., Oregon State, 1922, M.S., 1940.

JOSEPH JOHN O'ROURKE (1960)
Associate Professor of Business Administration.
B.A., University of Portland, 1952; M.B.A., University of Denver, 1953; D.B.A., Washington, 1964; C.P.A., State of Washington, 1959.

MIRIAM W. ORZECH (1965)
Instructor in History.
B.A., California (Berkeley), 1953.

ZE'EV B. ORZECH (1957)
Associate Professor of Economics.
B.S., California (Berkeley), 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-Technology Librarian (Associate Professor).
B.S. (Lib.Sc.), Washington, 1928; M.A., Oregon State, 1939.

JOHN PATRICK O'SHEA (1962)
Assistant Professor of Physical Education.
B.A., Michigan State, 1960, M.A., 1962.

CHARLES LAMAR OSTERBERG (1962)
Associate 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)
Assistant Professor of Mathematics.
B.A., California (at Los Angeles), 1936; M.A., Redlands, 1940.

WALTER SCOTT OVERTON (1965)
Professor of Statistics.
B.S., Virginia Polytechnic Institute, 1948, M.S., 1950; Ph.D., North Carolina State, 1964.

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.

BETTY J. OWEN (1963)
Associate Professor of Physical Education.
B.S., Illinois, 1947; M.S., 1950.

EBEN LOWELL OWENS (1958)
Development Engineer, NCSI (Instructor), Engineering Experiment Station.
B.S., Idaho, 1952.

DAVID OYLER (1962)
Assistant Reference Librarian (Senior Instructor).
B.A., U.C.L.A., 1961; M.S.L.S., U.S.C., 1962.

OLAF GUSTAV PAASCHE (1946)
Professor of Mechanical Engineering.
B.S., Illinois, 1943; M.S., Illinois Institute of Technology, 1955.

ROBERT EDWARD PACHA (1964)
Assistant Professor of Aquatic Microbiology and Civil Engineering.
B.S., Washington, 1955, M.S., 1958, Ph.D., 1961.

EARL LEROY PACKARD (1932)
Professor Emeritus of Geology.
A.B., Washington, 1911, M.A., 1912; Ph.D., California, 1915.

GLEN 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.

DAVID PHILIP PAINE (1962)
Assistant Professor of Forest Management.
B.S., Oregon State, 1953, M.S., 1958; Ph.D., Washington, 1965.

JOHN HOWE PAINTER (1948)
Professor of Horticulture; Horticulturist, U. S. Department of Agriculture.
B.S., Maryland, 1922; M.S., Oregon State, 1924.

JAMES ROWE PARK (1965)
Assistant Professor of Business Administration.
B.A., Walla Walla College, 1959; J. D., Chicago, 1962.

JOSEPH KENNETH PARK (1963)
Associate Professor of Agricultural Engineering; Agricultural Engineer USDA.
B.S. (Agr. Engr.), Missouri, 1937; M.S. (Agr. Engr.), Minnesota, 1940.

KILHO PARK (1961)
Associate Professor of Oceanography.
B.S., Pusan Fisheries College, 1953; M.S., Texas A&M, 1957, Ph.D., 1961.

JAMES ROLAND PARKER (1926)
Douglas County Extension Agent (Associate Professor) Emeritus.
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.

HAROLD NEVINS PARKINSON (1947)
Assistant Professor Emeritus of General Engineering.
B.S., Purdue, 1918.

FRANK LOVERN PARKS (1949)
Professor of Sociology; Head Counselor and Placement Officer 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 Microbial Physiology.
B.S., Illinois, 1952; A.M., Indiana, 1953; Ph.D., Washington, 1956.

JACH E. PARSONS (1965)
Clackamas County Extension Agent (Assistant Professor).
B.S., West Virginia, 1957; M.S., Maryland, 1962.

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.

PAUL EDWARD PASCHKE (1964)
Instructor in Business Administration.
B.S., Chicago, 1962, M.B.A., 1964.

DAVID EDWARD PASSON (1960)
Douglas County Extension Agent (Assistant Professor).
B.S., Oregon State, 1959.

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 Dean, School of Humanities & Social Sciences; Associate Professor of Economics.
B.S., Iowa State, 1951; M.A., Nebraska, 1956, Ph.D., 1961.
On leave 1965-66.

JUNE GRACE PATTULLO (1960)
Professor of Oceanography.
B.S., Chicago, 1948; M.S., Scripps Institution of Oceanography, 1950, Ph.D., 1957.

AUSTIN HORACE PATTY (1961)
Instructor in English.
B.A., St. Benedict's College, 1952; M.A., Idaho State, 1961.

WILLIAM HOWARD PAUL (1926)
Professor of Automotive Engineering.
B.S., Oregon State, 1924, M.S., 1935.

WILLIAM GORDON PEARCY (1960)
Associate 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.

CHARLES WESLEY PECKHAM (1965)
Assistant Director of Department of Printing (Assistant Professor).
B.S., California State Polytechnical College, 1958.

CHESTER ALLEN PEEK (1958)
Assistant Professor of Botany.
B.S., Wyoming, 1953, M.S., 1955; Ph.D., Oregon State, 1963.

JOAN McALMOND PELTO (1964)
Instructor in Institution Management.
B.S., Washington State, 1950, M.S., 1963.

ROGER LEONARD PEREIRA (1965)
Research Associate (Assistant Professor), Food Science and Technology.
B.S., Providence College, 1956; M.S., Rhode Island, 1962; Ph.D., Connecticut, 1965.

WILLIAM McGUIRE PERRY (1945)
Yamhill County Extension Agent, 4-H Club (Assistant Professor). (Retired.)
B.S., Oregon State, 1922.

JEAN McLEOD PETERS (1958)
Assistant Professor of Foods and Nutrition.
B.H.E., University of British Columbia, 1950; M.S., Oregon State, 1964.

RAY OLAF PETERSEN (1953)
Klamath County Extension Agent (Associate Professor).
B.S., Idaho, 1935; M.S., Oregon State, 1962.

JOHN PETERSON (1964)
Assistant Professor of Civil Engineering.
B.S., South Dakota State; M.S., Illinois, 1959; Ph.D., Wisconsin, 1964.

KERMIT JOSEPH PETERSON (1959)
Professor of Veterinary Medicine.
B.S., Minnesota, 1940; D.V.M., Colorado State, 1946.

ROGER GENE PETERSON (1955, 1965)
Professor of Statistics.
B.S., Iowa State, 1949, M.S., 1950; Ph.D., North Carolina State, 1954.

DAVID WALTON PHELPS (1965)
Assistant Professor of Hygiene.
B.S., Oregon College of Education, 1956; M.S., Oregon, 1959; M.P.H., California, 1962, Ed.D., 1962.

JOHN ADAMS PFANNER, JR. (1946)
Professor of Business Administration.
A.B., Dartmouth, 1927; M.A., Chicago, 1931, Ph.D., 1939.

KURT DAVID PHILIPP (1963)
Instructor in History.
B.A., California at Los Angeles, 1956; M.A., Colorado, 1958.

CHARLES JAMES PHILLIPS (1966)
Instructor in Statistics.
B.A., San Jose State, 1948; M.A., Stanford, 1949; M.A., San Jose State, 1963.

DONALD CHARLES PHILLIPS (1961)
Associate Professor of Civil Engineering.
B.S., Washington State, 1944; M.S., Louisiana State, 1958; Ph.D., Wisconsin, 1963.

JOHN JERALD PHILLIPS (1964)
Gunnery Sergeant, USMC, Instructor in Naval Science.

JOHN RICHARD PHILLIPS (1962)
Instructor in Mathematics.
B.S., Lewis & Clark, 1959.

ROBERT LEE PHILLIPS (1957)
Associate Professor of Speech; Director of Summer Term.
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.

JOAN HOWELL PIERSON (1965; 1966)
Producer KOAC-AM (Instructor).
B.S., Oregon State, 1947; M.A., George Washington, 1951.

K. STEPHEN PILCHER (1951)
Professor of Medical Microbiology.
B.S., Washington, 1933, Ph.D., 1939.

ROBERT TAYLOR PIPER (1964)
Assistant Professor of Architecture; Architect of Planning and Construction, Physical Plant.
B.S. in Arch., Oregon, 1941.

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 Management.
B.S., Women's College of University of North Carolina, 1940; M.S., Ohio State, 1949; Ph.D., Michigan State, 1964.

DAN WILLIAMS POLING (1937)
Dean of Men (Professor).
B.S., Oregon State, 1928, M.S., 1938; D.Ed., Oregon, 1956.

DOW P. POLING (1963)
Assistant Professor of Physical Education.
B.S., Oregon State, 1956, Ed.M., 1963.

HELEN VIRGINIA POLING (1956)
Senior Instructor in Physical Education for Women.
B.S., Oregon State, 1956.

PEGGY JO POLING (1965)
Instructor in Speech.
B.A., Oregon, 1956; M.A., Oklahoma, 1963.

ALBERT ROBERTS POOLE (1946)
Professor of Mathematics.
B.A., British Columbia, 1929, M.A., 1931; Ph.D., California Institute of Technology, 1935.

MARY B. POOLE (1965 Winter Term)
Instructor in Family Life.
B.A., Oberlin, 1931; M.A., Columbia, 1940.

MILOSH POPOVICH (1945, 1947)
Dean of Administration; Professor of Mechanical Engineering.
B.S., Oregon State, 1939, M.S., 1941.

FRANK ALBERT PORFILY (1965)
Crook County Extension Agent (Instructor).
B.S., Oregon State, 1965.

ERMINE 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)
Producer-Director, KOAC-TV; Assistant Professor, Educational Media, Division of Continuing Education.
B.A., Dakota Wesleyan, 1956; M.S., Syracuse, 1958.

WILLARD CHARLES POTTS (1959)
Assistant Professor of 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)
Associate 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.

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). (Retired)
B.S., Kansas State Teachers College, 1927.

FREDERICK EARL PRICE (1922)
Dean (Professor) Emeritus, School of Agriculture; Director Emeritus, Agricultural Experiment Station; Director Emeritus, Federal Cooperative Extension.
B.S., Oregon State, 1922.

JOHN ROBERT PRINCE (1959)
Instructor, General Science, Radiation Health Officer.
B.A., Northwest Nazarene College, 1958; M.S., Oregon State, 1964.

AUSTIN WYATT PRITCHARD (1953)
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; D.E., Stanford, 1965.

WILLIAM S. PROPERZIO (1965)
Instructor in X-Ray Science and Engineering, General Science.
B.S., Worcester Polytechnic Institute, 1962.

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 (Associate Professor) Emeritus.
B.S., Oregon State, 1933.

BENJAMIN PERCY PURVIS (1965)
Director of Audio Visual Department (Instructor).
B.S., Oregon State, 1960.

LOIS PYE (1960)
Instructor in Physical Education.
Diploma in Education (Physical Education), Whitelands College, London, 1949.

RICARDO MARCOS PYTKOWICZ (1963)
Assistant Professor of Oceanography.
B.S., Louisiana State, 1953; Ph.D., California, 1957.

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)
Associate 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)
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.

DONALD LEWIS RASMUSSEN (1946)
Marion County Extension Agent (Professor).
B.S., Washington State, 1937; M.S., Oregon State, 1942.

PAUL MEREDITH RAUEN (1959)
Yamhill County Extension Agent, 4-H Club (Assistant Professor).
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.

STANLEY IRVIN REBER (1964)
Chief Yoeman USN, Instructor in Naval Science.

ALICE LOIS REDMAN (1959)
State Extension Agent, 4-H (Associate Professor), Federal Cooperative Extension.
B.S., Missouri, 1953; M.S., Maryland, 1959.

RICHARD GEORGE REDMOND (1964)
Research Associate (Senior Instructor), Oceanography.
B.S., Kent State, 1940.

DALE IRVING REECE (1964)
Lieutenant, Assistant Professor of Naval Science.
B.S., Kansas State College, 1960.

DONALD JAMES REED (1962)
Associate Professor of Chemistry, Radiation Center.
B.S., College of Idaho, 1953; M.S., Oregon State, 1955, Ph.D., 1957.

CAROL NINETTE REEDER (1965)
Baker County Extension Agent (Instructor).
B.S., Oregon State, 1965.

CLINTON B. REEDER (1966)
Extension Marketing Management Specialist; Assistant Professor of Agricultural Economics.
B.S., Oregon State, 1961, M.S., 1963; Ph.D., Purdue, 1966.

RUTH LUCILLE REES (1955)
Associate Professor of Education.
B.S., Oregon, 1950, M.Ed., 1955; D.Ed., Oregon, 1965.

HAMIT DARWIN REESE (1947)
Associate Professor of Chemistry.
B.A., Brigham Young, 1940; Ph.D., Iowa State, 1947.

CHARLES CALHOUN REGER (1964)
Professor; Assistant Physician Student Health Service.
B.A., Colorado, 1939, M.D., 1942.

ROBERT RAY REICHART (1926-32, 1934)
Professor of Forestry Education.
B.S., Oregon State, 1917, M.S., 1937; D.Ed., Oregon, 1941.

WILLIAM CURTIS REID (1937)
Professor of Audiovisual Instruction; Head Audiovisual Instruction, Division of Continuing Education, Extension Specialist in Visual Instruction.
B.A., Willamette, 1929; M.S., New York, 1932; Ph.D., Oregon State, 1941.

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.
On leave, National Cancer Institute.

JACK LOUIS RETTIG (1961)
Associate Professor of Business Administration.
B.S., Evansville College, 1949; M.A., San Diego State College, 1956; Ph.D., UCLA, 1962.

JOHN RODERICK REUTER (1964)
Instructor in English.
A.B., DePauw, 1962, M.A., 1964.
On leave 1965-66.

ROGER RAYMOND REYNOLDS (1959)
Producer-Announcer, KOAC AM-TV; Senior Instructor, Educational Media, Division of Continuing Education.
B.S., Oregon State, 1960.

ODETTE CADART RICARD (1965)
Assistant Professor of French and Education.
B.A., University of Paris, 1943, LL.B., 1945; B.A., Dominican College, 1947; M.A., Sacramento State College, 1958.

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)
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.

EDWARD J. RILEY (1965)
Assistant Professor, Assistant Football Coach, Intercollegiate Athletics.
B.A., Idaho, 1952.

JOHN CLAYTON RINGLE (1966)
Associate Professor of Mechanical Engineering.
B.S., Case Institute of Technology, 1957, M.S., 1959; Ph.D., California, 1964.

PAUL OSBORN RITCHER (1952)
Professor of Entomology, Chairman of Department.
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.

ELLIS BROOKS RITTENHOUSE (1964)
Associate Professor of Oceanography; Marine Superintendent.
B.S., United States Naval Academy, 1934; M.B.A., Ohio State, 1952.

ALFRED NATHAN ROBERTS (1940)
Professor of Horticulture.
B.S., Oregon State, 1939, M.S., 1941; Ph.D., Michigan State, 1953.

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)
Director of Business Affairs (Professor).
B.S., Oregon State, 1941; M.S., New York University, 1942.

WILLIAM BARR ROBERTSON (1946)
Athletic Trainer (Assistant Professor), Intercollegiate Athletics.
B.S., Oregon State, 1948.

WILLIAM JAMES ROBERTSON (1965)
Associate Professor of Speech.
B.F.A., School of Drama, Art Institute of Chicago, 1949, M.F.A., 1951; Ph.D., Wisconsin, 1963.

DAN D. ROBINSON (1944)
Professor of Forest Management.
B.S., Oregon State, 1940; M. F., Syracuse, 1942.

PAUL T. ROBINSON (1963)
Assistant Professor of Geology.
B.S., University of Michigan, 1959; Ph.D., University of California, Berkeley, 1964.

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)
Associate 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.

CHARLES RAYMOND ROHDE (1952)
Associate Professor of Agronomy, Pendleton Experiment Station.
B.S., Montana State, 1947; Ph.D., Minnesota, 1953.

KERMIT JULIUS ROHDE (1956)
Professor of Psychology.
B.S., Iowa State, 1943; M.A., Nebraska, 1949; Ph.D., Northwestern, 1951.

FRED LOUIS ROSE, JR. (1964)
Instructor in Biology, General Science.
B.A., Willamette, 1957; M.S., Oregon State, 1964.

RAJA ROSENBLUTH (1965)
Research Associate (Instructor), Science Research Institute.
B.S., New York University, 1947; M.A., Columbia, 1949.

ROBERT GEORGE ROSENSTIEL (1946)
Associate Professor of Entomology.
B.S., Oregon State, 1937, M.S., 1939; Ph.D., California, 1950.

CHARLES ROBERT ROSS (1946)
Extension Forestry Specialist (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.

KENNETH EUGENE ROWE (1964)
Assistant Professor of Statistics.
B.S., Colorado State University, 1957; M.S., North Carolina State, 1960.

HAROLD ARMOND ROWLEY (1938)
Chief Accountant, Oregon State System of Higher Education (Professor).
B.S., Oregon State, 1925.

DORRIS MARY ROY (1952)
Jefferson County Extension Agent, Home Economics (Associate 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, M.S., 1963.

ROBERT DEAN RUDD (1957)
Professor of Geography.
B.S., Indiana State, 1947; M.S., Wisconsin, 1949; Ph.D., Northwestern, 1953.

JULIUS ALEXANDER RUDINSKY (1955)
Professor of Forest Entomology.
Diplom Engineer in Forestry, Slovak University in Bratislava, 1944; Absolutorium in Economics, Göttingen, 1949; Ph.D., Ohio State, 1953.

NORMA LEIGH RUDINSKY (1965)
Instructor in English.
A.B., Stanford, 1950, A.M., 1953.

CHARLES BUDDY RUMBURG (1958)
Associate Professor of Agronomy; Research Agronomist, U. S. Department of Agriculture, Science Research Institute.
B.S., Colorado State University, 1954; M.S., Rutgers, 1956, Ph.D., 1958.

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.

KEVIN THOMAS RYAN (1964)
Lieutenant, USN, Assistant Professor of Naval Science.
B.S., United States Naval Academy, 1960.

ROGER BAKER RYAN (1961)
Assistant Professor of Entomology; Entomologist, U. S. Forest Service.
B.S., New York State College of Forestry, 1953; M.S., Oregon State, 1959, Ph.D., 1961.

T. ANTOINETTE RYAN (1963)
Associate Professor of Education.
A.B., Sacramento State College, 1949, M.A., 1952; Ph.D., Stanford, 1963.

WILLIAM CHARLES RYAN (1964)
Instructor in Biology, General Science.
A.B., California State College, Long Beach, 1963.

DONALD J. RYDRYCH (1965)
Assistant Professor of Agronomy, Pendleton Experiment Station.
B.S., Idaho, 1953, M.S., 1958.

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.

CLIFFORD ELROY SAMUELS (1947)
Professor of Food Science and Technology.
B.S., California, 1941; M.S., Michigan State, 1954, Ph.D., 1960.

GARY RAY SAMUELS (1964)
Instructor in Physical Education.
B.S., Oregon State, 1963, M.S., 1964.

GARY H. SANDER (1955)
Extension Forestry Specialist (Assistant Professor).
B.S., Missouri, 1951.

ERNEST NELSON SANDGREN (1948)
Professor of Art.
B.A., Oregon, 1943, M.F.A., 1948.

WILLIAM EWALD SANDINE (1958)
Associate Professor of Dairy 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)
Associate Professor of Food Science and Technology.
B.S., Oregon State, 1945.

JOHN LOUIS SAUGEN (1964)
Assistant Professor of Electrical Engineering.
B.S.E.E., Washington, 1955, M.S.E.E., 1958, Ph.D., 1964.

ROY BLY SAUNDERS (1946)
Associate Professor of Mathematics.
A.B., Whitman, 1933; M.A., Minnesota, 1940, Ph.D., 1946.

WALTER LANE SAUNDERS (1964)
Instructor in Physical Science, General Science.
A.B., San Francisco State College, 1958; M.S., Oregon State, 1963.

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)
Professor of Physics.
A.B., California, 1948, M.A., 1951, Ph.D., 1953.

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.

FRED HERMAN SCHMIDT (1962)
Entomologist United States Forest Service; Assistant Professor of Forest Entomology.
B.S., Illinois, 1957, M.S., 1959.

LOTHAR SCHMIDT (1963)
Assistant Professor of German, Modern Languages.
Abschlussprüfung für Schauspieler, Braunschweig, 1948; Genossenschaft Deutscher Bunnen-Angehörigen, Hamburg, Regisseur 1952; Lehrer 1959.

PAULA LENCHNER SCHMIDT (1963)
Associate Professor of Music.
Diploma in Voice, Cincinnati College of Music, 1945; Diploma for Teaching: GDBA, Hamburg, 1958; Member Metropolitan Opera, New York, Stuttgart Opera, Bayreuth Festival.

GARY LEE SCHNEIDER (1964)
Wasco County Extension Agent (Instructor).
B.S., Oregon State, 1962.

GEORGE RUDOLPH SCHNEITER (1955)
Special County Extension Agent (Assistant Professor).
B.S., Idaho, 1932, M.S., 1933.

HARRY AUGUST SCHOTH (1914)
Professor Emeritus of Agronomy.
B.S., Oregon State, 1914, M.S., 1917.

ROGER EDWIN SCHOLL (1965)
Instructor in Civil Engineering.
B.S. C.E., North Dakota, 1960, M.S.C.E., 1963.

HELMUT GEORGE SCHREIMA (1959)
Associate Professor of Business Administration.
B.A., Willamette, 1953, LL.B., 1955.

BURKHARD HELMUT EBERHARD SCHRICKER (1965)
Research Associate (Assistant Professor), Entomology.
Ph.D., Universitat Frankfurt, 1965.

ELVER AUGUST SCHROEDER (1946)
Professor of English.
A.B., Elmhurst College, 1934; M.A., Illinois, 1937; Ph.D., Michigan, 1950.

HERBERT AUGUST SCHROEDER (1963)
Assistant Professor of Forest Products Chemistry, Forest Research Laboratory.
B.S., Idaho, 1952, M.S., 1954; Dr. Sc., Hamburg, 1960.

JANE FOSTER SCHROEDER (1952-59, 1960)
Deschutes County Extension Agent (Assistant Professor).
B.S. in Home Economics, Kansas State, 1949.

WALTER GREIFF SCHROEDER (1949)
Washington County Extension Agent (4-H) (Associate Professor).
B.S., Oregon State, 1949; M.S., Wisconsin, 1957.

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)
Associate Professor of Civil Engineering.
B.S. in Civil Eng., Worcester Polytechnic Institute, 1955, M.S., 1960.

MACK WALTER SCHWAB (1959)
Producer-Director, KOAC TV; Assistant Professor, Educational Media, Division of Continuing Education.
B.A., Harvard, 1931; M.A., Stanford, 1962.

HORST SCHWENGER (1965)
Research Associate (Assistant Professor) Botany and Plant Pathology.
Ph.D., Göttingen, 1961.

ERWIN A. SCHWINGHAMER (1965)
Associate Professor, Botany, Plant Pathology, and Microbiology.
B.S., Minnesota, 1949, Ph.D., 1954.

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.

RONALD WALTER SCOTT (1965)
Lane County Extension Agent (Assistant Professor).
B.S. Ag., Washington State, 1950, B.A. Ed., 1951.

THOMAS GEORGE SCOTT (1963)
Professor of Wildlife Ecology; Head of Department of Fisheries and Wildlife.
B.S., Iowa State, 1935; M.S., 1937; Ph.D., 1942.

HERMAN AUSTIN SCULLEN (1920)
Professor Emeritus of Entomology.
B.A., Oregon, 1910, M.A., 1927; Ph.D., Iowa State, 1934.

JOHN SEADERS (1961)
Assistant Professor of Civil Engineering.
B.S., Oregon State, 1959, M.S., 1963.

VELMA MAXWELL SEAT (1959)
Extension Food Marketing Specialist. (Assistant Professor).
B.S., Washington State, 1935.
On sabbatical leave 1965-66.

STUART BRUCE SEATON (1950)
Professor of Business Administration.
B.S., Central State (Oklahoma). 1933; M.S., Oklahoma State, 1941.

EVA MARIE SEEN (1935)
Professor Emeritus of Physical Education for Women.
B.S., Knox College, 1922; M.A., Wisconsin, 1926; Ed.D., New York, 1937.

WILLIAM RICHARD SEMON (1964)
Instructor, Assistant Trainer in Intercollegiate Athletics.
B.A., Central Washington State College, 1949.

STEPHEN FREDERICK SENINGER (1965)
Instructor in Economics.
B.A., Central Missouri State College, 1964; M.A., Wyoming, 1965.

JEAN CARYL SEVEREIDE (1957)
Assistant Professor of Education.
B.A., Grinnell, 1948; M.Ed., Oregon, 1956.

MARY LYDIA SEYMOUR (1955)
Associate Professor of Physical Education.
B.A., New York State (Albany), 1946; M.A., Syracuse, 1951.

EDFRED LOREN SHANNON (1945)
Portland City Agent, 4-H Club (Associate Professor).
B.S., Oklahoma, 1922, M.S., 1932; Ph.D., Cornell, 1941.

BRAHAMA D. SHARMA (1965)
Assistant Professor of Chemistry.
B.S., University of Delhi, 1949, M.S., 1951; Ph.D., U.S.C., 1961.

FRANCIS HARDING SHAW (1955)
Associate Professor of History.
B.A., Reed, 1948; M.A., California, 1951; Ph.D., Harvard, 1957.
On sabbatical leave 1965-66.

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, (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)
Senior Instructor in Horticulture, North Willamette Experiment Station.
B.S., Kansas State, 1952.

CHUNG YI SHEN (1963)
Instructor in Mathematics.
B.S., Oregon State, 1960, M.S., 1962.

JAMES W. SHERBURNE (1938)
Vice Chancellor, Division of Continuing Education, Oregon State System.
A.B., Greenville College, 1927; M.A., Michigan, 1928; Ph.D., Ohio State, 1938.

BARBARA JANE SHERMAN (1964)
Instructor in Microbiology.
B.A., Coe College, 1961; M.S., Iowa State, 1963.

FRED MERLE SHIDELER (1929)
Professor of Journalism, Head of Department; Director of Information.
B.S., Kansas State, 1927; M.S., Oregon State, 1941.

ROBERT EDWIN SHIRLEY (1964)
Assistant Professor of Business Administration.
B.A., Iowa, 1943; M.B.A., Harvard, 1948; Ph.D., Utah, 1965.

ELMO BRYANT SHIRTS (1965)
Instructor in Education
B.S., Brigham Young, 1958; Ed.M., Oregon State, 1965.

STEPHENS T. SHOU (1952)
Social Sciences & Business Librarian (Assistant Professor), Library.
B.A., Yenching University (China), 1946; M.A., Washington, 1950, B.A. (Librarianship), 1952.

DEAN LEE SHUMWAY (1960)
Assistant Professor of Fisheries.
B.S., Oregon State, 1956, M.S., 1960.

THEODORE HENRY SIDOR (1952)
Resource Development Specialist (Professor).
B.S., Oregon State, 1950; M.S., Michigan State, 1961.

WILLIAM ANDREW SIEBLER (1965)
Instructor in Mathematics.
B.A., Western Washington State College, 1959.

THEODORE JOHN SIEK (1964)
Research Associate (Assistant Professor), Food Science and Technology.
B.A., Pacific Lutheran College, 1957; M.S., Washington State, 1961; Ph.D., Oregon State, 1964.

WILLIAM EARL SIEVEKING (1958)
Seed Certification Specialist (Instructor) Farm Crops.
B.S., Illinois, 1953; M.S., Cornell, 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.

HELEN SIMMONS (1962)
Assistant Professor of Family Life.
B.A., British Columbia, 1955, M.A., 1957.

GERALD H. SIMONSON (1961)
Associate 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 KING SINNARD (1963)
Assistant Professor of Home Management.
B.S., Iowa State, 1929; M.S., Oregon State, 1942.

HERBERT REEVES SINNARD (1929-32, 1934)
Professor of Architecture and Agricultural Engineering; Chairman Department of Architecture; Registered Architect.
B.S., Iowa State, 1927, M.S., 1929.

RUSSELL OTTO SINNHUBER (1939)
Professor of Food Science and Technology.
B.S., Michigan State, 1939; M.S., Oregon State, 1941.

HARRIET ELEANOR SISSON (1946)
Assistant Professor of Pharmaceutical Science.
B.S., Minnesota, 1937, M.S., 1939.

GORDON RUSSELL SITTON (1955)
Professor of Agricultural Economics.
B.S., Oregon State, 1940; Ph.D., Stanford, 1954.

CHRISTINE OERTEL SJOGREN (1960)
Associate Professor of Modern Languages.
B.A., Mills College, 1945; Ph.D., Johns Hopkins, 1950.

PER H. SJOGREN (1959)
Associate Professor of Business Administration; Director of the M.B.A. Program.
Ph.B., Uppsala, 1947, Ph.M., 1948; Ph.D., Columbia, 1964.

FRANCIS ASBURY SKINNER (1946)
Klamath County Extension Agent, 4-H Club (Associate Professor).
B.S., Oklahoma State, 1941.

WENDELL HARTMAN SLABAUGH (1953)
Associate 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., (M.E.) Purdue, 1931, M.S., (M.E.) 1932, Ph.D., 1945.

EDWARD J. SLEZAK (1961)
Professor of Physical Education; Chairman Recreation.
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 (Professor) Emeritus Federal Cooperative Extension Service.
B.S., Washington State, 1921.

CLIFFORD LOVEJOY SMITH (1931-34, 1941)
State Extension Training Leader (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)
Associate Professor of Industrial Education.
B.S., Oregon State, 1950; M.A., Colorado State College, 1951; Ed.D., Oregon, 1965.

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.

FREDERICK JOHN SMITH (1964)
Extension Farm Management Specialist; Assistant Professor of Agricultural Economics.
B.S., Cornell, 1958; M.S., Oklahoma State, 1962; Ph.D., North Carolina State, 1965.

HARRY LEE SMITH (1964)
Harney County Extension Agent (Instructor).
B.S., Oregon State, 1964.

HOWARD GEORGE SMITH (1935)
Tillamook County Extension Agent (Associate Professor).
B.S., Oregon State, 1935.

JOHN WOLFGANG SMITH (1964)
Associate Professor of Mathematics.
B.A., Cornell, 1948; M.S., Purdue, 1950; Ph.D., Columbia, 1957.

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.
On leave 1965-66.

ROBERT LLOYD SMITH (1961)
Assistant Professor of Oceanography.
B.A., Reed, 1957; M.A., Oregon, 1959; Ph.D., Oregon State, 1964.

ROBERT WAYNE SMITH (1943)
Professor of History.
B.A., Kansas, 1924; M.A., Idaho, 1932; Ph.D., California, 1937.
On sabbatical leave 1965-66.

WESLEY WARREN SMITH (1947-48, 1956)
Professor of Mechanical Engineering.
B.Sc., Montana State, 1934, M.Eng., 1947.

WILLIAM CHARLES SMITH (1951)
Producer, KOAC-AM-TV; Associate Professor, Agricultural Extension and Educational Media, Division of Continuing Education.
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.
On leave through February 28, 1966.

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, LL.M. (in taxation), New York University, 1965.

INGVALD BEN SOLBERG (1947)
Associate Professor Emeritus of Landscape Architecture.
B.L.A., Cornell, 1924.

GEORGE JOSEPH SORGER (1964)
Research Associate (Assistant Professor), Botany and Plant Pathology.
B.S., McGill University, 1959; M.S., Yale, 1962, Ph.D., 1964.

DAVID WAYNE SORSOLI (1965)
Assistant Professor of Microbiology.
B.S., California, 1956; M.S., University of the Pacific, 1961; Ph.D., Oregon State, 1965.

JAMES BROOKES SPENCER (1963)
Assistant Professor of History of Science, General Science.
B.S., Lawrence College, 1948; M.S., Wisconsin, 1956, Ph.D., 1964.

BERTRAND THOMAS SPERLING (1965)
Lieutenant Commander USN, Assistant Professor of Naval Science.
B.S., St. Lawrence University, 1948; B.S. MTR. USPGS, Monterey, 1962.

MARK RITTER SPONENBURGH (1961)
Professor of Art.
Diploma, Cranbrook Academy, 1940; Cert d'Etudes, Ecole des Beaux Arts (Paris), 1946; A.M., 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.

STEPHEN EARL SQUIRE (1965)
Instructor in History.
B.A., Brooklyn College, 1961; M.A., Virginia, 1963.

CYRIL VELDE STADSVOLD (1963)
Assistant Professor of Architecture.
Jr. College Degree, State School of Science, North Dakota, 1952; B.Arch., North Dakota State, 1955. Registered Architect A.I.A.

WALTER RICHARD STAHL (1959)
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.

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, Ph.D., 1963.

ROBERT LLOYD STEBBINS (1962)
Extension Horticulture Specialist (Assistant Professor).
B.S., Colorado State University, 1955; M.S., California, 1959.

CHARLES F. STEILEN (1965)
Instructor in Business Administration.
B.S., Bradley, 1961; M.S., California State (Long Beach), 1964.

WILLIAM PROCURONOFF STEPHEN (1953)
Professor of Entomology.
B.S.A., Manitoba, 1948; Ph.D., Kansas, 1952.

LULA 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 (Associate 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.

ANN STEVENS (1964)
Tillamook County Extension Agent, Home Economics (Instructor).
B.S., Oregon State, 1964.

GEORGE F. STEVENS (1963)
Director Memorial Union and Student Activities (Assistant Professor).
B.A., Iowa, 1950.

JAMES ORVAL STEVENS (1962)
Assistant Professor of Veterinary Medicine.
D.V.M., Washington State, 1962.

MERRITT RAYMOND STEVENSON (1963)
Instructor, Research Associate, Oceanography.
B.S., Ohio State, 1958, M.A., 1961.

RICHARD IVAN STEWART (1965)
Assistant Professor of Architecture.
B.Arch., Rhode Island School of Design, 1957.

ROBERT E. STILL (1962)
Research Associate (Instructor), Oceanography.
B.S., Oregon State, 1962.

HENRY HERMAN STIPPLER (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)
Assistant Professor of Agricultural Economics.
B.S., Cornell, 1958; M.S., Illinois, 1962, Ph.D., 1963.

LOUIS NELSON STONE (1947)
Professor of Electrical Engineering, Head of Department.
B.S., Oregon State, 1939.

SOLON ALLEN STONE (1956)
Associate 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.

GEORGE STORM (1962)
Assistant Professor of Trade and Industrial Education.
B.V.E., California State at Long Beach, 1957; M.A., 1960; Ed.D., Oregon State, 1965.

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; Director, Nutrition Research Institute.
A.B., St. Olaf College, 1929; M.S., Iowa State, 1933; Ph.D., Cornell, 1941.
On sabbatical leave winter term, 1966.

FLOYD MADISON STOUT (1959)
Assistant Professor of Animal Nutrition.
B.S., Colorado State, 1953; M.S., Oregon State, 1959, Ph.D., 1960.

ANNE WRIGHT STRACHAN (1956)
Clatsop County Extension Agent, Home Economics (Assistant Professor).
B.S., Oregon State, 1953; M.A., Columbia, 1965.

AUGUST LEROY STRAND (1942)
President Emeritus of Oregon State University.
B.S., Montana State, 1917; M.S., Minnesota, 1925, Ph.D., 1928; LL.D. (honorary), Montana State, 1957.

AGNAR ALLEN STRAUMFJORD (1965)
Psychiatrist, Student Health Service.
B.A., Willamette, 1950; M.S., University of Oregon Medical School, 1955, M.D., 1955.

BERNICE STRAWN (1959)
Extension Specialist in Home Management (Associate Professor).
B.S., Iowa State, 1927, M.S., 1931.

HORST ERIC STREITBERGER (1965)
Assistant Director AYI.
B.A., State College of Iowa, 1958; M.S., Oregon State, 1963.

LESTER BRADEN STRICKLER (1954)
Associate Professor of Business Administration.
B.A., Pennsylvania State, 1948, M.A., 1949; D.B.A., Indiana, 1954.

ELIZABETH STRONG (1960)
Assistant Professor of Oceanography.
B.A., New York State College for Teachers, 1937.

EDWIN DAVID STROWBRIDGE, JR. (1964)
Assistant Professor of Education.
B.S., Oregon State, 1950; M.Ed., Lewis & Clark College, 1956.

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)
Associate Professor of Forest Economics.
B.S., Idaho, 1948, M.F., 1954; Ph.D., Michigan, 1961.

GRANT ALEXANDER SWAN (1926)
Associate Professor of Physical Education.
B.S., Oregon State, 1922; M.S., Washington, 1951.

STANLEY LEONARD SWANSON (1963)
Instructor in Agronomy; Soil Conservation Service, Plant Materials Center Manager USDA.
B.S., in Soils Science, California State Polytechnic College, 1953.

STANLEY STEWART SWANSON (1962)
Senior Cataloger (Assistant Professor), Library.
B.A., Colorado, 1949; M.Ed., 1953; M.A.L.S., Michigan, 1956.

KNUD GEORGE SWENSON (1954)
Professor of Entomology.
B.S., South Dakota State, 1948; Ph.D., California, 1951.

CAROL L. SWIM (1965)
Instructor in Physical Education for Women.
B.S., Southern Illinois University, 1962; M.S., North Carolina at Greensboro. 1965.

TERENCE REGINALD SWINBURNE (1964)
Assistant Professor of Botany.
B.Sc., London, 1957, A.R.C.S., 1957, D.I.C.., 1960, Ph.D., 1960.

KLINE RUTHVEN SWYGARD (1947)
Professor of Political Science.
B.A., Washington, 1935, Ph.D., 1950.

MOLLY H. SYLVESTER (1962)
Umatilla County Extension Agent, Home Economics (Associate Professor).
B.S., Washington, 1941, B.S. in Home Economics, 1942; M.S., Cornell, 1953.

GERTRUDE TANK (1953)
Associate Professor Emeritus 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.

RONALD LEE TARR (1964)
Instructor in Music.
B.A., Washington, 1954; M.M., Illinois, 1955; D.M.A., USC, 1964.

ROBERT FRANK TARRANT (1965)
Professor; Principal Forest Scientist, United States Forest Service.
B.S., Oregon State, 1941.

ESTHER ADELIA TASKERUD (1947)
Assistant Director, Federal Cooperative Extension Service (Professor).
B.S., South Dakota State, 1933; M.A., Columbia, 1947; Sc.D., South Dakota State, 1962.

JOHN FLETCHER TATOM (1961)
Associate Professor of Physics, Research Associate.
B.S., U.S. Naval Academy, 1930; M.S., Cal Tech., 1939.

WILLIAM HARRIS TAUBENECK (1951)
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 College, 1952.

DONALD MALCOLM TAYLOR (1963)
Extension Information Specialist (Assistant Professor).
B.S., California State Polytechnic College, 1958.

NORTON OSCAR TAYLOR (1946-48, 1949)
Umatilla County Extension Agent (Associate Professor).
B.S., Oregon State, 1942.

VIRGINIA ROSE TAYLOR (1964)
Assistant Professor of Art.

WAYNE PENDLETON TAYSOM (1953)
Associate Professor of Art.
B.F.A., Utah, 1948; M.A., Columbia, 1950.

RAY HOLT TEAL (1950)
Extension Seed Marketing Specialist (Associate Professor).
B.S., Illinois, 1935, M.S., 1937.

FREDA ANNE TEITZEL (1965)
Instructor in Home Management.
B.S., Washington State, 1962.

RAY ALFRED TENNYSON (1965)
Assistant Professor of Sociology.
B.S., Washington State, 1951, M.A., 1958, Ph.D., 1966.

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.

FRANK PETER TERRAGLIO (1964)
Assistant Professor of Civil Engineering.
B.S., University of Portland, 1949; M.S., Rutgers, 1962; Ph.D., 1964.

LEON C. TERRIERE (1950)
Professor of Biochemistry and Insect Toxicology, Agricultural Chemistry and Entomology.
B.S., Idaho, 1943; Ph.D., Oregon State, 1950.

JOHN RALPH THIENES (1952)
Wasco County Extension Agent (Associate 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.
On sabbatical leave 1965-66.

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)
Metropolitan Area Extension Agent (4-H), (Associate Professor).
B.S., Oregon State, 1948.

MAXINE MARIE THOMPSON (1964)
Research Associate (Assistant Professor), Horticulture.
B.S., California, 1948, M.S., 1951, Ph.D., 1960.

THOMAS WILLIAM THOMPSON (1949)
Sherman County Extension Agent (Associate Professor).
B.S., Oregon State, 1949.

GEORGE EARL THORNBURGH (1952)
Professor of Mechanical Engineering.
B.S., Nebraska, 1944; M.S., Iowa State, 1950.

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.

GERTRUDE BERNICE TINGELSTAD (1964)
Assistant Catalog Librarian (Instructor).
A.B., Luther College, 1941; A.B.L.S., Michigan, 1942; M.A., Minnesota, 1959.

IAN JAMES TINSLEY (1957)
Associate 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.
On sabbatical leave, October through December, 1965.

RICHARD EDWARD TOWEY (1962)
Assistant Professor of Economics.
B.S., University of San Francisco, 1954; M.A., California (Berkeley), 1957.

JAMES MARTIN TRAPPE (1965)
Assistant Professor, Principal Mycologist, United States Forest Service.
B.S., Washington, 1953; M.F., S.U.N.Y. Syracuse, 1955, Ph.D., Washington, 1962.

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)
Associate Professor of Botany and 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)
Associate Professor of Art.
B.A., Fresno State; M.F.A., Columbia, 1953.

EDRIE DALE TROUT (1962)
Professor of Radiological Physics, General Science.
B.S., Franklin College, 1922, D.Sc. (Honorary), 1952.

CLIFFORD WAYNE TROW (1965)
Assistant Professor of History.
A.B., Kansas Wesleyan University, 1951; M.A., Colorado, 1958.

DANIEL P. N. TSAO (1965)
Visiting Scientist, Science Research Institute.
B.A., Central China University, 1927; Ph.C., Washington, 1931, M.S., 1932, Ph.D., 1951.

WILLIAM BENJAMIN TUCKER (1921)
County Agent Emeritus, Jackson County (Professor).

ELLA ARLENE ULTICAN (1965)
Umatilla County Extension Agent (Instructor).
B.S., Idaho, 1965.

WILLIAM FRANCIS UNSOELD (1958)
Associate Professor of Philosophy.
B.S., Oregon State, 1951; B.D., Pacific School of Religion, 1954; Ph.D., Washington, 1959.
On leave of absence 1962-65.

PAUL BARTHOLOMEW VALENTI (1949)
Varsity Basketball Coach (Professor).
B.S., Oregon State, 1947, M.S., 1957.

MILTON ALBERT VALENTINE (1964)
Professor of Speech.
A.B., Stanford, 1945, M.A., 1950, Ph.D., 1957.

NELLIE JOAN VAN CALCAR (1965)
Linn County Extension Agent, 4-H Club (Instructor).
B.S., Oregon State, 1964.

NORBERT JOSEPH VANDEHEY (1959)
Linn County Extension Agent, 4-H Club (Assistant Professor).
B.S., Oregon State, 1949; M.Ed., Linfield College, 1955.

HENRY VAN DYKE (1963)
Associate Professor of Biology, General Science.
B.S., Western Reserve, 1947; M.A., Michigan, 1949, Ph.D., 1955.

EDNA MARJORIE VAN HORN (1939-40, 1942, 1944)
Professor Emeritus of Home Administration.
B.A., Colorado College, 1923; M.A., Columbia, 1932, Ph.D., 1953.

LILLIAN S. VAN LOAN (1965)
Coordinator, Continuing Education for Women.
B.S., Oregon College of Education, 1949; Ed.M., Oregon State, 1951, Ed.D., 1959.

SHARON LOUISE VAN LOAN (1964)
Instructor in Family Life.
B.S., Oregon State, 1959.

PAUL DUDLEY VANTURE (1965)
Captain, Assistant Professor of Military Science.
B.S., United States Military Academy at West Point, 1958.

ANTONE CORNELIS VAN VLIET (1955)
Associate Professor of Forest Products and Wood Products Extension Specialist.
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, 1947; M.S., Oregon State, 1953.

EDWARD KEMP VAUGHAN (1947)
Professor of Plant Pathology.
B.S., New Mexico State, 1929; Ph.D., Minnesota, 1942.

JACK BLAIR VERNETTI (1960)
Assistant in Chemistry, Agricultural Chemistry.
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Douglas County Extension Agent (Associate Professor).
B.S., Oregon State, 1940.

B. J. VERTS (1965)
Assistant Professor of Wildlife Ecology.
B.S., Missouri, 1954; M.S., Southern Illinois, 1956, Ph.D., 1965.

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Associate Professor of Physics.
B.S. (E.Eng.), Oregon State, 1924, M.S., 1928; Ph.D., Pennsylvania State, 1938.

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B.S., Oregon State, 1948; M.Agr.Sc., University of New Zealand, 1952.

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Associate Professor of Floriculture.
B.S., Cornell, 1935.

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Assistant Professor, Track Coach, Intercollegiate Athletics.
A.B., Stanford, 1948, M.A., 1949.

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.

SALLY ANN WAGNER (1966)
Instructor in Microbiology.
B.A., Texas College of Arts and Industries, 1961; M.A., Oregon State, 1965.

SHELDON LEON WAGNER (1963)
Medical Consultant, Student Health Service (Professor).
B.S., Wisconsin, 1954, M.D., 1957.

RODNEY KING WALDRON (1954)
Librarian (Professor), Library.
B.A., Denver, 1950, M.A., 1950.

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Associate Professor of Food Science and Technology.
B.A., Stanford, 1930, M.A., 1931.

ALEXANDER ST. CLAIR WALLACE, JR. (1965)
Assistant Professor of Speech.
B.A., Kansas State Teachers College, 1960; M.A., Kent State, 1961.

ALICE LOCKWOOD INGALLS WALLACE (1954)
Assistant Professor of Speech.
B.S., Oregon State, 1932; M.A., Northwestern, 1938.

IDA MAY WALLACE (1964)
Crook County Extension Agent (Instructor).
B.S., Oregon State, 1961.

JOE DEREK WALLACE (1958)
Assistant Professor of Animal Science, Squaw Butte Experiment Station.
B.S., New Mexico A & M, 1957; M.S., Texas A & 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.
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, Director, Institute of Nuclear Science and Engineering.
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.

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Assistant Professor of Forest Management.
B.S., Minnesota, 1957, M.S., 1959; Ph.D., California, 1963.

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.

JOHN JOSEPH WARNER (1963-64, 1964-65)
Assistant Professor of Landscape Architecture.
B.S., Oregon State, 1958.

CHARLES EDWARD WARREN (1953)
Professor of Fisheries.
B.S., Oregon State, 1949, M.S., 1951; Ph.D., California, 1961.

KENNETH LEE WARREN (1961)
Radio Program Manager, KOAC-AM, KOAP-FM; Assistant Professor, Educational Media, Division of Continuing Education.
B.S., Oregon, 1953; M.A., Fresno State, 1961.

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Extension Farm Crops Specialist (Professor).
B.S., Utah State, 1931; M.S., Oregon State, 1933.

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Assistant Professor of Physics.
B.S., Carnegie Institute of Technology, 1956; Ph.D., Iowa State, 1963.

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Associate Professor of Art and Architecture Emeritus.
B.A., Washington State, 1925; M.A., Columbia, 1933.

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Assistant Professor of Agricultural Engineering.
B.S., Oklahoma State, 1960; M.S., California (Davis), 1962.

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Coos County Extension Agent (Home Economics) (Assistant Professor).
B.S., Minnesota, 1949.

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B.A., Washington, 1939; C.P.A., Washington, 1939; Oregon, 1952.

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Assistant Professor of History.
B.A., Washington State, 1956; M.A., Washington, 1959, Ph.D., 1962.

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Instructor in English.
B.A., Oregon, 1957; M.A., Washington, 1962.

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B.S., Oregon State, 1952; M.S., Washington, 1962.

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B.S., Washington State, 1930.

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B.A., DePauw, 1959; M.A., Missouri, 1962.

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Associate Professor of Physical Education for Women, Acting Head of Department.
B.E., Minnesota State Teachers (Bemidji), 1936; M.S., Washington, 1941.

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Instructor, Research Associate, Audio Visual Department.
B.S., Oregon State, 1949.

EARL WILLIAM WELLS (1921)
Professor Emeritus of Speech.
A.B., Iowa, 1921; M.A., Wisconsin, 1927; J.D., Iowa, 1928.

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B.S.H.E., Arkansas, 1943, M.S., 1952; Ph.D., Cornell, 1958; B.A., Arkansas, 1961.

VERA LUCILE WELLS (1948)
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B.S., Oregon State, 1948, M.S., 1953.

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B.S., Education, Oregon State, 1960.

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B.S., Oregon State, 1950; M.S., Carnegie Institute of Technology, 1952, Ph.D., 1954.

WILBUR WILSON WIDICUS, JR. (Fall Term 1964)
Assistant Professor of Business Administration.
B.S., Southern Illinois University, 1958; M.B.A., Indiana, 1959; Ph.D., Columbia, 1964.

ALFRED M. WIEDEMANN (1965)
Instructor in Botany.
B.S., Utah State, 1960, M.S., 1962.

ERNEST HERMAN WIEGAND (1919)
Professor Emeritus of Food Technology.
B.S.A., Missouri, 1914.

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Assistant Professor of Chemistry, Radiation Center.
B.Sc., McMaster University, 1960, Ph.D., 1964.

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Associate Professor of Family Life.
B.A., Nebraska, 1931; M.A., Columbia T. C., 1936.

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Associate Professor of Wildlife Ecology.
B.S., Oregon State, 1948; M.S., Pennsylvania State, 1950.

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Klamath County Extension Agent (Assistant Professor).
B.S., Utah State, 1957; M.S., Oregon State, 1961.

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Associate 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)
Assistant Professor of English.
B.A., Linfield, 1950; M.A., Washington State, 1952.

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Extension Agricultural Information Specialist, Assistant Professor.
A.B., Journalism, Fresno State, 1960.

MAX BULLOCK WILLIAMS (1941)
Professor of Chemistry.
B.S., Utah, 1936, M.S., 1938; Ph.D., Cornell, 1941.

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)
Associate Professor of Biology, General Science.
B.Th., Biola College, 1949, B.A., 1951; B.S., Wheaton College, 1952; M.A., Long Beach State College, 1954; Ph.D., Oregon State, 1963.

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Professor of Clothing and Textiles, Department of Clothing, Textiles, and Related Arts.
B.A., Hillsdale College, 1915; M.A., Columbia, 1924.

CLAYTON STANLEY WILLS (1959)
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.

HOWARD LEROY WILSON (1964)
Assistant Professor of Mathematics and Science Education.
B.A., Willamette, 1954; M.S., Illinois, 1960.

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)
Associate Professor of Music.
A.B., College of St. Teresa, 1930; M.S., Oregon, 1954.

OSCAR LEE WILSON (1964)
Instructor in Modern Languages.
B.A., Colorado, 1949; M.A., New Mexico, 1960.

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; Ph.D., Oregon State, 1963.

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.

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 WINKLER (1957-63, 1965)
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)
Morrow County Extension Agent (Associate Professor).
B.S., Oregon State, 1950; M.Ed. (Agric.), California, 1963.

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Instructor in Art.
B.A., Washington, 1958; M.E., Central Washington State, 1962; M.F.A., Claremont Graduate School, 1964.

GERTRAUDE CHRISTA WITTIG (1962)
Microbiologist United States Forest Service, Associate Professor of Entomology.
Dr. rer. nat., University of Tübingen, 1955.

FLOYD BYRON WOLBERG (1945)
Associate Professor of Animal Science.
B.S., Wisconsin, 1928, M.S., 1932.

JOHN WILLIAM WOLFE (1947)
Professor of Agricultural Engineering.
B.S., South Dakota State, 1939; M.S., Idaho, 1940; Ph.D., Utah State, 1959; D.H.E., Delft, 1965.

HOWARD WILLIAM WOLFF (1965)
Instructor in Business Administration.
B.S., Roosevelt University, 1963; M.B.A., Chicago, 1965; C.P.A., Illinois, 1964.

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Assistant Professor of Economics.
B.S., City College of New York, 1948; M.S., Wisconsin, 1951, Ph.D., 1964.

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Assistant Professor of Soils.
B.S., Minnesota, 1959; M.S., Oregon State, 1962, Ph.D., 1965.

GREGORY BURTON WOOD (1951)
Associate Dean and Director (Professor), Agricultural Experiment Station.
B.S., Oregon, 1938; M.S., Oregon State, 1940; Ph.D., Wisconsin, 1945.

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Clatsop County Extension Agent (Associate Professor).
B.S., Washington State, 1947; M.A., Columbia (Extension Education), 1958.

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Instructor in Forest Management.
B.S., Oregon State, 1963.

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Research Associate (Assistant Professor), Chemistry.
B.Sc., University of Nottingham, England, 1961, Ph.D., 1964.

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Crook County Extension Agent (Associate Professor).
B.S., Oregon State, 1934.

CLYTIE MAE WORKINGER (1910)
Assistant Professor Emeritus of Education.

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Portland City Extension Agent (4-H Club) (Assistant Professor).
B.S., Oregon State, 1936.

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ARTHUR S. H. WU (1952)
Assistant Professor of Animal Physiology.
B.S., National Central (China), 1941; M.S., Oregon State, 1949, Ph.D., 1952.

HUBERT H. WUBBEN (1963)
Assistant Professor of History and Education.
A.A., Mesa Junior College, 1948; B.A., Cornell College, 1950; M.A., Iowa, 1958, Ph.D., 1963.

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), Oceanography.
B.S., Humboldt State, 1956; M.S., Oregon State, 1959.

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Assistant Professor of Mathematics.
A.B., Harvard, 1952; A.M., Princeton, 1955; Ph.D., Oregon State, 1964.

HOYA Y. YANG (1943)
Associate Professor of Food Science and Technology.
B.S., Nanking, 1936; M.S., Oregon State, 1940, Ph.D., 1943.

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Instructor in Statistics; Director, Statistics Computing Laboratory.
B.A., Willamette University, 1950.

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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)
Professor of Forest Management.
B.S., Oregon State, 1941; M.F., Harvard, 1942.

JOHN THOMAS YOKE III (1964)
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B.S., Yale, 1948; M.S., Michigan, 1950, Ph.D., 1954.

NICHOLAS J. YONKER (1962)
Assistant Professor of Philosophy and Religion.
B.A., Hope College, 1950; M.A., Columbia, 1956, Ph.D., 1960.

KOICHI YOSHIKAWA (1964)
Research Associate (Assistant Professor) in Food Science and Technology.
B. of Pharm., Osaka Pharmacy College, 1949; Ph.D., Osaka University, 1962.

JAMES GUY YOUDE (1966)
Assistant Professor of Agricultural Economics; Marketing Management Specialist.
B.S., Oregon State, 1962; Ph.D., Wisconsin, 1966.

ALAN D. YOUNG (1965)
Instructor in English.
B.A., Kansas, 1959; M.A., Colorado, 1964.

DeLOSS PALMER YOUNG (1927)
Professor of Speech; Director of the Theater.
B.S., Oregon State, 1926.

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Associate Professor of Soils; Chemist, A.R.S., U. S. Department of Agriculture.
B.S., Brigham Young, 1953; Ph.D., Ohio State, 1956.

MARVIN MILES YOUNG (1958)
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B.S., Oregon State, 1954; M.E., Extension Education, Colorado State University, 1962.

ROY ALTON YOUNG (1948)
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B.S., New Mexico A & M, 1941; M.S., Iowa State, 1942, Ph.D., 1948.

ROY E. YOUNG (1965)
Assistant Professor of Political Science.
B.S., Texas, 1957.

CHESTER THEODORE YOUNGBERG (1952)
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B.S., Wheaton College, 1941; M.F., Michigan. 1947; Ph.D., Wisconsin, 1951.

HAROLD WAYNE YOUNGBERG (1960)
Certification Specialist (Instructor), Farm Crops
B.S., Oregon State, 1951.

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; Director, Engineering Physics.
A.B., California, 1924; Ph.M., Wisconsin, 1930; Ph.D., Stanford, 1940.

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Assistant Professor of Forest Physiology, Forest Research Laboratory.
B.S., California, 1954, Ph.D., 1964.

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Assistant Professor of Physics.
B.S., Lewis & Clark, 1957; Ph.D., Washington, 1962.

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B.Sc., University of Lisbon, 1939, M.Sc. (Agr.), 1943; M.S., Wisconsin, 1950, Ph.D., 1952.

BRATISLAV ZAK (1962)
Associate Professor of Forest Pathology, Botany and Plant Pathology.
D.F., Duke, 1954.

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Assistant Professor of Mechanical Engineering.
S.B. (Mech.Eng.), MIT, 1947, S.M. (Mech. Eng.), 1958.
On leave 1963-66.

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Dean, School of Education; Professor of Education, Head of Department.
A.B., Wisconsin, 1930, M.A., 1932, Ph.D., 1937.

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Research Associate, Assistant Professor, Entomology.
M.F., Royal Veterinary and Agricultural College, Denmark, 1960, Licentiatus Agronomiae, 1964.

QUENTIN BLISS ZIELINSKI (1947)
Professor of Horticulture.
B.S., Oregon State, 1941; M.S., Ohio State, 1942; Ph.D., Virginia, 1947.

MARTIN JOSEPH ZIMMERMAN (1960)
County Extension Agent, Sherman-Gilliam (Assistant Professor).
B.S., Oregon State, 1953.

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Summary of Enrollment

Enrollment by Curriculum and Class, Regular Session, 1964-65

Curriculum	Freshman year	Sophomore year	Junior year	Senior year	Graduate	Special	Subtotal	Total
Liberal Arts and Sciences								
School of Humanities and Social Sciences	458	434	249	158		24	1,323	.....
School of Science	598	488	350	359	821	12	2,628	.....
Total, Liberal Arts and Sciences, excluding duplicates	1,056	922	599	517	821	36	.....	3,951
Professional Curricula								
School of Agriculture	209	202	171	168	209	6	947	.....
School of Business and Technology	382	382	269	330	.....	7	1,386	.....
School of Education	385	414	326	389	216	5	1,735	.....
School of Engineering	508	378	370	334	132	2	1,724	.....
School of Forestry	91	84	101	95	27	1	399	.....
School of Home Economics	250	209	124	140	60	8	791	.....
School of Pharmacy	67	64	67	160	13	1	372	.....
Unclassified	.....	.....	.....	.....	92	46	138	.....
Total, Professional Schools	1,892	1,733	1,428	1,616	749	76	7,494	.....
Totals, (excluding duplicates)	2,948	2,655	2,027	2,133	1,570	112	.....	11,445
Total Students, Regular Session								11,445

Enrollment by Sex, All Sessions, 1964-65

Session	Men	Women	Total
Summer Session 1964	2,005	1,268	3,273
Fall Term 1964-65	7,065	3,468	10,533
Winter Term 1964-65	6,844	3,314	10,158
Spring Term 1964-65	6,497	3,198	9,695
Total, Regular Sessions	7,656	3,789	11,445
Total, all sessions, Oregon State University	9,661	5,057	14,718

Enrollment in Summer Session, 1964

	Men	Women	Total
Summer Session	2,005	1,268	3,273
4-H Club Short Course	451	1,299	1,750
Totals	2,456	2,567	5,023

Enrollment in Division of Continuing Education 1964-65

Classes	Undergraduate	Graduate	Total
Division Classes:			
Portland Center	6,730	2,357	9,087
Other Continuation Centers	5,191	4,159	9,350
Total Division Classes	11,921	6,516	18,437
Correspondence Study	3,456		3,456
Telecourses	211		211
Total, Continuing Education	15,588	6,516	22,104

Summary of Degrees Conferred 1964-65

Advanced Degrees	
Doctors of Philosophy	92
Doctors of Education	7
Masters of Arts	20
Masters of Science	266
Masters of Agriculture	4
Masters of Education	189
Masters of Engineering	2
Masters of Forestry	6
Masters of Home Economics	7
Master of Material Science	1
Total Advanced Degrees	594
Bachelor's Degrees	
Bachelor of Arts	
Humanities and Social Sciences	30
Science	25
Business and Technology	11
Education	22
Engineering	1
Home Economics	7
Bachelor of Science	
Humanities and Social Sciences	108
Science	329
Agriculture	128
Business and Technology	283
Education	349
Engineering	268
Forestry	78
Home Economics	123
Pharmacy	67
Bachelor of Forestry	
Forestry	1
Total Bachelors Degrees	1,830
Total Degrees Conferred 1964-65	2,424

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Cover design: VIRGINIA TAYLOR
Catalog design: J. K. MUNFORD
Catalog editor: DULCIE NORTON

Composition: Type (6-, 8-, and 11-point Caledonia and 18- and 36-point Garamond Bold) set by the Department of Printing, Oregon State University

Printing: Lithographed by the Metropolitan Printing Company, Portland, Oregon

General Information

Humanities and Social Sciences

Science

Agriculture

Business and Technology

Education

Engineering

Forestry

Home Economics

Pharmacy

Physical Education

ROTC

Graduate School

Research and Extension

Faculty

OREGON STATE UNIVERSITY BULLETIN
Published by the Oregon State Board of Higher Education, Oregon State University
CORVALLIS, OREGON 97331

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Second Class Postage
Paid at Corvallis, Oregon

OREGON STATE SYSTEM OF HIGHER EDUCATION