



OREGON STATE SYSTEM  
OF HIGHER EDUCATION

# Oregon State College Bulletin

CORVALLIS • OREGON

CATALOG  
I S S U E  
1960-61

# Oregon State College B U L L E T I N

Number 83

May 1960

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*Please address inquiries to*  
The Registrar  
Oregon State College  
Corvallis, Oregon

Oregon State College  
CATALOG

1960-61



Corvallis, Oregon

# Oregon State College Calendar

## Summer Session 1960

June 20, <i>Monday</i> .....	Registration
June 21, <i>Tuesday</i> .....	Classes begin
July 4, <i>Monday</i> .....	Independence Day—holiday
August 11-12, <i>Thursday-Friday</i> .....	Final examinations
August 12, <i>Friday</i> .....	End of Summer Session

## Fall Term 1960

September 15, <i>Thursday</i> .....	Faculty Day
September 18-24, <i>Sunday-Saturday</i> .....	New Student Week
September 23-24, <i>Friday-Saturday to 3:00 p.m.</i> .....	Registration
September 26, <i>Monday</i> .....	Classes begin
October 8, <i>Saturday</i> .....	Latest day for registering or adding courses
October 22, <i>Saturday</i> .....	End of fourth week (reports of unsatisfactory progress)
November 5, <i>Saturday</i> .....	Latest day to drop a course
November 19, <i>Saturday</i> .....	End of eighth week
November 19, <i>Saturday</i> .....	Latest day to withdraw from college without responsibility for grades
November 24-27, <i>Thursday-Sunday</i> .....	Thanksgiving vacation
December 10, <i>Saturday</i> .....	Classes end
December 12-17, <i>Monday-Saturday</i> .....	Final examinations
December 17, <i>Saturday</i> .....	End of fall term

## Winter Term 1961

January 3-4, <i>Tuesday a.m. and p.m., Wednesday a.m.</i> .....	Registration
January 4, <i>Wednesday, 1:00 p.m.</i> .....	Classes begin
January 17, <i>Tuesday</i> .....	Latest day for registering or adding courses
January 31, <i>Tuesday</i> .....	End of fourth week (reports of unsatisfactory progress)

June 1960							July 1960							August 1960							September 1960									
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S			
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12	13	14	15	16	17	18	10	11	12	13	14	15	16	14	15	16	17	18	19	20	.....	.....	.....	11	12	13	14	15	16	17
19	20	21	22	23	24	25	17	18	19	20	21	22	23	21	22	23	24	25	26	27	.....	.....	.....	18	19	20	21	22	23	24
26	27	28	29	30	.....	.....	24	25	26	27	28	29	30	28	29	30	31	.....	.....	.....	.....	.....	.....	25	26	27	28	29	30	.....
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October 1960							November 1960							December 1960							January 1961									
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2	3	4	5	6	7	8	6	7	8	9	10	11	12	4	5	6	7	8	9	10	8	9	10	11	12	13	14			
9	10	11	12	13	14	15	13	14	15	16	17	18	19	11	12	13	14	15	16	17	15	16	17	18	19	20	21			
16	17	18	19	20	21	22	20	21	22	23	24	25	26	18	19	20	21	22	23	24	22	23	24	25	26	27	28			
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30	31	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

February 13, *Monday*.....Latest day to drop a course  
 February 18, *Saturday*.....Latest day to withdraw from college without  
 responsibility for grades  
 March 11, *Saturday*.....Classes end  
 March 13-18, *Monday-Saturday*.....Final examinations  
 March 18, *Saturday*.....End of winter term

### Spring Term 1961

March 27-28, *Monday a.m. and p.m., Tuesday a.m.*.....Registration  
 March 28, *Tuesday, 1:00 p.m.*.....Classes begin  
 April 10, *Monday*.....Latest day for registering or adding courses  
 April 24, *Monday*.....End of fourth week (reports of unsatisfactory progress)  
 May 8, *Monday*.....Latest day to drop a course  
 May 13, *Saturday*.....Latest day to withdraw from college  
 without responsibility for grades  
 May 27, *Saturday*.....Close of work for graduating students  
 May 30, *Tuesday*.....Memorial Day—holiday  
 May 31, *Wednesday*.....Grades due for graduating students  
 June 3, *Saturday*.....Classes end  
 June 4, *Sunday*.....Baccalaureate Service  
 June 5, *Monday*.....Commencement  
 June 5-10, *Monday-Saturday*.....Final examinations  
 June 10, *Saturday*.....End of spring term

### Summer Session 1961

June 19, *Monday*.....Registration  
 June 20, *Tuesday*.....Classes begin  
 July 4, *Tuesday*.....Independence Day—holiday  
 August 10-11, *Thursday-Friday*.....Final examinations  
 August 11, *Friday*.....End of summer session

### Fall Term 1961

September 17, *Sunday, 7 p.m.*.....Opening of New Student Week  
 September 25, *Monday*.....Classes begin

February 1961							March 1961							April 1961							May 1961						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
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5	6	7	8	9	10	11	5	6	7	8	9	10	11	2	3	4	5	6	7	8	7	8	9	10	11	12	13
12	13	14	15	16	17	18	12	13	14	15	16	17	18	9	10	11	12	13	14	15	14	15	16	17	18	19	20
19	20	21	22	23	24	25	19	20	21	22	23	24	25	16	17	18	19	20	21	22	21	22	23	24	25	26	27
26	27	28	.....	.....	.....	.....	26	27	28	29	30	31	.....	23	24	25	26	27	28	29	28	29	30	31	.....	.....	.....
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June 1961							July 1961							August 1961							September 1961						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
.....	.....	.....	.....	1	2	3	.....	.....	.....	.....	.....	1	.....	.....	1	2	3	4	5	.....	.....	.....	.....	.....	1	2	
4	5	6	7	8	9	10	2	3	4	5	6	7	8	6	7	8	9	10	11	12	3	4	5	6	7	8	9
11	12	13	14	15	16	17	9	10	11	12	13	14	15	13	14	15	16	17	18	19	10	11	12	13	14	15	16
18	19	20	21	22	23	24	16	17	18	19	20	21	22	20	21	22	23	24	25	26	17	18	19	20	21	22	23
25	26	27	28	29	30	.....	23	24	25	26	27	28	29	27	28	29	30	31	.....	24	25	26	27	28	29	30	
.....	.....	.....	.....	.....	.....	.....	30	31	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		

## State Board of Higher Education\*

	<i>Term Expires</i>
CHARLES R. HOLLOWAY, JR., Portland.....	1961
A. S. GRANT, Baker.....	1962
CHERYL S. MACNAUGHTON, Portland.....	1963
J. W. FORRESTER, JR., Pendleton.....	1963
ALLAN HART, Portland.....	1964
DOUGLAS MCKEAN, Beaverton.....	1964
WILLIAM E. WALSH, Coos Bay.....	1965
RALPH E. PURVINE, Salem.....	1965
HENRY F. CABELL, Portland.....	1966

### Officers

HENRY F. CABELL.....	President
WILLIAM E. WALSH.....	Vice President
J. W. FORRESTER, JR.....	Member, Executive Committee

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JOHN R. RICHARDS, Ph.D., Chancellor  
EARL M. PALLETT, Ph.D., Secretary of Board

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

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

## Oregon State System of Higher Education

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

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

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

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

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

Terminal courses in technical and semi-professional areas are offered at Oregon Technical Institute.

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

# Oregon State System of Higher Education

JOHN R. RICHARDS, Ph.D., Chancellor

AUGUST L. STRAND, Ph.D., LL.D.  
President, Oregon State College

ROY E. LIEUALLEN, Ed.D.  
President, Oregon College of Education

FRANK B. BENNETT, Ed.D.  
President, Eastern Oregon College

ELMO N. STEVENSON, Ed.D.  
President, Southern Oregon College

JAMES W. SHERBURNE, Ph.D.  
Dean, General Extension Division

\*O. MEREDITH WILSON, Ph.D.  
President, University of Oregon

DAVID W. E. BAIRD, M.D., LL.D.  
Dean, Medical School

HAROLD J. NOYES, D.D.S., M.D.  
Dean, Dental School

BRANFORD P. MILLAR, Ph.D.  
President, Portland State College

WINSTON D. PURVINE, A.B.  
Director, Oregon Technical Institute

---

HERBERT A. BORK, M.S., C.P.A. .... Comptroller and Bursar

RICHARD L. COLLINS, M.A., C.P.A. .... Budget Director

WILLIAM H. CARLSON, M.A. .... Director of Libraries

WOLF D. VON OTTERSTEDT, LL.B. .... Assistant Attorney General  
assigned to the State Board of Higher Education

---

EARL M. PALLETT, Ph.D. .... Chairman  
High School-College Relations Committee

FRANCIS B. NICKERSON, D.Ed. .... Executive Secretary  
High School-College Relations Committee

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## Former Chancellors Oregon State System of Higher Education

WILLIAM J. KERR, D.Sc., LL.D. .... 1932-1935

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

\* Resigned, effective June 1960.

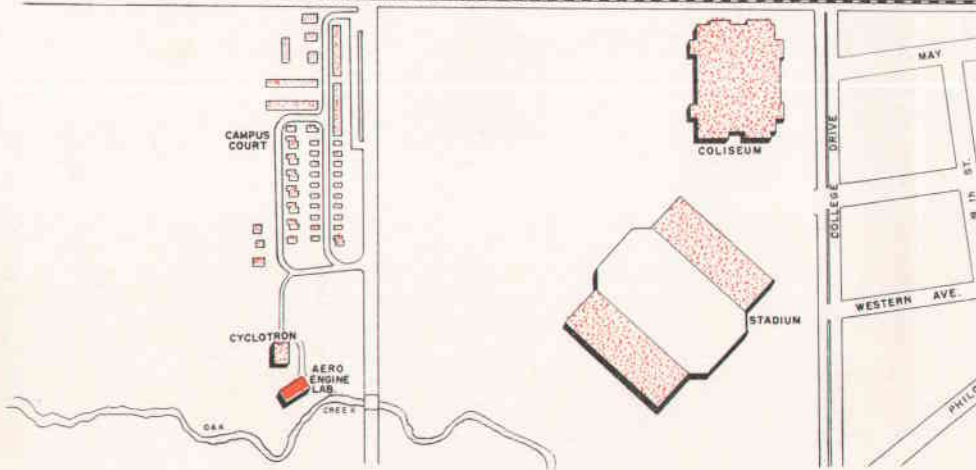
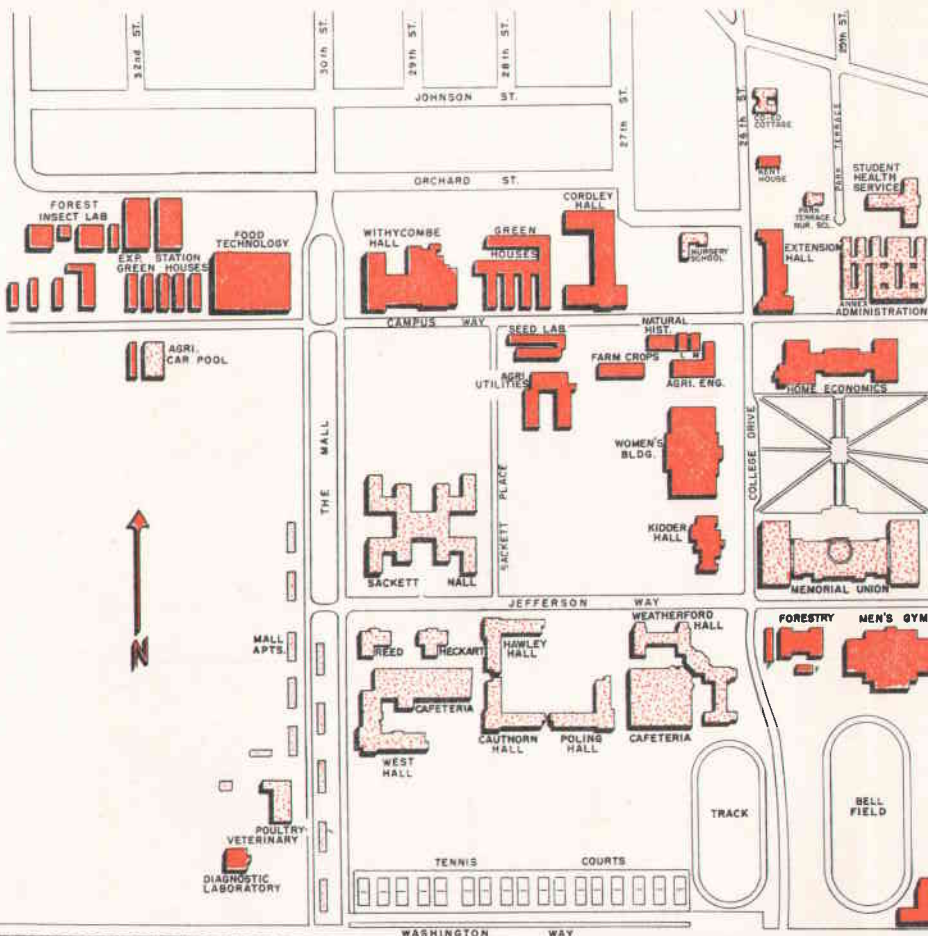


# Oregon State System of Higher Education

- JOHN REESE RICHARDS, Ph.D., Chancellor, State System of Higher Education; Professor.  
B.A. (1929), M.S. (1931), Pennsylvania State; Ph.D. (1936), Chicago. With System since 1953, chancellor since 1955.
- 
- DAVID W. E. BAIRD, M.D., LL.D., Dean of Medical School; Professor of Medicine.  
M.D. (1926), Oregon; LL.D. (1946), Portland. With System since 1927; dean, Medical School, since 1943.
- FRANK BROWN BENNETT, Ed.D., President, Eastern Oregon College; Professor.  
B.A. (1921), Willamette; M.A. (1933), Oregon; Ed.D. (1948), Willamette. With System since 1952; president, Eastern Oregon College, since 1952.
- HERBERT ARNOLD BORK, M.S., C.P.A., Comptroller and Bursar, State System of Higher Education; Dean; Professor.  
B.A. (1924), Wisconsin; C.P.A. (1926); M.S. (1940), Oregon State. With System since 1934; comptroller since 1934.
- WILLIAM HUGH CARLSON, M.A. (Lib.Sc.), Librarian.  
A.B. (1924), Nebraska; certificate (1926), New York State Library School; M.A. (Lib.Sc.) (1937), California. With System since 1945.
- RICHARD LYLE COLLINS, M.A., C.P.A., Budget Director, State System of Higher Education; Professor.  
B.B.A. (1927), Oregon; C.P.A. (1931); M.A. (1940), Columbia. With System 1927-29 and since 1932; budget director since 1943.
- ROY ELWAYNE LIEUALLEN, Ed.D., President, Oregon College of Education; Professor.  
B.S. (1940), Pacific; M.S. (1947), Oregon; Ed.D. (1955), Stanford. With System since 1946; president, Oregon College of Education, since 1955.
- BRANFORD P. MILLAR, Ph.D., President, Portland State College, Professor.  
A.B. (1935), A.M. (1938), Ph.D. (1946), Harvard. With System since 1959; president, Portland State, since 1959.
- HAROLD J. NOYES, D.D.S., M.D., Dean of Dental School; Professor of Dentistry.  
Ph.B. (1923), M.D. (1933), Chicago; B.S. (1928), D.D.S. (1928), Illinois. With System since 1946; dean, Dental School, since 1946.
- EARL M. PALLETT, Ph.D., Secretary of Board and Chairman, High School-College Relations Committee; Professor.  
B.S. (1921), M.S. (1922), Wisconsin; Ph.D. (1931), Oregon. With System since 1927; secretary of Board since 1955.
- WINSTON D. PURVINE, A.B., Director, Oregon Technical Institute.  
A.B. (1933) Albany College. With System since 1960, director, Oregon Technical Institute, since 1947.
- JAMES WILSON SHERBURNE, Ph.D., Dean, General Extension Division; Professor.  
A.B. (1927), Greenville College; M.A. (1928), Michigan; Ph.D. (1938), Ohio State. With System since 1938; dean, Extension Division, since 1956.
- ELMO NALL STEVENSON, Ed.D., President, Southern Oregon College; Professor.  
A.B. (1927), San Jose State; A.M. (1929), Ed.D. (1938), Stanford. With System since 1929; president, Southern Oregon, since 1945.
- AUGUST LEROY STRAND, Ph.D., LL.D., President, Oregon State College; Professor.  
B.S. (1917), Montana State; M.S. (1925), Ph.D. (1928), Minnesota; LL.D. (honorary, 1957), Montana State. With System since 1942; president, Oregon State, since 1942.
- O. MEREDITH WILSON, Ph.D., President, University of Oregon; Professor.  
B.A. (1934), Brigham Young; Ph.D. (1943), California. With System since 1954; president, University, since 1954.

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*Campus Map*

**Oregon State College**  
Corvallis, Oregon

 Built with State appropriations  
\$12,980,000 (cost)

 Built with other than State funds  
\$12,986,000 (cost)

<b>SCHOOL OF EDUCATION</b>	
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# Charter of Oregon State College

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

*... Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there be granted to the several States, for the purposes hereinafter mentioned, an amount of public land, to be apportioned to each State . . . And be it further enacted, That all moneys derived from the sale of lands aforesaid, by the States . . . shall constitute a perpetual fund . . . the interest of which shall be inviolably appropriated by each State . . . to the endowment, support and maintenance of at least one college, where the leading object shall be, without excluding other scientific and classical studies and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the Legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life. . . . No State shall be entitled to the benefit of this act unless it shall express its acceptance thereof by its Legislature, within two years from the date of its approval by the President. . . .*

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

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

## CORVALLIS COLLEGE INCORPORATED AUGUST 22, 1868

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

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

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

## OCTOBER 27, 1868 ACTION MADE PERMANENT, OCTOBER 1870

*Be it enacted by the Legislative Assembly of the State of Oregon: That 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, approved on the second day of July, 1862, granting public lands to the several States and Territories, which might provide colleges for the benefit of Agriculture and the Mechanic Arts, and the acts amendatory thereof. . . .*

# Oregon State College

## THE ADMINISTRATIVE COUNCIL

AUGUST LEROY STRAND, Ph.D., LL.D.....	President
MILOSH POPOVICH, M.S.....	Dean of Administration
JAMES KENNETH MUNFORD, Ed.D.....	Secretary
<hr/>	
JOSEPH HOWARD BERRY, Ed.M.....	Assistant to the President
WILLIAM HUGH CARLSON, M.A.....	Librarian
RALPH COLBY, Ph.D.....	Dean of Lower Division
CHARLES OWENS WILSON, Ph.D.....	Dean of Pharmacy
FRANCOIS ARCHIBALD GILFILLAN, Ph.D.....	Dean of Science
GEORGE WALTER GLEESON, Ch.E.....	Dean of Engineering and Industrial Arts
HENRY PAUL HANSEN, Ph.D.....	Dean of Graduate School
ROY SERVAIS KEENE, B.S.....	Director of Intercollegiate Athletics
COLONEL H G LEARNARD, A.B.....	Professor of Military Science
CLAIR VAN NORMAN LANGTON, Dr.P.H., Ed.D.....	Director of Physical Education
CLIFFORD ELGES MASER, Ph.D.....	Dean of Business and Technology
WALTER FRASER McCULLOCH, Ed.D.....	Dean of Forestry
HELEN STERLING MOOR, M.A.....	Dean of Women
DALLAS W NORTON, M.Ed.....	Personnel Coordinator
CAPTAIN KELVIN LIGHTFOOT NUTTING, B.S.....	Professor of Naval Science
COLONEL RALPH L OLIVER, B.S.....	Professor of Air Science
DANIEL THOMAS ORDEMAN, Ph.D.....	Registrar
DAN WILLIAMS POLING, D.Ed.....	Dean of Men
FREDERICK EARL PRICE, B.S.....	Dean and Director of Agriculture
GEORGE MORRIS ROBERTSON, M.S.....	Business Manager
MIRIAM GROSSER SCHOLL, Ed.D.....	Dean of Home Economics
FRED MERLE SHIDELER, M.S.....	Director of Information
FRANKLIN ROYALTON ZERAN, Ph.D.....	Dean of Education Director of Summer Session

## OTHER OFFICERS

RICHARD ALTON ADAMS.....	Director of Physical Plant
THOMAS FRANCIS ADAMS, B.S.....	Director of Dormitories
EDWARD CHRISTOPHER ALLWORTH, B.S., LL.D.....	Manager, Memorial Union
SAMUEL HALL BAILEY, M.S.....	Head, News Bureau
IRWIN CECIL HARRIS, M.S.J.....	Manager of Educational Activities
ROBERT PAUL KNOLL, B.S.....	Director of Alumni Relations
GEORGE YOULLE MARTIN, B.S.....	Director of College Press
DANIEL CLYDE REYNOLDS, B.S., M.D.....	Director of Health Service

# Oregon State College Staff\*

AUGUST LEROY STRAND, Ph.D., LL.D., President

B.S. (1917), Montana State; M.S. (1925), Ph.D. (1928), Minnesota; LL.D. (honorary 1957), Montana State. At Oregon State (President and Professor) since 1942.

MARY EUNICE ABBOTT, M.A., State Extension Agent (Associate Professor).

B.A. (1932), Oklahoma Baptist University; M.A. (1956), Oklahoma State. At Oregon State since 1950.

JOHN ADAIR, B.S., Junior Biologist (Instructor) Dairy and Animal Husbandry, Agricultural Experiment Station.

B.S. (1950), Oregon State. At Oregon State since 1953.

FRANK WILLIAM ADAMS, M.S., Junior Chemist (Instructor) Agricultural Experiment Station.

B.S. (1948), Montana State; M.S. (1950), Oregon State. At Oregon State since 1953.

RICHARD ALTON ADAMS, Director of Physical Plant (Professor).

At Oregon State since 1947.

THOMAS FRANCIS ADAMS, B.S., Director of Dormitories (Professor).

B.S. (1930), Oregon State. At Oregon State since 1946.

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B.A. Ed. (1943), Central Washington College; B.A. (1946), Ph.D. (1953), Washington. At Oregon State since 1955.

WALTER MILO ADRIAN, M.A., Professor of Physical Education.

B.S. (1924), Michigan State Normal; M.A. (1939), Michigan. At Oregon State since 1939.

MARIAN CUSHING AIKIN, M.Sc., Assistant Professor of Family Life.

B.Sc. (1939), Nebraska; M.Sc. (1943), Iowa State. At Oregon State since 1954.

CHESTER BOYD AINSWORTH, Ed.D., Associate Professor of Education and Industrial Education.

B.S. (1942), John Brown University; M.S. (1947), Oklahoma State; Ed.D. (1956), Missouri. At Oregon State since 1959.

LAWRENCE ARTHUR ALBAN, Ph.D., Assistant Professor of Soils; Assistant Soil Scientist, Agricultural Experiment Station.

B.S. (1943), M.S. (1948), Washington State; Ph.D. (1950), Oregon State. At Oregon State since 1952.

ARTHUR LEMUEL ALBERT, M.S., E.E., Professor of Communication Engineering.

B.S. (1923), M.S. (1926), E.E. (1939), Oregon State. At Oregon State since 1923.

GERALD CORWIN ALEXANDER, B.S., Assistant Professor of Electrical Engineering.

B.S. (1951), Oregon State. At Oregon State since 1955. Leave of absence 1959-60.

ROBERT M ALEXANDER, M.A., Assistant Director (Professor), Agricultural Experiment Station.

B.S. (1942), Oregon State; M.A. (1949), Harvard. At Oregon State since 1946.

HARRY THAIN ALLAN, J.D., Assistant Professor of Business Administration.

B.A. (1953), Washington and Jefferson College; B.S. (1953), Massachusetts Institute of Technology; J.D. (1956), Chicago. At Oregon State since 1956.

\* Oregon State College officers of administration, instruction, research, and extension—at Corvallis, in the counties, and at branch experiment stations; U. S. Department of Agriculture scientists on the campus; staff members of the Oregon State System of Higher Education at Corvallis. Includes only those with rank of instructor or above. Staff of Oregon Forest Research Center with courtesy rank are listed under RESEARCH on pages 390-1.



- ETHEL E ALLEN, B.S., Assistant Editor of Publications. (Retired.)  
B.S. (1916), Oregon State. At Oregon State 1917-48.
- LEONARD JOHN ALLEN, M.S., State 4-H Club Leader. (Retired.)  
B.S. (1914), M.S. (1915), Oregon State. At Oregon State since 1915; State 4-H Club Leader 1946-52.
- IRA SHIMMIN ALLISON, Ph.D., Professor of Geology; Chairman of Department.  
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- DELMAR ISAAC ALLMAN, Dr.P.H. Professor of Physical Education.  
B.S. (1928), Michigan State Normal College; M.S. (1931), Dr.P.H. (1936), Michigan.  
At Oregon State since 1937.
- EDWARD CHRISTOPHER ALLWORTH, B.S., LL.D., Manager and Secretary (professor) Memorial Union.  
B.S. (1916), LL.D. (1929), Oregon State. At Oregon State since 1925.
- MARGARET MARIE ALLYN, B.A., Columbia County Extension Agent, Home Economics (Assistant Professor).  
B.A. (1926), Iowa. At Oregon State since 1954.
- DONALD LOUIS AMORT, B.S. (E.Eng.), Instructor in Electrical Engineering.  
B.S. (E. Eng.) (1954), Oregon State. At Oregon State since 1959.
- WILBERT LOWELL ANDERSEN, B.S., Curry County Extension Agent (Assistant Professor).  
B.S. (1950), Oregon State. At Oregon State 1950-51 and since 1956.
- ARTHUR WALLACE ANDERSON, Ph.D., Associate Professor of Bacteriology; Associate Bacteriologist, Agricultural Experiment Station.  
B.S. (1942), North Dakota Agricultural College; M.S. (1947), Wisconsin; Ph.D. (1952), Oregon State. At Oregon State since 1953.
- CARL LEONARD ANDERSON, Dr.P.H., Professor; Chairman of Hygiene and Environmental Sanitation.  
B.S. (1928), M.S. (1932), Dr.P.H. (1934), Michigan. At Oregon State since 1949.
- DONALD EUGENE ANDERSON, B.S., Extension Dairy Specialist (Associate Professor).  
B.S. (1939), Iowa State. At Oregon State since 1944.
- MERLIN FRANK ANDERSON, M.S., Research Associate (Instructor) in Physics.  
B.S. (1954), Brigham Young; M.S. (1956), Oregon State. At Oregon State since 1959.
- NELSON CHRISTIAN ANDERSON, B.S., Morrow County Extension Agent (Professor).  
B.S. (1942), North Dakota Agricultural College. At Oregon State since 1946.
- RICHARD WILLIAM ANDERSON, Major, Associate Professor of Air Science.  
At Oregon State since 1959.
- LEON LESLIE ANDREWS, A.B., Lieutenant, USN, Assistant Professor of Naval Science.  
A.B. (1952), Willamette. At Oregon State since 1959.
- ALLEN FRANCIS ANGLEMIER, Ph.D., Assistant Professor of Food Technology; Assistant Food Technologist, Agricultural Experiment Station.  
B.S. (1953), Fresno State; M.S. (1955), Ph.D. (1957), Oregon State. At Oregon State since 1956.
- PETER ANTON, M.A., Assistant Professor of Philosophy.  
A.B. (1952). M.A. (1954), Indiana. At Oregon State since 1956.
- SPENCER BUTLER APPLE, JR., Ph.D., Professor of Horticulture, Head of Department; Horticulturist in Charge, Agricultural Experiment Station.  
B.S. (1933), M.S. (1936), Texas A and M; Ph.D. (1953), Washington State. At Oregon State since 1950.

- ARNOLD PIERCE APPLEBY, M.S., Junior Agronomist (Instructor), Farm Crops, Agricultural Experiment Station.  
B.S. (1957), M.S. (1958), Kansas State. At Oregon State since 1959.
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B.S. (1957), Minnesota. At Oregon State since 1957.
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B.S. (1949), Oregon State; M.S. (1950), Ph.D. (1953), Maryland. At Oregon State since 1953.
- GAYLEN LAMB ASHCROFT, M.S., Instructor in Soils; Junior Soil Scientist, Agricultural Experiment Station.  
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- WILFRED MCKENZIE ATWOOD, Ph.D., Professor Emeritus of Botany.  
A.B. (1907), A.M. (1910), Cornell College; M.S. (1911), Ph.D. (1913), Chicago. At Oregon State since 1913.
- WILLIAM SAMUEL AVERILL, B.S., Multnomah County Extension Agent (Professor).  
B.S. (1917), Oregon State. At Oregon State since 1930.
- HARRY GRANT AVERY, B.S., Professor Emeritus of Agriculture, Eastern Oregon Branch Experiment Station.  
B.S. (1930), Oregon State. At Oregon State since 1921.
- WILLIAM EDWARD BABCOCK, D.V.M., M.S., Associate Veterinarian (Associate Professor), Agricultural Experiment Station.  
B.S. (1944), D.V.M. (1945), Washington State; M.S. (1951), Oregon State. At Oregon State 1945-46 and since 1949.
- JAMES RONALD BAGGETT, Ph.D., Assistant Professor of Horticulture, Assistant Horticulturist, Agricultural Experiment Station.  
B.S. (1952), Idaho; Ph.D. (1956), Oregon State. At Oregon State since 1956.
- ANNETTE SUDMAN BAICH, Ph.D., Research Associate (Instructor), Science Research Institute.  
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- LEEDS CRIM BAILEY, B.S., Malheur County Extension Agent (Assistant Professor).  
B.S. (1941), Oregon State. At Oregon State since 1941.
- SAMUEL HALL BAILEY, M.S., Head of News Bureau; Associate Professor of Journalism.  
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- FRANK LLEWELLYN BALLARD, B.S., Associate Director, Federal Cooperative Extension Service (Professor).  
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- BOBBY LAINE BALLIOT, A.M.L.S., Assistant Circulation Librarian (Instructor).  
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- GEORGE HECTOR BARNES, Ph.D., Assistant Director Forest Research Division, Agricultural Experiment Station; Professor of Forest Management.  
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- ROBERT ERNEST BARR, Master Sergeant, Instructor in Military Science and Tactics.  
At Oregon State since 1957.
- JAMES GARNET BARRATT, JR., B.S., Athletic Business Manager, Intercollegiate Athletics (Assistant Professor).  
B.S. (1950), Oregon State. At Oregon State since 1950.
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- CHARLES EDWARD BEHLKE, Ph.D., Associate Professor of Civil Engineering.  
B.S. (1948), M.S. (1950), Washington State; Ph.D. (1957), Stanford. At Oregon State since 1956. On leave 1959-60.
- RICHARD OLIVER BELKENGREN, Ph.D., Associate Professor of Botany; Associate Botanist, Agricultural Experiment Station.  
B.S. (1939), Ph.D. (1941), Minnesota. At Oregon State since 1949.
- GEORGE SAM BELL, M.S., Track Coach (Instructor).  
B.A. (1950), Doane College; M.S. (1957), Oregon. At Oregon State since 1958.
- JAMES M BELL, M.S., (Civ. Eng.), Assistant Professor of Civil Engineering.  
B.S. (Civ. Eng.) (1954), Colorado State; M.S. (Civ. Eng.) (1955), Cal Tech. At Oregon State since 1958.
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B.S.F. (1949), Oregon State; M.F. (1951), Duke. At Oregon State since 1959.
- ELMA MARSHALL BEMIS, M.A., B.S. (Lib. Sc.), Binding Librarian (Instructor), Library.  
A.B. (1915), B.S. (1917), M.A. (1918), Phillips; M.A. (1942), Colorado State College; B.S. (Lib.Sc.) (1944), Denver. At Oregon State since 1944.
- CLEON VERNON BENNETT, M.A., Instructor in Speech.  
B.S. (1955), Murray State College (Kentucky); M.A. (1958), Southern Illinois. At Oregon State since 1958.
- NOEL LINDSAY BENNION, M.S., Extension Poultry Specialist (Professor).  
B.S. (1928), Utah State; M.S. (1932), Kansas State. At Oregon State since 1937.
- EVA MAE BENSON, M.A., Junior Nutritionist (Instructor) Home Economics, Agricultural Experiment Station.  
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- BURTON ERDMAN BERGER, M.S., Extension Information Specialist (Assistant Professor).  
B.S. (1949), (1954), Oregon State; M.R.E. (1952), Iliff School of Theology; M.S. (1955), Wisconsin. At Oregon State since 1956.
- PAUL CARSON BERGER, M.S., Instructor in Animal Husbandry.  
B.S. (1950), M.S. (1951), Oregon State. At Oregon State since 1955.
- ANNE SOUTH BERGHOLZ, M.A., Marion County Extension Agent (4-H Club) (Assistant Professor).  
B.S. (1941), Oregon State; M.A. (1953), Columbia. At Oregon State 1949-55 and since 1958.
- ROBERT WILLIAM BERGSTROM, Ed.D., Professor; Chairman of Professional Physical Education.  
B.S. (1937), Oregon State; M.A. (1942), Ed.D. (1947), Columbia. At Oregon State 1941-42, 1946-47, and since 1950.
- NORBORNE BERKELEY, M.A., Associate Professor of History.  
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- PAUL EMILE BERNIER, Ph.D., Professor of Poultry Husbandry; Poultry Husbandman, Agricultural Experiment Station.  
B.S.A. (1932), Université Laval; Ph.D. (1947), California. At Oregon State since 1947.

- DONALD WILSON BERRY, B.S., Jackson County Extension Agent (Assistant Professor).  
B.S. (1947), Oregon State. At Oregon State since 1954.
- JOSEPH HOWARD BERRY, Ed.M., Assistant to the President; Executive Secretary Oregon State College Foundation (Professor).  
B.S. (1929), Ed.M. (1954), Oregon State. At Oregon State since 1951.
- RALPH STEPHEN BESSE, M.S., Professor Emeritus of Agriculture.  
B.S.A. (1913), M.S. (1915), Missouri. At Oregon State since 1922. Associate Director of Agricultural Experiment Station, 1949-53.
- GARNET DOUGLAS BEST, B.S., County Agent Emeritus, Wallowa County (Associate Professor).  
B.S. (1925), Oregon State. At Oregon State since 1931.
- LAURN KEMP BEUTLER, B.S., Junior Agronomist (Instructor), Pendleton Branch Experiment Station.  
B.S. (1957), Utah State. At Oregon State since 1957.
- KAY ELIZABETH BEVANS, B.S., Hood River County Extension Agent, Home Economics (Instructor).  
B.S. (1958), Oregon State. At Oregon State since 1958.
- AMOS WILBUR BIERLY, B.S., Jefferson County Extension Agent (Associate Professor).  
B.S. (1941), Oregon State. At Oregon State since 1941.
- HERMAN ELDON BIERMAN, B.S., Umatilla County Extension Agent (Assistant Professor).  
B.S. (1948), Oregon State. At Oregon State since 1959.
- JULIUS FLOYD BINDER, B.S., Jefferson County Extension Agent, 4-H Club (Assistant Professor).  
B.S. (1948), Kansas State. At Oregon State since 1952.
- ROBERT HILL BIRDSALL, M.A., Agricultural Information Specialist (Assistant Professor).  
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- HAROLD MAYFIELD BLACK, B.S., Clackamas County Extension Agent, 4-H Club (Associate Professor).  
B.S. (1947), Oregon State. At Oregon State since 1949.
- EVA BLACKWELL, B.S., Assistant Registrar (Assistant Professor).  
B.S. (1924), Oregon State. At Oregon State since 1924.
- ARTHUR JAMES BLAKENEY, M.B.A., Assistant Professor of Business Administration.  
B.A. (1948), New Brunswick; M.A. (1949), Dalhousie University; M.B.A. (1954), Harvard. At Oregon State since 1957.
- GRANT E BLANCH, Ph.D., Professor of Agricultural Economics; Agricultural Economist, Agricultural Experiment Station.  
B.S. (1940), Utah State; M.S. (1941), Illinois; Ph.D. (1944), Cornell. At Oregon State since 1945.
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B.S. (1941), M.S. (1948), Penn State; Ph.D. (1955), California (Los Angeles). At Oregon State since 1948.
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B.A. (1959), St. Olaf College. At Oregon State since 1959.

- WILBUR LeROY BLUHM, B.S.**, Marion County Extension Agent (Assistant Professor).  
B.S. (1947), Nebraska. At Oregon State since 1957.
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B.S. (1934), Missouri; M.S. (1936), Kansas State; Ph.D. (1940), Cornell. At Oregon State since 1947.
- WALTER BENO BOLLEN, Ph.D.**, Professor of Bacteriology; Bacteriologist, Agricultural Experiment Station.  
B.S. (1921), M.S. (1922), Oregon State; Ph.D. (1924), Iowa State. At Oregon State since 1929.
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Licence ès Lettres (1915), Licence en Droit (1916), Licence ès Sciences (1916), Lyon; Docteur en Droit (1919), Paris; Docteur de l'Université de Lyon (Lettres) (1950). At Oregon State since 1943.
- THOMAS ALTON BOWN, B.S.**, Manager Plant Materials Center (Instructor) U. S. Department of Agriculture.  
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- PATRICIA ELIZABETH BRANDT, M.A., Assistant Serials Librarian (Instructor).  
B.S. (1955), Mt. Angel Women's College; B.Mus.Ed. (1957), B.Mus.Ed. (1958), Willamette; M.A. (1959), Denver. At Oregon State since 1959.
- WILLIAM HENRY BRANDT, Ph.D., Assistant Professor of Botany.  
B.A. (1950), Montana; M.Sc. (1951), Ph.D. (1954), Ohio State. At Oregon State since 1956.
- RUTH ELIZABETH BRASHER, M.A., State Extension Agent, 4-H Club (Assistant Professor).  
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- HAROLD WILLIAM BRAZIER, Lieutenant Colonel, Associate Professor of Air Science.  
At Oregon State since 1958.
- WILBUR PAUL BREESE, M.S., Assistant Fishery Biologist (Assistant Professor) Fish and Game Management, Agricultural Experiment Station.  
B.S. (1951), M.S. (1953), Oregon State. At Oregon State since 1953.
- LE ROY BREITHAAPT, B.S., Extension Agricultural Economist Emeritus.  
B.S. (1910), Oregon State. At Oregon State 1911-18, and since 1920.
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B.S. (1955), Oregon State. At Oregon State since 1957.
- GERALD WILLIAM BROCK, B.S., Assistant to Director of Dormitories. (Instructor).  
B.S. (1959), Oregon State. At Oregon State since 1959.
- ELIZABETH GRAVES BRODY, Ph.D., Instructor in Psychology; Counselor, Counseling and Testing Center.  
B.A. (1934), M.A. (1934), Ph.D. (1938), Minnesota. At Oregon State since 1958.
- GERALD WALTER BROG, B.S., Grant County Extension Agent (Assistant Professor), Federal Cooperative Extension.  
B.S. (1954), Oregon State. At Oregon State since 1956.
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B.S. (1922), M.S. (1959), Oregon State. At Oregon State since 1955.

- VICTOR JACK BROOKES, Ph.D., Assistant Professor of Entomology, Science Research Institute.  
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B.S. (1949), Colorado. At Oregon State since 1955.
- EARL EUGENE BROWN, B.S., Umatilla County Extension Agent (Assistant Professor).  
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- GORDON G BROWN, B.S., Associate Professor Emeritus of Horticulture, Mid-Columbia Branch Experiment Station.  
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- JOSEPH CHESTER BRYE, M.M., Professor of Music.  
B.M. (1940), M.M. (1941), Northwestern. At Oregon State since 1947.
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B.S. (1942), Illinois; M.S. (1945), Wisconsin; Ph.D. (1948), Oregon State. At Oregon State since 1948.
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- IRENE BUTTS, B.A., Instructor in English.  
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B.S. (1919), Missouri; M.S. (1940), Oregon State. At Oregon State since 1927.
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B.S. (1930), Battle Creek College; M.S. (1940), Oregon State. At Oregon State 1930-48 and since 1958.
- JEANNIE BEGG DIXON, M.A., Instructor in English.  
B.S. (1929); M.A. (1930), Northwestern. At Oregon State since 1959.
- NORMAN DALE DOBIE, Ph.D., Assistant Plant Pathologist, Agricultural Experiment Station; Extension Certification Specialist (Assistant Professor).  
B.S. (1947), South Dakota State; Ph.D. (1954), Oregon State. At Oregon State since 1949.
- THURSTON ERMON DOLER, M.S., Assistant Professor of Speech.  
B.A. (1948), Furman; M.S. (1949), Purdue. At Oregon State since 1949.
- THOMAS MICHAEL DONAHUE, Staff Sergeant, Instructor in Air Science.  
At Oregon State since 1958.
- EDWARD WOOD DONNALLY, LL.B., Associate Professor of Naval Science.  
A.B. (1938), LL.B. (1941), Florida. At Oregon State since 1958.
- ERNST JOHN DORNFELD, Ph.D., Professor of Zoology; Chairman of Department.  
B.S. (1933), Marquette; M.A. (1935), Ph.D. (1937), Wisconsin. At Oregon State since 1938.
- PETER DOUDOROFF, Ph.D., Supervisory Fishery Research Biologist (Professor).  
U. S. Public Health Service.  
A.B. (1935), Stanford; Ph.D. (1941), California. At Oregon State since 1953.
- RIZPAH ANNA DOUGLASS, M.A., Josephine County Extension Agent, Home Economics (Associate Professor).  
B.S. (1923), Nebraska; M.A. (1938), Columbia. At Oregon State since 1949.
- HAROLD CRAWFORD DOUTHIT, B.B.A., Captain, Assistant Professor of Military Science and Tactics.  
B.B.A. (1958), Georgia. At Oregon State since 1958.
- STEVE RICHARD DOWELL, B.S., Hood River County Extension Agent, (Instructor).  
B.S. (1955), Oklahoma State University. At Oregon State since 1956.
- DONALD THOMAS DOWNS, Ph.D., Associate Professor of Economics.  
A.B. (1948), M.A. (1949), Nebraska; Ph.D. (1954), Iowa. At Oregon State since 1956.

- DEAN ALEXANDER DOYAL, Major (Infantry Unit Director), Associate Professor of Military Science and Tactics.  
At Oregon State since 1958.
- MARJORY JEAN DOYLE, B.S., Grant County Extension Agent, Home Economics (Instructor), Federal Cooperative Extension.  
B.S. (1959), Iowa State. At Oregon State since 1959.
- WILLIAM HENRY DREESEN, Ph.D., Professor Emeritus of Economics.  
A.B. (1907), Greenville College; M.A. (1916), Ph.D. (1918), Illinois. At Oregon State since 1918.
- RICHARD STARK DRISCOLL, M.S., Instructor in Dairy and Animal Husbandry; Junior Range Ecologist, Agricultural Experiment Station.  
B.S. (1951), M.S. (1957), Colorado State University. At Oregon State since 1958.
- KARL FRANCIS DRLICA, M.S., Associate Professor of Physical Education; Coach of Rowing.  
B.S. (1940), M.S. (1952), Oregon State. At Oregon State since 1950.
- ULYSSES GRANT DUBACH, Ph.D., Dean of Men Emeritus.  
A.B. (1908), Indiana; M.A. (1909), Harvard; Ph.D. (1913), Wisconsin. At Oregon State since 1913.
- MARVIN CLARENCE DUBBÉ, Ed.D., Assistant Professor of English.  
B.S. (1929), M.A. (1932), Columbia; Ed.D. (1956), Oregon State. At Oregon State since 1952.
- GEORGE ANTHONY DUBINSKI, B.S., Instructor in Electrical Engineering.  
B.S. (1958), Oregon State. At Oregon State since 1959.
- MAY DUBOIS, Ph.D., Professor of Home Economics Education; Head of Department.  
B.S. (1931), M.S. (1939), Colorado State University; Ph.D. (1951), Ohio State. At Oregon State since 1939.
- ANDREW ADRIAN DUNCAN, Ph.D., Extension Vegetable Production Specialist (Associate Professor).  
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- CLARENCE RAPHAEL DUNLAP, B.S., Instructor in Electrical Engineering.  
B.S. (1935), Oregon State. At Oregon State since 1958.
- EDISON ELLSWORTH EASTON, M.B.A., C.P.A., Associate Professor of Business Administration.  
B.S. (1947), Southern California; M.B.A. (1951), California; C.P.A. Oregon and California. At Oregon State since 1951.
- ARNOLD CHRISTIAN EBERT, B.S., Agricultural Information Chairman (Associate Professor).  
B.S. (1936), Oregon State. At Oregon State since 1936.
- CLARA WILLIAMS EDABURN, M.A., Associate Professor of Clothing, Textiles, and Related Arts.  
B.S. (1925), Iowa State; M.A. (1939), Columbia. At Oregon State since 1939.
- LOUIS LAIRD EDWARDS, M.E., Head Counselor, School of Business and Technology; Placement Director, Business Administration Dept., Instructor in Business Administration.  
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- MARGARET ANN EDWARDS, B.S., Junior Nutritionist (Instructor) Home Economics, Agricultural Experiment Station.  
B.S. (1937), Washington State. At Oregon State since 1951.

- ARTHUR SKOGMAN EINARSEN, B.S., Biologist (Professor), U. S. Fish and Wildlife Service. (Retired.)  
B.S. (1923), Washington. At Oregon State since 1935.
- SIGMUND EISNER, Ph.D., Assistant Professor of English.  
B.A. (1947), M.A. (1949), California; Ph.D. (1955), Columbia. At Oregon State since 1954. On leave 1958-60.
- FLOYD ELROY ELLERTSON, Ph.D., Assistant Entomologist (Assistant Professor), Mid-Columbia Branch Experiment Station.  
B.A. (1942), Ph.D. (1958), Oregon State. At Oregon State since 1953.
- PAUL R ELLIKER, Ph.D., Professor of Bacteriology; Chairman of Department; Bacteriologist in Charge, Agricultural Experiment Station.  
B.S. (1934), M.S. (1935), Ph.D. (1937), Wisconsin. At Oregon State since 1947.
- RUSSELL EUGENE ELLIS, B.Arch.E., R.A., Associate Professor of Architecture.  
B.S. (1949), B.Arch.E. (1952), Washington State. At Oregon State since 1949.
- JOSEPH WALDO ELLISON, Ph.D., Professor of History; Head of Department.  
A.B. (1917), M.A. (1919), Ph.D. (1923), California. At Oregon State since 1924.
- WILLIAM FREDERICK ENGESSER, M.S., Professor of Industrial Engineering.  
B.S. (1941), M.S. (1950), Northwestern. At Oregon State since 1941.
- DAVID CHARLES ENGLAND, Ph.D., Assistant Professor of Animal Husbandry; Assistant Animal Husbandman, Agricultural Experiment Station.  
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B.S. (1947), M.S. (1951), E.E. (1958), Oregon State. At Oregon State since 1947.
- FLORENCE SARAH EUREN, B.S. (Lib. Sc.) Assistant Serials Librarian (Instructor), Library.  
B.E. (1937), Moorhead State Teachers College; B.S. (Lib.Sc.) (1946), Minnesota. At Oregon State 1946-49 and since 1957.
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B.S. (1937), Fukien Christian University; M.S. (1944), Ph.D. (1948), Oregon State. At Oregon State since 1948.
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B.S. (1930), M.S. (1932), E.E. (1937), Oregon State. At Oregon State since 1929.
- WILLIAM KREITER FERRELL, Ph.D., Associate Professor of Forest Management.  
B.S.F. (1941), Michigan; M.F. (1946), Ph.D. (1949), Duke. At Oregon State since 1956.
- BARBARA RUTH FESSLER, B.S., Instructor in Clothing, Textiles, and Related Arts.  
B.S. (1953), Oregon State. At Oregon State since 1959.
- BILLIE DOTSON FINCHER, Chief Quartermaster, USN, Instructor in Naval Science.  
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- ELIZABETH O'BRIEN FLOOD, M.S., Instructor in Mathematics.  
B.S. (1940), M.S. (1947), Oregon State. At Oregon State since 1954.
- GERHARD RAGNVALD FLOOD, M.S., Associate Professor of Physical Education.  
B.S. (1929), M.S. (1941), Oregon State. At Oregon State 1940-41, and since 1943.
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- WILSON HOOVER FOOTE, Ph.D., Assistant Director (Professor), Agricultural Experiment Station.  
B.S. (1942), Utah State; M.S. (1946), Ph.D. (1948), Minnesota. At Oregon State since 1948.

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- WANDA FOREE, B.S., Douglas County Extension Agent, 4-H Club (Instructor), Federal Cooperative Extension.  
B.S. (1956), Colorado State University. At Oregon State since 1959.
- WALTER CYRIL FOREMAN, Ph.D., Professor of English.  
B.A. (1933), Union College (Nebraska); M.A. (1937), Nebraska; Ph.D. (1948), California. At Oregon State since 1948.
- ROBERT NEAGLE FORREST, Ph.D., Assistant Professor of Physics.  
B.S. (1950), M.S. (1952), M.S. (1954), Ph.D. (1959), Oregon. At Oregon State since 1959.
- HERMAN CARL FORSLUND, M.S., Professor of Pharmacy.  
B.S. (1938), M.S. (1940), Washington State. At Oregon State since 1945.
- LEE RUSSELL FOSTER, B.S., Hood River County Extension Agent (Associate Professor).  
B.S. (1933), Washington State. At Oregon State since 1947.
- ROY ARCHIBALD FOSTER, H.S.D., Associate Professor of Hygiene and Health Education.  
B.A. (1937), Concordia College; M.S. (1950), H.S.D. (1953), Indiana. At Oregon State since 1955.
- WILLIAM ABRAM FOSTER, JR., Ph.D., Assistant Professor of Sociology.  
B.S. (1942), California; M.S. (1947), Ph.D. (1958), Cornell. At Oregon State since 1958.
- TED E FOULKE, M.D., Medical Consultant, Student Health Service (Professor).  
B.S. (1944), Case Institute of Technology; M.D. (1951), Western Reserve. At Oregon State since 1955.
- CARROLL WARREN FOX, Ph.D., Associate Professor of Animal Husbandry; Associate Animal Husbandman, Agricultural Experiment Station.  
B.S. (1943), Colorado State University; Ph.D. (1954), California. At Oregon State since 1956.
- DOROTHY BOURKE FOX, B.A., Associate Professor of Art.  
B.A. (1925), California School of Arts and Crafts. At Oregon State since 1928.
- FRED WAYNE FOX, Ph.D., Assistant Professor of Science Education.  
B.S.Ed. (1942), Miami University (Ohio); M.A. (1949), Ph.D. (1957), Ohio State. At Oregon State since 1957.
- REX RAYMOND FOX, B.S., LCDR United States Navy, Assistant Professor of Naval Science.  
B.S. (1947), Idaho. At Oregon State since 1958.
- ROBERTA C FRASIER, M.So.W., Extension Family Life Specialist (Associate Professor), Federal Cooperative Extension.  
B.A. (1933), Washington State; M.So.W. (1952), Washington. At Oregon State since 1959.
- LLOYD McDONALD FRAZIER, B.S., Associate Professor of Industrial Engineering and Industrial Arts.  
B.S. (1949), Oregon State. At Oregon State since 1947.
- WILLIAM ALLEN FRAZIER, Ph.D., Professor of Horticulture; Horticulturist (Vegetable Crops), Agricultural Experiment Station.  
B.S. (1930), Texas A and M; M.S. (1931), Ph.D. (1933), Maryland. At Oregon State since 1949.

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B.S. (1950), Oregon State. At Oregon State since 1956.
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B.S. (1943), M.S. (1948), Oregon State; Ph.D. (1959), Oregon. At Oregon State since 1943.
- HARRY FREUND, Ph.D., Associate Professor of Chemistry.  
B.S. (1940), College of City of New York; M.S. (1941), Ph.D. (1945), Michigan. At Oregon State since 1947.
- CHARLES BOSTWICK FRIDAY, Ph.D., Professor of Economics; Chairman of Department.  
B.A. (1943), M.A. (1947), Ph.D. (1950), Colorado. At Oregon State since 1950.
- DEAN WILFORD FRISCHKNECHT, M.S., Extension Animal Husbandry Specialist (Assistant Professor), Federal Cooperative Extension.  
B.S. (1942), M.S. (1943), Utah State. At Oregon State since 1956.
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- JOHN KITCHENER FRIZZELL, M.S., Wasco County Extension Agent (Associate Professor).  
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- HERBERT FARLEY FROLANDER, Ph.D., Associate Professor of Oceanography.  
Ed.B. (1946), Rhode Island College of Education; Sc.M. (1950), Ph.D. (1955), Brown. At Oregon State since 1959.
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A.B. (1933), California. At Oregon State since 1942.
- WINNIFRED KEIL FULMER, M.S., Head Counselor School of Home Economics (Associate Professor).  
B.S. (1930), M.S. (1938), Iowa State. At Oregon State since 1938.
- EVELYN FUNK, M.S., State Extension Agent (Associate Professor).  
B.S. (1942), Oklahoma State University; M.S. (1955), Cornell. At Oregon State since 1958.
- ROBERT FRANK FUQUAY, Ph.D., Associate Professor of Political Science.  
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- WILLIAM FURTICK, Ph.D., Associate Professor of Farm Crops; Associate Agronomist, Agricultural Experiment Station.  
B.S. (1949), Kansas State; M.S. (1952), Ph.D. (1958), Oregon State. At Oregon State since 1949.
- JOHN CLIFTON GARMAN, Ph.M., Associate Professor of Physics.  
B.S. (1922), Oregon State; Ph.M. (1933), Wisconsin. At Oregon State since 1923.
- LEON GAROLAN, Ph.D., Marketing Management Specialist (Associate Professor), Federal Cooperative Extension Service.  
B.S. (1947), California Polytechnic; M.S. (1955), Ph.D. (1959), Wisconsin. At Oregon State 1947-56 and since 1959.
- JAMES LATHROP GARRARD, Ph.D., Instructor in General Engineering.  
B.A. (1933), College of Puget Sound; B.A.Ed. (1937), Eastern Washington College of Education; M.A. (1951), Ph.D. (1956), Washington. At Oregon State since 1957.

- RALPH GARREN, JR., M.S., Assistant Professor of Horticulture; Assistant Horticulturist, Agricultural Experiment Station.  
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- CHESTER ARTHUR GARRISON, M.A., Assistant Professor of English.  
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- EVRA ALTA GARRISON, M.A., Assistant Professor Emeritus of Foods and Nutrition.  
B.S. (1923), Nebraska; M.A. (1930), California. At Oregon State since 1930.
- JAY SCHOOLING GASHWILER, M.S., Research Biologist (Associate Professor), U. S. Fish and Wildlife Service.  
B.S. (1937), Oregon State; M.S. (1939), Maine. At Oregon State since 1954.
- ROBERT EUGENE GASKELL, Ph.D., Professor of Mathematics.  
B.A. (1933), Albion; M.S. (1934), Ph.D. (1940), Michigan. At Oregon State since 1959.
- DOROTHY GATTON, M.A., Professor Emeritus of Clothing, Textiles, and Related Arts.  
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- CHARLES GERALD GAVIN, B.S., Union County Extension Agent (Assistant Professor).  
B.S. (1949), Wyoming. At Oregon State since 1955.
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B.S. (1951), Colorado; M.S. (1954), Mississippi State. At Oregon State since 1959.
- LOUIS GUSTAVE GENTNER, Ph.D., Entomologist (Professor), Southern Oregon Branch Experiment Station.  
B.S. (1915), Oregon State; M.S. (1918), Wisconsin; Ph.D. (1953), Oregon State. At Oregon State since 1930.
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B.S. (1948), M.S. (1949), Kansas State. At Oregon State since 1954.
- WALLACE EUGENE GIBBS, Ed.M., Assistant Football Coach (Instructor).  
B.S. (1950), Ed.M. (1959), Oregon State. At Oregon State since 1958.
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- DAVID HEGGIE GILBERT, M.A., Instructor in English.  
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- EARL C GILBERT, Ph.D., Professor of Physical Chemistry.  
B.S. (1916), M.S. (1917), Hiram College; Ph.D. (1922), Chicago. At Oregon State since 1917.
- FRANCOIS ARCHIBALD GILFILLAN, Ph.D., Dean of the School of Science; Professor of General Science; Executive Committee, Oregon Institute of Marine Biology.  
B.S. (1918), Ph.G. (1918), Ph.C. (1920), Oregon State; Ph.D. (1921), Yale. At Oregon State 1918, 1922-25, and since 1927.
- GORDON WAVERLY GILKEY, M.F.A., Arts D., Professor of Art; Head of Department.  
B.S. (1933), Albany College; M.F.A. (1936), Oregon; Arts D. (honorary, 1957), Lewis and Clark. At Oregon State since 1947.
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B.S. (1907), M.S. (1911), Oregon State; Ph.D. (1915), California. At Oregon State 1908-11 and since 1918. Curator of Herbarium 1918-51.

- AMORY TINGLE GILL, B.S., Head Coach of Basketball (Professor).  
B.S. (1925), Oregon State. At Oregon State since 1926.
- PERCY MARGARET GILL, M.S., Associate Professor of Physical Education for Women.  
B.A. (1931); California; M.S. (1948), Oregon State. At Oregon State since 1945.
- CAMPBELL MOORE GILMOUR, Ph.D., Professor of Bacteriology.  
B.S. (1941), M.S. (1945), British Columbia; Ph.D. (1949), Wisconsin. At Oregon State since 1951.
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B.S. (1959), Oregon State. At Oregon State since 1959.
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B.S. (1952), M.S. (1955), Oregon State; Ph.D. (1960), Purdue. At Oregon State since 1959.
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- SAUL BOGDAN GORSKI, B.S., Instructor in Mechanical Engineering.  
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B.S. (1907), E.E. (1908), B.S. (1908), M.E. (1909), M.S. (1909), Oregon State. At Oregon State since 1908.
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- IRIS GRAY, M.M., Associate Professor of Music.  
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- MARTHA MARIE GUENTHER, M.A., (Lib. Sc.), Assistant Catalog Librarian (Instructor).  
B.A. (1923), Iowa; B.S. (Lib.Sc.), (1931), Illinois; M.A. (Lib.Sc.), (1938), Michigan.  
At Oregon State since 1959.
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B.S. (1947), Pennsylvania State Teachers (Edinboro); M.F.A. (1948), California College of Arts and Crafts. At Oregon State since 1948.
- JOHN REGINALD GURTON, B.S., Lane County Extension Agent, 4-H Club (Assistant Professor).  
B.S. (1939), Minnesota. At Oregon State since 1948.
- RUTH TILLIE GUSTAVSON, B.S., Klamath County Extension Agent, Home Economics (Assistant Professor).  
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B.S. (1918), M.S. (1923), Penn State; Ph.D. (1926), Minnesota. At Oregon State since 1927.
- FRED HAGELSTEIN, B.S., Baker County Extension Agent (Assistant Professor).  
B.S. (1951), Oregon State. At Oregon State 1951-53 and since 1958.
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A.B. (1911), Washington; Graduate (1912), B.L.S. (1942), Pratt Institute. At Oregon State since 1921.
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- WILLIAM EDWARD HAMILL, Master Sergeant, Instructor in Military Science and Tactics.  
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- HENRY PAUL HANSEN, Ph.D., Dean of Graduate School; Professor (Chairman) of General Science; Professor of Palynology.  
Ph.B. (1930), Ph.M. (1931), Wisconsin; Ph.D. (1937), Washington. At Oregon State since 1939.
- NIELS JOHN HANSEN, B.S., Polk County Extension Agent (Professor).  
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- JOHN ROBERT HARDISON, Ph.D., Plant Pathologist (Professor), U. S. Department of Agriculture.  
B.S. (1939), Washington State; M. S. (1940), Ph.D. (1942), Michigan. At Oregon State since 1944.
- JESSE EDWARD HARMOND, B.S., Principal Agricultural Engineer (Professor), Head of Small Seed Harvesting and Processing Section, U. S. Department of Agriculture.  
B.S. (1932), Mississippi State. At Oregon State since 1945.
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B.S. (1940), Oregon State; M.S. (1942), Penn State. At Oregon State since 1942.
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- CHARLES NEWTON HARRIS, M.A., Associate Professor of Speech.  
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- IRWIN CECIL HARRIS, M.S.J., Manager of Educational Activities (Associate Professor).  
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B.S. (1917), Washington State; M.S. (1922), Iowa State. At Oregon State 1919-31, and since 1932.
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- MOYLE E HARWARD, Ph.D., Associate Professor of Soils; Associate Soil Scientist, Agricultural Experiment Station.  
B.S. (1948), Brigham Young; M.S. (1950), Massachusetts; Ph.D. (1952), North Carolina State. At Oregon State since 1955.
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A.B. (1942), Ph.D. (1953), Illinois. At Oregon State since 1953.
- ERNEST MILLARD HAUSER, B.S., Malheur County Extension Agent, 4-H Club (Associate Professor).  
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B.S. (1937), Panhandle Agricultural Mechanical College. At Oregon State since 1959.
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B.S. (1939), Oregon State. At Oregon State since 1942.
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B.S. (1919), Michigan; M.S. (1931), Oregon State. At Oregon State since 1920.
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B.S. (1923), Ph.D. (1939), Minnesota. At Oregon State since 1948.
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B.S. (1935), Oregon State; M.S. (1958), Michigan State University. At Oregon State since 1945.
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B.S. (1953), California Polytechnic; M.S. (1955), Oregon State. At Oregon State since 1958.

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B.S. (1918), Ph.D. (1935), Washington. At Oregon State since 1941.
- SUSAN HOUSTON, B.S., (H.E.), Josephine County Extension Agent, 4-H Club  
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- ROBERT LEE HOWARD, B.S., Research Associate, Science Research Institute, Act-  
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B.S. (1958), Oregon State. At Oregon State since 1958.
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B.S. (1956), Oregon State. At Oregon State since 1957.
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- WALTER JOHN JENDRZEJEWSKI, B.S., Klamath County Extension Agent (Associate Professor).  
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B.S. (1950), Iowa State; M.S. (1955), North Carolina State; Ph.D. (1958), Oregon State. At Oregon State since 1958. On leave 1959-60.
- HARRY RUDOLPH SANDQUIST**, B.S., Malheur County Extension Agent (Professor).  
B.S. (1938), Oregon State. At Oregon State since 1945.
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- HENRY DELBERT SCHALOCK, Ph.D., Assistant Professor of Family Life.  
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- HAROLD WILLIAM SCHULTZ**, Ph.D., Professor, Head of Department of Food and Dairy Technology; Food Technologist in Charge, Agricultural Experiment Station.  
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- RALPH MELVIN SIMMONS, Master Sergeant, Instructor in Air Science.  
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- THOMAS JAMES SINNARD, B.S., Instructor in Architecture.  
B.S. (1959), Oregon State. At Oregon State fall term 1959.
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B.A. (1936), North Central; M.S. (1938), North Dakota State; Ph.D. (1950), Washington State. At Oregon State since 1953.
- LOUIS SLEGEL, Ph.D., Professor of Mechanical Engineering; Head of Department.  
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B.S. (1935), Oregon State. At Oregon State since 1935.
- KATHRYN HASKIN SMITH, Ed.M., Director of Teacher Placement (Assistant Professor).  
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A.B. (1906), Syracuse; M.A. (1909), Ph.D. (1912), Harvard. At Oregon State since 1919. Dean of Lower Division and Service Departments 1932-49.
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- WESLEY WARREN SMITH, M.Eng., Associate Professor of Mechanical Engineering.  
B.Sc. (1934), M.Eng. (1947), Montana State. At Oregon State 1947-48, and since 1956.

- WILLIAM CHARLES SMITH, B.S., Farm Program Director (Assistant Professor) (KOAC).  
B.S. (1942), Nebraska. At Oregon State since 1952.
- FORREST ARLO SNEVA, B.S., Range Conservationist (Assistant Professor), Squaw Butte-Harney Branch Experiment Station, U. S. Department of Agriculture.  
B.S. (1952), Utah State. At Oregon State since 1952.
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B.S. (1953), Oregon State. At Oregon State since 1954.
- CHARLES EDWIN THOMAS, M.M.E., Professor Emeritus of Mechanics and Materials.  
M.E. (1913), M.M.E. (1931), Cornell. At Oregon State since 1918.
- DALE OREN THOMAS, Ph.D., Assistant Professor of Physical Education; Varsity Wrestling Coach, Freshman Wrestling Coach.  
B.A. (1947), Cornell College; M.P.E. (1948), Purdue; Ph.D. (1956), Iowa. At Oregon State since 1956.
- MARION DAWS THOMAS, B.S., Extension Agricultural Economist (Professor).  
B.S. (1937), Oregon State. At Oregon State 1937-45, and since 1947.
- BENJAMIN GARRISON THOMPSON, Ph.D., Professor Emeritus of Entomology.  
B.S. (1918), M.S. (1924), Oregon State; Ph.D. (1939), Washington. At Oregon State since 1924.
- BETTY LYND THOMPSON, M.A., Associate Professor of Physical Education for Women.  
A.B. (1923), Illinois Wesleyan; M.A. (1926), Wisconsin. At Oregon State since 1927.
- JOHN GRAY THOMPSON, B.S., Umatilla County Extension Agent, 4-H Club (Associate Professor).  
B.S. (1948), Oregon State. At Oregon State since 1948.
- THOMAS WILLIAM THOMPSON, B.S., Sherman County Extension Agent (Assistant Professor).  
B.S. (1949), Oregon State. At Oregon State since 1949.
- GEORGE EARL THORNBURGH, M.S., Associate Professor of Mechanical Engineering.  
B.S. (1944), Nebraska; M.S. (1950), Iowa State. At Oregon State since 1952.
- ROBERT LEWIS TICKNOR, Ph.D., Associate Horticulturist (Associate Professor), North Willamette Branch Experiment Station.  
B.S. (1950), Oregon State; M.S. (1951), Ph.D. (1953), Michigan State. At Oregon State since 1959.

- IAN JAMES TINSLEY, Ph.D., Assistant Chemist (Assistant Professor), Agricultural Experiment Station.  
B.Sc. (1950), Sydney University, (Australia); M.S. (1955), Ph.D. (1958), Oregon State. At Oregon State since 1957.
- HELEN TIRPAK, B.S., Marion County Extension Agent Home Economics (Assistant Professor).  
B.S. (1949), Stout State College. At Oregon State since 1958.
- WENDELL H TOMPKINS, LL.B., Assistant Professor of Business Administration.  
A.B. (1934), Kansas; LL.B. (1948), Yale. At Oregon State since 1959.
- PALMER STANLEY TORVEND, M.S., Washington County Extension Agent (Professor).  
B.S. (1938), Oregon State; M.S. (1953), Columbia. At Oregon State since 1939.
- GEORGE GALLOWAY TOWN, M.S., Instructor in Mathematics.  
B.S. (1952), M.S. (1954), Wisconsin. At Oregon State since 1956.
- LOUIS NAPOLEON TRAVER, General Superintendent of Physical Plant (Retired).  
At Oregon State 1918-22 and 1940-49.
- BESSIE GWYNETH TRESSLER, B.S. (Lib. Sc.), Order Librarian (Associate Professor), Library.  
A.B. (1926), Emporia; B.S. (Lib.Sc.) (1930), Illinois. At Oregon State since 1946.
- GEORGE LOCKWOOD TRIGG, Ph.D., Assistant Professor of Physics.  
A.B. (1947), A.M. (1950), Ph.D. (1951), Washington University. At Oregon State since 1954.
- EDWARD JOHN TRIONE, Ph.D., Assistant Professor of Plant Pathology; Biochemist, U. S. Department of Agriculture; Science Research Institute.  
B.A. (1950), Chico State; Ph.D. (1957), Oregon State. At Oregon State since 1959.
- RICHARD HENRY TROJAN, M.A., Assistant Professor of Art.  
B.A. (1948), Fresno State; M.A. (1953), Columbia. At Oregon State since 1956.
- PAUL RICHARD TSCHIRLEY, M.S., Instructor in Geography.  
B.A. (1956), Eastern Washington College of Education; M.S. (1958), Oregon State. At Oregon State since 1958.
- DAN C TUCKER, B.S., Instructor in Agricultural Economics; Junior Agricultural Economist, Agricultural Experiment Station.  
B.S. (1951), Nebraska. At Oregon State since 1958.
- RICHARD RAY TUCKER, M.S., Acting Instructor in Mathematics.  
B.S. (1952), Washington; M.S. (1955), Oregon State. At Oregon State since 1958.
- WILLIAM BENJAMIN TUCKER, County Agent Emeritus, Jackson County (Professor).  
At Oregon State since 1921.
- RICHARD MARVIN TWENGE, B.S., Assistant Football Coach (Instructor).  
B.S. (1950), Oregon State. At Oregon State since 1954.
- ARTHUR RICHARD TYNES, M.S., Acting Instructor in Physics.  
B.S. (1950), Montana State; M.S. (1953), Oregon State. At Oregon State since 1954.
- MARIA UHER, Ph.D., Instructor in Modern Languages.  
Ph.D. (1942), University of Vienna. At Oregon State since 1958.
- WILLIAM FRANCIS UNSOELD, Ph.D., Assistant Professor of Philosophy.  
B.S. (1951), Oregon State; B.D. (1954), Pacific School of Religion; Ph.D. (1959), Washington. At Oregon State since 1958.
- FLORENCE MARION VASEY, M.Sc., Instructor in Foods and Nutrition.  
B.Sc. (1949), Manitoba; M.Sc. (1951), McGill. At Oregon State since 1956.

- PAUL BARTHOLOMEW VALENTI, M.S., Assistant Basketball Coach (Assistant Professor).  
B.S. (1947), M.S. (1957), Oregon State. At Oregon State since 1949.
- WILLIAM CAMPBELL VAN ARSDELL III, Ph.D., Junior Animal Physiologist (Instructor), Dairy and Animal Husbandry, Agricultural Experiment Station.  
B.S. (1949), M.S. (1951), Oregon State; M.S. (1954), Oregon Medical School; Ph.D. (1959), Oregon State. At Oregon State since 1959.
- NORBERT JOSEPH VANDEHEY, M.Ed., Linn County Extension Agent, 4-H Club (Assistant Professor), Federal Cooperative Extension.  
B.S. (1949), Oregon State; M.Ed. (1955), Linfield College. At Oregon State since 1959.
- EDNA MARJORIE VAN HORN, Ph.D., Associate Professor of Home Administration.  
B.A. (1923), Colorado College; M.A. (1932), Ph.D. (1953), Columbia. At Oregon State 1939-40, 1942, and since 1944.
- LILLIAN SCHROEDER VAN LOAN, Ed.D., Assistant Professor of Psychology.  
B.A. (1950), Oregon College of Education; Ed.M. (1951), Ed.D. (1959), Oregon State. At Oregon State 1929-32, and since 1933.
- WENDELL LINWOOD VAN LOAN, Ed.D., Professor of Education.  
B.S. (1928), M.S. (1933), Oregon; Ed.D. (1942), Stanford. At Oregon State since 1958.
- ANTONE CORNELIS VAN VLIET, M.S., Assistant Professor of Forest Products.  
B.S. (1952), M.S. (1958), Oregon State. At Oregon State since 1955. On leave 1959-60.
- WILLIAM ROY VARNER, E.E., Ph.D., Professor of Physics.  
B.S. (1912), M.S. (1932), Ph.D. (1939), Oregon State; E.E. (1914), Westinghouse. At Oregon State 1929-32, and since 1934.
- EDWARD KEMP VAUGHAN, Ph.D., Professor of Plant Pathology; Plant Pathologist, Agricultural Experiment Station.  
B.S. (1929), New Mexico State; M.S. (1932), Oregon State; Ph.D. (1942), Minnesota. At Oregon State since 1947.
- ERNEST VANCOURT VAUGHN, Ph.D., Professor Emeritus of History.  
B.L. (1900), M.A. (1904), Missouri; Ph.D. (1910), Pennsylvania. At Oregon State since 1924.
- LYMAN RAY VAWTER, D.V.M., M.S., Veterinarian in Charge (Professor), Animal Diagnostic Service, Agricultural Experiment Station.  
D.V.M. (1918), Kansas State; M.S. (1931), Cornell. At Oregon State since 1951.
- JUNIUS DANIEL VERTREES, B.S., Klamath County Extension Agent (Assistant Professor).  
B.S. (1940), Oregon State. At Oregon State 1949-53, and since 1957.
- LARRY WILLIAM VINCENT, B.S. (E.Eng.), Instructor in Electrical Engineering.  
B.S. (E.Eng.) (1958), Oregon State. At Oregon State since 1959.
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B.S. (E.Eng.) (1924), M.S. (1928), Oregon State; Ph.D. (1938), Pennsylvania State. At Oregon State since 1938.
- WILLIAM SACHAROV VOLMER, B.S., Captain, Assistant Professor of Military Science and Tactics.  
B.S. (1946), West Point. At Oregon State since 1958.
- FRANK VON BORSTEL, JR., M.A., Douglas County Extension Agent, 4-H Club (Assistant Professor).  
B.S. (1948), Oregon State; M.Agr.Sc. (1952), University of New Zealand. At Oregon State since 1948.

- STANLEY ELLIOTT WADSWORTH, B.S., Associate Professor of Horticulture; Associate Horticulturist, Agricultural Experiment Station.  
B.S. (1935), Cornell. At Oregon State since 1946.
- GEORGE FORDYCE WALDO, M.S., Horticulturist (Professor), U.S. Department of Agriculture.  
B.S. (1922), Oregon State; M.S. (1926), Michigan State. At Oregon State since 1932.
- RODNEY KING WALDRON, M.A., Assistant Librarian (Associate Professor), Library.  
B.A. (1950), M.A. (1950), Denver. At Oregon State since 1954.
- JOSEPH HOWE WALES, M.A., Associate Fishery Biologist; Associate Professor of Fish and Game.  
B.A. (1930), M.A. (1931), Stanford. At Oregon State since 1959.
- MAUD MORSE WALKER, M.S., Extension Specialist in Group Development (Professor).  
B.S. (1927), M.S. (1931), Oregon State. At Oregon State 1935-38, and since 1956. On leave of absence.
- ALICE LOCKWOOD INGALLS WALLACE, M.A., Instructor in Speech.  
B.S. (1932), Oregon State; M.A. (1938), Northwestern. At Oregon State since 1954.
- EUNICE EWER WALLACE, M.Ed., Instructor in English.  
B.A. (1934), College of Idaho; M.Ed. (1959), Oregon State. At Oregon State since 1959.
- JOE DEREK WALLACE, M.S., Junior Animal Husbandman (Instructor), Squaw Butte-Harney Branch Experiment Station.  
B.S. (1957), New Mexico A and M; M.S. (1959), Texas A and M. At Oregon State since 1958.
- MARY SUSANNE WALLACE, M.S., Instructor in Foods and Nutrition.  
B.S. (1955), New York State University Teacher's College (Plattsburgh); M.S. (1957), Rhode Island. At Oregon State since 1958.
- ROBERT BOEN WALLS, M.S., Professor of Music; Director of Music; Head of Department.  
B.E. (1932), Minnesota State Teachers (Moorhead); M.S. (1936), North Dakota. At Oregon State since 1947.
- DON COIN WALROD, B.S., Columbia County Exxtension Agent (Associate Professor).  
B.S. (1942), Colorado State University. At Oregon State since 1948.
- ANN LOUISE WALSH, B.A., Instructor in Family Life and Home Administration.  
B.A. (1944), California (Santa Barbara). At Oregon State since 1959.
- AUSTIN FREDERIC WALTER, Ph.D., Professor of Political Science; Chairman of Department.  
B.A. (1940), Carleton; M.A. (1942), Fletcher School of Law and Diplomacy; Ph.D. (1954), Michigan. At Oregon State since 1950.
- JESSE SEBURN WALTON, B.S., Professor of Chemical Engineering; Head of Department.  
B.S. (1928), Iowa. At Oregon State since 1945.
- CHIH HSING WANG, Ph.D., Professor of Chemistry; Professor (Chemistry), Science Research Institute.  
B.S. (1937), University of Shantung, China; M.S. (1947), Ph.D. (1950), Oregon State. At Oregon State since 1950.
- RUPERT ALRED WANLESS, B.S., Professor of General Engineering, Head of Department.  
B.S. (1923), Oregon State. At Oregon State 1929-32, and since 1935.



- MARGARET CHRISTIAN WARE, M.S., Assistant Professor of Foods and Nutrition.  
B.S. (1941), M.S. (1944), Oregon State. At Oregon State since 1945.
- HARRIET JANET WARNER, A.B., Assistant Reference Librarian (Assistant Professor), Library.  
A.B. (1919), Certificate of Librarianship (1930), California. At Oregon State since 1930.
- CHARLES EDWARD WARREN, M.S., Associate Professor of Fish and Game Management; Associate Fishery Biologist, Agricultural Experiment Station.  
B.S. (1949), M.S. (1951), Oregon State. At Oregon State since 1953.
- REX WARREN, M.S., Extension Farm Crops Specialist (Professor).  
B.S. (1931), Utah State; M.S. (1933), Oregon State. At Oregon State 1934-45, and since 1947.
- JOSEPHINE WASSON, M.A., Associate Professor of Art and Architecture.  
B.A. (1925), Washington State; M.A. (1933), Columbia. At Oregon State since 1943.
- ALVIN SIDNEY WATERHOUSE, B.S., Instructor in Mechanical Engineering.  
B.S. (1958), Oregon State. At Oregon State since 1958. Fall term 1959 only.
- JOHN McLAIN WATKINS, B.A., Instructor in Speech.  
B.A. (1959), Montana State. At Oregon State since 1959.
- JOHN LOWE WATSON, B.A., C.P.A., Assistant Comptroller, Oregon State System of Higher Education (Professor).  
B.A. (1939), Washington; C.P.A. (1939), Washington, (1952), Oregon. At Oregon State since 1947.
- ROBERT STUART WATSON, B.S., Assistant Football Coach (Assistant Professor).  
B.S. (1951), California (Los Angeles). At Oregon State since 1955.
- FRANCES MARGARET WATTS, B.S., Lane County Extension Agent (Home Economics) (Assistant Professor).  
B.S. (1949), Minnesota. At Oregon State since 1958.
- JACK LLOYD WAUD, B.S., Extension Certification Specialist (Instructor).  
B.S. (1955), Oregon State. At Oregon State since 1955.
- KENNETH EDWIN WAUD, B.S., Crook County Extension Agent (Assistant Professor).  
B.S. (1950), Oregon State. At Oregon State since 1953.
- LEONARD JOSEPH WEBER, B.S., Associate Professor of Electrical Engineering.  
B.S. (1952), Oregon State. At Oregon State since 1954.
- MARY LOUISE WEBER, M.S., Instructor in Physical Education.  
B.S. (1954), Central Michigan College; M.S. (1957), U.C.L.A. At Oregon State since 1957.
- EMMA LOUISE WEBSTER, B.S., Multnomah County Extension Agent, Home Economics (Associate Professor).  
B.S. (1930), Washington State. At Oregon State since 1953.
- ERMA MARION WEIR, M.S., Associate Professor of Physical Education for Women.  
B.E. (1936), Minnesota State Teachers (Bemidji); M.S. (1941), Washington. At Oregon State since 1945.
- EARL WILLIAM WELLS, J.D., Professor of Speech; Chairman of Department.  
A.B. (1921), Iowa; M.A. (1927), Wisconsin; J.D. (1928), Iowa. At Oregon State since 1921.
- VERA LUCILE WELLS, M.S., Assistant Professor of Clothing, Textiles, and Related Arts.  
B.S. (1948), M.S. (1953), Oregon State. At Oregon State since 1948.

- JAMES RICHARD WELTY, M.S., Instructor in Mechanical Engineering.  
B.S. (1954), M.S. (1959), Oregon State. At Oregon State since 1958.
- HAROLD ELDON WERTH, B.S., Benton County Extension Agent (Assistant Professor).  
B.S. (1948), Oregon State. At Oregon State 1949-51, and since 1956.
- WILLIAM IRVIN WEST, M.F., Professor of Forest Products; Head of Department.  
B.S.F. (1939), M.F. (1941), Washington. At Oregon State since 1946.
- HAZEL KELSEY WESTCOTT, B.S., Administrative Assistant (Assistant Professor), President's Office. (Retired.)  
B.S. (1920), Oregon State. At Oregon State 1919-21, and since 1926.
- WARREN CYRIL WESTGARTH, M.S., Assistant Professor of Civil Engineering.  
B.S. (1949), M.S. (1954), Oregon State. At Oregon State since 1949. On leave 1959-61.
- MELVIN NEIL WESTWOOD, Ph.D., Associate Professor of Horticulture; Associate Horticulturist, Agricultural Experiment Station.  
B.S. (1952), Utah State; Ph.D. (1956), Washington State. At Oregon State since 1960.
- PAUL HENRY WESWIG, Ph.D., Chemist (Professor), Agricultural Experiment Station.  
B.A. (1935), St. Olaf College; M.S. (1939), Ph.D. (1941), Minnesota. At Oregon State since 1941.
- CHARLES WHEELER, M.A., Instructor in English.  
A.B. (1951), U.C.L.A.; M.A. (1958), Highlands University. At Oregon State since 1959.
- WILLIAM PERRY WHEELER, M.F., Associate Professor of Forest Management; Personnel Director, School of Forestry.  
B.S. (1948), M.F. (1949), Minnesota. At Oregon State since 1949.
- HAROLD H WHITE, M.S., Superintendent, Agronomist (Professor), Southern Oregon Branch Experiment Station.  
B.S. (1920), M.S. (1937), Oregon State. At Oregon State since 1931.
- SIDNEY DOUGLAS WHITE, M.S., Assistant Professor of Art.  
B.A. (1951), New Mexico; M.S. (1952), Wisconsin. At Oregon State since 1958.
- CHARLES EDWARD WICKS, Ph.D., Associate Professor of Chemical Engineering.  
B.S. (1950), Oregon State; M.S. (1952), Ph.D. (1954), Carnegie Institute of Technology. At Oregon State since 1954.
- ERNEST HERMAN WIEGAND, B.S.A., Professor Emeritus of Food Technology.  
B.S.A. (1914), Missouri. At Oregon State since 1919.
- MIRIAM AUGUSTA WIGGENHORN, M.A., Associate Professor of Family Life.  
B.A. (1931), Nebraska; M.A. (1936), Columbia. At Oregon State since 1946.
- CURTIS J WILDER, M.S., Associate Professor of Food Technology; Associate Food Technologist, Agricultural Experiment Station.  
B.S. (1940), M.S. (1941), Montana State. At Oregon State since 1944.
- WILLIAM DONALD WILKINSON, Ph.D., Professor of Geology.  
B.A. (1923), Ph.D. (1932), Oregon. At Oregon State since 1932.
- DALE HERBERT WILLEY, M.A., Instructor in English.  
B.A. (1950), Linfield; M.A. (1952), Washington State. At Oregon State since 1959.
- EARL CLARK WILLEY, M.S., Professor Emeritus of General Engineering.  
B.S. (1921), M.S. (1941), Oregon State. At Oregon State since 1921.
- GEORGE ALFRED WILLIAMS, A.M., Professor of Mathematics.  
A.B. (1918), Illinois; A.M. (1926), California. At Oregon State since 1920.

- JESSAMINE CHAPMAN WILLIAMS, M.A., Professor Emeritus of Foods and Nutrition.  
B.S. (1906), M.A. (1921), Columbia. At Oregon State since 1923.
- MAX BULLOCK WILLIAMS, Ph.D., Professor of Chemistry.  
B.S. (1936), M.S. (1938), Utah; Ph.D. (1941), Cornell. At Oregon State since 1941.
- ROY CHRISTOPHER WILLIAMS, Master Sergeant, Instructor in Military Science and Tactics.  
At Oregon State since 1955.
- RUSSELL WILLARD WILLIAMSON, M.A., Associate Professor of Industrial Engineering and Industrial Arts.  
B.S. (1935), Oregon State; M.A. (1948), Minnesota. At Oregon State since 1946.
- STANLEY ELLSWORTH WILLIAMSON, Ed.D., Professor of Science Education; Chairman of Department.  
B.A. (1931), Nebraska Wesleyan; M.A. (1936), Columbia; Ed.D. (1956), Oregon. At Oregon State since 1946.
- OLIVER JOSEPH WILLIFORD III, B.S., Captain, Assistant Professor of Military Science and Tactics.  
B.S. (1951), Virginia Military Institute. At Oregon State since 1959.
- CLAYTON STANLEY WILLS, M.Ed., Clackamas County Extension Agent (Assistant Professor), Federal Cooperative Extension.  
B.S. (1950), M.Ed. (1957), Oregon State. At Oregon State since 1958.
- CHARLES OWENS WILSON, Ph.D., Dean of the School of Pharmacy, Professor of Pharmaceutical Chemistry.  
Ph.C. (1932), B.S. (1934), M.S. (1935), Ph.D. (1938), Washington. At Oregon State since 1959.
- MAUD MATHES WILSON, A.M., Professor Emeritus of Home Economics Research.  
B.S. (1913), Nebraska; A.M. (1931), Chicago. At Oregon State since 1925.
- NORMAN WILLIAM WILSON, M.A., Assistant Professor of English.  
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B.S. (1949), Ed.M. (1955), Oregon State. At Oregon State since 1949.
- ROBERT ELLIOT WILSON, M.S., Instructor in Mechanical Engineering.  
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B.A. (1942), Iowa; M.F. (1947), Colorado State University. At Oregon State since 1952.
- SHERWOOD ANN WILSON, M.A., Instructor in Psychology.  
B.S. (Ed.) (1954); M.A. (1956), Kansas. At Oregon State since 1959.
- GUSTAV HANS WILSTER, Ph.D., Professor Emeritus of Dairy Technology; Dairy Technologist, Agricultural Experiment Station.  
B.S. (1920), M.S. (1921), Ph.D. (1928), Iowa State. At Oregon State since 1929.
- EDNA MAE WIMSATT, B.S., Malheur County Extension Agent, Home Economics (Assistant Professor).  
B.S. (1950), Drexel Institute of Technology. At Oregon State since 1951.

- CARLYN REO WINGER, M.A., Associate Professor of Speech.  
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- FRED EVERETT WINGER, D.Ed., Professor of Business Education and Secretarial Science.  
B.S. (1934), Nebraska; M.A. (1938), Iowa; D.Ed. (1951), Oregon. At Oregon State since 1947.
- JUDITH HOFSTRA WINKLER, B.S. (Ed.), Instructor in Physical Education.  
B.S.(Ed.) (1957), Michigan. At Oregon State since 1957.
- WILLIAM WINKLER, B.S. (Ed.), Assistant Professor of Physical Education.  
B.S.(Ed.) (1955), Michigan. At Oregon State since 1957.
- EUGENE PHILIP WINTERS, B.S., Jackson County Extension Agent (Assistant Professor).  
B.S. (1950), Oregon State. At Oregon State since 1954.
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- RICHARD PERRY WITHYCOMBE, B.S., Instructor in Industrial Engineering.  
B.S. (1958), Oregon State. At Oregon State since 1958.
- JOANE SOPHIA WOHLGENANT, M.Ed., Instructor in Home Economics Education.  
B.S. (1948), Montana State; M.Ed. (1956), Colorado State. At Oregon State since 1956.
- FLOYD BYRON WOLBERG, M.S., Associate Professor of Dairy Husbandry; Associate Dairy Husbandman, Agricultural Experiment Station.  
B.S. (1928), M.S. (1932), Wisconsin. At Oregon State since 1945.
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B.S. (1939), South Dakota State; M.S. (1940), Idaho; Ph.D. (1959), Utah State. At Oregon State since 1947.
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B.S. (1938), Oregon; M.S. (1940), Oregon State; Ph.D. (1945), Wisconsin. At Oregon State since 1951.
- JACK HENRY WOOD, B.S., Clatsop County Extension Agent (Associate Professor).  
B.S. (1947), Washington State; M.A. (1958), Columbia (Extension Education). At Oregon State since 1948.
- ETHAN LINDEN WOODS, B.S., Crook County Extension Agent (Associate Professor).  
B.S. (1934), Oregon State. At Oregon State since 1934.
- ROBERT A WORK, B.S., Head, Water Supply Forecasting Section (Professor), U. S. Department of Agriculture (Portland).  
B.S. (1927), California. At Oregon State since 1929.
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- GRACE IRENE WORKMAN, B.S., Portland City Extension Agent, 4-H Club (Assistant Professor).  
B.S. (1936), Oregon State. At Oregon State since 1957.
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B.S. (1958), Oregon State. At Oregon State since 1958.

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B.S. (1924), Rhode Island; M.S. (1926), Ph.D. (1936), Wisconsin. At Oregon State since 1946.
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B.S. (1929), Oregon State. At Oregon State since 1929.
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B.S. (1941), National Central (China); M.S. (1949), Ph.D. (1952), Oregon State. At Oregon State since 1952.
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B.S. (1955), M.S. (1958), Utah. At Oregon State since 1958.
- ROSALIND WULZEN, Ph.D., Sc.D., Professor Emeritus of Zoology.  
B.S. (1904), M.S. (1910), Ph.D. (1914), California; Sc.D. (1943), Oregon. At Oregon State since 1933.
- BRUCE WYATT, M.S., Research Associate (Instructor) in Oceanography.  
B.S. (1956), Humboldt State; M.S. (1959), Oregon State. At Oregon State since 1959.
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A.B. (1952), Harvard; M.A. (1955), Princeton. At Oregon State since 1958.
- RICHARD YAMAMOTO, Ph.D., Assistant Professor of Veterinary Medicine; Assistant Veterinary Serologist, Agricultural Experiment Station.  
B.S. (1952), Washington; M.A. (1955), Ph.D. (1957), California (Davis). At Oregon State since 1959.
- HOYA Y YANG, Ph.D., Associate Professor of Food Technology; Associate Food Technologist, Agricultural Experiment Station.  
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- CHARLES THEODORE YERIAN, Ph.D., Professor, Head of Departments of Business Education and Secretarial Science.  
B.S. (1932), Oregon State; M.S. (1936), Ph.D. (1938), Iowa. At Oregon State since 1937.
- ELMON EUGENE YODER, B.S., Instructor in Civil Engineering.  
B.S. (C.Eng.) (1947), B.S. (Agr.Eng.) (1952), Oregon State. At Oregon State since 1958.
- RAY ARNOLD YODER, M.F., Associate Professor of Forest Management.  
B.S. (1941), Oregon State; M.F. (1942), Harvard. At Oregon State since 1949.
- DELOSS PALMER YOUNG, B.S., Professor of Speech.  
B.S. (1926), Oregon State. At Oregon State since 1927.
- J LOWELL YOUNG, Ph.D., Chemist (Assistant Professor) United States Department of Agriculture.  
B.S. (1953), Brigham Young; Ph.D. (1956), Ohio State. Postdoctoral fellow. Department of Agricultural Biochemistry (1956-57), Ohio State. At Oregon State since 1957.
- JAMES ORVILLE YOUNG, M.S., Assistant Dairy Technologist (Assistant Professor), Agricultural Experiment Station.  
B.S. (1949), M.S. (1951), Oregon State. At Oregon State since 1950.
- MARVIN MILES YOUNG, B.S., Josephine County Extension Agent (Instructor).  
B.S. (1954), Oregon State. At Oregon State since 1958.

- MARY KATHERINE YOUNG, B.S., Multnomah County Extension Agent, 4-H Club (Instructor).  
B.S. (1949), Michigan State; Institutional Administration Internship (1951), Washington. At Oregon State since 1956.
- ROY ALTON YOUNG, Ph.D., Chairman of Department of Botany; Head Botany and Plant Pathology, Agricultural Experiment Station.  
B.S. (1941), New Mexico A and M; M.S. (1942), Ph.D. (1948), Iowa State. At Oregon State since 1948.
- CHESTER THEODORE YOUNGBERG, Ph.D., Professor of Soils; Soil Scientist, Agricultural Experiment Station.  
B.S. (1941), Wheaton College; M.F. (1947), Michigan; Ph.D. (1951), Wisconsin. At Oregon State 1952-57, and since 1958.
- TEH CHU YU, M.S., Assistant Food Technologist (Assistant Professor), Agricultural Experiment Station.  
B.S. (1940), Fukien Christian University; M.S. (1951), Oregon State. At Oregon State since 1951.
- JOHN ALFRED YUNGEN, M.S., Assistant Agronomist (Assistant Professor), Southern Oregon Branch Experiment Station.  
B.S. (1950), M.S. (1959), Oregon State. At Oregon State since 1950.
- EDWIN ARTHUR YUNKER, Ph.D., Professor of Physics; Chairman of Department.  
A.B. (1924), California; Ph.M. (1930), Wisconsin; Ph.D. (1940), Stanford. At Oregon State since 1925.
- ROBERT JOSEPH ZAWORSKI, S.M., Assistant Professor of Mechanical Engineering.  
S.B. (Mech.Eng.) (1947); S.M. (Mech.Eng.) (1958), MIT. At Oregon State since 1958.
- LESLIE ZEIGLER, Th.D., Instructor in Religion.  
B.S. (1936), M.L.S. (1959), California; B.D. (1954), Th.D. (1957), Pacific School of Religion. At Oregon State since 1959.
- ROBERT ZELINKA, B.S., Assistant Football Coach (Instructor).  
B.S. (1952), California (Los Angeles). At Oregon State since 1955.
- FRANKLIN ROYALTON ZERAN, Ph.D., Dean, School of Education; Director of Summer Session; Professor of Education, Head of Department.  
A.B. (1930), M.A. (1932), Ph.D. (1937), Wisconsin. At Oregon State since 1947.
- ADOLPH ZIEFLE, M.S., Phar.D., Professor Emeritus of Pharmacy.  
Ph.C. (1904), B.S. (1907), M.S. (1919), Michigan; Phar.D. (1928), Pittsburgh. At Oregon State since 1914. Dean of the School of Pharmacy 1914-45.
- QUENTIN BLISS ZIELINSKI, Ph.D., Associate Professor of Horticulture; Associate Horticulturist, Agricultural Experiment Station.  
B.S. (1941), Oregon State; M.S. (1942), Ohio State; Ph.D. (1947), Virginia. At Oregon State since 1947.
- AFTON ZUNDEL, B.S., Lincoln County Extension Agent (Associate Professor).  
B.S. (1929), Oregon State. At Oregon State 1934-44, and since 1957.
- FRED CASPER ZWAHLEN, JR., A.M., Assistant Professor of Journalism; News Bureau Assistant.  
B.A. (1949), Oregon State; A.M. (1952), Stanford. At Oregon State since 1950.

# Organization and Facilities

## History

**O**REGON PIONEERS had great faith in education. As soon as feasible they started schools, and some communities built academies and colleges.

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

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

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

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

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

Corvallis College originally occupied a site at Fifth and Madison Streets. 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 engi-

neering, 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; and Education, 1918. The first summer school was held in 1918. Extension work had its beginnings in 1889 when farmers' institutes were held at four places in the State.

In the organization of 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 Oregon State College the School of Science was established offering undergraduate and graduate work in the biological and physical sciences and mathematics. Work in mining was incorporated in 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 1960.

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

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

Oregon State College is a member of the National Association of State Universities and has been accredited by the Northwest Association of Secondary and Higher Schools since 1924. The Departments of Chemistry and Chemical Engineering are approved by the American Chemical Society. 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. Since 1929 the School of Pharmacy has been accredited and is now rated as a class A school by the American Council on Pharmaceutical Education.

Presidents of Oregon State College since its founding are: W. A. Finley, 1865-72; B. L. Arnold, 1872-92; John M. Bloss, 1892-96; H. B. Miller, 1896-97; Thomas M. Gatch, 1897-1907; William Jasper Kerr, 1907-32; George Wilcox Peavy, 1934-40; Frank Llewellyn Ballard, 1940-41; Francois Archibald Gilfillan (acting), 1941-42; August Leroy Strand, from 1942.

## 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 College, 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 insti-



tutions; 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.

## Campus

Corvallis (population 20,000), is situated in the heart of the Willamette Valley between the Cascade Mountains and the Coast Range, 85 miles south of Portland and 60 miles from the Pacific Ocean. The climate is equable, the average annual temperature being about 52° F. Rainfall, mostly during the winter months, averages about 39 inches annually.

Development of the Oregon State College campus during the past forty years has been in accordance with a permanent plan prepared for the institution by consulting landscape architects of national recognition (John C. Olmsted in 1908, A. D. Taylor in 1925 and 1945).

The buildings are arranged first as colleges or schools, and further are grouped in quadrangles, so planned that expansion can take place without injury to established buildings and campus areas. Each quadrangle is planted with ornamental trees and shrubs, which serve as living laboratory material for students engaged in landscape and horticultural studies.

The area from near 9th Street to 14th Street, known as the East Campus, provides a recreation park and a surveying laboratory for engineering students. Directly west are the East Quadrangle and Engineering Quadrangle, the West Quadrangle (center of the present campus), the Men's and Women's Quadrangles, and the Mall (30th Street), with farms beyond.

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

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

## Forest and Farm Lands

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

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

## Library

Kerr Library contains approximately 370,000 volumes housed in a central stack unit, the Main Reference Room, and four divisional Reading Rooms. Books in the pure and applied sciences, numbering 66,000 volumes, are easily available in an attractive open-shelf arrangement in the Science Room. The Engineering and Applied Technology collection of 39,000 volumes and the Agriculture collection of 48,000 volumes are similarly arranged on open shelves in a separate reading room. The Beaver Book Room, also in an open-shelf arrangement, houses all the books in the various literatures, as well as a representative browsing collection. Books in which required readings are assigned are housed in the Reserve Reading Room. The reading room seats 575.

In the Mary J. L. McDonald Room the Library has a collection of fine and rare editions, numbering 3,138 volumes. This collection and the attractively decorated and furnished room which houses it came to the Library as a gift from Mrs. McDonald.

**Collections.** The books in the Library, and the 14,000 or more volumes added annually, are closely coordinated with the teaching and research conducted by the College. The collections are therefore primarily technical and scientific, but sufficient books in the humanities and the social sciences are owned to give the Library a good cultural and literary balance. Subjects in which special strength has been developed are textiles, costume design, nutrition, mathematics, and the history of horticulture. Collections of some distinction are also being built up in biology, food technology, chemistry, plant pathology, mycology, and entomology. Over 3,200 periodicals are received currently and a large portion of the Library's holdings are consequently bound journal volumes.

The Library is a designated depository for publications of the United States Government, Carnegie Institute of Washington, U. S. Atomic Energy Commission, Atomic Energy Research Establishment of Great Britain, Rand Corporation of Santa Monica, California, and official publications of the State of Oregon. It is also a depository for U. S. Army maps and has a total map collection of over 52,300 items. The picture collection includes 70,300 pieces. Newspapers received currently, some of which are on microfilm, total 122.

All books, numbering 1,277,000 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 College. 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.

Books may be taken for home use by anyone connected with Oregon State College and by others on permission. Students may keep books for two weeks, with privilege of renewal. Faculty members may borrow for more extended periods. Graduate students and seniors are admitted to the stacks by permission of the Librarian.

**Unified Facilities.** Library facilities of the State institutions of higher education in Oregon are coordinated through a director of libraries. The director is also librarian of Oregon State College, where central offices of the library system are located.

The collections at the several institutions are developed to meet special needs on each campus; but the book stock of the libraries, as property of the State, circulates freely to permit the fullest use of all books. A combined author list of all books and periodicals in the State System is maintained in the central office to facilitate a better distribution of the book stock and to eliminate unnecessary duplication of material.

## Museums and Collections

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

**The Horner Museum of the Oregon Country** (LULA MARY STEPHENSON, curator) contains valuable collections of historic, scientific, and artistic interest. Located on the ground floor of the Coliseum, the displays include, for example, the famous Hank Monk stagecoach and many weapons and tools of pioneer Oregon, displays of antique glass and china, objects of art from foreign countries, Indian artifacts, mineral collections, mounted birds and animals, a replica of the U. S. Capitol, and many other types of exhibits, approximately 12,000 articles in all. Visitors to the Museum exceed 30,000 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** (FRANK F. HASBROUCK, curator) contains approximately 250,000 specimens of insects, about 80% of them from Oregon, and most of them on pins. The collection includes 4,100 microscope slides and life histories of many economically important insects in 480 glass-topped Riker mounts. The collection is housed in Cordley Hall.

**The Geological Collections**, housed in Education Hall, include minerals, ores, rocks, invertebrate fossils, some vertebrate fossils, and a large number of fossil plants. More than 800 mineral species are arranged according to the Dana classification, and ore samples are arranged according to the Lindgren classification of ores. A paleontological collection in the Paleontology Laboratory supplements the other collections.

The **Herbarium** (LA REA DENNIS, acting curator) housed on the fourth floor of Cordley Hall, contains about 152,000 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 types 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.

## Official Publications

Through its Office of Publications, Oregon State College publishes:

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

MONOGRAPHS, including studies in botany, economics, education and guidance, entomology, geology, history, literature and languages, mathematics and statistics, political science, zoology, and MONOGRAPH REPRINTS

BIOLOGY COLLOQUIUM PROCEEDINGS (annually)

IMPROVING COLLEGE AND UNIVERSITY TEACHING (quarterly)

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

## Cooperation With Kasetsart University

Oregon State College and Kasetsart University in Thailand entered into a contract sponsored by the U. S. State Department's International Cooperation Administration on October 14, 1954.

A total of 18 OSC faculty members have participated directly in the program in Thailand, and 59 staff members from Kasetsart University came to this country for training, 36 of them to Oregon State College. The purpose of the contract, carried out without expense to the State of Oregon, was to assist the university in Thailand in improving its curriculum, teaching methods, facilities, agricultural research, and extension and demonstration projects.

OSC faculty who participated in the program are President A. L. Strand, one month; E. L. Potter, one month; J. R. Beck, one year; F. E. Price, five months; Margaret Fincke, six months; R. W. Henderson, nine months; M. D. Dawson, 15 months; R. E. Fore, 20 months; G. R. Hoerner, 42 months; and the following on regular two years tours in Thailand: I. S. Allison, D. D. Bolinger, E. E. Easton, Agnes Kolshorn, Gerald Korzan, A. V. Logan, H. D. Reese, Elmon Yoder, and Ray Yoder. Wilbur Cooney, associate dean of agriculture, was campus coordinator for the program. Grant Blanch, C. V. Plath, and Gordon Sitton have held appointments in Thailand from the Council on Economic and Cultural Affairs, New York City.

# Procedures and Requirements

**S**TUDENTS are held responsible for familiarity with requirements governing such matters as the routine of registration, academic standards, student activities, organizations, etc. Complete academic regulations and procedures are included in the *Schedule of Classes*, a copy of which is available to each student at the Registrar's Office.

## Admission

Oregon State College accepts students of good moral character who provide evidence of suitable preparation for work at the college level. To be admitted for any regular term an applicant must present to the Registrar a formal application and certified satisfactory records of all of his high school and other academic work. These records become the property of Oregon State College. For failure to have submitted complete records the College may cancel the student's registration.

All application materials should be filed four weeks before the applicant expects to enter the institution. Unavoidable delay in registration may result if materials are filed later. The Registrar will examine the records submitted and will notify the applicant of his admission status. When the College is unable to accommodate all qualified persons who apply, preference will be given to Oregon residents. A \$10 fee may be charged for fall-term applications filed after August 31.

**Oregon residents** being admitted to first-year (freshman) standing:

a. Must have completed the following uniform entrance requirements approved by the institutions of higher education in Oregon:

Graduation from a standard high school with 19 units, including 3 units in English, 2 units in social science, 1 unit in mathematics, and 1 unit in the natural sciences.

b. Must have achieved one of the following:

- (1) A "C" average or above in all high school subjects taken toward graduation, or
- (2) A score on a standard college-aptitude test within the upper 60%, or
- (3) 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.

**Out-of-State** residents graduated from high school and registering as freshmen:

a. Must have completed the distribution of subject matter required for Oregon residents.

b. Must have achieved a 2.50 grade-point average or above in all high school subjects taken toward graduation, or one of the following:

- (1) A score on a standard college aptitude test within the upper 50%, or
- (2) A minimum grade-point average of 2.00 (C) on 12 term hours of college-level course work.

**Transfers from other colleges**, regardless of residence, are required to present a 2.00 ("C") grade-point average and evidence of eligibility to return to colleges previously attended. A student transferring fewer than 12 term hours must also have an acceptable high school record.

**Admission with Graduate Standing.** A student applying for entrance to the Graduate School must present to the Registrar official transcripts of all undergraduate and graduate academic work. Eligibility for admission to graduate study is dependent upon: (a) achievement of the bachelor's degree from an accredited institution, (b) achievement of a minimum 2.50 grade-point average on all work taken, and (c) suitable preparation for the intended field of study.

**Admission of Foreign Students.** Records in a foreign language must be accompanied by a certified English translation. Policies established by the Admissions Committee determine the minimum entrance requirements which apply to records received from each foreign country. Considered are subject-matter preparation, marks or grades achieved, and degrees (or equivalents) earned.

**Admission to Summer Session.** The only requirement for admission to the Summer Session is ability to do the work. Those persons who wish to earn degrees and those who expect to attend regular sessions must meet standard admission requirements.

**Admission as Special Student.** Persons who have not completed high school but who qualify by maturity and experience may be admitted as special students.

**Admission from Unaccredited Institutions.** Admission to undergraduate or graduate standing involving work done in an unaccredited institution is determined by the Admissions Committee. If a student is admitted on probation, credit for work done in an unaccredited institution is withheld until validated on this campus.

## Placement Examinations

An entering student takes no *entrance* examination; he does, however, take *placement* tests. These tests provide the faculty with information to use as a basis for advising and assisting students in planning their college programs and for determining which courses they may take. Students do not register for courses until all test results are available for counseling purposes. Any student entering Fall Term and not present during New Student Week will be delayed in registration.

**The psychological examination** gives an indication of ability to do college work. The results are used in planning the student's educational and vocational programs. It is required of all undergraduate students.

**The English examination** covers the fundamentals of composition. Students who show exceptional ability are placed in honors sections (Wr 111-H, 112-H, and 113-H). Students who reveal the need for more training are expected to take two hours of instruction in addition to the regular Wr 111 course. No credit or grades are given for this extra work.

Foreign undergraduate students whose native language is not English must take an examination to determine whether they should enroll in Eng 91, 92, 93, English for Foreign Students.

**The mathematics examination** covers the fundamentals of elementary algebra. Students whose scores are sufficiently high on this test then take extra tests in advanced algebra and trigonometry for possible advanced placement. Students whose scores are very low on the elementary algebra test take a test on general mathematics to indicate possible need for remedial arithmetic. Results of these tests normally take precedence in course placement over units or credits earned. The tests are required of all entering students except those whose Advanced Standing Report shows credit for either analytic geometry or calculus or both college algebra and college trigonometry.

**Other placement examinations** may be required in certain majors. Engineering students whose placement test scores indicate a deficiency in mathematics will be classified as "pre-engineering" 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 College for the first time includes tuberculin test, vaccination against smallpox, and other tests. It provides a scientific basis for adjustment of the student's physical education to his individual needs. It also provides a safeguard both to the student and to the institution. For the student, it may result in the discovery and correction of defects which, if allowed to continue, might seriously impair his health; for the the institution it may result in the prevention of epidemics which might develop from undiagnosed cases of contagious disease.

## Degrees and Certificates

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

- Humanities and Social Sciences, *B.A., B.S.*
- Science, *B.A., B.S., M.A., M.S., Ph.D.*
- Agriculture, *B.S., B. Agr., M. Agr., M.S., Ph.D.*
- Business and Technology, *B.A., B.S.*
- Education, *B.A., B.S., Ed.B., M.A., M.S., Ed.M., Ed.D.*
- Engineering and Industrial Arts, *B.A., B.S., M.A., M.S., A.E., Ch.E., C.E., E.E., I.E., M.E., Min.E., Ph.D.*
- Forestry, *B.S., B.F., M.S., M.F., Ph.D.*
- Home Economics, *B.A., B.S., M.A., M.S., M.H.Ec., Ph.D.*
- Naval Science, *B.A., B.S.*
- \*Nursing Education, *B.A., B.S.*
- Pharmacy, *B.A., B.S., M.A., M.S., Ph.D.*
- Physical Education (through School of Education), *B.A., B.S., Ed.B.*

Air Science, Military Science and Tactics, 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.

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\* Conferred upon completion of Preparatory Nursing Curriculum at Oregon State College and the nursing curriculum at the Medical School in Portland.

Lower division work leading to certificates (*Junior Certificate, Junior Certificate with Honors Privileges, Lower Division Certificate*) 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 education at the University of Oregon Medical and Dental schools in Portland.

### Requirements for Bachelor's Degree

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

#### General requirements (institutional)

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

- a. English Composition: 9 term hours. (Students who do not earn a minimum rating in the English placement examination are advised to take extra work concurrently with Wr 111; students who show exceptional ability by the placement examination are placed in honors sections.)
- b. Physical Education: Five terms in activity courses.
- c. General Hygiene: One term.
- d. Military Science: Six terms for men. (A veteran may receive exemption from the military requirement and partial exemption from the physical education requirement by submitting to the Registrar a copy of his separation paper—D214.)

#### Graduation requirements (institutional)

- a. Term Hours: Minimum, 192 [in Engineering and Forestry, 204; in Pharmacy (5-year curriculum), 240]. The minimum must include:
  - (1) Hours in upper division courses: Minimum, 45.
  - (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, English (except Wr 50, 111, 112, 113), philosophy, speech, and foreign languages (including at least 9 hours of review grammar and literature at the second-year or higher level).
  - (2) Bachelor of Science: 36 hours in science, or 36 hours in social science, or 45 hours in science and social science together.
  - (3) Professional bachelor's degree (Ed.B., B.F., B.Agr.): Fulfillment of all school requirements.
- c. Group requirements:
  - (1) For students working toward a Junior Certificate in Lower Division—at least 9 term hours of work selected from three "groups" representing comprehensive fields of knowledge: (a) literature or upper division foreign language; (b) sciences; and (c) social science.



- (2) For students in the School of Science—at least 9 term hours approved by the dean in each of (a) and (b) listed above.
  - (3) For students in the professional and technical schools—at least 9 term hours approved by the dean in each of two of the three fields (a), (b), or (c) listed above.
- d. Grade-Point Average: Minimum of 2.00 on all of the following:
- (1) All college work.
  - (2) All work taken in residence at this institution (exclusive of General Extension Division courses).
  - (3) Last 45 hours for which registered.
- e. Residence: Minimum, 45 term hours (normally the last 45). Classroom work taken through the General Extension Division is considered as resident work. A student qualifying for his degree by study through the General Extension Division must satisfactorily complete a minimum of 12 term hours while registered as a full-time Oregon State College student.
- f. Dean's certification of fulfillment of all requirements of major school. (For details see school advisers or deans.)
- g. Restrictions:
- (1) Correspondence study: Maximum, 60 term hours.
  - (2) Law or Medicine: Maximum, 48 term hours.
  - (3) Music: Individual and group instruction: Maximum, 12 term hours.
- h. Application for degree: To become a candidate for a degree a student must have achieved senior standing and must make formal application for the degree. (For his own protection, the student must file his application with the Registrar during the first week of the term preceding the term in which he expects to complete requirements for a degree.)

### Concurrent degrees

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

### Requirements for Certificates

These certificates may be granted on completion of approved programs:

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

**Junior Certificate with Honors Privileges**, granted on application and completion of requirements for Junior Certificate with a grade-point average of at least 2.75 and with approval of dean.

**Lower Division Certificate**, granted on application and completion of two years of lower division work and with approval of dean.

**Certificate in Agriculture**, granted on application and completion of 2-year curriculum and with approval of dean.

**Certificate in Engineering**, granted on application and completion of 2-year curriculum and with approval of dean.

### Requirements for Advanced Degrees

For advanced degree requirements see GRADUATE SCHOOL section of this Catalog. Students who, before they have received baccalaureate degrees, take courses they wish to apply toward an advanced degree may have a limited number of credits by petition. See "Reserving Credits" under GRADUATE SCHOOL. A copy of the Graduate Catalog may be obtained from the Registrar.

## Definitions

**Academic Year:** three terms of approximately 12 weeks each.

**Summer Session:** an 8-week session from late June to mid-August.

**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:** preparation expected for proper continuation in a course, expressed in specific course or courses, by academic classification, or by stated circumstances.

**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 descriptions in this Catalog or in the separately published *Schedule of Classes*.

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

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

### Course Numbering System

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

- 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, including "group 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 College 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

**Grading System**

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

A student who has done acceptable work to the time of the final examination but does not take it will receive an *E*. The *E* may be removed upon presentation to a faculty committee of an acceptable reason for not taking the final examination. An *E* not removed within the first term after the student's return to the institution will be changed to an *F*. For failure in a course, the grade of *F* is given. When the quality of the work is satisfactory, but some minor but essential requirement of the course has not been completed for reasons acceptable to the instructor, a report of *I* may be made and additional time granted. Students may withdraw from a course by filing the proper blanks at the Registrar's Office in accordance with State College 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.

**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*, and *E*, 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.

**Scholarship Regulations**

The faculty Committee on Academic Deficiencies has discretionary authority to suspend or place on probation any student not achieving profitable and creditable 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 or *C* either for a term or cumulative will be placed or continued on probation (unless subject to suspension).

**SUSPENSION.** A student is subject to suspension any time it is apparent that he is not satisfactorily meeting graduation requirements. Most suspensions occur when a student is 12 or more grade points deficient. (Hours taken times 2 subtracted from grade points earned.) If other factors so indicate, a student may be suspended with fewer than 12 points deficiency. Also, a student 12 or more points deficient for his last two or more terms may be suspended even though he may have a cumulative average above 2.00, if other factors so indicate. (This applies to resident and/or transfer students of sophomore, junior, or senior standing.)

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

## Fees and Deposits

Students at Oregon State College, Portland State College, 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 the rates quoted without notice.

### Regular Fees

Undergraduate students pay regular fees each term as follows: tuition, \$10; laboratory and course fee, \$46; incidental fee, \$22; and building fees, \$12, a total of \$90 per term—\$270 a year.

Payment of these fees entitles a student to all services maintained by Oregon State College 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 athletic events; and admission to concerts and lectures sponsored by the College. No reduction in fees is made to students who may not desire to use some of these privileges.

### Out-of-State Tuition

Undergraduate students who are not residents of Oregon, Alaska, or Hawaii pay regular fees and in addition pay a nonresident fee of \$85 per term, or \$255 per year—a total of \$525 per year for fees and tuition.

The Oregon State Board of Higher Education has ruled that any person who comes into the State of Oregon for the purpose of attending one of the institutions under the control of the Board, and for any reason is not qualified for classification as a resident of the State of Oregon, shall pay the nonresident fee, *except*: a student holding a degree from an accredited college or university and registered in a curriculum other than dentistry, law, or medicine; a student attending Summer Session; a student paying the part-time fee; a student whose parent is a regular employee of the Federal Government stationed in Oregon; a student whose father is domiciled in the State of Oregon; a student who has been a resident of Alaska or Hawaii for the major part of the two years prior to registration at a state system institution.

Residence or domicile of a student is normally that of his father; if his father is not living, it is normally that of his mother. In case of parents' divorce, the domicile of a student is generally determined by the residence of the parent to whom custody is granted by the court. Domicile of a wife is normally that of her husband; if both are students, the wife's residence status is determined by that of the husband. An alien cannot begin to establish residence until he has demonstrated his intention of becoming an American citizen.

The Board has established the following rules to be observed in determining the residence status of students:

(1) Residence and domicile are synonymous and domicile shall be considered to be a fixed permanent residence to which the student has the intention of returning. The fixed permanent residence must normally have been maintained for at least 12 months prior to the school term for which resident classification is sought,\* and must be a bona fide residence which the student has no intention of changing when the school period has expired. Proved actual residence and intention to remain must exist simultaneously. Factors used

\* This 12-month period must include at least six consecutive months during which the student was not enrolled at any time for more than 6 term hours in college-level courses.

in determining intent include age and family status of the student, residence of near relatives, place of voting, ownership of property, sources of financial support, length of time within the State, record of employment and schooling (intent cannot be demonstrated by school attendance alone).

(2) A student whose official records show his own or his parents' domicile to be outside of Oregon is prima facie a nonresident and the burden is upon the student to prove the contrary. If his official transcripts of academic record show attendance at a school outside of Oregon, he may be required to furnish further proof of Oregon domicile.

(3) A nonresident at the time of enrollment is held to that classification throughout his attendance as a student, except where he can prove that his or his parents' previous domicile has been abandoned and a new one established in Oregon in accordance with these regulations. A resident student will be reclassified as nonresident any time his Oregon domicile is lost.

**Graduate Fees**

Graduate students registered for 7 term hours of work or more pay tuition and fees of \$90 a term. Graduate students do not pay nonresident fee. Graduate or research assistants or fellows pay \$34 per term. Graduate students registered for 6 hours of work or less pay the regular part-time fee. Payment entitles the student to all services maintained by the College for benefit of students.

**Deposits**

Persons who enroll for academic credit (except staff members) must make a deposit of \$10, 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 re-establish the original amount.

**Refund.** The deposit, less any deductions, is refunded about one month after close of academic year. Students who discontinue work before end of 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 Fee.....per term hour, \$11.00  
Undergraduate and graduate students enrolled for 6 term hours or less pay, instead of the regular fees, a part-time fee in accordance with the following scale: 1-2 term hours, \$22; 3 term hours, \$33; 4 term hours, \$44; 5 term hours, \$55; 6 term hours, \$66. Nonresident fee does not apply. Payment of fee entitles students to all usual services and use of facilities of Oregon State College. An auditor, a person who has obtained permission to attend classes without receiving credit, pays the auditor's fee at time of registration. He is entitled to attend classes but has no other institutional privileges. Regularly enrolled students may be granted auditor's privileges without payment of auditor's fee. Maximum for auditors is \$90.
- Staff Fee.....per term hour, \$3.00  
On approval of the President's Office, staff members may register for College courses at a \$3-per-term-hour rate. Full-time staff are limited to a maximum of 5 hours per term. Academic staff who have appointments with full-time equivalent of .50 or more (but less than full-time) may take up to 10 hours a term at this rate. Payment of fee entitles member to instructional and library privileges only.
- Late-Registration Fee.....per day, \$1.00  
Students registering after scheduled registration dates of any term pay a late-registration fee of \$1 a day. 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-Program Fee.....	\$1.00
The student pays this fee for each change in his official program after the scheduled last day for adding courses.	
Reinstatement Fee.....	\$2.00
If for any reason a student has his registration cancelled during a term for failure to comply with the regulations of the institution, but is later allowed to continue his work, he must pay the reinstatement fee.	
Special-Examination Fee.....	per term hour, \$1.00
A student pays a fee of \$1 per term hour for the privilege of taking an examination for advanced credit, or other special examinations.	
Registration-in-Absentia Fee.....	per term hour, \$11.00
Minimum fee \$22.	
Transcript Fee.....	\$.50 and \$1.00
Charge for first copy at any one time is \$1; charge for each additional copy furnished simultaneously is 50¢.	
Late Application Filing Fee.....	\$10.00
May be assessed on applications for fall term enrollment received after August 31.	
Counseling and Testing Service Fee.....	\$5.00
Graduate Qualifying Examination Fee.....	\$1.00 to \$15.00
Microfilming Doctoral Thesis.....	\$20.00
Placement Fee (See SCHOOL OF EDUCATION). Initial registration . . .	no charge
Reregistration.....	per year, \$5.00
Applied Music Fees (See MUSIC).....	per term, \$20.00 to \$50.00
Horseback Riding Fee.....	per term, \$20.00

**Fee Refunds.** Students who withdraw from college and who have complied with regulations governing withdrawals are entitled to certain refunds of fees paid, depending on time of withdrawal. 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 Interests

**A** STUDENT attending Oregon State College has an opportunity for wholesome growth in congenial, stimulating surroundings. All faculty members participate in some measure in the process of all-round student development. In addition, certain members of the faculty, certain offices, and several committees serve in special ways.

The Dean of Women and the Dean of Men seek to promote high standards of student life and welfare. They help coordinate social and activity programs; they provide housing and employment services. They work closely with student organizations and councils in developing sound student leadership and participation in student self-government. They counsel students on matters of both general and personal welfare. The Foreign Student Counselor has an office in Commerce Hall or may be reached through the office of the Dean of Men.

Each school has a Head Counselor and a number of specially selected Advisers. The Advisers assist students in their courses and programs of study. When asked to do so Advisers and Head Counselors aid in finding solutions to personal problems. Both groups work closely with the Academic Deficiencies Committee to learn causes for poor student accomplishment and to promote policies and procedures for improvement of student scholarship. The Personnel Coordinator assists in developing an efficient student personnel service in each school and in coordinating various advising and counseling agencies.

The Counseling and Testing Center, when requested to do so, conducts personal interviews and various tests to help students determine interests and aptitudes for different vocational fields, ability to do college work, and causes of difficulties they may have in course work. For some of its services the Center charges a nominal fee.

Sometimes a student needs assistance in addition to that provided by regular advisers and counselors. The following agencies offer clinical or advisory services: Student Health Service, Departments of Psychology, Religion, Speech, English (for remedial reading), Family Life and Home Administration (for marriage and family life problems), and the School of Education (for methods of study).

The Committee on Student Life, a student-faculty group, (1) administers those regulations pertaining to students who are referred to it by the College administration and (2) acts as a subcommittee of the Student Senate concerned with setting standards and policies in regard to activities of living groups, classes, clubs, societies, and certain student functions. The Committee on Student Housing assists in making adjustments relative to housing and boarding. The Committee on Religious Activities coordinates campus religious agencies and serves as the connecting link between campus and churches. The Committee on Educational Activities promotes and supervises student activities.

As a student nears the end of his curriculum, the school in which he is registered helps him find appropriate employment. As a service both to the professions and to its graduates, each school maintains a placement office which tries to get the right man into the right job.

## New Student Week

A program of orientation required for entering undergraduate students is held annually the first week of fall term. By means of general assemblies, group lectures and discussions, individual conferences, and examinations and tests, an

effort is made to assist every new student in getting the best possible start in his new life. During New Student Week students become acquainted with ideals and traditions, aims of higher education, principles of wise use of time and money, and methods of study. Directions concerning New Student Week and registration are sent four weeks before the term opening to each new student accepted for admission.

## Student Living

Oregon State College provides to the extent possible comfortable, healthful, and congenial living conditions for all students. All students have opportunity to belong to some social organization. Each living group on the campus, including residence halls, cooperatives, sororities, and fraternities, has its own self-government and social activities.

All living arrangements must be approved by the Dean of Men or the Dean of Women. Although much of the correspondence between a student or prospective student and Oregon State College will be directed to the Registrar's Office, he may expect to hear regarding housing from the Dean of Men, the Dean of Women, or the Director of Dormitories. The latter supervises the operation of all residence halls and their facilities.

### College Residence Halls

Hall	For men or women	Capacity	Living groups or clubs	Board per month	Room rent per term		Approximate total board and room per year
					Single room	Multiple occupancy	
Cauthorn .....	Men	313	5	\$54.00	\$120.00	\$ 80.00	\$665.00
Hawley .....	Women	313	5	54.00	120.00	80.00	665.00
Poling .....	Men	313	5	54.00	120.00	80.00	665.00
Sackett A,B,D	Women	345	3	54.00	120.00	80.00	665.00
Sackett C.....	Men	115	2	54.00	120.00	80.00	665.00
Snell .....	Women	366	5	54.00	120.00	80.00	665.00
Waldo .....	Men	300	5	54.00	97.50	65.00	620.00
Weatherford ..	Men	431	7	54.00	97.50	65.00	620.00
West .....	Women	415	5	54.00	120.00	80.00	645.00

*Board and room rates are subject to change by the State Board of Higher Education as circumstances demand.*

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

Room and board charges are due the first day of each month. Students paying after the first are charged a late fee of \$1 for the first day and \$1 for each additional day. In exceptional cases, extension of time may be given by Director of Dormitories, if application is made before first day of the month. If bill is not paid by 10th of the month, student's registration may be canceled.



### Reserving a Room

To reserve a room in a residence hall, a student should obtain an application blank from the Registrar and send it filled out and accompanied by a deposit of \$15 to the Business Office, Oregon State College. Money orders or checks should be made payable to Oregon State College.

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 \$15 deposit, it will be returned to him.

When a student makes a \$15 deposit to reserve a room, he is holding that room for one term and is responsible for paying rent unless he cancels his reservation. If he withdraws from college before the close of the term, he forfeits the deposit.

### Cancellation, Assignment, and Refunds

Cancellation of a room reservation (or transfer of deposit to a later term) must be made before August 15 for fall term and not later than 14 days before the opening of winter or spring terms. If cancellation is made within the proper time limit, the deposit will be refunded. If the depositor registers and has not canceled his reservation as indicated above, he will be required to live in the residence hall. If he does not register and has not canceled his reservation, the deposit is forfeited in total. Requests for cancellation or transfer should be directed to the Director of Dormitories.

Charges reported for damage or loss of residence hall property and for unpaid hall dues may be made against the room deposit. Any balance remaining after all charges have been deducted will be refunded in about six weeks after termination of occupancy.

Assignment to a particular hall will be made after the student has been officially admitted to Oregon State College. Room assignment is made after he arrives on campus. Halls will open for students and for receiving baggage at 10:00 a.m. Sunday, the first day of New Student Week.

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

### Sororities and Fraternities

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

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

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

Phrateres is a national social society for college women.

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

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

### Cooperatives

In cooperative houses students achieve desirable group and social life for about \$15 a month less than in other types of living groups. Students share all housework responsibilities. Each house has a hostess and a cook. Room rent for the year at all cooperatives is about \$195 and total board and room for a year is estimated at \$505 for men and from \$420 to \$500 for women. Rules on keeping reservations, making cancellations, or moving apply in cooperatives as in other living organizations.

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

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

### Rooms in Private Homes

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

Agreements may be terminated: (a) If the student properly withdraws from college; (b) upon mutual agreement and satisfaction to the student and householder with written notice to the Dean of Men 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 College. Housing in a private home for fall term should be arranged soon after June 15. Costs in private homes are comparable to those in residence halls.

Permission to live in private homes is rarely given to women students. Special cases will be given consideration by the Dean of Women.

### **Housing for Married Students**

The College maintains a number of furnished apartments for married students. Rentals range from \$30 to \$58 per month with water and garbage disposal service furnished. Apply to the Director of Dormitories.

**Off-Campus Apartments.** A married student wishing to find living accommodations off campus should consult the Housing and Employment Secretary, 108 Commerce Hall.

### **Housing Regulations**

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

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

b. All unmarried undergraduate students under 23 years of age must live in college-approved housing. (Hotels, motels, and all apartments suitable for married students are not approved housing for unmarried students.)

c. A graduate or married student (or anyone not a regular full-time student) normally lives in private housing. Official approval is required if such students are to live in any type of college housing. The College is not, in general, responsible for the housing of married students.

d. All living arrangements in college-approved housing are for one full college term. Students making duplicate housing arrangements and not making proper cancellation are financially responsible for such arrangements.

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

f. Should a request to move during the term be granted by the Housing Committee, the student must expect to pay a term's rent for a room reserved but not occupied.

g. Established College rules regarding student conduct apply to all housing, on or off campus.

For more detailed information see the official pamphlet "Student Housing, Regulations and Information" available from the Director of Dormitories.

## **Student Health Service**

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

Students registered for credit 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. 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, and so forth.

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

Health Service privileges are not available to members of the faculty.

Activities pertaining to medical care of students are centered in the Student Health Service building. The dining room, the kitchen, and the refrigeration unit are on the ground floor. The clinic, including physicians' offices, examining rooms, X-ray and clinical laboratories, pharmacy, and minor surgery, occupies the second floor. On the third floor are 30 beds in 2-bed and 4-bed wards for students requiring confinement for general medical care or isolation for contagious and communicable diseases. The Health Service staff includes physicians, registered nurses, a laboratory technician, and an X-ray technician.

**Medical examination.** A medical examination is required of all entering students. It includes tuberculin test, vaccination against smallpox, and other tests deemed necessary to protect the health of the student body.

**Vaccination.** The State Board of Higher Education requires that students, as a condition to entering any State System institution, satisfy the institutional physician of immunity to smallpox (by evidence of having had the disease or successful vaccination). Exception is made, however, for students who decline vaccination because of religious convictions. Such students may be admitted, but only on the condition that they or, in case of minor or dependent students, their parents or guardians agree in writing to assume all expenses incident to their care or quarantine, should they fall ill with smallpox while students at the institution.

## Student Automobiles

Students may operate cars on campus only by permission obtained through registration with Campus Police and payment of yearly fees. Parking is restricted to certain assigned areas, and cars must carry stickers in the lower righthand corner of windshields indicating areas assigned.

Students are responsible for knowing regulations pertaining to operation of a motor vehicle at Oregon State College and will be held responsible for any violation of these regulations in which a vehicle registered to them is involved regardless of who operates it. Specific information on parking and traffic regulations can be obtained in the leaflet *Your Car On The Campus*, available from the Campus Police Office. Reservation of a dormitory room does not necessarily guarantee a student parking privileges.

Almost all living accommodations are within walking distance of the campus. Campus traffic and parking are becoming overly congested. For these reasons, students are urged to leave their cars at home.

## Student Expenses

The table below gives estimated *average expenses* for a year and for the first term. Board and room costs are based on charges in the halls of residence. The incidental item varies greatly with the individual. Cost of clothing is not included. Some courses of study require more expensive books and supplies than others. Drawing instruments and slide rule for engineering students cost about \$75.

Average expenses per month may vary from \$100 to \$145, but a student meets large financial demands in the first two weeks of college. He pays registration fees for the whole term, room rent for at least half a term in advance, and board a month in advance, and he must buy books at the beginning of the term. For this reason students from Oregon, including veterans whose first subsistence check will arrive at a late date, should come prepared for an initial expense of at least \$280. Out-of-State students should be prepared for an initial outlay of at least \$365. Personal checks in the exact amount provide the most convenient and safest method of payment.

### First Year Expenses

Expenses	First term	First year
Tuition and regular fees		
Tuition .....	\$10.00	
Laboratory and course fee .....	46.00	
Incidental fee .....	22.00	
Building fee .....	12.00	
Deposit to cover breakage (returnable at end of year)....	10.00	\$ 270.00
Books, supplies, etc. (estimate) .....	45.00	10.00
Board and room (average) .....	230.00	90.00
Incidentals .....	50.00	640.00
Total for residents of Oregon, Alaska, and Hawaii ..	\$ 425.00	\$1,160.00
Out-of-State tuition .....	85.00	255.00
Total for nonresident students .....	\$ 510.00	\$1,415.00

### Opportunities for Employment

To assist students desiring to find work, the Dean of Men conducts an Employment Bureau for Men in 108 Commerce Hall and the Dean of Women conducts a similar service for women in 114 Commerce Hall.

Some men and women living in residence halls find employment in cafeterias or dining rooms, where they earn most of their board and room. For information on this type of employment contact the Director of Dormitories.

Some men and women earn a large part of their expenses working for room and board in private homes. They give their employer approximately three hours work per day. For information contact the Dean of Men or Dean of Women.

### Student Loan Fund

The Student Loan Fund, a perpetual, revolving trust fund established for the purpose of lending money to worthy students attending Oregon State College, 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 the College. 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 the College *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.

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

**Other Loan Funds** administered by the trustees of the Student Loan Fund include 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; and FEDERAL STUDENT LOAN FUNDS.

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, OSC), BEN SELLING SCHOLARSHIP LOAN FUND (administered by First National Bank, Portland).

## Scholarships

The scholarship program is coordinated through the College 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 Office of the Registrar or from any Oregon high school principal. Applications, including transcripts of all academic work to date of application, should be forwarded to the Office of the Registrar by March 1 of each year. Exceptions to these procedures will be noted for certain of the scholarships administered by other agencies.

### Undergraduate Scholarships

**AMERICAN-MARIETTA CUSTOMERS SCHOLARSHIPS:** Two \$250 scholarships annually to entering freshmen of outstanding scholastic ability interested in chemistry, chemical engineering, forestry, or high school teaching in science or mathematics.

**ASSOCIATED INDEPENDENT STUDENTS:** Tuition and fees for one term for each of three non-affiliated undergraduates. Application through Committee on Scholarships or by invitation of A.I.S.

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

**BASH SCHOLARSHIP:** \$255 provided by the Portland chapter of the Oregon State College Mothers Club for an outstanding freshman woman from an Oregon high school, in memory of the late Dean of Women, Mary Bash.

- CENTURY CLUB SCHOLARSHIP:** \$100 a year for four years provided by the Century Club of OSC faculty for a student in Science.
- COLLEGE FOLK CLUB SCHOLARSHIP:** Tuition and fees to an undergraduate student who demonstrates outstanding ability and financial need; recipients chosen by the College Folk Club with the approval of the College Scholarship Committee. Available only to residents of Oregon.
- 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, and show promise of future meritorious achievement.
- 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. Fund is administered by a board of trustees including a representative of Oregon State College. Selections are made on the basis of a qualifying examination held in Lake County.
- DELTA DELTA DELTA SCHOLARSHIP:** Two \$150 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 enter freshman class at Oregon State College. Application through high school principal with approval of local unit extension officers.
- HECKART SCHOLARSHIP:** For present or prospective male students selected on basis of citizenship, outstanding grades, and athletic ability. Recipients are expected to maintain a 2.50 grade-point average. A memorial to Earl W. and Elaine Heckart.
- HOLMES SCHOLARSHIP:** About \$250 awarded annually to a worthy male graduate of a Jackson County high school; provided by Harry and David Holmes of Medford.
- INTERFRATERNITY COUNCIL SCHOLARSHIPS:** \$100 each to five Oregon high school seniors for freshman year in college; recipients chosen from top 15% of class on basis of character, leadership, and scholarship; final selection by Interfraternity Council from nominations by Committee on Scholarships.
- INTERHALL SCHOLARSHIP:** \$74 provided by the residents of women's halls for a student of the halls, selected by the Committee on Scholarships from nominations made by a special committee. Recipient must be 50% self-supporting, have a grade-point average of at least 2.50, and demonstrate service to the campus.
- LEONORA H. KERR-FOLK CLUB SCHOLARSHIP:** \$255 to 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:** \$100 for an outstanding woman student worthy of financial assistance.
- NAVAL ROTC SCHOLARSHIPS:** Tuition, textbooks, laboratory and other instructional fees, and \$50 per month to cover living expenses for twelve months per year for four years, provided by the United States Navy.
- OREGON STATE COLLEGE EDUCATIONAL FOUNDATION, INC. SCHOLARSHIPS:** Partial and full tuition scholarships annually for two or three outstanding students in need of financial assistance.
- OREGON STATE COLLEGE FOUNDATION:** Partial and full-tuition scholarships as made available through contributions to the Oregon State College Foundation.
- OREGON STATE DADS CLUB SCHOLARSHIPS:** Tuition and fees to men and women nominated by Dean of Men and Dean of Women and approved by Committee on Scholarships. Recipients must have good grades and must be in need of financial aid.
- OREGON STATE MOTHERS CLUB SCHOLARSHIPS:** Tuition and fees to men and women nominated by Dean of Men and Dean of Women and approved by Committee on Scholarships. Recipients must need financial aid, must be of high character, must have average or above grades. Honor scholarships will be given to a man and a woman with grade-point averages above 3.00. If a woman recipient marries, she relinquishes the scholarship.
- PAPER INDUSTRY MANAGEMENT ASSOCIATION SCHOLARSHIP:** \$222 annually to an outstanding undergraduate who may enter chemical engineering, chemistry, or forestry, provided by the Pacific Coast Division of the American Pulp and Paper Mill Superintendents Association. Award made on the basis of scholarship, adaptability, and financial need.
- PHI SIGMA KAPPA FRATERNITY SCHOLARSHIP:** \$100 annually to a male high school senior for his freshman year in college. Recipients selected by Phi Sigma Kappa fraternity on basis of scholarship, character, and financial need, without regard to academic major, or resident status, from nominations by Committee on Scholarships. Applicants write to Oregon State Chapter of Phi Sigma Kappa.
- SCABBARD AND BLADE SCHOLARSHIPS:** Three \$75 annual scholarships to senior students, one from each ROTC service unit, provided by the local company of Scabbard and Blade Society. Selections made by Scabbard and Blade from nominations from each service unit. Selection confirmed by the Committee on Scholarships.
- STATE SCHOLARSHIPS:** Under law created by the State legislature partial tuition and fee scholarships are awarded by the State Scholarship Commission equal in number to 2½% of the enrollment in State-supported institutions. Entering freshmen are eligible to apply if ranked in the upper one-half of their high school class. College students may apply if

they have achieved a term and cumulative GPA of 2.50 or better. Applications may be made to the Scholarship Committee of the State institution the student desires to attend or to the State Scholarship Commission.

In addition, the State Scholarship Commission will award annually one scholarship for each Oregon county and one for each State legislative seat. The Commission accepts nomination for these awards from State legislators and others. Recipients may attend the State institution of their choice.

**VARSITY O SCHOLARSHIP:** \$75 annually to a male high school senior planning to enter OSC. Selection on basis of leadership, citizenship, scholarship, and proficiency in athletics, specifically in golf, tennis, wrestling, or swimming.

#### SCHOOL OF HUMANITIES AND SOCIAL SCIENCES

**CORVALLIS ELKS LODGE SCHOLARSHIP FOR INSTRUMENTALISTS:** Two full-tuition scholarships to students participating in the Oregon State College band or orchestra who have earned at least 2.50 grade-point average on a minimum of 12 hours.

**KAPPA PI SCHOLARSHIP:** \$100 annually provided by Kappa Pi, national art honorary, to OSC 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:** Six scholarships annually of \$60 to \$90 each, established by friends of the Music Department, to cover special fees for individual instruction in piano, organ, voice, stringed instruments, and wind instruments. Open to all students. Application through the Music Department.

#### SCHOOL OF SCIENCE

**BOEING SCHOLARSHIPS:** Two \$150 scholarships to undergraduates in the School of Science, one majoring in mathematics and one majoring in physics. Selections made by the Committee on Scholarships from nominations made by the School of Science.

**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, for many years head of the Bacteriology Department. Recipient must be a junior or senior with outstanding promise in School of Science.

**CROWN ZELLERBACH FOUNDATION SCHOLARSHIP IN HONOR OF LEO FRIEDMAN:** \$1,000 to an upper division student in chemistry, preferably wood chemistry or pulp and paper chemistry. A memorial to Dr. Leo Friedman, for many years on the Chemistry faculty, a pioneer in wood chemistry in Oregon.

**GENERAL PETROLEUM CORPORATION SCHOLARSHIP:** \$400 plus tuition and fees to an outstanding senior or graduate student in geology or geophysics. Applications to the Committee on Scholarships may be presented through the Department of Geology.

**LONGVIEW FIBRE COMPANY PULP AND PAPER SCHOLARSHIP:** \$255 to a sophomore and \$255 to a junior in chemistry. Recommendations of chemistry faculty confirmed by Committee on Scholarships. Final selection by donor.

**PAPER INDUSTRY MANAGEMENT ASSOCIATION SCHOLARSHIP:**  
See UNDERGRADUATE SCHOLARSHIPS page 114.

**SIMMONS SCHOLARSHIP:** Established by widow and friends of the late Professor Joseph E. Simmons, formerly head of Bacteriology Department, for a worthy, promising junior in bacteriology in need of financial assistance for senior year.

**TEXACO SCHOLARSHIPS:** Financial assistance for upper division male U. S. citizens majoring in Chemistry, Physics, Mathematics, or Geology, and qualified for careers in the petroleum industry. Awards based upon scholastic ability, qualities of leadership, financial need, and sound health. Selection by Committee on Scholarships from nominations by departments concerned.

#### SCHOOL OF AGRICULTURE

**BORDEN SCHOLARSHIP:** \$300, provided by the Borden Company Foundation, for a senior in agriculture who has completed 6 term hours in dairying and who among all similarly eligible students has the highest grade-point average.

**CROWN ZELLERBACH FOUNDATION SCHOLARSHIP IN FISH AND GAME MANAGEMENT:** \$500 annually to a junior or senior in Fish and Game Management, preferably fisheries. Selection will be made by the Committee on Scholarships from nominations made by the Department of Fish and Game Management.

**H. H. GIBSON MEMORIAL SCHOLARSHIP:** \$262 provided annually as a memorial to Professor Gibson by his family, for a high school graduate in Vocational Agriculture.

**JACOBS FOUNDATION SCHOLARSHIP:** \$250 annually to sophomore in agriculture who ranks in upper third of class; application through Dean of Agriculture.

**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.

**MULTNOMAH HUNTERS AND ANGLERS CLUB SCHOLARSHIP:** \$150 for a male student, junior or senior, majoring in fish and game management to assist him in continuing his studies in wildlife conservation and management.

**OREGON DAIRY INDUSTRIES SCHOLARSHIP:** \$1,000 over 4-year period to an entering freshman in dairy technology. Open to both men and women residents of Oregon. Applicants use regular State Scholarship Application Blank.



- OREGON FEDERATION OF GARDEN CLUBS SCHOLARSHIP:** Two \$200 grants-in-aid for sophomore or upperclassman, one in Landscape Architecture and one in Ornamental Horticulture. Selection by Committee on Scholarships from nominations by horticulture faculty.
- PACIFIC NORTHWEST PLANT FOOD ASSOCIATION SCHOLARSHIP:** \$100 to an outstanding junior or senior 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 College seniors in this field who rank in the upper 25% of the class and who have financial needs may apply through Dean of Agriculture.
- SEARS ROEBUCK SCHOLARSHIPS:** \$2,700 for scholarships provided by Sears Roebuck Foundation for men in agriculture who have been farm reared in Oregon. Recipients must show good character, scholastic attainment, and leadership ability through participation in 4-H Club, Future Farmers, or community activities.
- VAN WATERS AND RODGERS, INC. SCHOLARSHIP:** \$200 annually to a junior man in agriculture who qualifies on the basis of leadership, scholarship, and interest in the wholesale selling field. Selection made by the Committee on Scholarships on nomination by the School of Agriculture.
- VAUGHAN SCHOLARSHIPS:** \$500 annually, a memorial to Sara Rehnberg Vaughan, for one or more juniors or seniors in fish and game management: provided by Nutrilite Foundation of California.
- WADE FOUNDATION SCHOLARSHIP:** \$200 annually for a junior or senior majoring in Agricultural Education.
- G. H. WILSTER SCHOLARSHIP:** \$255, provided by the Oregon Dairy Industries, for an outstanding freshman in dairy technology, to be used during sophomore year. Applicants use State System Application Blanks in applying through Dean of Agriculture or Department of Food and Dairy Technology.

#### SCHOOL OF BUSINESS AND TECHNOLOGY

- BOEING SCHOLARSHIPS:** Two \$150 scholarships annually to undergraduates in business administration with emphasis on accounting, finance, business statistics, and production. Selections made by the Committee on Scholarships from nominations made by the School of Business and Technology.
- PACIFIC INTERMOUNTAIN EXPRESS COMPANY SCHOLARSHIP:** \$250 to a junior in business and technology for use in his senior year. Selection based on scholarship, character, and interest in the transportation industry as a future career.

#### SCHOOL OF EDUCATION

- PARENT-TEACHER SCHOLARSHIP:** \$255 annually from the Oregon Congress of Parents and Teachers to encourage capable young people to enter elementary teacher training in Oregon. Open to freshmen, sophomores, and juniors; award based on scholarship, character, personality, leadership, school citizenship, and sound health. Apply through the Oregon Congress of Parents and Teachers, Education Center Building, Portland.

#### SCHOOL OF ENGINEERING AND INDUSTRIAL ARTS

- AERO CLUB SCHOLARSHIPS:** Scholarship assistance for entering freshmen or other undergraduates who show aeronautical interest, engineering aptitude, and ability in physical science and mathematics, and who show financial need.
- ASSOCIATED GENERAL CONTRACTORS OF AMERICA SCHOLARSHIP:** Five scholarships annually of \$200 each to juniors and seniors in civil engineering. Provided by Portland chapter of Associated General Contractors of America, Inc. Application through Dean of Engineering.
- BECHTEL CORPORATION SCHOLARSHIP:** \$1,500 annually for four seniors in engineering; recipients must be under 26 years of age and anticipating careers in private industry.
- BOEING SCHOLARSHIPS:** Two \$200 scholarships annually to undergraduates majoring in the School of Engineering. Selections made by the Committee on Scholarships from nominations made by the School of Engineering.
- COLLINS RADIO COMPANY SCHOLARSHIP:** \$1,500 annually to an outstanding senior in electrical or mechanical engineering for research project related to major field of study.
- LYOYD W. COVERT SCHOLARSHIP:** Approximately \$150 to a student in Chemical Engineering; provided by Mr. Covert. Award made on basis of scholarship, ability, and potential leadership.
- FREIGHTLINER SCHOLARSHIPS:** Two scholarships of \$500 each, provided by the Freightliner Corporation of Portland, to a junior and a senior in civil engineering or in mechanical engineering. Applications through the School of Engineering.
- GENERAL ELECTRIC COMPANY SCHOLARSHIPS:** \$650 each to two engineering students selected from northwestern institutions including Oregon State College, Montana State College, Washington State University, University of Washington, and University of Idaho.
- LARRY HARRINGTON COMPANY SCHOLARSHIP:** \$300 to an outstanding junior in mechanical engineering. Nominations made by faculty of the department.
- HERMANN SCHOLARSHIP:** \$150 annually to an outstanding senior in civil engineering in memory of the late Otto Hermann, a graduate of the School of Engineering. Nominations made to Committee on Scholarships by faculty in Civil Engineering.

- LONGVIEW FIBRE COMPANY PULP AND PAPER SCHOLARSHIP:** \$255 each to two sophomores, two juniors, and two seniors in mechanical or chemical engineering. Recommendations of engineering faculty confirmed by Committee on Scholarships; final selection by donor.
- PAPER INDUSTRY MANAGEMENT ASSOCIATION SCHOLARSHIP:**  
See UNDERGRADUATE SCHOLARSHIPS page 114.
- RAYONIER INCORPORATED SCHOLARSHIPS:** Two \$250 scholarships annually to undergraduates in the School of Engineering, one in Chemical Engineering, and one from among the Departments of Mechanical, Electrical, or Civil Engineering. Candidates must be U. S. citizens. Applications through the School of Engineering.
- STANDARD OIL COMPANY OF CALIFORNIA UNDERGRADUATE SCHOLARSHIP:** \$750 provided by Standard Oil Company of California for an undergraduate scholarship to a student in chemical engineering. Selection made by Committee on Scholarships on nomination by head of the department.
- TEXACO SCHOLARSHIPS:** Financial assistance for upper division majors in chemical engineering qualified for careers in the petroleum industry; awards based on scholastic ability, qualities of leadership, financial need, and sound health. Selection by Committee on Scholarships from nominations by Department of Chemical Engineering.
- WESTERN ELECTRIC COMPANY SCHOLARSHIP:** \$400 to a student in electrical or mechanical engineering on basis of high achievement in academic work and demonstrated qualities of leadership.
- WESTERN ELECTRONIC MANUFACTURERS' ASSOCIATION SCHOLARSHIP:** \$750 to three students in electrical engineering, preferably to an incoming freshman, sophomore, or junior transfer.
- WESTINGHOUSE ACHIEVEMENT SCHOLARSHIP:** \$500 per year to a junior in electrical or mechanical engineering on basis of high achievement in academic work and demonstrated qualities of leadership.

### SCHOOL OF FORESTRY

- AUTZEN FOUNDATION SCHOLARSHIP:** \$500 for an outstanding student in forestry.
- COLE, CLARK, AND CUNNINGHAM, INC. SCHOLARSHIP:** \$400 to an outstanding senior in forestry.
- CROWN ZELLERBACH FOUNDATION SCHOLARSHIP:** \$500 each for two outstanding juniors or seniors in forestry who are citizens of the United States and have not previously held scholarships sponsored by the Zellerbach Foundation.
- HART SCHOLARSHIP:** Income from an endowment fund, a memorial to Floyd Hart, prominent Oregon lumberman, for a senior in forestry.
- PAPER INDUSTRY MANAGEMENT ASSOCIATION SCHOLARSHIP:**  
See UNDERGRADUATE SCHOLARSHIPS page 114.
- 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 an endowment fund, a memorial to John R. Snellstrom, a prominent Oregon lumberman and Oregon legislator; for an outstanding forestry student; nominated by the forestry faculty.
- SOUTH SANTIAM EDUCATIONAL AND RESEARCH PROJECT SCHOLARSHIPS:** \$2,500 annually, provided by the Louis W. and Maud Hill Family Foundation for at least five Oregon students in forestry in the sophomore, junior, or senior years.
- TUCKER SCHOLARSHIPS:** Three \$1,000 scholarships, provided by the will of Max D. Tucker, for Oregon students in forestry.
- VAUGHAN SCHOLARSHIPS:** \$500 annually, a memorial to Sara Rehnberg Vaughan, for one or more juniors or seniors in conservation; provided by Nutrilite Foundation of California.

### SCHOOL OF HOME ECONOMICS

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

### SCHOOL OF PHARMACY

- A. K. BERMAN PHARMACY SCHOLARSHIP:** \$50 annually to a deserving upper division pharmacy student selected by the faculty of the School, and confirmed by Committee on Scholarships.
- OREGON STATE PHARMACEUTICAL ASSOCIATION SCHOLARSHIP:** \$100 for tuition and fees of a senior in pharmacy who has demonstrated outstanding scholastic ability in all academic work, who is a resident of Oregon, and who, in the opinion of the pharmacy faculty, will benefit most from the financial support thus given. Selection confirmed by Committee on Scholarships.

**WOMEN'S AUXILIARY, OREGON STATE PHARMACEUTICAL ASSOCIATION TUITION SCHOLARSHIP:** Full tuition annually for a woman in pharmacy; given in third, fourth, or fifth year of study to an Oregon resident; selection by Dean of the School of Pharmacy on basis of merit and need.

### Scholarships for Foreign Students

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

**BUSINESS AND PROFESSIONAL WOMEN'S CLUB SCHOLARSHIP:** \$1,200 annually to a student from the Orient with senior or higher standing in home economics, 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 the fraternities.

**INTERHALL SCHOLARSHIP:** Room for one academic year provided for one undergraduate foreign student (man) selected on the basis of scholarship and need; provided by men's residence halls.

**INTERNATIONAL FRIENDSHIP SCHOLARSHIP:** Provided by the Home Economics Club for an upper division or graduate student from a foreign country to study home economics at Oregon State College.

**MILAM FELLOWSHIP:** A fellowship for an undergraduate or graduate woman foreign student in home economics, established in tribute to Ava B. Milam, dean of the School of Home Economics 1917-1950.

**PANHELLENIC SCHOLARSHIP:** Room and board for one academic year provided for two undergraduate foreign students (women) selected on the basis of scholarship and need; provided by sororities.

**STATE SCHOLARSHIPS FOR FOREIGN STUDENTS:** Tuition and course fees for a limited number of students from foreign countries attending institutions of the Oregon State System of Higher Education. Student pays building fee and incidental fee (\$29).

### Scholarships Administered by Other Agencies

**AUXILIARY TO PROFESSIONAL ENGINEERS OF OREGON SCHOLARSHIP:** \$250 to a Portland State College student transferring into professional engineering at Oregon State College. Application through Portland State College Scholarship Committee.

**CONSOLIDATED FREIGHTWAYS, INC. SCHOLARSHIP:** \$500 to an outstanding graduate of an Oregon high school to be used at institution in State selected by recipient.

**CROWN ZELLERBACH FOUNDATION SCHOLARSHIP:** \$500 per year for four years to students in education.

**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. Application through Committee on Scholarships.

**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.

**GILBRETH SCHOLARSHIP:** \$500 to a junior or senior woman in engineering; selection based on scientific aptitude, character, financial need, personality, and citizenship. Application through Society of Women Engineers, 29 W 39th St., New York 18, New York.

**IRON FIREMAN MANUFACTURING COMPANY SCHOLARSHIP:** Tuition and fees to 1960 graduates of Oregon high schools in upper one-third of their class. Awarded on basis of scholarship and a 500-word written discussion of "Modern Heating Methods." Standard State System Application Blank must be completed and mailed with theme by May 5, to Scholarship Committee, Iron Fireman Manufacturing Co., 3205 S.E. 13th Avenue, Portland, Oregon.

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

**KAPPA DELTA PI SCHOLARSHIP:** \$75 annually to a junior or senior in School of Education who has shown scholastic ability and an interest in the profession.

**MCCLEINTOCK 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 Mr. 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 in food technology.

- OREGON HOME ECONOMICS ASSOCIATION SCHOLARSHIP:** \$500 over 4-year period awarded a senior in an Oregon high school for enrollment in an Oregon college granting a degree in home economics. Application through high school teacher of home economics.
- OREGON NISEI VETERANS SCHOLARSHIPS:** Two \$150 awards annually through office of State Superintendent of Public Instruction, in memory of World War II deaths.
- OREGON STATE EMPLOYEE'S ASSOCIATION SCHOLARSHIP:** A \$600 scholarship to a student whose parent is a member of O.S.E.A. Selection based upon scholastic achievement and financial need.
- OREGON STATE PHARMACEUTICAL CONTINUING SCHOLARSHIPS:** Two Oregon high-school graduates awarded \$50 per year for a period of five years while registered in the School of Pharmacy at Oregon State College. Selection based upon excellent grades, leadership, and need.
- P.E.O. SCHOLARSHIPS:** Scholarships provided by the Oregon State Chapter of P.E.O. for Oregon junior or senior women, outstanding and worthy of financial assistance. Application through Committee on Scholarships.
- PEPSODENT PRESIDENTIAL SCHOLARSHIP:** \$100 a year for a freshman in pharmacy to be continued for five years if scholarship is maintained. Awarded on basis of scholastic ability and financial need. Selection by the Oregon State Pharmaceutical Association.
- PORTLAND HOME ECONOMICS IN EDUCATION SCHOLARSHIP:** \$150 to a freshman majoring in home economics in a college in Oregon.
- PORTLAND ROSE FESTIVAL SCHOLARSHIP:** Tuition and fees for members of the royal court who enroll at Oregon State College.
- ROTANA CLUB OF PORTLAND SCHOLARSHIP:** \$25 to an outstanding woman student in home economics.
- ST. REGIS PAPER COMPANY SCHOLARSHIP:** \$800 a year for two years, provided by St. Regis Paper Company, for a junior at either Oregon State College or the University of Washington, including opportunity for work at the 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:** For a student whose parent died from causes incurred in World War I, World War II, or the Korean Conflict. Eligible students should apply to the Veterans Administration.
- WESTERN ROD AND REEL CLUB SCHOLARSHIP:** Tuition and fees for one year to a junior or senior of outstanding promise in wildlife management or fisheries.

### **Graduate Scholarships and Fellowships**

See "Graduate Appointments and Fellowships" under the GRADUATE SCHOOL.

## **Honors and Awards**

High scholarship is recognized at Oregon State College in several ways:

Junior Honors, presented at the end of a student's sophomore year.

Senior Honors, presented at the time of graduation.

Election to membership in various honor societies.

Personal awards, which may take the form of certificates, plaques, money prizes, or items of intrinsic value.

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

**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 College 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 College 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 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 College; 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 College Cooperative Association to students judged to possess the most outstanding personal libraries.
- HAMILTON AWARDS:** \$50 each to a freshman and a sophomore (man or woman) who are one-half self-supporting and are making most purposeful progress toward useful and active citizenship; a memorial to Beatrice Hamilton, mother of W. D. Hamilton, '15.
- MACKENZIE-BLUE KEY MEMORIAL AWARD:** In memory of Donald Wilson MacKenzie, class of 1953, to any man student who exhibits outstanding qualities and ability as a student leader and in service and loyalty to the institution. Cash and plaque.
- SMITH AWARD:** Income from \$500 to the senior woman having highest scholastic standing during the eight terms preceding her selection for this award; not given to any student who receives another award during same year; a memorial to Drucilla Shepard Smith, formerly of Polk County, Oregon, established by her son, Mr. John E. Smith, '02.
- WALDO AWARDS:** Presented each spring in the proportions of \$40, \$30, \$20, and \$10 respectively to the woman student of highest standing in the senior, junior, sophomore, and freshman years; based on (a) scholarship, (b) success in student activities, (c) qualities of womanhood, and (d) qualities of leadership; a memorial to Clara H. Waldo.

#### SCHOOL OF HUMANITIES AND SOCIAL SCIENCES

- ALPHA CHI OMEGA CUP:** Awarded to the woman student of music who has rendered the greatest service to the campus.
- BAROMETER AD TROPHY:** Awarded to *Daily Barometer* advertising solicitor who has contributed most to financial health of student newspaper.
- BAROMETER AWARD:** Trophy to the freshman student who has contributed most to general welfare and improvement of the *Daily Barometer*, student newspaper.
- INGALLS AWARD:** Trophy given annually to the senior who has contributed most to welfare of student publications; award is recorded on a plaque, a memorial to Claude E. Ingalls, formerly editor of the *Corvallis Gazette-Times*.
- "PROF MAC" MEMORIAL PLAQUE:** Awarded annually to the day and night editors of the *Daily Barometer* who have excelled in typographical proficiency and have contributed most to general news excellence. Provided by Dr. Charles D. Byrne in memory of the late C. J. McIntosh, founder of journalism at OSC and staff member 28 years.
- SIGMA DELTA CHI CITATION:** Certificate awarded by national organization to outstanding male senior interested in journalism.
- SIGMA DELTA CHI SCHOLARSHIP AWARD:** Certificate awarded by national organization in recognition of high scholastic standing in all college work.
- SIGMA DELTA PI SPANISH AWARD:** A Spanish masterpiece and the medal of the American Association of Teachers of Spanish given annually to the advanced student of Spanish who has made the greatest progress during the academic year.

#### SCHOOL OF SCIENCE

- AMERICAN INSTITUTE OF CHEMISTS AWARD:** Engraved medal awarded to an outstanding senior in chemistry, in recognition of leadership, character, and excellence in scholarship.
- MERCK AND COMPANY AWARDS:** Chemical books valued at \$15 awarded to two seniors for high academic standards and leadership qualities in chemistry.
- PHI LAMBDA Upsilon AWARD:** Certificate of merit to an outstanding junior in chemistry and chemical engineering; recipient's name engraved on plaque in Chemistry Hall.
- PHI SIGMA AWARDS:** Two certificates to the outstanding undergraduate and graduate students who have shown creative interest in biology.
- PI MU EPSILON-DEPARTMENT OF MATHEMATICS AWARD:** \$35 for first place and \$20 for second place in a mathematics competition for freshmen and sophomores; winners 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**

- ALPHA GAMMA RHO FRESHMAN AWARD:** Rotating trophy to a 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, leadership, development, and character.
- ALPHA ZETA SCHOLARSHIP CUP:** Awarded during the first term of the sophomore year to the student in agriculture receiving the highest grade average in the freshman class.
- BURPEE AWARD IN HORTICULTURE:** \$100 to an outstanding student in horticulture majoring in floriculture or vegetable crops.
- DANFORTH AWARD IN AGRICULTURE:** Expenses for two weeks in St. Louis, Missouri, and two weeks in a Michigan summer camp; provided by the Danforth Foundation and Ralston-Purina Mills of St. Louis, for outstanding agriculture students.
- HANSON AWARD:** An annual award of \$100 to a student in agriculture demonstrating outstanding achievement or interest in poultry husbandry.
- JACOBS FOUNDATION AWARD:** \$250 to a deserving sophomore in agriculture in the upper one-third of his class scholastically; provided by the Ralph and Adolph Jacobs Foundations.
- LENDERKING AWARD:** \$500 to a student in food technology who makes a real contribution toward improving the quality of frozen food; provided by Mr. William R. Lenderking.
- NORTHWEST CANNERS AND FREEZERS ASSOCIATION AWARD:** \$100 to an outstanding junior in food technology.
- RODENWOLD AWARDS:** Medals awarded each year to the members of the 5-man team representing Oregon State College in the intercollegiate livestock judging contest at the Pacific International Livestock Show in Portland; a memorial to Ben W. Rodenwold.
- ERNEST H. WIEGAND AWARD:** \$100 and name of outstanding senior in food technology inscribed on plaque in foyer of Food Technology Building. Selection by Oregon section and student chapter of Institute of Food Technologists.

**SCHOOL OF BUSINESS AND TECHNOLOGY**

- BUSINESS AND TECHNOLOGY CLUB AWARD:** Inscription on Business and Technology Honor Plaque of names of outstanding man and woman graduates determined by representatives of Business and Technology Club and faculty of Departments of Business Administration, Business Education, and Secretarial Science.
- 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 AWARDS:** \$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 AND INDUSTRIAL ARTS**

- AMERICAN INSTITUTE OF CHEMICAL ENGINEERS CERTIFICATE OF MERIT:** Certificate of merit and pin awarded to the junior student member of the chapter judged the outstanding student during preceding academic year.
- AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS AWARD:** \$10 and certificate plus travel allowance.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS AWARDS:** Awards of \$20, \$15, \$10, and \$5 are given annually for the best papers prepared and delivered in the student branch of the society.
- AMERICAN SOCIETY OF METALS:** Cash awards of \$50, \$25, and \$15 for the best papers prepared by student members of the society.
- ETA KAPPA NU AWARD:** Certificate of merit to the outstanding student in the sophomore electrical engineering class; name engraved on a bronze plaque in Dearborn Hall.
- HAMILTON WATCH COMPANY:** \$100 Hamilton watch for a senior in engineering attaining highest academic accomplishment in humanistic-social science subjects as combined with scholastic accomplishment.
- INSTITUTE OF AERONAUTICAL SCIENCES AWARDS:** Certificate of merit and 1-year membership (\$10) in the Institute to the senior or graduate student attaining the best scholastic record and to student presenting best lecture to regular meeting of student branch. Additional award of \$25 from student branch for best lecture.
- PI TAU SIGMA AWARD:** One mechanical engineering handbook presented to the outstanding student in the sophomore mechanical engineering class.
- DELROY F. RYNNING AWARD:** Initiation fee and half-year's junior membership dues to A.I.Ch.E. to a graduating member of the student chapter judged by his classmates to become most valuable member to the society. A memorial to the late Delroy F. Rynning established by his friends and associates.

**SIGMA TAU AWARD:** A medal awarded each year to the sophomore student in engineering who as a freshman was the most outstanding student.

**TAU BETA PI LOCAL AWARDS:** Award of \$5 for the best essay submitted in the student chapter of the society. Certificates of merit are also awarded to freshmen in engineering having the highest scholastic standing during the first two terms of the year.

### SCHOOL OF FORESTRY

**ANNUAL CRUISE CUP:** Revolving cup to staff member of the *Annual Cruise*, School of Forestry yearbook, who is judged to have contributed most to success of the publication.

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

**KELLY AXE AWARD:** Presented by Kelly Axe Company to the senior in forestry who has contributed most to the success of the School of Forestry.

**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.

**X1 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

**ELECTRICAL WOMEN'S ROUND TABLE OF PORTLAND AWARD:** \$100 to a home economics junior. Awarded on the basis of financial need, good scholarship, and interest and aptitude in electric equipment studies.

**HOME ECONOMICS FRESHMAN AWARD:** An award of \$10 to promote scholarship and leadership in home economics, the recipient being selected by a committee representing Omicron Nu and the faculty in home economics.

**JOHNSON AWARD:** \$40 annually as a memorial to Miss A. Grace Johnson, professor of household administration (1915-1933), for a home economics junior or sophomore whose grade-point average is above student body average.

**LATHROP AWARD:** An annual award of \$50 by the Oregon Home Economics Extension Council to a junior or senior in home economics in memory of K. and Ethel Lathrop.

**LEE AWARD:** \$40 annually as a memorial to Mrs. Minnie E. Lee and Mr. J. B. Lee, awarded each year to a junior in home economics who has shown improvement in her college work, stability and meritorious record in all her activities, and general all-round worthiness.

**OMICRON NU PLAQUE:** Awarded each year to the senior woman who has best lived the teachings of home economics throughout her college career.

### SCHOOL OF PHARMACY

**BRISTOL LABORATORIES AWARD:** A personalized copy of the *Modern Drug Encyclopedia*, awarded annually to a senior who has achieved notably during his academic residence.

**KAPPA PSI AWARD:** An advanced reference in pharmacy or pharmacology given each year to the senior student who, in opinion of his classmates, has most outstandingly displayed qualities of character, leadership, and service.

**LAMBDA KAPPA SIGMA SCHOLARSHIP KEY:** Awarded annually to the senior member of Lambda Kappa Sigma, women's honorary in pharmacy, who has maintained the highest scholastic average.

**MCKESSON AND ROBBINS AWARD:** \$50 awarded annually by the Portland Branch of the company to the senior student scoring highest in a comprehensive examination in pharmacy.

**MERCK AWARDS:** Two sets of reference books awarded annually to senior students having highest scholastic averages in pharmacy and in pharmaceutical chemistry.

**RHO CHI AWARD:** An advanced reference in pharmacy or related field awarded each year to junior student having achieved highest scholastic rating in professional studies.

**WOMEN'S AUXILIARY, OREGON STATE PHARMACEUTICAL ASSOCIATION AWARD:** \$100 annually to a deserving woman student in pharmacy.

### Oregon State College student affiliates of national professional societies

Accounting Society  
 American Chemical Society  
 American Foundryman's Society  
 American Guild of Organists  
 American Institute of Chemical Engineers  
 American Institute of Electrical Engineers  
 American Institute of Industrial Engineering  
 American Institute of Mining Engineering  
 American Meteorological Society  
 American Pharmaceutical Association  
 American Society of Agricultural Engineers

American Society of Agronomy  
 American Society of Civil Engineers  
 American Society of Heating and Ventilating Engineers  
 American Society of Mechanical Engineers  
 Associated Western Forestry Clubs (West)  
 Institute of the Aeronautical Sciences  
 Institute of Radio Engineers (OSC Branch)  
 Society for the Advancement of Management  
 Society of American Military Engineers  
 Society of Automotive Engineers

## Honor Societies\*

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

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



## Activities

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

### Memorial Union

The Memorial Union provides the campus center for democratic fellowship among all students, faculty, alumni, and friends of Oregon State College. Every day hundreds of students make use of its social rooms, bookstore, and post office. They read and converse in the comfortable lounges; they hold committee meetings and social hours in the club and game rooms; they pause between classes at the coffee shop. The building contains offices for student organizations and activities. It provides a tearoom and cafeteria open to the public, a telegraph office, a barbershop, and a ballroom. The president of the Memorial Union is a student; students share actively in its management and in organizing its social program.

Dedicated on June 1, 1929, to "the service and inspiration of the living and to the memory of our immortal dead," the Memorial Union now honors the memory of the men and women who gave their lives in the service of their country in the Spanish-American War, World War I, World War II, and the Korean conflict. The building was financed from funds provided by students, alumni, faculty members, and other friends of Oregon State College.

### Student Self-Government

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

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

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

The Associated Independent Students unifies independent students for participation in campus life and government.

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

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

### Other Activities

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

Membership in the student musical organizations is open to all students after consultation with the directors concerned. Honor societies also promote art and music interests on the campus.

The Symphony Orchestra and Concert Band each play one major concert on the campus annually and make a number of such appearances in other communities; they perform frequently for other major campus events. The Men's Glee Club and the Women's Madrigal Club present seasonal concerts both as separate choruses and as one large choir, the College Chorus. The Choralaires, selected from the membership of the College Chorus, is the traveling group, making several off-campus appearances annually.

In cooperation with Corvallis and OSC Music Association, the Educational Activities Board brings artists of international fame to the campus for concerts and recitals. Advanced music students and faculty also give public recitals during the year. Several dance recitals are given each year under the auspices of the Division of Physical Education, Orchestral, and other organizations.

**Forensics, Dramatics, and Radio and Television.** Speech activities have intellectual and cultural value for both the participants and the campus community. Oregon State College is a member of the Pacific Forensic League and the Intercollegiate Forensic Association of Oregon. Special student organizations, such as Masque and Dagger, the Telemike Club, the Campus Puppeteers, and chapters of Delta Sigma Rho and National Collegiate Players, also provide outlets for forensic and dramatic talent.

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

**Lectures.** Frequent public lectures by faculty members and visiting scholars and persons prominent in national affairs supplement the regular curriculum. Campus sponsors of lectures include the Committee on Concerts and Lectures, Faculty Men's Club, American Association of University Women, Faculty

Women's Club, College Folk Club, Lower Division Faculty, Committee on Religious Education, Round Table, Associated Students, Associated Women Students, Phi Kappa Phi, Sigma Xi, and others.

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

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

### Eligibility for Participation

Before a student can qualify for an elective or appointive office in any student, extracurricular, or organization activity he must obtain a certificate of eligibility from the Dean of Men or the Dean of Women. He must be registered for at least 12 term hours and have an accumulative grade-point average of at least 2.00 and a 2.00 for the preceding term during which term he must have completed at least 12 term hours. A student becomes disqualified to continue in office in any term in which he drops below a 12-term-hour load.

Complete rules regarding eligibility for participation in student activities are included in *Student Regulations*, a copy of which goes to each student at fall term registration.

## Parent and Alumni Cooperation

### Dads and Mothers Clubs

The Dads Club of Oregon State College, composed of fathers or male guardians of students attending Oregon State College, 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.

The Mothers Club of Oregon State College is open to all mothers and other women interested in furthering the interests and welfare of students of Oregon State College. "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 meeting of the State organization is held on campus Mothers Weekend. The clubs donate tuition scholarships to deserving and needy students.

### Alumni Association

Informed, organized alumni backing of college projects is provided by the Oregon State College Alumni Association. Another important function is the publishing of *The Oregon Stater*, the monthly alumni magazine. Attendance at

Oregon State makes one eligible for membership in the association. Annual dues are \$4.50 and include a year's subscription to *The Oregon Stater*. A life membership costs \$80 if paid in a lump sum, or \$88 if paid in 11 cumulative installments of \$8 each over a period of 11 years.

Officers and directors of the association are elected at the annual business meeting which is held in June. Directors serve for a 3-year period and officers are elected annually. Officers and directors are:

AMBY FREDERICK, '32, Portland.....	President
JOHN FENNER, '40, Corvallis.....	Vice President
MRS. RUTH LUNDGREN PASLEY, '35, Hillsboro.....	Vice President
ROBERT ADAMS, '48, Corvallis.....	Treasurer
ROBERT P. KNOLL, '48, Corvallis.....	Director of Alumni Relations
TED H. CARLSON, '50, Corvallis.....	Assistant Director of Alumni Relations

*Executive Committee:*

A. H. SMITH, '41, Corvallis	ROBERT WHITE, '39, Salem
FRANK RAMSEY, '39, Corvallis	C. H. GRAHAM, '36, Seattle
THOMAS DELZELL, '23, Portland	M. M. HUGGINS, '38, Medford
HERBERT KIRKPATRICK, '34, Condon	

*Directors:*

MRS. RUTH BENNETT TRIMBLE, '28, Portland	NORM KENNEDY, '52, Madras
H. H. "BOB" NARVER, '34, Portland	ROBERT THOMPSON, '25, Klamath Falls
MRS. FREIDA LINDER BLAKELY, '37, Portland	JOHN MULLIGAN, '51, Pendleton
ROBERT CONKLIN, '23, Oswego	RICHARD TENSEN, '50, Nyssa
JOHN GALLAGHER, SR., '00, Corvallis	JOE OLIVER, '40, John Day
H. W. LARSON, '43, Astoria	FRANK HILL, '33, La Canada, California
LYLE SPECHT, '41, Tillamook	JOHN LAVINDER, '28, LaFayette, California
NAT GUISTINA, '41, Eugene	E. J. KEEMA, '33, Sacramento, California
TERRY ELDER, '47, Albany	M. JOE CARTER, '40, Spokane, Washington
CLYDE WILLIAMSON, '08, Albany	ROBERT HOUSE, '41, Stockton, California
JOHN HACKENBRUCK, '46, Coos Bay	

*School Representatives:*

Agriculture: GRANT PERRY, '37, Portland
Business and Technology: DONALD C. ELDRIDGE, '46, Camas, Washington
Education: RALPH E. JONES, '27, Grants Pass
Engineering: HILBERT S. JOHNSON, '36, Portland
Forestry: RUDY KALLANDER, '40, Salem
Home Economics: MRS. LOIS LUTZ BRUNDAGE, '32, Coos Bay
Pharmacy: WILLIAM F. RAW, '29, Corvallis
Science: DR. JAMES A. RILEY, JR., '42, Corvallis

**Oregon State College Federation.** The Oregon State College Federation, organized in 1951, includes representatives of the Associated Students, the Mothers Club, the Dads Club, and the Alumni Association. Its purpose is to coordinate, implement, and encourage the activities of the various member groups in behalf of Oregon State College and its students. Officers are BERT W. FARNES, Portland, Chairman; and MRS. JOHN WIMAN, Portland, Secretary.

### **Oregon State College Foundation**

The object of the Oregon State College 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 Oregon State College.

Substantial gifts have been received and, since its incorporation in 1947, the Foundation has become an important adjunct to the advancement of the work of Oregon State College.

*Board of Trustees:*

ALBERT BAUER, Portland  
DONALD W. HOLGATE, San Francisco  
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MARION T. WEATHERFORD, President; GLENN JACKSON, Vice President; ROBERT M. KERR, Treasurer; and A. L. STRAND, Secretary.

*Councilors:*

AMBY FREDERICK, President, Oregon State College Alumni Association, Portland  
VIRGIL DUNKIN, President, Oregon State College Dads Club, Portland  
MRS. CHARLES FORREST, President, Oregon State College Mothers Club, Ashland  
J. CLINTON DAVIS, Representative of Alumni Association, Portland  
ROBERT P. KNOLL, Director of Alumni Relations, Corvallis

## Summer Session

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

**T**HE 8-WEEK SUMMER SESSION serves several groups of students: undergraduate and graduate students who wish to shorten time for completing degree requirements, mature students who have the summer free for study and travel, junior-college graduates and transfer students who need to make adjustment in their programs before entering advanced or professional training, recent high school graduates, and others who find the campus of Oregon State College a pleasant and profitable place for summer studies in many fields.

Instead of the 8-week program followed in other schools and departments, the School of Home Economics operates on a 6-week basis in the Summer Session. A student may earn up to 9 term hours in this period.

**Summer Courses.** Eight schools and divisions participate. The Lower Division offers basic courses in arts and letters and in social sciences. The School of Science offers undergraduate and graduate work in all departments. The School of Business and Technology offers courses in business administration, secretarial science, and business education. All departments of the School of Home Economics offer undergraduate and graduate courses. The School of Engineering offers a limited number of engineering courses. The Department of Industrial Education offers courses in industrial engineering, industrial arts, and industrial arts education. The School of Education provides basic and advanced course work in teaching theory, with stress on the training of guidance, testing, and counseling specialists. Workshops, seminars, and short courses in health education, guidance, Northwest resources, science, family life education, and special types of subject matter supplement the regular courses. The Division of Physical Education offers both recreational and professional course work.

**Credit and Fees.** Students may earn a total of up to 12 term hours of credit in the 8-week session. Under certain conditions an additional three credits of graduate work may be taken in a 2-week post session in the School of Education. For fees and tuition see pages 105-6.

**Summer Information.** For this year's Summer Session calendar see page 2. The Summer Session bulletin and other special announcements may be obtained by writing the Director of the Summer Session, Oregon State College.

# School of Humanities and Social Sciences

## Faculty

as of January 1960

RALPH COLBY, Ph.D., Dean of the School of Humanities and Social Sciences.

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

**Architecture:** Professor H. R. SINNARD (department head); Associate Professors ELLIS, WASSON; Assistant Professors GLASS, PEACOCK-LOUKES<sup>1</sup>; Instructor T. J. SINNARD<sup>2</sup>.

**Art:** Professor GILKEY (department head); Associate Professors FOX, GUNN, JAMESON, SANDGREN<sup>3</sup>, WASSON; Assistant Professors HUCK, LEVINE, ROCK, TAYSON, TROJAN, WHITE; Instructor PILADAKIS.

**Economics:** Professors FRIDAY (department chairman), DREESSEN (emeritus), M. N. NELSON; Associate Professor DOWNS; Assistant Professor DARCY; Instructors COMITINI, ORZECK, PATTERSON, W. F. SMITH.<sup>4</sup>

**Geography:** Professors JENSEN (chairman), HIGHSMITH<sup>5</sup>; Associate Professors HEINTZELMAN, MYATT; Assistant Professor RUDD; Instructor TSCHIRLEY.

**English:** Professors H. B. NELSON (department head), CHILDS, COLBY, FOREMAN, GIBSON, JENKINS, PETERSON (emeritus), M. E. SMITH (emeritus); Associate Professors GROSHONG, LIGON<sup>6</sup>, MALAMUD<sup>4</sup>, SCHROEDER, E. D. SMITH; Assistant Professors BROWN, CLAYES, DUBBÉ, EISNER<sup>4</sup>, GARRISON, HEWITT, KING, LAWRENCE, LUDWIG<sup>4</sup>, MCELFRISH (emeritus), MITCHELL, NORRIS, ONSTAD, N. W. WILSON; Instructors BUTTS, CARLSON, CARTER, DIXON, FINNIGAN, GILBERT, HAISLIP, HENLEY, HUFF, JOHNSTON, KRANIDAS, LEAHY, LUNDAHL, McCLANAHAN, McCORKLE, P. B. NELSON, POTTS, STAVER, E. WALLACE, WHEELER, WILLEY.

**History:** Professors ELLISON (department head), C. K. SMITH, R. W. SMITH, VAUGHAN (emeritus); Associate Professors BERKELEY<sup>6</sup>, CARLIN; Assistant Professors ADOLF, SHAW, THAYER; Instructors McCLINTOCK, PUTNAM.

**Journalism:** Professor SHIDELER<sup>7</sup> (department head); Associate Professors BAILEY, LAKE; Assistant Professor ZWAHLEN; Visiting Assistant Professors INGALLS<sup>2</sup>, MYERS<sup>1</sup>.

**Landscape Architecture:** Professors MARTEL (department head), PECK (emeritus); Associate Professor SOLBERG (emeritus); Assistant Professor FREDEEN; Instructor RICKARD.

**Modern Languages:** Professors KRAFT (department chairman), BOURBOUSSON, DAWES; Associate Professors JURGENSON, KUNNEY (emeritus); LEWIS (emeritus); Assistant Professor RICHTER; Instructor UHER.

**Music:** Professors WALLS (director)<sup>5</sup>, BRYE, SITES; Associate Professors GRAY, MESANG, J. O'CONNOR, ROBERTS; Assistant Professor MOLTSMANN, O. J. WILSON; Instructor MURRAY.

**Philosophy:** Professor HOVLAND (department chairman); Assistant Professors ANTON, UNSOELD.

**Political Science:** Professors WALTER (department chairman), DURACH (emeritus), SWYGARD; Associate Professors FUGUAY, MADDOX, McCLENAGHAN; Visiting Associate Professor HAWKINS.

**Psychology:** Professor CROOKS (department chairman); Associate Professors MILLS, RHODE; Assistant Professors CRAWFORD, LEWIS, MADDEN, SIMMONS, SIMPSON, VAN LOAN; Instructors BRODY, DAMM, TAUBMAN, S. A. WILSON.

**Religion:** Professor HOVLAND (department chairman); Assistant Professor UNSOELD; Instructor ZEIGLER.

**Sociology:** Professors PLAMBECK (department chairman), BAKKUM; Associate Professor PARKS; Assistant Professors CANTRELL, FOSTER; Instructors GRAVATT, MCCARTHY.

**Speech:** Professors WELLS (department chairman), CORTRIGHT, YOUNG; Associate Professors HARRIS, LIVINGSTON, WINGER; Assistant Professors DOLER, HENRY, HILDEBRANDT, PETERSON; Instructors BENNETT, GONZALES, GROVER<sup>4</sup>, PHILLIPS, A. WALLACE, WATKINS.

<sup>1</sup> Winter and spring terms 1960.

<sup>2</sup> Fall term 1959.

<sup>3</sup> On sabbatical leave 1959-60.

<sup>4</sup> On leave 1959-60.

<sup>5</sup> On sabbatical leave spring term 1960.

<sup>6</sup> On leave fall term 1959.

<sup>7</sup> On sabbatical leave fall term 1959.

## General Statement

At Oregon State College the liberal arts and sciences are offered in the School of Humanities and Social Sciences and the School of Science.

The School of Humanities and Social Sciences offers: (1) Liberal arts courses with a divisional major in Humanities leading to the degree of Bachelor of Arts and a divisional major in General Social Science leading to a degree of Bachelor of Arts or Bachelor of Science. (2) Electives and service courses in the humanities and social sciences for students majoring in other schools. (3) Lower division work in the professional fields of Architecture and Allied Arts (including Art and Landscape Architecture), Journalism, and Music. (4) Basic courses in humanities and social sciences as preparation for later specialization in a liberal or professional field.

**Majors.** The divisional major programs of the School of Humanities and Social Sciences provide a broad liberal education in accord with a philosophy which encourages breadth rather than specialization at the undergraduate level. The maximum number of credit hours in any one specific subject matter field which a student may count toward meeting degree requirements is 36. To ensure a well balanced as well as a broad education, the student combines a prescribed program of studies in either the subject area designated Humanities or that designated Social Sciences with a minor in the second area and in addition an approved minor in science or science and technology.

The humanities are those fields of knowledge and experience having to do with the productions of man as a feeling, thinking creator and communicator of beauty and truth. They include the fields of Architecture, Art, English, Journalism, Landscape Architecture, Modern Languages, Music, Philosophy, Religion, and Speech. The social sciences are those fields of knowledge having especially to do with human institutions, customs, and behavior which define man's social relationships. They include Economics, Geography, History, Political Science, Psychology, and Sociology.

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

**Science and Science-Technology Minors.** The student has a wide choice among approved minors in science or in science combined with technological courses. These minors range from 28 to 37 term hours, 33 hours being most frequent. Specialized minors include Botany, Chemistry, Entomology, Geology, Economic Geology, Mathematics, Meteorology, and Zoology. Less specialized minors include General Science, Biological Science, Earth Science, and Physical Science. Science teaching minors are in General Science and in Biological Science (General Biology). Minors combining science and technology include Foods and Nutrition, Food Processing and Utilization, Forest Conservation and Recreation, Land Resources Conservation, Soil and Water Conservation, and Textiles. The aim is not to prepare the specialist but to provide the student with insight and understanding in some area of particular significance in the technological society of which he is a part.

**Co-majors in Defense Education.** Under the principles establishing Defense Education at Oregon State College it is stipulated that the prescribed 4-year program in Air Science, or Military Science and Tactics, or Naval Science may be taken by men as a co-major in any school (see DEGREES AND CERTIFICATES). The approved co-major in Naval Science is accepted in the School of Humanities and Social Sciences as satisfying the requirements of a minor in science or science and technology. It is expected that approved co-majors in Air Science and in Military Science and Tactics, when accompanied by prescribed science courses, will be similarly accepted at a later date.

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

**Certificates.** A student who has completed a total of at least 93 term hours of required and elective freshman and sophomore work and has met requirements (see DEGREES AND CERTIFICATES) may be granted a Junior Certificate, a Junior Certificate with Honors Privileges, or a Lower Division Certificate, depending on his objectives and attainments. For either Junior Certificate the student must complete at least 9 approved term hours in each of three groups of courses, Humanities, Science, Social Science, and at least 9 additional approved term hours in any one of the groups. See GROUP COURSES.

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

### Lower Division and Service Departments

Under the plan adopted for the Oregon State System of Higher Education on March 7, 1932, major work in the fields of arts and letters, architecture and allied arts (including art and landscape architecture), journalism, music, and social sciences was confined to the University of Oregon. Lower division work in these fields may be taken at Oregon State College. Similarly, in certain fields in which major work is confined to Oregon State College, work is offered at the University as follows: in home economics, lower division and service courses; in secretarial science, lower division service courses. At each institution, in addition to the lower division work, upper division service courses are offered in the nonmajor departments for students in other fields.

While it is recommended that students wishing a departmental major in any of these fields enter at the beginning of the freshman year the institution at which major work is offered, they may, if they wish, complete the first two years of work in any of these fields at the nonmajor institution, and transfer to the major institution at the beginning of the junior year with fundamental requirements for upper division work fully met. Students will be aided in the selection of lower division studies preparing them for majoring in these fields at the upper division level at the University of Oregon.

Preparatory Dental, Medical, and Nursing Education curricula are offered at Oregon State through the School of Science.



## Group Courses

Sequences in liberal arts and sciences, applicable in meeting group requirements, are offered in the School of Humanities and Social Sciences and the School of Science.

### Humanities

#### ENGLISH

- <sup>1</sup>Eng 101, 102, 103. Survey of English Literature. 3 hours each term.  
<sup>1</sup>Eng 104, 105, 106. Appreciation of Literature. 3 hours each term.  
<sup>1</sup>Eng 107, 108, 109. World Literature. 3 hours each term.  
 Eng 201, 202, 203. Shakespeare. 3 hours each term.  
 Eng 253, 254, 255. Survey of American Literature. 3 hours each term.

#### GERMANIC LANGUAGES

- GL 101, 102, 103. Second-Year German. 2, 3, or 5 hours each term. (Applicable as a second Literature sequence when taken for 3 or 5 hours each term.)  
 GL 201, 202, 203. Survey of German Literature. 3 hours each term.

#### ROMANCE LANGUAGES

- <sup>FRENCH</sup>  
 RL 101, 102, 103. Second-Year French. 2, 3, or 5 hours each term. (Applicable as a second Literature sequence when taken for 3 or 5 hours each term.)  
 RL 201, 202, 203. Survey of French Literature. 3 hours each term.  
<sup>SPANISH</sup>  
 RL 107, 108, 109. Second-Year Spanish. 2, 3, or 5 hours each term. (Applicable as a second Literature sequence when taken for 3 or 5 hours each term.)  
 RL 207, 208, 209. Survey of Spanish Literature. 3 hours each term.

#### SLAVIC LANGUAGES

- SL 101, 102, 103. Second-Year Russian. 2, 3, or 5 hours each term. (Applicable as a second Literature sequence when taken for 3 or 5 hours each term.)

#### PHILOSOPHY

- Phl 201, 202, 203. Introduction to Philosophy. 3 hours each term. (Applicable as a second sequence in this group.)

### Science

#### SCIENCE SURVEYS

- GS 101, 102, 103. General Biology. 4 hours each term.  
 GS 104, 105, 106. Physical Science. 4 hours each term.

#### BACTERIOLOGY

- Bac 200. Bacteriology Laboratory. 2 hours. (See Interdepartmental Combinations, next page.)  
 Bac 204, 205, 206. General Bacteriology. 3 hours each term.

#### BOTANY

- Bot 201, 202. General Botany. 3 hours each term. Bot 203. Field Botany. 3 hours. (See Interdepartmental Combinations, next page.)

#### CHEMISTRY

- Ch 101, 102, 103. General Chemistry. 3 hours each term.  
 Ch 201, 202, 203. General Chemistry. 3 hours each term.  
 Ch 204, 205. General Chemistry. 4 or 5 hours each term.  
 Ch 206. Qualitative Analysis. 4 or 5 hours.

#### ENTOMOLOGY

- Ent 200. General Entomology. 3 hours. (See Interdepartmental Combinations, next page.)

#### GEOLOGY

- G 201, 202, 203. Geology. 3 hours each term. (May be accompanied by G 204, 205, 206. Geology Laboratory. 1 hour each term.)

#### MATHEMATICS

- Mth 100, Intermediate Algebra; Mth 101, College Algebra; Mth 102, Trigonometry; 4 hours each term. St 311, Descriptive Statistics, 3 hours. Any three in this group.  
 Mth 200, 201, 202, 203, Calculus. 4 hours each term. Any three in this group.

#### PHYSICS

- Ph 201, 202, 203. General Physics. 4 hours each term.  
 Ph 204, 205, 206. Astronomy. 3 hours each term.  
 Ph 207, 208, 209. Engineering Physics. 4 hours each term.

<sup>1</sup> Only one of these sequences may apply toward fulfilling group requirements.

**PSYCHOLOGY**

Psy 201, 202. General Psychology. 3 hours each term; Psy 205, Applied Psychology. 3 hours; when accompanied by Psy 208, 209, 210. Psychology Laboratory. 1 hour each term.

**ZOOLOGY**

Z 114, 115, 116. Human Biology. 3 hours each term, when accompanied by Z 117, 118, 119. Human Biology Laboratory. 1 hour each term.

Z 200. General Zoology. 5 hours. (See Interdepartmental Combinations, below.)

Z 201, 202, 203. General Zoology. 3 hours each term.

**INTERDEPARTMENTAL COMBINATIONS.** Any two of the four following:

Bac 200. Bacteriology Laboratory; Bac 230. Principles of Bacteriology; total of 5 hours.

Bot 201, 202. General Botany. 6 hours.

Z 200. General Zoology. 5 hours.

Ent 200. General Entomology. 3 hours.

**Social Science****GENERAL SOCIAL SCIENCE**

SSc 101, 102, 103. Background of Social Science. 3 hours each term.

**ANTHROPOLOGY**

Soc 214, 215, 216. Anthropology. 3 hours each term.

**ECONOMICS**

Ec 201, 202, 203. Principles of Economics. 3 hours each term.

Ec 213, 214. Principles of Economics. 4 hours each term. Ec 215. Economic Development of the United States. 3 hours.

**GEOGRAPHY**

Geog 105, 106, 107. Introductory Geography. 3 hours each term.

**HISTORY**

Hst 101, 102, 103. History of Western Civilization. 3 hours each term.

Hst 224, 225, 226. History of American Civilization. 3 hours each term.

**POLITICAL SCIENCE**

PS 201, 202, 203. American Governments. 3 hours each term.

PS 206. European Political Systems. 3 hours. (With PS 201 and PS 202 or 203 may be counted as a sequence.)

**PSYCHOLOGY**

Psy 201, 202. General Psychology. 3 hours each term. Psy 205, Applied Psychology. 3 hours. (May be accompanied by Psy 208, 209, 210. Psychology Laboratory. 1 hour each term.)

**SOCIOLOGY**

Soc 204, 205, 206. General Sociology. 3 hours each term.

**Curricula in Humanities and Social Sciences**

*B.A., B.S. Degrees*

**General Notes**

a. While in the School of Humanities and Social Sciences the maximum number of term hours required is 170 in a major curriculum, the requirements are such as to provide the student with a broad education in the liberal arts. As many as 36 hours in any Social Science or Humanities subject matter field may be counted toward the bachelor's degree. Students are urged to choose elective courses best suited to their interests and vocational and educational goals.

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

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

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

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

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

**HUMANITIES**

	<i>Hours</i>
<b>Freshman Year</b>	
English Composition (Wr 111, 112, 113).....	9
Survey of English Literature (Eng 101, 102, 103).....	9
Journalism, speech, or writing courses.....	6
Approved speech course.....	3
History of Western Civilization (Hst 101, 102, 103).....	9
Air, Military, or Naval Science (men).....	3-9
Physical Education .....	3
Electives .....	6-0
<b>Sophomore Year</b>	
Approved electives in art, landscape architecture, or music .....	9-3
Approved philosophy courses.....	9
First-year foreign language.....	12
Approved natural science or science-technology courses.....	9-12
Air, Military, or Naval Science (men).....	3-9
Physical Education .....	3
Electives .....	3-0
<b>Junior Year</b>	
Approved electives in art, landscape architecture, or music.....	0-6
Upper division courses in humanities <sup>1</sup> .....	18
Second-year foreign language.....	9
Approved natural science or science-technology courses.....	9-12
Humanities Seminar (Hum 307).....	3
Electives .....	9-0
<b>Senior Year</b>	
Upper division courses in humanities <sup>1</sup> .....	9
Humanities Seminar (Hum 407).....	6
Approved natural science or science-technology courses.....	9-15
Social science electives.....	9
Electives .....	15-9

**GENERAL SOCIAL SCIENCE**

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

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

## HUMANITIES

The humanities are those fields of knowledge and experience having to do with the productions of man as a thinking, feeling creator and communicator of beauty and truth. Included for administrative convenience as well as the nature of their subject matter are the courses in humanities and the work offered in the Departments of Architecture, Art, English, Journalism, Landscape Architecture, Modern Languages, Music, Philosophy, Religion, and Speech.

### Upper Division Courses

- Hum 307. **Seminar.** Terms and hours to be arranged.
- Hum 311, 312, 313. **Creative Epochs in Western Thought.** 3 hours each term. 3 ①  
 Seminal ideas in history, philosophy, science, art, and literature defining Western civilization. Sources in 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. HOWLAND, NORRIS, SHAW.
- 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. JURGENSON.
- Hum 407. **Seminar.** Terms and hours to be arranged.

## Architecture

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

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

### Lower Division Courses

- AA 111, 112. **Graphics I.** 3 hours each term. 3 ②  
 Light, color, and space in typical architectural forms, media and methods; manipulation of instruments; perspective, shades, shadows; projection and sectioning. GLASS.
- AA 121. **Construction Materials.** 3 hours. 2 ① 1 ②  
 Materials and techniques of constructing buildings and furnishings; materials in framing, fabrication, enveloping, surfacing, and finishing; color, scale, texture—techniques for use. Manufacture, distribution, availability, maintenance, and depreciation. Field trips, demonstrations, illustrated lectures, and laboratory investigation. ELLIS.
- AA 178. **House Planning and Architectural Drawing.** 3 hours any term. 1 ① 2 ③  
 Appreciation and criticism of domestic architecture. Small-house planning and drawing 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 ②  
 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.** 2 hours. 2 ②  
 Human environment and design processes, integration of natural materials with man-made materials in studio exercises, color phenomena and use in architectural design, three-dimensional design applied to structural space, model construction. 6 hours required for majors in architecture, interior architecture, and landscape architecture.
- AA 211, 212. **Graphics II.** 3 hours each term. 3 ②  
 Principles of orthographic projection and descriptive geometry; application to construction of plans and elevations; projections of points, lines, and planes; location of shades and shadows; mechanical and freehand perspective techniques; media and techniques of architectural presentation. GLASS.
- AA 218, 219, 220. **Construction.** 2 hours each term. 2 ①  
 Materials and methods of architectural construction; individual research and observation; sketching existing examples; class discussion. Prerequisite: AA 179 or AA 218. 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 Interiors.** 2 hours. 2 ②  
 Introduction to scope, aim, and technique of interior design intended to give understanding of professional field. All work done in drafting room. Open to nonmajor students with consent of instructor. WASSON.
- AA 287. **Design Studio II: Architecture.** 3 hours. 1 ① 2 ②  
 Processes by which architectural structures are conceived and executed; site location, function, organization of space and form, scale, proportion; review of executed models and drawings. Coordinated with AA 288, 289. Required of majors in architecture, interior architecture, and landscape architecture. Prerequisite: AA 187.
- AA 288. **Design Studio II: Interior Architecture.** 3 hours. 1 ① 2 ②  
 Interior spaces and forms; color, materials, fabrics, fixtures, and furnishings and selection and arrangement for functional needs and environment. Coordinated with AA 287, AA 289. Required of majors in architecture, interior architecture, and landscape architecture. Prerequisite: AA 187.
- AA 289. **Design Studio II: Landscape Architecture.** 3 hours. 1 ① 2 ②  
 Design of exterior spaces and landscape developments; problems in site utilization, circulation, orientation, exposure, contours, grading; plant materials, growth, and composition; relation of site exterior to structures. Coordinated with AA 287, AA 288. Required of majors in architecture, interior architecture, and landscape architecture. Prerequisite: AA 187.
- AA 297. **Lower Division Architectural Design.** 1 to 3 hours each term. 1 ③ to 3 ③  
 Principles of architectural design; methods, concepts, and ideas in architectural design and planning. Series of related problems studied and executed in plan, elevation, isometric perspective, and model in 2-year sequence.

## Art

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

## Lower Division Courses

- AA 160, 161. **Color and Composition.** 3 hours each term. 2 ②  
Studio classes in the everyday use of the principles of composing or creating with lines, colors, and textures. Required in the School of Home Economics.
- AA 201, 202, 203. **Survey of Visual Arts.** 3 hours each term. 3 ①  
Fundamentals and functions of architecture, painting, sculpture, and other arts; best of man's creations studied to develop an individual taste and increased appreciation. Three terms required of students who expect to major in the School of Architecture and Allied Arts at the University of Oregon. Recommended for home economics students.
- AA 250, 251. **Recreational Use of Art Crafts.** 3 hours each term. 2 ②  
Projects in various craft mediums, with particular attention to age levels, hobby interests, cost of equipment and materials. Required for recreational leadership minors, camp education minors, nonteaching majors in physical education; suggested for physical education majors, elementary education, and education majors.
- AA 254. **Leathercraft.** 3 hours each term, two terms. 2 ②  
Design and production of leathercraft objects.
- AA 255. **Ceramics.** 2 or 3 hours any term, three terms. 2 ①  
Introduction to pottery-making materials and techniques. Laboratory hours to be arranged.
- AA 257. **Jewelry.** 2 or 3 hours each term, two terms. 2 ②  
Design, tools, and techniques of jewelry introduced through individual student problems in semiprecious materials.
- AA 258. **Art Metalcraft.** 2 or 3 hours each term, two terms. 2 ②  
Design and hand execution of useful and decorative objects in copper, brass, and bronze.
- AA 259. **Art Craft.** 2 or 3 hours each term, two terms. 2 ②  
Application of original designs to textile and other materials by block and silk-screen printing and in weaving.
- AA 275, 276, 277. **Graphic Arts.** 2 or 3 hours each term. 2 ②  
Workshop instruction in making and printing engravings, etchings, lithographs, linoleum cuts, and wood cuts.
- AA 281, 282, 283. **Industrial Arts Drawing and Design.** 3 hours each term. 2 ②  
Freehand drawing with studio experience in the design of industrial arts objects, workshop techniques in art crafts. AA 281, 282 required for all industrial arts majors. AA 283 required for industrial arts education majors.
- AA 290. **Painting.** 2 or 3 hours any term, six terms. 2 ③  
Oil and mixed painting techniques; creative expression; special interests in painting. Twelve hours required of students who expect to major in drawing and painting at the University of Oregon.
- AA 291. **Drawing.** 2 or 3 hours each term, three terms. 2 ②  
Primary means of art expression and communication; principles of composition and techniques of fine draughtsmanship; specialized classes in fashion illustrating, sketching, and figure sketching. Three terms required of students who expect to major in the School of Architecture and Allied Arts at the University of Oregon.
- AA 292. **Water Color.** 2 or three hours each term, three terms. 2 ②  
Basic creative composing with colors, lines, and textures in casein and water colors. Abstract composition leading into representational problems to develop creativeness.
- AA 293. **Elementary Sculpture.** 2 or 3 hours each term, three terms. 2 ②  
Creative clay and plaster modeling and stone and wood carving; technical methods developed in conjunction with expressive design.
- AA 294. **Scientific Illustration.** 2 or 3 hours each term, two terms. 2 ②  
Freehand technical drawing adapted to needs of students in science and forestry.
- AA 295. **Basic Design.** 2 hours each term, three terms. 2 ②  
Individual projects leading to creative mastery of basic design in major visual arts and understanding of design factors involved in professional art. Three terms required of students who expect to major in art in the School of Architecture and Allied Arts at the University of Oregon. The work is correlated with that of AA 201, 202, 203.

- AA 296. **Display Design.** 3 hours each term, two terms. 2 ②  
Practical design experience in commercial art lettering, layouts, packaging, and display advertising. Offered for pharmacy, agriculture, and business and technology students.

#### Upper Division Courses

- AA 311, 312, 313. **Creative Arts and Crafts for Classroom Teacher.** 3 hours each term. 2 ②  
Studio projects, discussions, and observations to give practical approach to arts and crafts instruction at preschool and elementary school levels.
- AA 363, 364, 365. **History of Art.** 3 hours each term. 3 ①  
Visual arts from prehistoric to modern times; selected works of painting, sculpture, architecture, and other arts in relation to cultures producing them. Prerequisite: AA 201, 202, 203.
- AA 395. **Creative Art Projects.** 2 hours each term, six terms. 2 ②  
Advanced studio work on approved projects in drawing, painting, sculpture, and graphic arts. Upper division standing, one year lower division work in the selected medium, and approval of instructor required.
- AA 427, 428, 429. **Art in the Secondary School.** 5 hours each term. 2 ②  
Art practices in secondary school; laboratory work; individual research; current theoretical directions in relation to classroom situation. Prerequisite: 9 hours in art.

## English

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

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

**Writing.** The study and practice of writing aim to teach students to express their ideas clearly, simply, and accurately. An examination in English is required of all entering freshmen and all transfer students who have not completed 3 or more term hours of college English composition. Exceptional students are placed in honors sections. Students who reveal serious weaknesses are expected to enroll for two class hours each week in addition to Wr 111.

### Courses in Literature

#### Lower Division Courses

- <sup>1</sup>Eng 101, 102, 103. **Survey of English Literature.** 3 hours each term. 3 ①  
History of English literature in chronological sequence. Recommended for a major or minor in English. GIBSON, HEWITT, NELSON.
- <sup>1</sup>Eng 104, 105, 106. **Appreciation of Literature.** 3 hours each term. 3 ①  
Appreciation and criticism of literature with emphasis throughout on ideas and motives.

<sup>1</sup> Only one of these sequences may apply toward fulfilling group requirements.

- <sup>1</sup>Eng 107, 108, 109. **World Literature.** 3 hours each term. 3 ①  
Masterpieces of the ancient, medieval, Renaissance, and post-Renaissance world. BROWN.
- Eng 131. **Directed Recreational Reading.** 2 hours. 2 ①  
Reading and discussion to stimulate enjoyment of good literature. For students who normally do not take other literature courses.
- Eng 201, 202, 203. **Shakespeare.** 3 hours each term. 3 ①  
The major plays. Recommended for a major or minor in English. FOREMAN.
- Eng 253, 254, 255. **Survey of American Literature.** 3 hours each term. 3 ①  
American literature from its beginnings to present day. Recommended for a major or minor. CHILDS, JENKINS, NELSON.
- Eng 263. **Great Books.** 3 hours spring. 3 ①  
Great books of the world and their influence. BROWN.
- Eng 275. **The Bible as Literature.** 3 hours spring. 3 ①  
GIBSON.

#### Upper Division Courses

- Eng 354, 355, 356. **Continental European Literature.** 3 hours each term. 3 ①  
Survey of those writers, chiefly modern, whose works in translation have become part of our literary heritage and which aid in understanding the world today. *Eng 354*: Romance; *Eng 355*: Germanic; *Eng 356*: Slavic. COLBY.
- Eng 374. **The Short Story.** 3 hours. 3 ①  
Reading and analysis of masterpieces of the short story. JENKINS.
- Eng 384, 385, 386. **Contemporary Literature.** 3 hours each term. 3 ①  
Twentieth century American and British fiction, drama, and poetry. CHILDS.
- Eng 388. **Children's Literature and Library.** 3 hours. 3 ①  
Examination of reading material suitable for elementary grades and analysis of criteria to be used in selecting books for children. CARTER.
- Eng 417, 418, 419. **The English Novel.** (g) 3 hours each term. 3 ①  
Selected English novels of 18th and 19th centuries. *Eng 417*: Richardson through Austen. *Eng 418*: Scott through Trollope. *Eng 419*: Bronte to present. Prerequisite: 9 hours of literature. GROSHONG.
- Eng 454, 455. **Individual Authors.** 3 hours fall and winter. 3 ①  
Major English authors of the nineteenth century. GIBSON.
- Eng 488. **Literature for Teachers.** (g) 3 hours winter. 3 ①  
For students who plan to teach English. Critical reading and analysis of literature selected primarily from State-adopted texts. NORRIS.
- Eng 490. **Development of the English Language.** (g) 3 hours fall. 3 ①  
CHILDS.
- Eng 495, 496, 497. **The Democratic Tradition in Literature.** 3 hours each term. 3 ①  
Democratic ideas in literature from Plato to the present. Not open to freshmen and sophomores except by permission of instructor. CHILDS.

#### Graduate Service Courses

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

<sup>1</sup> Only one of these sequences may apply toward fulfilling group requirements.



## Auxiliary Courses

### Lower Division Courses

- Eng 91, 92, 93. **English for Foreign Students.** 3 hours each term. 3 ①  
Practice in vocabulary building, reading, writing, speaking, and comprehension of spoken discourse, adapted to needs of individual. *BUTTS.*
- Eng 115. **Effective Reading.** 3 hours any term. 3 ①  
Designed to develop better comprehension and greater speed in reading.
- Eng 211. **Vocabulary Building.** 3 hours any term. 3 ①

## Courses in Writing

### Lower Division Courses

- Wr 50. **Corrective English.** 3 hours. 3 ①  
Refresher course in English fundamentals. Credit does not count toward graduation.
- Wr 111, 112, 113. **English Composition.** 3 hours each term. 3 ①  
Frequent written compositions with emphasis on clarity and accuracy. Courses must be taken in sequence. Prerequisite: English placement examination. Students who score low on placement test are advised to take two class hours of instruction each week in addition to Wr 111. No credit and no grades are given for the additional classes. Students who pass placement test with distinction should enroll in honors sections in Wr 111, 112, 113.
- Wr 214. **Business English.** 3 hours any term. 3 ①  
Analysis and writing of common types of business letters. Prerequisite: Wr 113. *HEWITT, LIGON.*
- Wr 218. **Creative Writing.** 3 hours. 3 ①  
For students in professional schools who desire training and practice in such writing as may be called for in their vocational or cultural pursuits. Prerequisite: Wr 113. *NORRIS.*
- Wr 227. **Technical Report Writing.** 3 hours any term. 3 ①  
Principles and techniques of writing effective reports for both business and industry. Prerequisite: Wr 113. *GROSHONG, LIGON.*
- Wr 230. **Effective Writing.** 3 hours. 3 ①  
Practice to develop exactness and facility of expression; course varied to suit individuals. Prerequisite: Wr 113. *GROSHONG.*

### Upper Division Courses

- Wr 316, 317. **Advanced Expository Writing.** 3 hours each term. 3 ①  
Practice in various forms of expository writing.
- Wr 324, 325, 326. **Short Story Writing.** 2 hours each term. 3 ①  
Designed to develop proficiency in art of writing short story. Courses may be taken separately. Prerequisite: Wr 113.
- Wr 411. **English Composition for Teachers.** 3 hours. 3 ①  
For students expecting to teach English. *FOREMAN, DUBBÉ.*

## Courses in Library

### Upper Division Courses

- Lib 379. **Elementary School Library.** 3 hours. 3 ①  
Organization, administration, and function of elementary school library; methods of ordering and processing materials; care and repair of books; library resources in the community and state. Not open to freshmen and sophomores. Prerequisite: Eng 388.
- Lib 380. **Secondary School Library.** 3 hours. 3 ①  
Planning, organizing, and administering a public school library. Relation of library to curriculum; acquisition, processing, care, and use of library materials; routines; records. Not open to freshmen and sophomores. Prerequisite: Eng 388.

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

## Journalism

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

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

Students desiring to combine journalism with agriculture to prepare for positions in the field of agricultural journalism may major in general agriculture with a minor in journalism. A minor in journalism is likewise available in the School of Home Economics. A teaching minor in journalism is offered in the School of Education.

### Lower Division Courses

- J 111, 112. Journalism. 3 hours each term. 3 ①  
Journalistic style of writing; workings of the press, both general and technical. J 111 is required for eligibility to editorial staffs of student publications. J 111 offered each term; J 112, Spring Term. LAKE, ZWAHLEN.
- J 121. Journalism Laboratory. 1 hour any term.  
Given only in coordination with J 111 sections offering news beat experience.
- J 214. Copyediting. 3 hours any term. 2 ① 1 ②  
Copy reading, head writing, proofreading, and makeup; actual experience in editing copy. Required for advanced positions on the *Barometer*. Prerequisite: J 111. LAKE.
- J 223. Editorial Writing. 3 hours fall. 3 ①  
Materials, style, and arrangement of periodical editorials; training in writing editorials; policy and ethics; makeup of editorial page of farm and trade journals. Prerequisite: J 111. BAILEY.

### Upper Division Courses

- J 317. Special Feature Articles. 3 hours winter. 3 ①  
Writing of special articles along line of student's own major; study of media of such articles; practice in popularization of scientific material. Prerequisite: J 111. ZWAHLEN.
- J 318. Public Information Methods. 3 hours winter. 3 ①  
Planning and executing informational campaigns; methods of informing public of public affairs and other enterprises in which it has an interest. Prerequisite: J 111. BAILEY.

- J 319. **Technical Writing.** 3 hours spring. 3 ①  
Writing and editing popular and scientific bulletins; preparing reports and writing articles for scientific publications; preparing radio manuscripts. Prerequisite: J 111. BAILEY.
- J 331. **Photo-Journalism.** 3 hours. 1 ① 2 ②  
Planning, taking, and processing pictures for newspapers, magazines, and television. Prerequisite: J 111.
- J 351, 352, 353. **Journalism Projects.** 2 hours each term. 1 ① 1 ②  
Application of newswriting, copy-editing, feature-writing, and technical-writing principles; experience on student publications; preparation of articles for trade and technical publications or specialized material for general publications. Consent of instructor required. Prerequisite: J 111, 214. SHIDELER.

## Landscape Architecture

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

A 4-year curriculum in landscape construction and maintenance is offered in the Department of Horticulture leading to the degree of Bachelor of Science. Students register in the School of Agriculture beginning with the freshman year.

A student may complete a lower division curriculum in landscape architecture at Oregon State College and transfer to the University of Oregon for the last three years of professional work.

### Lower Division Courses

- LA 279. **Home Ground Planning.** 3 hours any term. 1 ① 2 ②  
Organization and improvement of rural and urban home grounds.
- LA 290. **Lower Division Landscape Design.** 2 hours each term, three terms. 3 ②  
Design of city and suburban residence properties and other design problems of three acres or less. Prerequisite: LA 279 or consent of instructor.

### 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  
Story of gardens as an outgrowth of living conditions of the times from early Egyptian to the modern American.
- LA 359, 360, 361. **Maintenance and Construction.** 3 hours each term. 1 ① 2 ②  
Maintenance of private and public landscapes; landscape construction problems. Prerequisite: LA 279.
- LA 379. **Landscape Architecture.** 3 hours spring. 2 ① 1 ②  
Elements and design of recreation areas. Prerequisite: LA 279.
- LA 382, 383, 384. **Layout of Small Properties.** 2 or 3 hours each term. 1 ① 1 or 2 ②  
City lot, small suburban properties, and other areas; sketch plans, finished renderings, and contour problems. Prerequisite: LA 279, 290.

- LA 390. **Intermediate Landscape Design.** 3 hours each term, three terms. 1 ① 2 ③  
Continuation and enlargement of LA 290. Prerequisite: LA 290.
- LA 392, 393, 394. **Planting Plans.** 2 hours each term. 1 ① 1 ②  
Planting plans; estimates of costs; construction and seasonal care of planting areas.  
Prerequisite: LA 290, 326, 327, 328.

## Modern Languages

The Department of Modern Languages offers instruction in Chinese, French, German, Portuguese, Russian, and Spanish. The courses are planned to meet the demand for practical use of language as well as cultural needs of all students, to provide foreign-language requirements found in scientific and technical curricula and needed in connection with various professions, and to prepare students to major in one of these languages at the upper division level.

Teaching minors in French, German, Russian, and Spanish are offered for students in the School of Education, and minors in these languages are available to students in the School of Home Economics. The second-year course in any foreign language, when taken for three or five hours each term, is applicable as a *second* literature sequence in meeting group requirements in the liberal arts and sciences.

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

### Courses in German

#### Lower Division Courses

- GL 50, 51, 52. **First-Year German.** 4 hours each term. 5 ①  
Elements of pronunciation, grammar, reading, and conversation. Engineering students and others may, with consent of instructor, enroll for 3 hours each term. KRAFT, UHER.
- GL 101, 102, 103. **Second-Year German.** 2, 3, or 5 hours each term.  
(a) For 3 hours credit: grammar, composition; reading of modern German authors.  
(b) For 2 hours credit: two meetings a week devoted to conversation. (c) For 5 hours credit: (a) and (b) combined. Prerequisite: GL 50, 51, 52. KRAFT, UHER, staff.
- GL 201, 202, 203. **Survey of German Literature.** 3 hours each term. 3 ①  
Reading of masterpieces of various periods; general survey of German literature. Prerequisite: GL 101, 102, 103, or equivalent. KRAFT.
- GL 211, 212, 213. **Directed Reading in German.** 1 or 2 hours each term. 1 or 2 ①  
Reading in German in field of student's major interest as aid to maintaining proficiency in the language. Students who register for 1 hour may register for an additional hour in a subsequent year. Prerequisite: two years of college German or equivalent. KRAFT.

#### Upper Division Courses

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

- GL 320, 321, 322. **Scientific German.** 1, 2 or 3 hours each term. 1, 2, or 3 ①  
Recommended to students interested in science or medicine. Articles in science, surgery, history of medicine, and current clinical literature are read. A maximum of 3 term hours may be taken under each course number. Consent of instructor required. KRAFT.

- GL 343, 344, 345. **Survey of German Literature.** 3 hours each term. 3 ①  
Reading of masterpieces of various periods; general survey of German literature. Prerequisite: GL 101, 102, 103, or equivalent. Not open to students who have taken GL 201-203. KRAFT.

### Courses in Oriental Languages: Chinese

#### Lower Division Courses

- OL 50, 51, 52. **First-Year Chinese.** 4 hours each term. 5 ①  
Essentials of colloquial Mandarin with emphasis on conversation and easy reading. Consent of instructor required. YANG.

### Courses in Romance Languages: French

#### Lower Division Courses

- RL 50, 51, 52. **First-Year French.** 4 hours each term. 5 ①  
Elements of pronunciation, grammar, reading, and conversation. Engineering students and others may, with consent of instructor, enroll for 3 hours each term. BOURBOUSSON, RICHTER.
- RL 101, 102, 103. **Second-Year French.** 2, 3, or 5 hours each term.  
(a) For 3 hours credit: grammar, composition; reading of modern French authors.  
(b) For 2 hours credit: two meetings a week devoted to conversation. (c) For 5 hours credit: (a) and (b) combined. Prerequisite: RL 50, 51, 52. BOURBOUSSON, RICHTER.
- RL 201, 202, 203. **Survey of French Literature.** 3 hours each term. 3 ①  
(Third-year French.) Masterpieces of various periods; general survey of French literature. Prerequisite: two years of college French or the equivalent. BOURBOUSSON.
- RL 211, 212, 213. **Directed Reading in French.** 1 or 2 hours each term.  
1 or 2 ①  
Reading in French in field of the student's major. Students who register for 1 hour any term may register for an additional hour in a subsequent year. Consent of instructor required. BOURBOUSSON, staff.

#### Upper Division Courses

- RL 311, 312, 313. **Survey of French Literature.** 3 hours each term. 3 ①  
(Third-year French.) Masterpieces of various periods; general survey. Prerequisite: two years of college French or equivalent. Not open to students who have taken RL 201-203. BOURBOUSSON.
- RL 320, 321, 322. **Scientific French.** 1, 2, or 3 hours each term.  
For students in science, medicine, and technology. Current technical and professional literature. Maximum credit, 3 term hours under each course number. Prerequisite: second-year French or consent of instructor. BOURBOUSSON.

### Courses in Romance Languages: Portuguese

#### Lower Division Courses

- RL 80, 81, 82. **First-Year Portuguese (Brazilian).** 4 hours each term. 5 ①  
Elements of pronunciation, grammar, reading, and conversation. Engineering students and others may, with consent of instructor, enroll for 3 hours each term. DAWES.
- RL 217, 218, 219. **Directed Reading in Portuguese.** 1 to 2 hours each term.  
1 or 2 ①  
Reading in Portuguese to aid students to maintain facility in the language. Prerequisite: consent of instructor. DAWES.

## Courses in Romance Languages: Spanish

### Lower Division Courses

- RL 60, 61, 62. **First-Year Spanish.** 4 hours each term. 5 ①  
Pronunciation, grammar; reading and conversation. Engineering students and others may, with consent of instructor, enroll for 3 hours each term. DAWES, RICHTER.
- RL 107, 108, 109. **Second-Year Spanish.** 2, 3, or 5 hours each term.  
(a) For 3 hours credit: grammar, composition; reading of modern Spanish authors.  
(b) For 2 hours credit: two meetings a week devoted to conversation. (c) For 5 hours credit: (a) and (b) combined. Prerequisite: RL 60, 61, 62. DAWES.
- RL 207, 208, 209. **Survey of Spanish Literature.** 3 hours each term. 3 ①  
(Third-year Spanish.) Reading of masterpieces of various periods; general survey of credit: (a) and (b) combined. Prerequisite: RL 60, 61, 62. DAWES.
- RL 214, 215, 216. **Directed Reading in Spanish.** 1 or 2 hours each term.  
1 or 2 ①  
Reading in Spanish in student's major. Students who register for 1 hour any term may register for an additional hour in a subsequent year. Consent of instructor required. DAWES, RICHTER.

### Upper Division Courses

- RL 323, 324, 325. **Scientific Spanish.** 1, 2, or 3 hours each term. 1, 2, or 3 ①  
For students in science and technology. Current technical and professional literature. Maximum credit, 3 term hours under each course number. Prerequisite: second-year Spanish. If student has not had prerequisite, consent of instructor is required. DAWES, RICHTER, staff.
- RL 341, 342, 343. **Survey of Spanish Literature.** 3 hours each term. 3 ①  
(Third-year Spanish.) Masterpieces of various periods; general survey. Prerequisite: two years of college Spanish or equivalent. Not open to students who have taken RL 207-209. DAWES.

## Courses in Slavic Languages: Russian

### Lower Division Courses

- SL 50, 51, 52. **First-Year Russian.** 4 hours each term. 5 ①  
Elements of pronunciation, grammar, reading, and conversation. JURGENSON.
- SL 101, 102, 103. **Second-Year Russian.** 2, 3, or 5 hours each term.  
(a) For 3 hours credit: review of grammar, composition; reading of newspapers, periodicals, and modern Russian authors. (b) For 2 hours credit: two meetings a week devoted to conversation. (c) For 5 hours credit: (a) and (b) combined. Prerequisite: SL 50, 51, 52. JURGENSON.

### Upper Division Courses

- SL 320, 321, 322. **Scientific Russian.** 1, 2, or 3 hours each term. 1, 2, or 3 ①  
Provides opportunity to study beyond second year and to read in various fields of science. JURGENSON.

## Music

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

**Musical Organizations.** The Bands, Orchestra, Glee Club, Madrigal Club, and Choralaires are open to all students after consultation with the directors. Each group appears frequently in public concerts.

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

**Music Minors.** A minor in music is available to students majoring in Secondary Education. See SCHOOL OF EDUCATION.

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

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

APPLIED MUSIC (private lessons):	<i>Per term</i>
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 .....	\$15.00
PRACTICE ROOM RENTAL—with piano:	
One-half hour a day, a term.....	\$ 2.50
One hour a day, a term.....	\$ 4.00
Two hours a day, a term.....	\$ 7.00
Three hours a day, a term.....	\$10.00
PRACTICE ROOM RENTAL—without piano:	
One hour a day, a term.....	\$ 2.50
ORGAN RENTAL:	
One hour a day, a term (Hammond spinet).....	\$ 7.50
One hour a day, a term (Connsonata).....	\$10.00

#### Lower Division Courses

- Mus 111, 112, 113. **Music Theory I.** 4 hours each term. 5 ①  
 Music fundamentals, scales, key relationships, intervals, triads; harmonizations 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 190. **Applied Music.** 1 or 2 hours any term.  
 Individual instruction in piano, organ, voice, and instruments of band and orchestra. Term hours on basis of number of lessons a week (1 or 2 half-hour periods).
- Mus 191. **Class Lessons in Voice.** 1 hour each term, three terms. 1 ①
- Mus 195. **Band.** 1 hour each term. 3 ①  
 Division I band: concert organization of men and women who have obtained membership by tryout. Division II band: those who need more experience and training to meet standards of concert band. The marching band which plays at football games, parades, etc., is composed of all men in the Division I and II bands. Membership of all three groups is interchangeable at discretion of conductor.
- Mus 196. **Orchestra.** 1 hour each term. 1 ② 1 ①  
 Symphonic group including all instruments common to such an organization. Membership is open to all string players and those wind and percussion players who, in opinion of conductor, can meet the special requirements of the orchestra.

- Mus 197. **Chorus.** 1 hour each term. 3 ①  
Membership is open to all students subject to tryout. Two weekly rehearsals of Glee Club (men) and Madrigal Club (women), and one rehearsal of the two groups combined. Concert of standard choral works each term.
- Mus 211, 212, 213. **Music Theory II.** 3 hours each term. 3 ①  
Continuation of Mus 113 involving use of secondary and altered chords in harmonization and analysis of master works; modulation and keyboard harmony further developed.
- Mus 221. **Introduction to Music Literature.** 3 hours. 3 ①  
A beginner's course in listening to music.
- Mus 241. **Recreational Use of Music.** 3 hours. 3 ①  
Use of musical activities in organized community recreational program. Primarily for students majoring in recreation.
- Upper Division Courses**
- Mus 321, 322. **Instrumental Conducting.** 2 hours each term. 2 ①  
Basic conducting techniques and score reading for conductors of instrumental groups. Practical experience conducting campus organizations.
- Mus 324, 325, 326. **Choral Conducting.** 2 hours each term. 2 ①  
Basic conducting techniques and score reading for conductors of choral groups. Practical experience conducting campus organizations.
- Mus 335, 336. **Band and Orchestra Techniques.** 2 hours each term. 2 ①  
Instruction on band and orchestral instruments; instrumental group organization; rehearsal procedures; survey of literature; program building.
- Mus 350. **Music for the High School Teacher.** 3 hours. 3 ①  
Materials and methods for developing high school choral organizations, adolescent voice, its care and development; survey of choral literature; public performance; program building; general music class; assembly singing. Prerequisite: six terms of music.
- 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 364, 365. **History of Music.** 3 hours each term. 3 ①  
Development of music in relation to social, economic, and political influences from primitive times to the present. Must be taken in sequence. Prerequisite: Mus 221.
- Mus 371, 372. **Music for Elementary Teachers.** 3 hours each term. 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. 3 ①  
Experiences in teaching the various music activities found in the elementary school. Prerequisite: Mus 372.
- Mus 390. **Applied Music.** 1 or 2 hours any term.  
Advanced study of piano, organ, voice, and instruments of band and orchestra. Term hours on basis of number of lessons a week. (1 or 2 half-hour periods.) Prerequisite: 6 hours of Mus 190, or qualifying examination.
- Mus 395. **Band.** 1 hour each term.  
Prerequisite: 6 terms of Mus 195.
- Mus 396. **Orchestra.** 1 hour each term.  
Prerequisite: 6 terms of Mus 196.
- Mus 397. **Chorus.** 1 hour each term.  
Prerequisite: 6 terms of Mus 197.



## Philosophy

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

### Lower Division Courses

- Phl 201, 202, 203. **Introduction to Philosophy.** 3 hours each term. 3 ①  
 Unified year sequence but work of three terms may be taken in any order. *Phl 201*, nature of philosophy and its basic problems; *Phl 202*, philosophy of ethics; *Phl 203*, social philosophy.
- Phl 211, 212, 213. **Practical Life Philosophies.** 2 hours each term. 2 ①  
 Classics of philosophy selected to help student develop his own philosophy of life.
- Phl 214, 215, 216. **Modern Logic.** 3 hours each term. 3 ①  
*Phl 214*: Critical thinking; methods and principles of deductive logic to develop facility in detection of fallacies. *Phl 215*: Symbolic logic; techniques of analysis and deduction. *Phl 216*: Metalogic; rigorous development of a propositional calculus and a lower functional calculus. Phl 215 is prerequisite for Phl 216.

### Upper Division Courses

- Phl 301, 302, 303. **History of Philosophy.** 3 hours each term. 3 ①  
 Western philosophy from the pre-Socratic Greeks to twentieth century. Prerequisite: Phl 201.
- Phl 471. **Philosophy of Science.** 3 hours. 3 ①  
 Systematic analysis of nature and structure of scientific concepts, theories, and laws; historical examination of revolutions in science and their causes; appraisal of influences of science and philosophy on each other.

## Religion

Establishment of a chair of religion at Oregon State College was authorized in 1928, and the first courses were offered in the fall of 1928-29. The Department of Religion is nonsectarian in spirit and organization. Its purpose is threefold:

- 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.
- 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.
- 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 211. **The New Testament and Its Historical Background.** 3 hours. 3 ①  
 Special attention is given to time and conditions out of which New Testament writings came and problems that gave rise to Christian movement.
- R 212. **The Old Testament and Its Historical Background.** 3 hours. 3 ①  
 Old Testament in light of times and conditions which produced it; religion of Israel as it emerges out of critical survey of sources.

- R 220. **The Sermon on the Mount.** 2 hours. 2 ①  
Philosophy of Jesus' teaching as embodied in selected passage.
- R 225. **The Prophets and Their Message.** 2 hours. 2 ①  
Selected writings of Hebrew prophets; their significance and value for present day.
- R 230. **History of Christian Thought.** 3 hours. 3 ①  
Rise and spread of Christian religion; thought of its various leaders; movements within Christianity; present tendencies in religious thought.
- R 231. **The American Religious Heritage.** 2 hours. 2 ①  
Development of main religious groups in America: Catholicism, Judaism, Protestantism; role of the churches; current trend toward ecumenicity.
- Eng 275. **The Bible as Literature.** 3 hours spring. 3 ①  
Structure, literary types, ideas of the Bible; its influence on our literary heritage.  
GIBSON.

#### Upper Division Courses

- R 370. **Principles of Religious Leadership.** 2 hours. 2 ①  
Practical study of religious leadership. Open only to students actually engaged in some form of leadership in a religious organization that serves as laboratory work for the study.
- R 407. **Seminar.** Terms and hours to be arranged.
- R 461. **Philosophy of Religion.** 3 hours. 3 ①  
Basic convictions underlying religious thinking; values, God, problem of good and evil, immortality, human nature, religious experience.
- R 462. **History of Great Religions.** 3 hours. 3 ①  
Comparative study of religions that command a large following today, such as Hinduism, Buddhism, Confucianism, Judaism, Christianity, and Islam.
- R 463. **Psychology of Religion.** 3 hours. 3 ①  
Bearing of psychology on religious thought and action, both past and present.

## Speech

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

Courses in interpretation and community drama are conducted not only as a means of rounding out the speech training but also as an aid to prospective teachers and other community leaders in the directing of plays and in the making of stage settings, costumes, and other equipment. Seven full-length plays, several 1-act plays, and a number of puppet shows are produced each year.

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

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

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

#### Lower Division Courses

- Sp 111, 112, 113. **Extempore Speaking.** 3 hours each term. 3 ①  
Original speeches; analysis and synthesis of material, adaptation to audience, outline construction; development of confidence and release on platform; voice, enunciation, gesture, and bearing in delivery; speeches for special occasions; the extended address. Must be taken in sequence. WELLS, staff.
- Sp 120. **Voice and Diction.** 3 hours. 3 ①  
Vocal tone and correct speech sounds, pronunciation standards, vocabulary building, and word usage in relation to social integration of student; principles underlying good business and technical speaking on platform, radio, and television. HARRIS, WINGER.
- Sp 121, 122, 123. **Interpretation.** 3 hours each term. 3 ①  
Analysis and presentation of printed materials; study of emotional reactions that give color and interest; expressive vocal and bodily responses; pantomime; correction of faulty speech habits; intensive work in characterization; choral reading; interpretation of dramatic literature. Must be taken in sequence. CORTRIGHT, YOUNG, WINGER, HENRY, BENNETT.
- Sp 190. **Corrective Speech.** 1 hour each term, maximum 3 hours. 2 ①  
Designed specifically for students having organic or functional speech disorders; group meetings of class, supplemented by clinical periods devoted to individual diagnosis and treatment. HARRIS, HILDEBRANDT.
- Sp 191. **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 231. **Parliamentary Procedure.** 3 hours winter or spring. 3 ①  
Rules of parliamentary procedure; practice in application; forming temporary and permanent organizations; preparation of constitutions and bylaws. Students serve as chairman and secretary and learn how to participate effectively in meetings. WINGER, DOLER.
- Sp 232. **Group Discussion.** 3 hours winter or spring. 3 ①  
Preparing for, leading, and participating in types of discussions used in various groups led by extension workers, technical and professional people, and teachers, in conferences, panels, lecture-forums, and symposiums; strong emphasis on problem-solving and interpersonal relations. Prerequisite: Sp 111. HARRIS, WINGER, DOLER, PETERSON.
- Sp 237. **Argumentation.** 3 hours fall or winter. 3 ①  
Theory; brief-drawing; collection and use of evidence; construction of speeches. Each student works out several briefs and delivers several speeches. Prerequisite: Sp 111. PETERSON.
- Sp 238. **Persuasion.** 3 hours fall or winter. 3 ①  
Study of models; composition exercises; writing a term speech; mastery of audience psychology and effective style. Prerequisite: Sp 111. WELLS.
- 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. HENRY.
- Sp 242. **Recreational Use of Drama.** 3 hours fall or 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. HENRY.
- Sp 243. **Puppetry.** 3 hours winter. 3 ①  
History of puppetry; practice in adapting plays, stories, and historical events for puppet dramatization; practice in manipulating puppets and marionettes; application to television. HARRIS.

- Sp 244. **Stagecraft and Lighting.** 3 hours. 2 ① 2 ③  
Constructing scenery and stage properties; lighting equipment and basic principles of lighting; practical experience in lighting, backstage procedures, and designing and construction of settings both realistic and suggestive. YOUNG, BENNETT.
- Sp 247, 248, 249. **Community Drama.** 3 hours each term. 3 ①  
Participation and leadership in community dramatics; community-drama idea; play selection; stage technique and acting; costume and makeup; short cuts in craftsmanship; directing and play production. Prerequisite for Sp 247: Sp 122; for Sp 248: none; for Sp 249: Sp 247. CORTRIGHT, YOUNG, HENRY.
- Sp 253. **Workshop Theater.** 1 to 3 hours.  
For participation in dramatic activities, credit totaling not more than 6 hours is given on recommendation of instructor. Consent of instructor required. CORTRIGHT, YOUNG, HARRIS, HENRY, BENNETT.
- Sp 264. **Radio-Television Projects.** 2 hours.  
Educational projects in radio-television under supervision, chosen for variety of experience in microphone interpretation, production planning, script preparation, studio acoustic practices; practical laboratory experimentation under broadcast conditions. Consent of instructor required. LIVINGSTON, GROVER, PHILLIPS, GONZALES, WATKINS.
- Sp 271. **Oratory.** 1 hour each term, four terms.  
Original manuscript speeches; preparation for intercollegiate competition. Prerequisite: Sp 111. Either Sp 238 or consent of instructor required. WELLS.
- 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; preparation for intercollegiate competition. Prerequisite: Sp 111. Either Sp 112 or consent of instructor required. DOLER, PETERSON.
- Sp 277. **Debate.** 1 hour each term, four terms.  
Principles of argumentation; preparation for intercollegiate competition. Prerequisite: Sp 111. Either Sp 237 or consent of instructor required. PETERSON.

#### Upper Division Courses

- Sp 346. **Scene and Stage Design.** 3 hours. 2 ① 2 ③  
Physical theater; forms of auditoriums and stages; history of scene design; design of stage settings; application to high school and community dramatics. Prerequisite: Sp 244 or consent of instructor. YOUNG, BENNETT.
- Sp 355. **Workshop Theater.** 1 to 3 hours.  
For participation in dramatic activities, credit totaling not more than 6 hours is given to juniors and seniors on recommendation of instructor. Prerequisite: 3 term hours of Sp 253. CORTRIGHT, YOUNG, HARRIS, HENRY, BENNETT.
- Sp 361, 362, 363. **Radio Speaking.** 3 hours each term. 2 ① 1 ②  
Radio delivery techniques; station broadcasting policies; adapting informational materials to broadcasting; basic production techniques; program planning, writing, and promotion in major areas of student interest; practical broadcasting experience, using modern studios and recording equipment. Prerequisite: Sp 111 for Sp 361; Sp 361 for Sp 362 or 363. LIVINGSTON, GROVER, PHILLIPS.
- Sp 365. **Radio-Television Projects.** 2 hours.  
Educational projects in radio-television similar to work in Sp 264. Prerequisite: Sp 264 or Sp 361. LIVINGSTON, GROVER, PHILLIPS.
- Sp 367. **Basic Television.** 3 hours fall or winter. 2 ① 1 ②  
Television performance techniques, including functions of camera, microphones, studio special equipment, with basic principles of sound program planning; designed to supplement training for extension workers, in addition to giving students of the School of Education basic understanding of educational TV possibilities. Prerequisite: Sp 361. LIVINGSTON, PHILLIPS.
- Sp 368. **Television Programing.** 3 hours spring. 2 ① 1 ②  
Advanced principles of television writing and production in terms of public service programing in such fields as home economics, agriculture, engineering; special projects in the student's field of major interest. Prerequisite: Sp 367. LIVINGSTON.
- Sp 372. **Oratory.** 1 hour each term, six terms.  
Continuation of Sp 271, which is prerequisite. WELLS.

- Sp 375. **General Forensic Speaking.** 1 hour each term, six terms.  
Continuation of Sp 274, which is prerequisite. **DOLER, PETERSON.**
- Sp 378. **Debate.** 1 hour each term, six terms.  
Continuation of Sp 277, which is prerequisite. **PETERSON.**
- Sp 451. **Audio-Visual Aids in Radio-Television.** (g) 3 hours. 3 ①  
Adaptation of audio-visual effects in broadcasting. Use of sound, music, graphics, film, and special studio and electronic effects in communicating information through broadcast media. Prerequisite: Sp 367. **LIVINGSTON.**
- Sp 480. **Speech Science.** 3 hours fall or winter. 3 ①  
Scientific bases of speech; nature and purpose of speech; origin and development in race and individual; anatomy and physiology of speech mechanisms, both peripheral and nervous; physics of speech sounds; phonetic elements; psychological aspects. **WELLS.**
- Sp 493. **Principles and Techniques of Speech Correction.** (G) 3 hours. 3 ①  
Nature, causes, diagnosis, and treatment of speech defects both organic and functional; for students requiring knowledge of speech problems of children and adolescents especially. Recommended prerequisite: Sp 480. **WELLS, HARRIS, HILDEBRANDT.**
- Sp 494. **Clinic Procedures.** (G) 3 hours spring. 3 ①  
Extensive practical experience in handling clinical cases, including taking of case history, making diagnosis, and giving remedial treatment. Prerequisite: Sp 493. **WELLS, HILDEBRANDT.**

## SOCIAL SCIENCES

The Social Sciences are those fields of knowledge having especially to do with institutions, customs, and behavior which define man's human relationships. Included for administrative convenience as well as the nature of their subject matter are the courses in general social science and the work offered in the Departments of Economics (including Geography), History, Political Science, Psychology, and Sociology.

### General Social Science

#### Lower Division Courses

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

#### Upper Division Courses

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

## Economics

Instruction in the Department of Economics includes lower division and service courses intended to serve the cultural and informational needs of all students interested in economic problems in relation to citizenship; to supply a lower division foundation for law, business, or public service, or for majoring in economics at the upper division level; and to meet the prescriptions found in professional curricula.

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

### Courses in Economics

#### Lower Division Courses

- Ec 111. **The American Economy.** 3 hours fall. 3 ①  
Introduction to economic institutions in United States; living standards, employment, income distribution, economic resources, forms of business enterprise, and role of government. Emphasis on position and problems of consumer in market economy. SMITH.
- Ec 201, 202, 203. **Principles of Economics.** 3 hours each term. 3 ①  
The principles that underlie production, exchange, and distribution; practical problems, such as monetary and banking reform, trade regulations, taxation, labor movements, unemployment, business cycles. A 3-term sequence. FRIDAY, staff.
- Ec 212. **Outlines of Economics.** 3 hours. 3 ①  
A rapid survey of the principles of economics and economic institutions. Restricted to science and upper division professional school students. FRIDAY, staff.
- Ec 213, 214. **Principles of Economics.** 4 hours each term, winter and spring. 4 ①  
Similar to Ec 201, 202, 203. A 2-term sequence. SMITH.
- Ec 215. **Economic Development of the United States.** 3 hours. 3 ①  
Origin and development of economic institutions including industry, agriculture, commerce, transportation, labor, and finance. Analyzes the economic progress of the United States. FRIDAY.

#### Upper Division Courses

*Prescribed in major curricula in degree-granting schools at Oregon State College and also available as electives to students majoring in such schools.*

- Ec 310. **Economics of National Security.** 3 hours fall. 3 ①  
Economic basis of national security; industrial mobilization; stabilization of civilian economy; national budget and fiscal and monetary policy under a security program; foreign aid policies. FRIDAY.
- \*Ec 407. **Seminar.** (g) Terms and hours to be arranged.
- Ec 420. **Business Combinations.** (g) 3 hours spring. 3 ①  
Historical development and present status of American business combinations; cooperatives, trade associations, trusts, holding companies, and consolidations; monopolies; fair and unfair practices, monopoly price problems; control. Prerequisite: elementary economics. DOWNS.
- Ec 421. **Business Fluctuations.** (g) 3 hours spring. 3 ①  
Variations in economic activity viewed in historical perspective; fluctuations and cycles; prosperity and depression; measurement and control. Prerequisite: elementary economics. ORZEC.

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

- Ec 422. Economics of Consumption.** 3 hours spring. 3 ①  
Economic principles applied to consumer problems; wealth consumption; living standards; living costs; budgeting; consumer markets; choice in buying; conservation policies; consumption theories. Prerequisite: elementary economics. PATTERSON.
- Ec 423. Economics of Public Utilities.** 3 hours winter. 3 ①  
Development of public utilities in the United States; their economic and legal characteristics; problems of regulation, rates, services, and finance. Prerequisite: elementary economics. PATTERSON.
- \*Ec 424. Money and Banking.** (g) 4 hours fall or spring. 4 ①  
Nature and functions of money; factors affecting price; forms of money; functions of banks; history of banking; Federal Reserve Bank Act; American and foreign banking systems. Prerequisite: elementary economics. NELSON.
- Ec 425. Labor Problems.** (g) 4 hours fall or winter. 4 ①  
Sources and nature of labor problems; labor market; wages; unions; law related to employer and union tactics; effect of levels of employment. Prerequisite: elementary economics. DOWNS.
- Ec 426. Collective Bargaining and Labor Legislation.** 4 hours spring. 4 ①  
Wages and hours; unemployment; labor relations and social insurance; collective bargaining; legal, social, and economic implications of the labor movement. Prerequisite: elementary economics. DOWNS.
- Ec 427. Public Finance.** (g) 3 hours winter. 3 ①  
Survey of government taxing, spending, borrowing with emphasis on current issues of theory and practice at Federal, State, local levels; shifting and incidence; effects of taxes on income distribution and welfare. Prerequisite: elementary economics. DARCY.
- \*Ec 435. Transportation.** (g) 3 hours winter. 3 ①  
Development of systems of transportation; organization and financing; effect of competition; freight classification; rates and fares; government control; State and Federal regulation. Prerequisite: elementary economics. SMITH.
- \*Ec 443. International Trade.** (g) 4 hours winter. 4 ①  
Theory of international trade; nature and effects of government bounties, subsidies, import and export duties; commercial policies of nations; consular service; ocean routes and carriers. Prerequisite: elementary economics. SMITH.
- Ec 450. Comparative Economic Systems.** 3 hours fall. 3 ①  
Analysis and critical appraisal of contemporary economic systems: capitalism, socialism, communism. Prerequisite: elementary economics. DOWNS.
- \*Ec 475, 476, 477. Current Economic Theory and Problems.** (g) 3 hours each term. 3 ①  
*Ec 475:* Nature and scope of economics; role of economic theory; microeconomics: supply and demand; indifference curves; pricing under conditions of competition, oligopoly, monopoly; functional distribution of income. *Ec 476:* Macroeconomics; determination of national income and employment; consumption; investment; multiplier; accelerator; monetary and fiscal policy. *Ec 477:* Economics of growth: long run changes in national income and structure of economic institutions; growth theories; underdeveloped economies. Courses may be taken separately. Prerequisite: Elementary economics. NELSON, DOWNS, ORZEC.
- \*Ec 481. Economic Programing.** (g) 3 hours spring. 3 ①  
Basic principles of programing problems and methods of solution in decision-making problems in agriculture, transportation, and manufacturing; meaning and application of input-output analysis. Prerequisite: Ec 475, 476, 477. SMITH, ORZEC.

#### Graduate Service Courses

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

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

## Courses in Geography

### Lower Division Courses

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

### Upper Division Courses

- Geog 323. **Geography of Pacific Northwest.** 3 hours. 3 ①  
 Analysis of human and economic geography of Pacific Northwest with special attention to Oregon. Prerequisite: Geog 107. MYATT.
- Geog 326. **Geography of Europe.** 3 hours. 3 ①  
 Physical and cultural environment and economic activities of each political unit (excluding U.S.S.R.). Prerequisite: Geog 107. HEINTZELMAN.
- Geog 328. **Geography of Latin America.** 3 hours. 3 ①  
 Geographic foundations of the Latin American nations; industrial and commercial development and potentialities. Prerequisite: Geog 107. JENSEN.
- Geog 329. **Geography of North America.** 3 hours any term. 3 ①  
 Regional analysis of North America, including Canada and Alaska but not Mexico. Prerequisite: Geog 107. MYATT, RUDD.
- Geog 331. **Geography of Asia.** 3 hours. 3 ①  
 Geographic appraisals of Asiatic countries including the island fringe; human, cultural, and economic conditions; national economies and world relationships; 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 for present and future. Prerequisite: Geog 107. MYATT.

## History

History courses are designed not only for those who wish to major in the field but also for general students. A knowledge of the history of the civilizations of the world is fundamental as background for the social sciences and humanities. It is of special value to the students of law, journalism, and business. It is necessary for a liberal education and is preparation for intelligent, informed citizenship.

### Lower Division Courses

- Hst 101, 102, 103. **History of Western Civilization.** 3 hours each term. 3 ①  
 Survey of history of man, his governmental, economic, social, religious, intellectual, and esthetic activities, from earliest times to present, in Europe, Asia, and Americas. Special effort is made to relate past to contemporary events and institutions.
- Hst 207, 208. **England and the British Empire.** 3 hours fall and winter. 3 ①  
 Political, social, and economic developments of modern Britain in relation to growth of the Empire, development of the Dominions, and present role of Commonwealth in world affairs. Prerequisite: Hst 101, 102, 103. Students who have not had prerequisites must have consent of instructor. C. K. SMITH.
- Hst 224, 225, 226. **History of American Civilization.** 3 hours each term. 3 ①  
 Rise and development of American civilization from beginning to present; special attention to economic, social, and cultural life, political changes and international relations.



Hst 230, 231, 232. **Great Americans in Thought and Action.** 2 hours each term. 2 ①  
 Personality and leadership of men and women who have been outstanding in various fields of endeavor, great movements, and critical periods. BERKELEY.

#### Upper Division Courses

- Hst 341, 342, 343. **Europe since 1789.** 3 hours each term. 3 ①  
 Political, social, economic, and cultural trends since fall of Napoleon; growth of political institutions; development of national states, imperial rivalries, problems of race, origin of World War I, peace settlement; totalitarianism, Munich, World War II, contemporary scene. *Fall:* 1815-1890; *winter:* 1890-1933; *spring:* 1933-present. Prerequisite: Hst 101, 102, 103 or consent of instructor. C. K. SMITH.
- Hst 360, 361. **Latin-American Civilization.** 3 hours each term. 3 ①  
 Native civilizations of 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 to present. R. W. SMITH.
- Hst 391, 392, 393. **The Far East.** 3 hours each term. 3 ①  
 Introduction to history, civilization, and political, economic, cultural, and social problems of modern China, Japan, India, Korea, South Asia, and the Pacific Islands. ADOLF.
- Hst 447. **Tsarist Russia.** (g) 3 hours fall. 3 ①  
 Growth of Russian Empire and its institutions; rise of revolutionary thought and movement. Prerequisite: Hst 101, 102, 103. C. K. SMITH.
- Hst 448. **Soviet Union.** (g) 3 hours. 3 ①  
 Political, diplomatic, economic, and social development of Russia from 1917 to present. Prerequisite: Hst 101, 102, 103. C. K. SMITH.
- Hst 460, 461, 462. **American Thought and Culture.** (g) 3 hours each term. 3 ①  
 Growth of American thought, ideals, and institutions; analysis of contributions to American culture by schools, newspapers, magazines, motion pictures, radio, art, literature, television, and philosophy. Prerequisite: Hst 224, 225, 226. CARLIN.
- Hst 478. **History of Pacific Northwest.** (g) 3 hours. 3 ①  
 Survey of growth and development of Oregon, Washington, and Idaho from Indian times to present, with emphasis on political, economic, social, cultural changes. Prerequisite: Hst 224, 225, or equivalent. ELLISON.
- Hst 480, 481, 482. **The United States in the Twentieth Century.** (g) 3 hours each term. 3 ①  
 Development of political and economic institutions since 1897; relevant social and cultural changes. Prerequisite: Hst 224, 225, 226. SHAW.

#### Graduate Service Courses

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

## Political Science

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

#### Lower Division Courses

- PS 201, 202, 203. **American Governments.** 3 hours each term. 3 ①  
*First term:* principles of American political system; organization of national government. *Second term:* powers and functions of national government. Ps 201 may be taken separately but is prerequisite for PS 202. *Third term:* Practical operation and contemporary reforms in government at state and local levels.

- PS 206. **European Political Systems.** 3 hours winter or spring. 3 ①  
Comparative study of ideological foundations, forms, and practices of political systems of major European countries; comparison to and contrast with American political system. WALTER.

#### Upper Division Courses

- PS 312. **Basic American Constitutional Law.** 3 hours winter or spring. 3 ①  
Interpretation of Constitution; judicial review; nation-state relationship; civil rights; powers of President and Congress. Prerequisite: PS 202. FUGUAY.
- PS 313. **Political Parties.** 3 hours fall or spring. 3 ①  
Practical politics in action; political parties and pressure groups; propaganda; nominations and elections; citizen's relationship to agencies that influence public policy and government at all levels. Prerequisite: PS 201. McCLENNAGHAN.
- PS 334, 335, 336. **Current Problems in American Democracy.** 2 hours each term. 2 ①  
For juniors and seniors only. Domestic and foreign policy, organization and operation of American political system; individual and the state in democratic society.
- PS 411, 412, 413. **Public Administration.** (g) 3 hours each term. 3 ①  
*PS 411:* principles of public administration; administrative organization and procedures; public relations. *PS 412:* administrative functions; public personnel and fiscal problems and practices. *PS 413:* basic administrative law; control of administrative agencies; powers, limitations, and remedies. Prerequisite: PS 201. Students who have not had prerequisite must have consent of instructor. MADDOX, FUGUAY.
- PS 417. **International Relations.** (g) 3 hours fall or spring. 3 ①  
International relations from emergence of modern state system to present. Designed to provide student with essential backgrounds and to show significance and interrelationships of international law, war, power politics, peaceful settlement of disputes, and international organization. WALTER.
- PS 419. **Pacific Area Relations.** (g) 3 hours fall or winter. 3 ①  
Survey of problems in government and foreign relations of Pacific powers; revolutionary ferment and postwar adjustments, with particular attention to American security and commercial interests. SWYGARD.
- PS 423. **Municipal Government.** (g) 3 hours spring. 3 ①  
Organization, functions, and present-day problems of city governments. Prerequisite: PS 201, 203. Students who have not had prerequisites must have consent of instructor. MADDOX.
- PS 431, 432, 433. **Western Political Ideas.** (g) 3 hours each term. 3 ①  
*PS 431:* bases of Western political ideas; *PS 432:* modern political thought; *PS 433:* American political thought from Revolution to present. Prerequisite: PS 201 and 6 hours from PS 202, 203, 206, 312, 313. WALTER.

#### Graduate Courses

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

## Psychology

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

## Lower Division Courses

- Psy 111. **Personality and Development.** 3 hours. 3 ①  
Self-understanding and development; emphasis upon habits, attitudes, emotional problems, and efficient learning techniques. Open only to freshmen and sophomores.
- Psy 201, 202. **General Psychology.** 3 hours each term. 3 ①  
Study of behavior and experience; facts and principles of motivation, learning, perceiving, and individual difference. 2-term sequence; with Psy 205 forms year sequence. Prerequisite: Sophomore standing.
- Psy 205. **Applied Psychology.** 3 hours. 3 ①  
Applications of psychological facts and principles to such fields as education, industry, business, and other professions. Prerequisite: Psy 202.
- Psy 208, 209, 210. **Psychology Laboratory.** 1 hour each term. 1 ③  
Introduction to laboratory experimental methods. Operated in coordination with Psy 201, 202, 205. Must be taken in sequence. Combination counts as science sequence in meeting group requirements.
- Psy 212. **Practical Psychology.** 3 hours. 3 ①  
A survey of 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; development of 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  
Principles of motivation, perception, communication, learning, and adjustment with emphasis on their discovery and application in life patterns of student; self-understanding and self-acceptance fundamental to increasing human efficiency and effectiveness requisite for happy living. Prerequisite: Psy 202.
- Psy 361. **Group Dynamics.** 3 hours. 2 ① 1 ②  
Principles and techniques of group work; interaction of individuals within groups. For students preparing to work with groups in industry, extension work, youth organizations, etc. Prerequisite: Psy 202.
- Psy 371. **Quantitative Methods.** 3 hours. 3 ①  
Fundamentals of experimentation; design and conduct of experiments; analysis and interpretation of data; reporting of research in human behavior. Prepares for critical reading of literature of research in psychology, social sciences, business, education, and home economics. Not primarily computational. Prerequisite: Psy 202.
- Psy 411. **Mental Hygiene.** (g) 3 hours. 3 ①  
Principles and application of mental hygiene to problems of individual in home, school, and occupational situations. Prerequisite: Psy 314 or equivalent.
- Psy 431. **Industrial Psychology.** (g) 3 hours. 3 ①  
Study of human relationships in industry, human engineering, personnel placement and selection. Prerequisite: Psy 205 or equivalent.
- Psy 433. **Human Factors in Engineering.** 3 hours. 3 ①  
Principles of human behavior as related to fundamentals of equipment design, layout, and operation. Special attention given to abilities and limitations of human operators and effect of such on accuracy, speed, safety, training, comfort, and fatigue in equipment operation. Prerequisite: Psy 202 or 212.
- Psy 462. **Behavior Deviations.** (g) 3 hours. 3 ①  
Normal and abnormal behavior contrasted; understanding of bases for deviant behavior; role of society in promoting deviant behavior. Prerequisite: Psy 311 or 314 or equivalent.
- Psy 472, 473, 474. **Individual Differences.** (g) 3 hours each term. 3 ①  
Theories of personality; experimental evidence on individual differences; evaluation of differences; guiding and directing normal development. Prerequisite: Psy 371 or equivalent. Prerequisite for 473 or 474: Psy 472.

- Psy 478, 479, 480. **Psychological Tests and Testing.** (g) 3 hours each term. 3 ①  
Theory and practice of psychological testing; supervised practice in administration, scoring, and interpretation of individual mental tests; analysis of group tests of intelligence, personality, interests, etc. Prerequisite: Psy 371 or equivalent. Prerequisite for Psy 479 or Psy 480: Psy 478.
- Psy 482. **Practice in Psychological Services.** (g) 3 hours each term, two terms. 3 ①  
Designed to give properly qualified students experience in use of psychological and related methods in dealing with individuals at adolescent and adult levels. Consent of instructor required. Prerequisite: Psy 473, 479.

#### Graduate Courses

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

## Sociology

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

#### Lower Division Courses

- Soc 204, 205, 206. **General Sociology.** 3 hours each term. 3 ①  
Principles underlying structure and functioning of human groups. Soc 206 stresses application of sociological principles to social problems. Soc 212 may be substituted for Soc 204. BAKKUM, PLAMBECK, CANTRELL, FOSTER.
- Soc 212. **Introduction to Sociology.** 3 hours. 3 ①  
Selected sociological principles. Not open to students who have taken Soc 204.
- Soc 214, 215, 216. **Anthropology.** 3 hours. 3 ①  
Interplay of man with his environment through the ages; factors influencing cultural growth and change, and the differences within and between cultures. PARKS.

#### Upper Division Courses

- Soc 312. **Sociology of the Family.** 3 hours. 3 ①  
Historical development of the family as an institution; trends and problems in courtship, marriage, and family life related to society. Prerequisite: Soc 204 or 212. CANTRELL.
- Soc 327. **Introduction to Social Research.** 3 hours. 3 ①  
Nature of scientific inquiry; sources of data for the social sciences; basic methods and techniques in social research. Prerequisite: 9 hours of social science.
- Soc 364. **Sociology of Rural Life.** 3 hours. 3 ①  
Basic social factors in rural life; rural communities in a changing society. FOSTER.
- Soc 411, 412, 413. **Social Problems.** (g) 3 hours each term. 3 ①  
May be taken separately. Soc 411: disorganization—personal and social; Soc 412: criminology and penology; Soc 413: race relations and minority groups. Prerequisite: 6 hours of sociology or sociology and psychology. BAKKUM, CANTRELL, PLAMBECK.
- Soc 468. **Sociology of Urban Life.** (g) 3 hours. 3 ①  
Sociological analysis of the modern city; its history, structures, functions, and problems. Prerequisite: 6 hours of sociology or sociology and psychology.

- Soc 469. **Rural Social Organizations.** (g) 3 hours. 3 ①  
More detailed analysis of special aspects of rural life than in Soc 364. Prerequisite: 9 hours of sociology or of sociology and economics or psychology. PLAMBECK.
- Soc 474. **Social Psychology.** (g) 3 hours. 3 ①  
Biological and social functions of human behavior; individual and social adjustments; behavior in presence of others; social psychology of institutions; social conflict. Prerequisite: 6 hours of sociology and psychology. BAKKUM.
- Soc 475. **Community Organization.** (g) 3 hours. 3 ①  
Nature and problems of community organization; adjustments in community organization to meet changing needs. Prerequisite: 6 hours of sociology or sociology and psychology. PLAMBECK.
- Soc 490. **Educational Sociology.** (g) 3 hours. 3 ①  
Contributions of sociology to educational problems and practices. Prerequisite: 6 hours of sociology or sociology and psychology. BAKKUM.

**Graduate Service Courses**

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

# School of Science

## Faculty

As of January 1960

FRANCOIS ARCHIBALD GILFILLAN, Ph.D., Dean of the School of Science.

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

**General Science:** Professors HANSEN (department chairman), GILFILLAN, WILLIAMSON; Associate Professors BEER, CREWS; Assistant Professors FOX, HUMPHREY, STAHL; Instructor CRAVEN; Graduate Assistants BRASWELL, GRIFFIN, LELLING, MONROE, THORESEN.

**Bacteriology and Hygiene:** Professors ELLIKER (department chairman), C. L. ANDERSON, BOLLEN, GILMOUR, LANGTON, PILCHER; Associate Professor A. W. ANDERSON; Assistant Professor PARKS; Instructor SANDINE<sup>1</sup>; Research Associate BUCKLEY; Research Assistants EVENSON, KRACKOV; Graduate Assistants BOWEN, CAVENEY, CORLETT, KNITTEL, PIGG.

**Botany:** Professors YOUNG (department chairman), ATWOOD (emeritus), DIETZ (emeritus), GILFILLAN (executive committee, Institute of Marine Biology), GILKEY (emeritus), MILBRATH, ROTH, F. H. SMITH, VAUGHAN; Associate Professors BELKENGREN, CHILCOTE, H. J. JENSEN, L. E. JONES, PHINNEY; Assistant Professors BRANDT, CAMERON, CORDEN, DEEP, RAYMER, TRIONE; Senior Instructor LUND; Instructors DUBE, PEEK; Research Assistant MURPHY; Graduate Assistants BROWN, HERRIDGE.

**Chemistry:** Professors CHRISTENSEN (department chairman), BULLIS, BUTTS, CALDWELL, CHELDELIN, CLARK, DECIUS, GILBERT, HAAG, HILL, KING, KURTH, LOGAN, MEHLIG (emeritus), PEASE, REMMERT, RICHARDSON, SCOTT, SLABAUGH, WANG, WESWIG, WILLIAMS; Associate Professors E. BUBL, FANG, FRED, FREUND, HEBBERG, MARVELL, NEWBURGH, NORRIS, REESE, TERRIERE; Assistant Professors BROOKES, HEISLER, LIKEN<sup>2</sup>, LOOMIS, PARSONS, SCHUBERT, TINSLEY; Instructors ADAMS, BAICH<sup>3</sup>, BRAY, COKER, GRUZENSKY<sup>3</sup>, HUMPHREYS, IWASAKI<sup>2</sup>, JONES, KALMAN<sup>2</sup>, LIETZ<sup>2</sup>, NICHOLLS<sup>2</sup>, OKAMOTO<sup>2</sup>, RYAN<sup>4</sup>, STEVENS; Acting Instructors HARRIS, HOWARD, POTTER; National Science Foundation Fellows CATON, CONANT, GRITTON, RAUCH, ROCKHOLT, WOODMANSEE; Dupont Teaching Fellow RUSSELL; Stauffer Graduate Research Assistant JOHNSON; Crown Zellerbach Research Fellow CARLBERG; Forest Products Research Fellow HADLEY; Cooperative Fellow, U. S. Bureau of Mines, VARGA; Research Fellows ALLEN, ANDERSON, BAKER, A. BIBBER, L. BIBBER, BJERRE, BOURKE, HARA, G. HOLMES, KERWAR, KHIDIR, LEE, LOTLIKAR, McDONALD, MELVIN, NISSEN, RAMSEY, SCHNEIDER, SEEFELD, VAISEY, WOODLEY; Research Assistants D. R. ANDERSON, COFFEY, HAMBY, KIEF, KRACKOV, MALLEY, R. McDONALD, POSSEHL, SEILER, SPILL, D. WILSON, WIMAN; Teaching Fellows BAIN, BEASLEY, DENNISON, FOGARTY, HANSEN, R. HOLMES, KUHN, LASATER, LENZ, NASH, NITIDANDHAPRABHAS, PIPPIN, POTTER, WEBB, J. WILSON; Teaching Assistants BLANK, COX, CURTICE, DAVIS, GEORGE, GREENDORFER, KENNEDY, LILIENTHAL, MASUMOTO, MAZZA, NAZEERI, ONG, PATTERSON, A. A. PERSYN, A. H. PERSYN, RADOMSKY, ROWELL, RUUD, SCHAUB, SELZ, STELLER, TANAKA, VANDERZANDEN, WARREN.

**Entomology:** Professors RITCHER (department chairman), CHAMBERLIN (emeritus), MARTIN, MOTE (emeritus), SCULLEN (emeritus); Associate Professors CROWELL<sup>4</sup>, RUDINSKY, STEPHEN, SWENSON, TERRIERE; Assistant Professors BROOKES, DICKSON, GOULDING, KRANTZ; Instructors HASBROUCK, KRAFT, LATTIN.

**Geology:** Professors ALLISON (department chairman), HANSEN, PACKARD (emeritus), WILKINSON; Associate Professor TAUBENECK<sup>5</sup>; Assistant Professors BOSTWICK, CUMMINGS, KOCH; Instructors COCHRAN, SNOOK; Graduate Assistants ARNBT, BUBB, KULM, MALONEY, MANSKE.

**Mathematics:** Professors LONSETH (department chairman), ARNOLD, BEATY (emeritus), GASKELL, GOHEEN, HOSTETTER, MILNE (emeritus), OBERHETTINGER, POOLE, WILLIAMS; Associate Professors KIRKHAM, REIFENBERG, SAUNDERS, STONE<sup>5</sup>; Assistant Professors BUSCHMAN, GODARD, GROEMER, McLEOD<sup>5</sup>, R. REYNOLDS, STALLEY; Instructors BAKKUM, DEFENBACH, FLOOD, HERRMANN, McFARLAND (Research Associate), OVERHOLSER, N. REYNOLDS, TUCKER (Research Associate), TOWN, WYSE; Research Associate (Instructor E. E.) DUBINSKI; Teaching Fellows ANDERSON, BRADY, GOEBEL, JIRKA, KOHFELD, KVARDA, MALOOF, ROSENTHAL, K. SONI, P. SONI; National Defense Education Act Fellow PHILLIPS; Graduate Assistants AYYOUB, BRAUN, CHISUM, CLARK, DAMEWOOD, GAMON, HOLGERSEN, LIM, MARSH, MERRIAM, NORMANN, SHAVLIK, SMITH, TJOELKER, TOMS, UNGER, WILSON, WITCRAFT; Research Assistants BACHELOR, BRENNE.

**Natural Resources:** Professors JENSEN (department chairman), HIGHSMITH; Associate Professor HEINTZELMAN; Assistant Professor RUDD; Instructor JACK; Graduate Assistants ALTIG, ELLIS, NEWLAND, YOUNG.

<sup>1</sup> On leave until September 1, 1960.

<sup>2</sup> Courtesy appointment.

<sup>3</sup> Research Associate.

<sup>4</sup> On sabbatical leave 1959-1960.

<sup>5</sup> On leave of absence 1959-60.

**Nursing Education:** Professor BOYLE (director of department); Associate Professor OLSON.

**Oceanography:** Professor BURT (department chairman); Associate Professor FROLANDER; Research Associate (Instructor) MCALISTER; Research Associate (Instructor) WYATT; Research Assistant HEALY.

**Physics:** Professors YUNKER (department chairman), BRADY, DEMPSTER, VARNER (emeritus); Associate Professors DECKER, GARMAN, MORGAN (emeritus), NICODEMUS, SCHECTER, VINYARD; Assistant Professors BURCH, CHURCH, FORREST, TRIGG; Instructors M. ANDERSON, SOMMERFELDT, TYNES; Research Associates ANDERSON, GLASGOW, LALL, SKINNER; Research Assistants EVENSON, HERSHMAN; Teaching Fellow COLEMAN; Graduate Assistants BARR, CUDERMAN, DARRAH, DICKERSON, DOW, FESSENDEN, KVARDA, MANSFIELD, NICHOLS, R. STRAYER, V. STRAYER, TUCKER, WEBB.

**Science Education:** Professor WILLIAMSON (department head); Assistant Professor FOX.

**Statistics:** Professors LI (department chairman), CALVIN; Associate Professors LINK, PETERSEN; Graduate Assistant MACKETT.

**Zoology:** Professors DORNFELD (department chairman), ALLMAN, C. L. ANDERSON, GILFILLAN (executive committee, Oregon Institute of Marine Biology), GORDON, HILLEMANN, KRUEGER, PRATT, WULZEN (emeritus); Associate Professors OSBORN (emeritus), PRITCHARD, STORM; Assistant Professors HISAW, MAYSHARK, MOHLER, OWCZARZAK; Research Associates MCCAULEY, SWEDBERG; National Science Foundation Fellows BURNS, CANARIS; National Institutes of Health Research Fellow STANLEY; Research Fellows BELTZ, PUYEAR; Research Assistant JOHNSON; Teaching Fellows ALDRICH, CLOTHIER, HANSON; Graduate Assistants BAWDON, CONNELL, DORSCH, HEATH, KERLEY, STEWART, WEATHERLY, WHITE.

## General Statement

**T**HE SCHOOL OF SCIENCE at Oregon State College 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.

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

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

**Predental and Dental Hygiene.** Oregon State College offers 2-year and 3-year predental curricula to prepare students for admission to the University of Oregon Dental School or other standard dental schools. Both curricula satisfy the requirements established by the Council on Dental Education of the American Dental Association for admission to dental schools. Students completing the 3-year curriculum may qualify for a bachelor's degree after one year of dental-school work.

The 2-year curriculum satisfies the minimum predental requirements of the Council on Dental Education:

The minimum educational requirement for admission to a dental school is the successful completion of two years of study in a liberal arts college. . . . The college course must include a year's work in English, in biology, in physics, and in inorganic chemistry, and a half-year's work in organic chemistry. The work in the sciences must include laboratory practice as well as didactic instruction.

The counselors for pre dental students are: Dr. D. I. Allman, professor of physical education, chairman; Dr. A. W. Pritchard, assistant professor of zoology; and Frank C. Morris, D.M.D.

The 2-year and 3-year curricula are printed on later pages. Students who complete the 2-year program for dental hygiene at the University of Oregon Dental School may qualify by two additional years for a baccalaureate degree in general science at Oregon State College.

**Premedical Curriculum.** A premedical curriculum for entrance to standard medical schools is offered at Oregon State College. Students pursuing this curriculum work are under the supervision of a special advisory committee to insure a selection of studies that will satisfy medical school entrance requirements and the cultural needs of students planning to enter the profession of medicine. For entrance to a standard medical school the student must not only complete certain prescribed work but also show an aptitude for medical studies.

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 authorized advisers.

The counselors for premedical students are: Dr. C. S. Pease, professor of chemistry, chairman; Dr. Robert M. Storm, associate professor of zoology; Dr. James D. Mohler, assistant professor of zoology; and Charles E. Reed, M.D.

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

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

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

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

	<i>Term hours</i>
Chemistry .....	23
General inorganic, which may include qualitative analysis .....	12
Quantitative analysis, emphasis on volumetric analysis .....	3
Organic .....	8
Biology .....	15
General biology or zoology .....	9
Selections from general embryology, vertebrate anatomy, or general physiology .....	6
Physics .....	12
Mathematics .....	6
English .....	9
Total prescribed credit .....	65

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 a part of the cultural training of a physician. Students anticipating research in the medical sciences should obtain 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. Students electing additional work are advised to take a course in elementary physical chemistry. At least 25% of all chemistry credit must be received for laboratory work.

Human anatomy is not accepted toward meeting the minimum requirements in biology. Students electing additional work are advised to take courses in embryology, vertebrate anatomy, histological technique, or general physiology.



The work in physics must include the divisions of mechanics, heat and sound, light and electricity. Students electing additional work are advised to take further courses in electricity or atomic physics.

The work in mathematics should be of standard college grade, and include subjects such as algebra, elementary analysis, or trigonometry. Students electing additional work in mathematics are advised to take calculus.

The premedical student is advised very strongly against taking any medical courses in his preparation for the study of medicine. Rather, he should devote his efforts to obtaining the best possible general cultural education and, in addition, a thorough training in the basic sciences of chemistry, physics, and biology.

*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. Under Oregon State College regulations, 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 Oregon State College requirements and requirements for a major within the School of Science) 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. The Pre-medical Curriculum is printed on a later page.

**Preveterinary Curriculum.** Oregon State College offers a 2-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 2-year period must have adequate high school training in English, mathematics, and other basic sciences. This preveterinary curriculum is designed to meet the general requirements for admission into the professional schools of veterinary medicine located 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.

Agreements are in effect whereby a limited number of Oregon residents are selected to attend the above-listed schools of veterinary medicine without being required to pay out-of-state fees. For further information concerning these agreements write to: Commissioner, State of Oregon, Western Interstate Commission for Higher Education, P.O. Box 5175, Eugene, Oregon.

At Oregon State College the adviser for preveterinary students is Dr. Ira W. Deep, Department of Botany.

**Prenursing Curriculum.** Oregon State College offers the one year of prenursing required for entrance into the School of Nursing of the University of Oregon in Portland. See curriculum on page 174 and further information on page 199.

Adviser of students in the prenursing program at Oregon State College is Miss Guhli Olson.

**Curriculum in Medical Technology.** The first two years of the Curriculum in Medical Technology as given in regular courses at Oregon State College satisfy the minimum requirements of the American Society of Clinical Pathologists. The third and fourth years include additional courses needed to qualify for the B.S. degree in Medical Technology. It is recommended that three years or more be devoted to this curriculum. Some hospitals require three years of college work and a few demand a college degree for admission to the technician's course. The counselors for students pursuing this curriculum are Professor K. S. Pilcher and Professor C. M. Gilmour of the Department of Bacteriology and Hygiene.

### **Degree Honors Program**

A NEW HONORS PROGRAM, offered for the first time in the fall of 1959, seeks to enrich educational opportunities for the more able student and to recognize scholarly achievement.

**Applications.** Entering freshmen may make formal application to participate in the program. Interested high school graduates are advised to obtain application forms from the Dean of the School of Science as soon as they have been accepted for admission to Oregon State College. 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. Exceptions may be made for transfer students.

**Eligibility.** To be eligible for the HONORS PROGRAM, an entering freshman must have been in the upper one-third of his high school graduating class and must have an average above B 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.

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

**Basic Science Honors Program.** The HONORS PROGRAM, as it relates to freshmen and sophomores, is a general school HONORS PROGRAM under the supervision of the School of Science Honors Council. All freshmen and sophomores in the HONORS PROGRAM follow the same basic honors requirements. Freshman and sophomore honors students enroll in honors sections in chemistry, English, mathematics, and physics and must develop a reading knowledge in a foreign language. Freshman honors students enroll in a special 1-credit course each term and sophomore honors students also enroll in a special 1-credit course each term.

**Departmental Honors Program.** Specific honors requirements for upper division students are the responsibility of each department. Department honors

requirements include honors readings, seminars, special projects, special course work, research, thesis, and comprehensive written examinations. All upper division honors students enroll in a 2-hour colloquium. All departments have a requirement of an oral examination of at least one hour's duration. A student may receive from 9 to 18 hours of credit for work in the HONORS PROGRAM during the junior and senior years. Honors are awarded in the field of the department recommending the student for honors.

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

## Curricula in Science

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

### General Notes

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

b. In freshman year General Hygiene (PE 150, 1 term hour for men; PE 160, 2 hours for women) is taken one term in place of physical education.

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

d. All science students before graduation must show by placement examination or completed college courses accomplishment in mathematics equal to completion of Mth 5 and Mth 10.

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

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

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

h. Except in General Science, each student in the School is required for graduation to maintain a 2.00 G.P.A. in his major field.

### Department of General Science

Undergraduate and graduate general science majors: General Science, Biology, Physical Science.

Interdepartmental graduate majors: Biophysics, Geophysics, Life Sciences, Paleobiology, Seismology, and other fields involving joint majors.

Freshman Year		Sophomore Year	
	Hours		Hours
Approved biological science sequence...	9-15	Group requirement in literature .....	9
English Composition (Wr 111, 112, 113)	9	Sophomore science sequence .....	9-15
Mathematics (Mth 101, 102, 200), or approved physical science sequence....	12	Air, Military, or Naval Science (men)...	3-9
Air, Military, or Naval Science (men)...	3-9	Physical Education .....	1
Physical Education .....	3	<sup>1</sup> Approved electives .....	24-12
Electives .....	0-12		
Junior Year		Senior Year	
Group requirement in social science .....	9	<sup>2</sup> Approved upper division science .....	12
<sup>2</sup> Approved upper division science .....	12	<sup>1</sup> Approved electives .....	36
<sup>1</sup> Approved electives .....	27		

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

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

## Department of Bacteriology and Hygiene

Undergraduate majors: Bacteriology, Sanitary Bacteriology.  
 Graduate majors: Bacteriology, Dairy Bacteriology, Food Bacteriology,  
 Hygiene and Sanitation, Industrial Bacteriology, Physiology of Bacteria, Soil Bacteriology.

Common Freshman Year	Hours	Common Sophomore Year	Hours
General Zoology (Z 200).....	5	Group requirement in literature.....	9
English Composition (Wr 111, 112, 113).....	9	Organic Chemistry (Ch 226, 227).....	10
General Chemistry (Ch 204, 205).....	10	Quantitative Analysis (Ch 234).....	5
Qualitative Analysis (Ch 206).....	5	General Bacteriology (Bac 204, 205).....	6
Air, Military, or Naval Science (men).....	3-9	Air, Military, or Naval Science (men).....	3-9
Physical Education.....	3	Physical Education.....	3
Electives .....	14-8	Electives .....	11-5

### Bacteriology

Junior Year	Hours	Senior Year	Hours
Group requirement in social science.....	9	Approved upper division bacteriology courses .....	15
General Physics (Ph 201, 202, 203).....	12	<sup>2</sup> Approved electives .....	30
Elementary Physical Chemistry (Ch 340).....	3	Seminar (Bac 407).....	3
Approved upper division bacteriology courses .....	15		
<sup>1</sup> Approved electives.....	9		

### Sanitary Bacteriology

Junior Year	Hours	Senior Year	Hours
Group requirement in social science.....	9	Approved upper division bacteriology.....	13
Clinical Laboratory Methods (Bac 341).....	5	Pathogenic Bacteriology (Bac 332).....	3
Food Sanitation Bacteriology (Bac 411).....	4	Pathogenic Bacteriology Laboratory (Bac 333).....	2
Approved upper division bacteriology.....	3	Epidemiology (Bac 453).....	3
Community Health Problems (Bac 424, 425, 426).....	9	Food Bacteriology (Bac 460).....	4
Abridged General Physics (Ph 211, 212).....	6	Bacteriology of Water and Sewage (Bac 470).....	4
Market Milk (FDT 310).....	3	Federal and State Food Regulations (FDT 421).....	2
Approved electives.....	9	Seminar (Bac 407).....	3
		Approved electives.....	15
		Suggested Electives: Bac 321, 401, 412, 421, 431, 441, 442, 451, 452, 480, 481, 490. Ch 234, 450, 451, 452; Ent 412. SED 431, 432, 433; Mth 101, 102, 200. DAH 351; FDT 412, 423, 424. CE 414; Wr 227; Z 331, 332, 456.	

## Department of Botany

Undergraduate majors: General Botany with emphasis, if desired, on one of the fields of the graduate majors.  
 Graduate majors: Cytology, Ecology, Morphology, Mycology, Plant Pathology, Physiology, Systematic Botany.

Freshman Year	Hours	Sophomore Year	Hours
General, and Field Botany (Bot 201, 202, 203).....	9	<sup>5</sup> Upper Division Botany.....	12
English Composition (Wr 111, 112, 113).....	9	General Zoology (Z 200).....	5
<sup>3</sup> General Chemistry (Ch 101, 102, 103).....	9	Mathematics .....	4
<sup>4</sup> Foreign language.....	9-12	Literature or Social Science.....	9
Air, Military, or Naval Science (men).....	3-9	Air, Military, or Naval Science (men).....	3-9
Physical Education.....	3	Physical Education.....	3
Electives .....	0-3	Electives .....	6-12

<sup>1</sup> Mathematics, modern language, recommended for those who plan to obtain the Ph.D.  
<sup>2</sup> Mathematics, modern language, biochemistry and physical chemistry recommended for those who plan to obtain the Ph.D.

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

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

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

Junior Year		Senior Year	
	Hours		Hours
Upper Division Botany.....	12	Seminar .....	3
Statistical Techniques (St 314).....	3	Social Science or Literature.....	9
<sup>1</sup> Supporting Science.....	9-15	<sup>1</sup> Supporting Science.....	9-15
<sup>2</sup> Electives .....	18-24	Electives .....	21-27

### Department of Chemistry

Undergraduate and graduate majors: Agricultural Chemistry, Analytical Chemistry, Biochemistry, Inorganic Chemistry, Organic Chemistry, Physical (including Colloidal) Chemistry, Forest Products Chemistry, Radiochemistry.

Common Freshman Year		Common Sophomore Year	
	Hours		Hours
General Chemistry (Ch 204, 205).....	10	Chemical Theory (Ch 241).....	4
Qualitative Analysis (Ch 206).....	5	Quantitative Analysis (Ch 232, 233).....	10
Mathematics (Mth 101, 102).....	4	General Physics (Ph 201, 202, 203).....	12
Analytical Geometry and Calculus (Mth 200).....	8	Calculus (Mth 201, 202, 203).....	12
English Composition (Wr 111, 112, 113).....	9	Air, Military, or Naval Science (men).....	3-9
Chemistry Survey (Ch 111, 112).....	2	Physical Education.....	3
Air, Military, or Naval Science (men).....	3-9	Electives .....	1
Physical Education.....	3		

#### Major in Chemistry

Analytical Chemistry, Inorganic Chemistry, Organic Chemistry, Physical (including Colloidal) Chemistry, Forest Products Chemistry.

Junior Year <sup>1</sup>		Senior Year	
	Hours		Hours
Organic Chemistry (Ch 430, 431, 432)....	15	<sup>6</sup> Approved upper division chemistry courses .....	9
Physical Chemistry (Ch 440, 441, 442)....	9	Group requirement in social science and literature .....	9
Physical Chemistry Laboratory (Ch 443, 444, 445) .....	3	<sup>7</sup> Biological science sequence.....	9
German .....	12	Principles of Research (Ch 415).....	1
<sup>5</sup> Group requirements in literature or social science .....	9	Electives .....	21

#### Major in Agricultural Chemistry

(See Common Freshman and Sophomore Year.)

Junior Year		Senior Year	
	Hours		Hours
Organic Chemistry (Ch 430, 431, 432)12-15		Approved electives in biochemistry or plant biochemistry.....	15
Physical Chemistry (Ch 440, 441, 442)....	9	Group requirement in social science.....	9
Physical Chemistry Laboratory (Ch 443, 444, 445) .....	3	German .....	12
<sup>5</sup> Group requirement in literature.....	9	Statistical Techniques (St 314).....	3
<sup>8</sup> Electives including biological science sequence .....	15-12	Principles of Research (Ch 415).....	1
		<sup>8</sup> Electives .....	9

#### Major in Biochemistry

(See Common Freshman and Sophomore Year.)

Junior Year		Senior Year	
	Hours		Hours
Organic Chemistry (Ch 430, 431, 432)....	15	Approved electives in biochemistry.....	15
Physical Chemistry (Ch 440, 441, 442)....	9	Group requirement in social science.....	9
Physical Chemistry Laboratory (Ch 443, 444, 445) .....	3	German .....	12
Biological science sequence (approved life science electives).....	15	Statistical Techniques (St 314).....	3
<sup>5</sup> Group requirement in literature.....	9	Principles of Research (Ch 415).....	1
		<sup>3</sup> Electives .....	6

<sup>1</sup> Courses may be taken in bacteriology, entomology, genetics, geology, or physics, or additional work may be taken in the fields of chemistry, mathematics, or zoology.

<sup>2</sup> Should be devoted largely to upper division courses in botany.

<sup>3</sup> Students majoring in agricultural chemistry or biochemistry may take a life science elective instead of Mth 203.

<sup>4</sup> The student is encouraged to take, if possible, a year of modern physics (Ph 311, 312, 313) in his junior year.

<sup>5</sup> Students in Air, Military, or Naval Science will adjust electives and other courses to make this advanced work possible.

<sup>6</sup> The 9 hours of advanced chemistry must be courses having prerequisites of 3 years of chemistry and must include 3 hours of actual laboratory work. Students interested in forest products chemistry should include Ch 470, 471, 472, 473, 474, and some bacteriology.

<sup>7</sup> Students having one year of biological science in high school may reduce this requirement to 5 term hours.

<sup>8</sup> Junior or senior electives must include at least 9 hours of life sciences, which may include approved courses in agriculture or home economics.

**Department of Entomology**

Undergraduate and graduate major: Entomology.

Freshman Year <sup>1</sup>		Sophomore Year	
	Hours		Hours
General Zoology (Z 201, 202, 203).....	9	General Entomology (Ent 200).....	3
<sup>2</sup> General Chemistry (Ch 204, 205), Qualitative Analysis (Ch 206).....	15	Economic Entomology (Ent 314).....	4
English Composition (Wr 111, 112, 113) 9		Mathematics (Mth 100 or 101).....	4
Air, Military, or Naval Science (men)....	3-9	General Botany (Bot 201, 202), Field Botany (Bot 203).....	9
Physical Education.....	3	Group requirement in literature.....	9
Electives .....	6-0	General Bacteriology (Bac 204).....	3
		Air, Military, or Naval Science (men)....	3-9
		Physical Education.....	3
		Electives .....	12-6
Junior Year		Senior Year	
	Hours		Hours
Group requirement in social science.....	9	Statistical Techniques (St 314).....	3
Approved upper division courses in entomology .....	15	Approved upper division course in entomology .....	12
Plant Pathology (Bot 351).....	5	Electives .....	33
<sup>3</sup> Electives .....	20		

**Department of Geology**

Undergraduate and graduate majors: Geology, Paleontology.

**Major in Geology**

Freshman Year		Sophomore Year	
	Hours		Hours
English Composition (Wr 111, 112, 113) 9		Mineralogy and Rock Study (G 312, 313, 314).....	12
Geology (G 201, 202, 203).....	9	General Chemistry (Ch 204, 205).....	10
Geology Laboratory (G 204, 205, 206)....	3	Qualitative Analysis (Ch 206).....	5
Group requirement in literature.....	9	Group requirement in social science.....	9
Mathematics (Mth 100, 101, 102).....	12	Air, Military, or Naval Science (men)....	3-9
Air, Military, or Naval Science (men)....	3-9	Physical Education.....	3
Physical Education.....	3	Electives .....	0-6
Junior Year		Senior Year	
	Hours		Hours
Sedimentology (G 323).....	4	Upper division geology sequence.....	12
Geomorphology (G 322).....	4	Seminar (G 407).....	3
Structural Geology (G 321).....	4	Paleontology or other biological science	9-12
General Physics (Ph 201, 202, 203).....	12	<sup>5</sup> Electives .....	21
Surveying (CE 226).....	3		
Engineering Drawing (GE 115).....	3		
Field Methods (G 380).....	3		
Technical Report Writing (Wr 227).....	3		
<sup>4</sup> Electives .....	15		

**Major in Paleontology**

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

<sup>1</sup> Students planning to specialize in Forest Entomology should confer with Dr. Julius Rudinsky.<sup>2</sup> Prospective economic entomologists should elect Ch 226, 227, and 252, or their equivalent as early as convenient.<sup>3</sup> Junior or senior electives must include at least 9 hours of life sciences, which may include approved courses in agriculture or home economics.<sup>4</sup> Recommended courses are Ch 234, 241, 321, 322, 323, or 340; Mth 200, 201, 202, 203; NR 421, 422, 423; Ph 311, 312, 313.<sup>5</sup> Students contemplating graduate work are advised to elect German, French, or Russian.

### Department of Mathematics

Undergraduate majors: Mathematics with emphasis on any of the fields of the graduate majors; Actuarial Mathematics; Computer Mathematics; Secondary Teaching.

Graduate majors: Analysis, Algebra, Geometry, Applied Mathematics.

Freshman Year		Sophomore Year	
	Hours		Hours
Group requirement in literature.....	9	Mathematics (Mth 201, 202, 203).....	12
<sup>1</sup> Mathematics (Mth 101, 102, 200).....	12	Group requirement in social science.....	9
English Composition (Wr 111, 112, 113) 9		Physical Science.....	9
Air, Military, or Naval Science (men)....	3-9	Air, Military, or Naval Science (men)....	3-9
Physical Education.....	3	Physical Education.....	3
<sup>2</sup> Electives .....	12-6	<sup>2</sup> Electives .....	12-6
Junior Year		Senior Year	
	Hours		Hours
<sup>3</sup> Upper division mathematics.....	18	<sup>3</sup> Upper division mathematics.....	9
<sup>4</sup> Biological science.....	9	Electives (including courses leading to graduate minors).....	39
Electives .....	21		

### Department of Natural Resources

Undergraduate major: Natural Resources.  
Graduate major and minor: Natural Resources.

Freshman Year		Sophomore Year	
	Hours		Hours
English Composition (Wr 111, 112, 113) 9		Group requirement in literature.....	9
General Chemistry (Ch 101, 102, 103)....	9	Cartography (NR 261, 262, 263).....	9
Introductory Geography (Geog 105, 106, 107) .....	9	General Botany (Bot 201, 202, 203).....	9
Air, Military, or Naval Science (men)....	3-9	Soils (Sls 211, 212).....	6
Physical Education.....	3	Air, Military, or Naval Science (men)....	3-9
<sup>6</sup> Electives .....	15-9	Physical Education.....	3
		<sup>6</sup> Electives .....	9-3
Junior Year		Senior Year	
	Hours		Hours
Physical Geography (NR 327, 328, 329)....	9	Aerial Photointerpretation (NR 413).....	3
Physical Geography Laboratory (NR 321, 322, 323).....	3	Natural Resources of the World (NR 421, 422, 423).....	9
Techniques in Field Research (NR 361) 5		Conservation Principles and Practices (NR 411).....	3
Geography of Pacific Northwest (Geog 323) .....	3	Seminar (NR 407).....	3
<sup>5</sup> Electives in resource fields.....	18	Thesis (NR 403).....	6
<sup>6</sup> Electives .....	10	<sup>6</sup> Electives .....	24

### Department of Physics

Undergraduate major: Classical Physics or Modern Physics with emphasis on one of the fields of the graduate majors: electronics, meteorology, atomic physics, modern physics, photography, theoretical physics, applied physics, and nuclear physics.

Freshman Year		Sophomore Year	
	Hours		Hours
General Physics (Ph 201, 202, 203).....	12	Introduction to Modern Physics (Ph 311, 312, 313).....	9
Mathematics (Mth 101, 102).....	8	Differential and Integral Calculus (Mth 201, 202, 203).....	12
Analytical Geometry and Calculus (Mth 200) .....	4	General Chemistry (Ch 204, 205).....	10
English Composition (Wr 111, 112, 113) 9		Qualitative Analysis (Ch 206).....	5
Air, Military, or Naval Science (men)....	3-9	Air, Military, or Naval Science (men)....	3-9
Physical Education.....	3	Physical Education.....	3
Electives .....	9-3	Electives .....	6-0

<sup>1</sup> Well prepared freshmen may enroll directly in Mth 200 by passing appropriate placement tests.

<sup>2</sup> A foreign language (French, German, Russian) is recommended for those who plan to do graduate work.

<sup>3</sup> At least one of the four sequences Mth 411, 412, 413; Mth 434, 435, 436; Mth 441, 442, 443; or Mth 451, 452, 453 must be included.

<sup>4</sup> On petition, this requirement may be reduced to 5 hours for those with a year of high school biology who wish to earn degrees in both mathematics and engineering.

<sup>5</sup> Must include approved courses in both forestry and agriculture.

<sup>6</sup> See departmental recommendations on use of electives.

Junior Year	Hours	Senior Year	Hours
Electricity and Magnetism (Ph 331, 332)	8	Mechanics (Ph 324, 325, 326)	9
Thermodynamics and Heat Measurements (Ph 353)	4	Geometrical and Physical Optics (Ph 465, 466)	6
Differential Equations (Mth 321, 322)	6	Atomic and Nuclear Physics (Ph 474, 475, 476)	9
Group requirement in literature	9	Electronics (Ph 430) if Ph 437, 438, 439 is not elected	3
Approved courses in biological science	9	Group requirement in social science	9
Electives	9	<sup>1</sup> Electives	12

### Curriculum in Engineering Physics

Students electing the program in Engineering Physics should register in the School of Engineering.

### Department of Science Education

Undergraduate and graduate majors: Biological Science (General Biology, Health Education), General Science, Mathematics, Physical Science.  
For requirements of this department see "Science Education" under SCHOOL OF EDUCATION. Students who complete the health education teaching major meet the requirements for a major in the School of Science.

### Department of Zoology

Undergraduate majors: Zoology with emphasis, if desired, on one of the fields of the graduate majors.  
Graduate majors: Anatomy and Embryology, Physiology, Invertebrate Zoology and Parasitology, Cellular Biology, Genetics, and Natural History and Ecology.

Freshman Year	Hours	Sophomore Year	Hours
English Composition (Wr 111, 112, 113)	9	Group requirement in literature	9
General Zoology (Z 201, 202, 203)	9	Comparative Vertebrate Embryology and Anatomy (Z 326, 324, 325)	12
General Chemistry and Qualitative Analysis (Ch 204, 205, 206)	15	General Botany (Bot 201, 202)	6
Physical Education	3	Mathematics or physics sequence	12
Air, Military, or Naval Science (men)	3-9	Physical Education	3
Electives	3-9	Air, Military, or Naval Science (men)	3-9
		Electives	1-3
Junior Year	Hours	Senior Year	Hours
Approved electives in invertebrate zoology	8-10	Approved electives in physiology	9-15
Genetics (Z 341)	3	Zoology option (see requirements under Zoology)	9-13
Group requirement in social science	9	Electives	19-30
Electives	25-26		

### Premedical Curriculum

(School of Science and Medical School)

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

Freshman Year	Hours	Sophomore Year	Hours
English Composition (Wr 111, 112, 113)	9	Organic Chemistry (Ch 226, 227)	10
General Chemistry (Ch 204, 205)	10	Quantitative Analysis (Ch 234)	5
Qualitative Analysis (Ch 206)	5	General Physics (Ph 201, 202, 203)	12
General Zoology (Z 201, 202, 203)	9	Comparative Vertebrate Embryology (Z 326)	4
Mathematics (Mth 101, 102)	8	Comparative Vertebrate Anatomy (Z 324, 325)	8
Group requirement in literature	3	Air or Military Science (men)	3
Air or Military Science (men)	3	Physical Education	3
<sup>2</sup> Physical Education	3	Electives	3
<sup>3</sup> Electives	1		

<sup>1</sup> Suggestions: Chemistry, mathematics, meteorology, photography, modern language, physics. German, Russian, or French is recommended for students planning to earn the Ph.D. degree.

<sup>2</sup> Freshman women must take General Hygiene (PE 160), 2 term hours, in any term.

<sup>3</sup> Students should confer with their premedical adviser in the selection of electives.



## Junior Year

	<i>Hours</i>
Group requirement in literature.....	3
Group requirement in social science.....	9
German, French, Russian, or Spanish.....	12
<sup>1</sup> Electives .....	24

## Major in Science at Oregon State College

B.A., B.S. Degrees

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

## Three-Year Predental Curriculum

Freshman Year	<i>Hours</i>	Sophomore Year	<i>Hours</i>
English Composition (Wr 111, 112, 113)	9	Group requirement in social science.....	9
<sup>2</sup> General Chemistry (Ch 101, 102, 103) or General Chemistry (Ch 204, 205) and Qualitative Analysis (Ch 206)	9-15	General Physics (Ph 201, 202, 203).....	12
General Zoology (Z 201, 202, 203).....	9	Comparative Vertebrate Embryology (Z 326) .....	4
<sup>3</sup> Approved art course.....	2-3	Comparative Vertebrate Anatomy (Z 324, 325) .....	8
Intermediate Algebra (Mth 100).....	4	Air or Military Science (men).....	3
College Algebra (Mth 101).....	4	Physical Education.....	3
Air or Military Science (men).....	3	Electives .....	4-9
Physical Education.....	2		
Hygiene .....	2		
Electives .....	3-0		

Junior Year<sup>4</sup>

	<i>Hours</i>
Organic Chemistry (Ch 226, 227).....	10
Quantitative Analysis (Ch 234).....	5
Group requirement in literature.....	9
Electives .....	24

Two-Year Predental Curriculum<sup>5</sup>

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	<i>Hours</i>	Sophomore Year	<i>Hours</i>
English Composition (Wr 111, 112, 113)	9	Organic Chemistry (Ch 226, 227).....	10
<sup>2</sup> General Chemistry (Ch 204, 205 or Ch 101, 102, 103) and Qualitative An- alysis (Ch 206).....	14-15	Quantitative Analysis (Ch 234).....	5
General Zoology (Z 201, 202, 203).....	9	General Physics (Ph 201, 202, 203) or Engineering Physics (Ph 207, 208, 209) .....	12
<sup>3</sup> Approved art course.....	2-3	English literature or social science.....	9
Mathematics (Mth 100, 101).....	8	Comparative Vertebrate Embryology (Z 326) .....	4
Air or Military Science (men).....	3	Comparative Vertebrate Anatomy (Z 324, 325) .....	8
Physical Education.....	2	Air or Military Science (men).....	3
Hygiene .....	2	Physical Education .....	3

<sup>1</sup> Students should confer with their premedical adviser in the selection of electives.

<sup>2</sup> Those taking General Chemistry (Ch 101, 102, 103) must complete Qualitative Analysis (Ch 206) before enrolling for Organic Chemistry (Ch 226).

<sup>3</sup> Recommended courses: Basic Design (AA 295), Jewelry (AA 257), Art Metalcraft (AA 258), Graphic Arts (AA 275), Elementary Sculpture (AA 293), or Scientific Illustration (AA 294).

<sup>4</sup> On successful completion of the 3-year program and 48 term hours (32 semester hours) of dental-school work, the student may be awarded a bachelor's degree in general science. If 2 years of a language are completed during the 3-year program, the student may satisfy requirements for the bachelor of arts degree.

<sup>5</sup> Students who complete the 2-year program for dental hygienists at the University of Oregon Dental School may qualify by two additional years for a baccalaureate degree in General Science at Oregon State College.

**Preveterinary Curriculum<sup>1</sup>**

See page 165.

Freshman Year	<i>Hours</i>	Sophomore Year	<i>Hours</i>
English Composition (Wr 111, 112, 113)	9	Organic Chemistry (Ch 226, 227)	10
<sup>2</sup> General Chemistry (Ch 204, 205), Qualitative Analysis (Ch 206) or General Chemistry (Ch 101, 102, 103)	15-9	General Zoology (Z 201, 202, 203)	9
Approved sequence in social science	9	Air or Military Science (men)	3
Air or Military Science (men)	3	Physical Education	3
Physical Education	3	Approved electives	26
<sup>1</sup> Approved electives	12-18		

**Prenursing and Nursing Education Curriculum***B.S. Degree*

See page 165.

Freshman Year	<i>Hours</i>
General Chemistry (Ch 101, 102, 103) or (Ch 204, 205)	9-10
English Composition (Wr 111, 112, 113)	9
Group requirement in literature	3
General Psychology (Psy 201)	3
Extempore Speaking (Sp 111)	3
Physical Education	3
Liberal arts electives	9-8
Nutrition (FN 225)	3

**Second, Third, and Fourth Years (Medical School Campus)**

After their freshman year on the Oregon State College campus students take their sophomore, junior, and senior years at the School of Nursing in Portland. Freshmen must maintain at least a 2.00 grade-point average to be eligible for admission. They are also required to take the National League for Nursing Prenursing and Guidance Examination.

In the School of Nursing in Portland, all clinical courses are directed by the faculty and are based on the educational needs of the students. Courses are equated for credit in the same manner as university courses. The program on the college calendar provides the same opportunities for prenursing students to share in college life as it does for other students. Improvements in the continuity and integration of content has resulted in a more even distribution of course load each term and reduced the program to 10 hours at the University of Oregon Medical School campus.

See also page 199.

**Curriculum in Medical Technology<sup>3</sup>***B. S. Degree*

See page 166.

The following curriculum is suggested as meeting the requirements of the American Society of Clinical Pathologists for admission to approved training schools. Some hospital authorities require three years of college work and some a bachelor's degree. It is recommended that, where possible, students devote at least three years to preparing for their clinical-laboratory training. Students completing three years of work as outlined may receive a B.A. or B.S. degree from Oregon State College after completing a year of prescribed work in Medical Technology at the University of Oregon Medical School.

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

<sup>2</sup> Those taking Ch 101, 102, 103 must complete Qualitative Analysis (Ch 206) before enrolling for Organic Chemistry (Ch 226).

<sup>3</sup> 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 <sup>1</sup>		Sophomore Year <sup>1</sup>	
	Hours		Hours
<sup>2</sup> General Chemistry (Ch 204, 205, 206).....	15	General Bacteriology (Bac 204).....	3
English Composition (Wr 111, 112, 113).....	9	Pathogenic Bacteriology (Bac 332, 333).....	5
<sup>3</sup> Literature.....	6	Quantitative Analysis (Ch 234).....	5
General Zoology (Z 201, 202).....	6	Organic Chemistry (Ch 226, 227).....	10
Physical Education.....	2	Physiology (Z 331, 332).....	6
General Hygiene (PE 160).....	2	Social Science.....	9
Approved Electives.....	7	Physical Education.....	3
		Approved Electives.....	8
Junior Year		Senior Year (Medical School)	
	Hours		Hours
Abridged General Physics (Ph 211, 212).....	6	Medical Technology.....	47
Upper Division Science.....	12		
Approved Electives.....	28		

## General Science

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

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

The elementary courses in biological and physical sciences are designed for the student interested in science more as a cultural subject than for any other specific purpose. The courses may serve as satisfaction of a science group requirement or as part of a teaching major or minor, but they are not usually considered as prerequisites to further work in science or in the professional schools.

### Lower Division Courses

- \*GS 101, 102, 103. **General Biology.** 4 hours each term. 3 ① 1 ②  
Principles of biology as they apply to both plants and animals. For general students and majors in fields other than biology.
- \*GS 104, 105, 106. **Physical Science.** 4 hours each term. 3 ① 1 ②  
Principles of physics, chemistry, astronomy, and geology; development and application of the scientific method. For majors in fields other than the physical sciences.

### Upper Division Courses

- GS 341. **Bioecology.** 3 hours. 2 ① 1 ③  
Interrelations of 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; development of faunas and floras; biogeographic areas. Prerequisite: one year of biological science, GS 341, and junior standing. BEER.

<sup>1</sup> Men in Medical Technology must adjust program in freshman and sophomore years to provide for Air, Military, or Naval Science.

<sup>2</sup> Students who have not had high school chemistry should take Ch 101, 102, 103, and 206.

<sup>3</sup> Students not candidates for a degree may substitute for literature.

<sup>4</sup> Students who have earned 6 term hours or more in one 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 401. **Research.** Terms and hours to be arranged.
- GS 403. **Thesis.** Terms and hours to be arranged.
- GS 405. **Reading and Conference.** Terms and hours to be arranged.
- GS 407. **Seminar.** Terms and hours to be arranged.
- GS 411, 412, 413. **History of Science.** (G) 2 hours each term. 2 ①  
Development of science from beginnings, with emphasis on scientific method and spirit. Prerequisite: 18 hours of upper division science, or equivalent. Offered alternate years. Not offered 1960-61. HUMPHREY.
- GS 421, 422, 423. **Classics of Science.** (G) 2 hours each term. 2 ①  
Works notable in development of science studied for (1) significance to science and (2) form; biographies of men of science studied as background. Prerequisite: 18 hours of upper division science, or equivalent. Offered alternate years. Offered 1960-61.
- GS 431. **Physical Limnology.** (G) 3 hours winter. 3 ①  
Physical and chemical processes in lakes and rivers; methods of making physical measurements; some field work. Prerequisite: senior or graduate standing, two years of biological science. BURR.

#### Graduate Courses

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

- GS 501. **Research.** Terms and hours to be arranged.
- GS 503. **Thesis.** Terms and hours to be arranged.
- GS 505. **Reading and Conference.** Terms and hours to be arranged.
- GS 507. **Seminar.** Terms and hours to be arranged.

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

- \*Bot 521. **Taxonomy and Field Botany.** 3 hours summer.
- \*Bot 571. **Morphology of Lower Plants.** 3 hours summer.
- \*Bot 572. **Morphology and Anatomy of Seed Plants.** 3 hours summer.
- \*Bot 573. **Preparation of Botanical Materials.** 3 hours summer.
- \*Ch 561. **Advanced Inorganic Chemistry.** 3 hours summer.
- \*Ch 562. **Advanced Inorganic Chemistry.** 3 hours summer.
- \*Ch 564. **Organic Chemistry.** 3 hours summer.
- \*Ch 565. **Organic Chemistry.** 3 hours summer.
- \*GS 511. **History of Biological Science.** 3 hours summer.
- \*GS 541. **Bioecology.** 3 hours summer.
- \*G 511. **Geology for Teachers.** 3 hours summer.
- \*G 530. **Geologic History of Life.** 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 591. **Meteorology**. 3 hours summer.
- \*Z 541. **Heredity**. 3 hours summer.
- \*Z 554. **Invertebrate Zoology**. 3 hours summer.
- \*Z 556. **Collection and Preparation of Zoological Materials**. 3 hours summer.
- \*Z 560. **Cells and Tissues**. 3 hours summer.
- \*Z 577. **Ornithology**. 3 hours summer.
- \*Z 578. **Field Natural History**. 3 hours summer.

## Bacteriology and Hygiene

Bacteriology, especially through its application in agriculture, industrial fermentations, sanitation, and medicine, has great importance in modern civilization. Because of its close relation to many fundamental aspects of human life, bacteriology affords an excellent field of concentration for a liberal arts degree; it also affords opportunity to prepare for professional service, especially in fields involving applications of bacteriology and hygiene.

The graduate majors include general bacteriology, industrial bacteriology, dairy bacteriology, food bacteriology, hygiene and sanitation, pathogenic bacteriology, virology, and soil bacteriology. As agriculture and allied fields are vital in Oregon industrial life, a valuable and practical field of research is open to the student taking advanced work in agricultural bacteriology. Similarly, the recent trend toward industrialization in certain parts of the State, with attendant increases in population densities, demands more bacteriologists with specialized training in sanitation and industrial bacteriology.

### Lower Division Courses

- <sup>1</sup>Bac 200. **Bacteriology Laboratory**. 2 hours spring. 2 ②  
May be taken only with Bac 230, which combination may be used in meeting science group requirement.
- <sup>1</sup>Bac 204, 205, 206. **General Bacteriology**. 3 hours each term. 2 ① 2 ②  
*Bac 204*: Characteristics of bacteria, yeasts, molds, viruses, and related organisms; elementary technique in cytology, taxonomy, and physiology. *Bac 205*: Application of microbiology to dairy, soils, industry, sanitation, and the home. *Bac 206*: Fundamental factors in growth and death of micro-organisms; systematic identification of micro-organisms and a study of their metabolisms. Prerequisite: one year of chemistry. Bac 204 is offered fall and winter; Bac 205 offered spring term.

<sup>1</sup> Students may receive credit only for Bac 230 with Bac 200; or for Bac 204.

- Bac 230. **Principles of Bacteriology.** 3 hours spring. 3 ①  
Applications to agriculture, industry, sanitation, disease. Prerequisite: one year of chemistry.
- Bac 261. **Sanitary Bacteriology.** 3 hours fall. 2 ① 2 ②  
Principles of municipal water and sewage bacteriology as applied to problems in sanitary engineering.

**Upper Division Courses**

- Bac 321. **Sanitation.** 3 hours winter. 3 ①  
Sanitation in home, school, city, with particular reference to control of communicable diseases and their relation to foods, rodents, swimming pools, eating establishments, insects, ventilation, industrial hygiene, etc. Prerequisite: one term of general bacteriology or equivalent. Offered alternate years. Not offered 1960-61.
- Bac 332. **Pathogenic Bacteriology.** 3 hours winter. 3 ①  
Important bacteria pathogenic for man, emphasizing morphological, physiological, and disease-producing properties; methods of isolation and identification. Prerequisite: Bac 204.
- Bac 333. **Pathogenic Bacteriology Laboratory.** 2 hours winter. 2 ③  
Laboratory studies to accompany Bac 332.
- Bac 341. **Clinical Laboratory Methods.** 5 hours fall. 3 ① 2 ③  
Methods used in clinical laboratory to aid the physician in diagnosis and treatment of disease; theory and interpretation. Prerequisite: Bac 204, Ch 226, 234, or 221.
- Bac 401. **Research.** Terms and hours to be arranged.
- Bac 403. **Thesis.** Terms and hours to be arranged.
- Bac 405. **Reading and Conference.** Terms and hours to be arranged.
- Bac 407. **Seminar.** 1 hour each term. Staff.
- Bac 411. **Food Sanitation Bacteriology.** (g) 4 hours fall. 2 ① 2 ②  
Physiological activities of dairy and food spoilage micro-organisms; bacteriological problems in production and processing of milk, cream, and other foods with emphasis on sanitation and public health. Prerequisite: Bac 204 and organic chemistry. ELLIKER.
- Bac 412. **Dairy Bacteriology.** (G) 4 hours winter. 2 ① 2 ②  
Continuation of Bac 411. Microbiology of milk products; a more thorough study of specific problems in dairy microbiology and training in advanced techniques. Prerequisite: Bac 411. ELLIKER.
- Bac 421. **Soil Bacteriology.** (G) 4 hours fall. 2 ① 2 ③  
Relation of micro-organisms to soil fertility; ammonification; nitrification; nitrogen fixation; organic decomposition and humification. Prerequisite: Bac 204. BOLLEN.
- Bac 422. **Soil Bacteriology.** (G) 3 hours winter. 1 ① 2 ③  
Continuation of Bac 421. Review of literature and special problems. Prerequisite: Bac 421. Offered alternate years. Not offered 1960-61.
- Bac 424, 425, 426. **Community Health Problems.** (g) 3 hours each term. 3 ①  
Application of principles of hygiene to sanitary, statistical, governmental, epidemiological, and sociological problems. Prerequisite: junior or senior standing, one year of upper division biological science. C. L. ANDERSON.
- Bac 431. **Bacteriological Technique.** (G) 5 hours fall. 3 ① 2 ②  
Intensive study of the fundamental principles involved in the study of bacteria. Prerequisite: Bac 206 or equivalent and two years of chemistry. BOLLEN.
- Bac 441. **Systematic Bacteriology.** (G) 3 hours winter. 3 ①  
Taxonomy and nomenclature; history of bacterial classification; International Rules of Nomenclature and Bacteriological Code; Bergey's Manual. Prerequisite: Bac 206 or equivalent and two years of chemistry. GILMOUR.

- Bac 442. **Systematic Bacteriology Laboratory.** (G) 2 hours winter. 2 ②  
 Laboratory studies to accompany Bac 441. Prerequisite: Bac 431. GILMOUR.
- Bac 451. **Physiology of Bacteria.** (G) 3 hours spring. 3 ①  
 Bacterial growth, reproduction, and death; influence of environmental factors; metabolic pathways; microbial nutrition. Prerequisite: Bac 205 and organic chemistry. PARKS.
- Bac 452. **Physiology of Bacteria Laboratory.** (G) 2 hours spring. 2 ②  
 Laboratory studies to accompany Bac 451. Prerequisite: Bac 442. PARKS.
- Bac 453. **Epidemiology.** 3 hours spring. 3 ①  
 Causes and behavior of communicable diseases in general population; factors influencing occurrence of epidemics; basic principles underlying control. Prerequisite: Bac 205 or equivalent. Offered alternate years. Not offered 1960-61. C. L. ANDERSON.
- Bac 460. **Food Bacteriology.** (g) 4 hours spring. 2 ① 2 ②  
 Control of micro-organisms in production and handling of foods with emphasis on microbiological methods of examining foods. Prerequisite: Bac 205 or equivalent. A. W. ANDERSON.
- Bac 470. **Bacteriology of Water and Sewage.** (g) 4 hours spring. 2 ① 2 ②  
 Numbers and kinds of micro-organisms in water and sewage; indicators of water pollution, tests for pollution, acceptable standards; purification of water and bacteriology of sewage disposal. Prerequisite: Bac 204, 205, one year of chemistry or equivalent. Offered alternate years. Not offered 1960-61.
- Bac 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: Bac 332 or 205 and 2 years of chemistry. Offered alternate years. Not offered 1960-61. PITCHER.
- Bac 481. **Immunology and Serology Laboratory.** (G) 2 hours, spring. 2 ③  
 Laboratory exercises to accompany Bac 480.
- Bac 490. **Industrial Microbiology.** (G) 4 hours spring. 2 ① 2 ②  
 Micro-organisms in industrial processes; production of organic acids, solvents, antibiotics, and enzymes of microbiological origin. For advanced students in bacteriology, chemistry, and chemical engineering. Consent of instructor required. Prerequisite: one year of bacteriology, two years of chemistry. Offered alternate years. Offered 1960-61. GILMOUR.

#### Graduate Courses

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

- Bac 501. **Research.** Terms and hours to be arranged.
- Bac 503. **Thesis.** Terms and hours to be arranged.
- Bac 505. **Reading and Conference.** Terms and hours to be arranged.
- Bac 507. **Seminar.** Terms and hours to be arranged. Staff.
- Bac 530. **Marine Bacteriology.** 3 hours summer. 2 ① 2 ②  
 Micro-organisms of ocean water, their ecology and economic importance. Prerequisite: one year upper division bacteriology.
- Bac 551, 552. **Advanced Bacterial Physiology.** 3 hours each term, fall and winter. 1 ① 2 ②  
 Growth, fermentation, and death of micro-organisms; emphasis on the morphology, cytology, and cell microchemistry. Prerequisite: Bac 451 or equivalent; organic and physical chemistry.
- Bac 553. **Biochemistry of Bacteria.** 3 hours fall. 1 ① 2 ②  
 Role of carbohydrates, proteins, fats, minerals, accessory growth factors in nutrition of micro-organisms; microbiological assay techniques. Prerequisite: Bac 451 and one year of biochemistry. Offered alternate years. Offered 1960-61. A. W. ANDERSON.

## Botany

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

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

Excellent greenhouse facilities are available for botanical instruction and research. The herbarium collections total more than 150,000 specimens including over 95,000 classified specimen sheets of higher plants and 40,000 collections of parasitic fungi. There are also collections of seeds, bryophytes, myxomycetes, algae, and photographs of type specimens that are located in other herbaria.

An extensive and diversified research program relating to plant diseases is conducted by State and Federal investigators. A number of graduate students are granted research assistantships that enable them to gain valuable training in research under the guidance of these investigators. There is also opportunity for some undergraduate students to obtain part-time employment and experience in research.

### Lower Division Courses

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

### Upper Division Courses

- Bot 314. **Agrostology.** 3 hours fall. 2 ① 2 ②  
Taxonomy of grasses. Identification in vegetative condition and in flower. Prerequisite: Bot 203.
- Bot 315. **Forest Pathology.** 3 hours winter. 1 ① 2 ②  
Disease in relation to forest development, protection, and harvest. Prerequisite: two terms of general botany. ROTH.
- Bot 316, 317. **Aquatic Plants.** 3 hours fall and winter. 1 ① 2 ③  
Ecology, taxonomy, and economic significance of aquatic plants. Prerequisite: Bot 203 or equivalent. PHINNEY.
- Bot 320. **Fungus Deterioration of Wood Products.** 3 hours winter. 2 ① 1 ③  
Relation of decay in standing timber to decay of wood products; fungus deterioration of logs, lumber, and remanufactured products. Prerequisite: Bot 201, 202. Offered alternate years. Offered 1960-61. ROTH.
- Bot 321. **Systematic Botany.** 4 hours spring. 2 ① 2 ③  
Taxonomy of vascular plants. Principles of plant classification; collection and identification. Prerequisite: Bot 201, 203, or equivalent.
- Bot 331. **Plant Physiology.** 5 hours fall or spring. 2 ① 3 ②  
Survey of physiology with emphasis on agriculture and forestry. Prerequisite: Bot 201, 202, and one year of chemistry. BELKENGREN.



- 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 various 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. DIETZ, 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. Terms and hours to be arranged.
- 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 upper division biology. PHINNEY.
- Bot 421, 422, 423. **Advanced Systematic Botany.** (G) 3 hours each term. 1 ① 2 ③  
Nomenclature of vascular plants; history and systems of classification; preparation of taxonomic keys. Prerequisite: Bot 321 or equivalent.
- 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. BELKENGREN.
- 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 451. **Research Methods in Plant Pathology.** (G) 3 hours fall. 1 ① 2 ③  
Problems involved in study and research on fungus, bacterial, and virus diseases of plants. Prerequisite: Bot 331 and 351, or equivalent.
- Bot 452. **Field Crop Diseases.** (g) 3 hours spring. 1 ① 2 ②  
Identification, development, and control of principal diseases of field crops. Prerequisite: Bot 351. RAYMER.
- Bot 453. **Fruit Diseases.** (g) 3 hours spring. 3 ②  
Chief diseases of fruits and their control. Prerequisite: Bot 351 or equivalent. Offered alternate years. Offered 1960-61. CAMERON.
- Bot 461. **Mycology.** (G) 4 hours fall. 2 ① 2 ③  
Occurrence, significance, structure, function, and relationships of molds and other saprophytic fungi and plant pathogenic forms. Prerequisite: Bot 201, 202, and 3 terms upper division biological science. ROTH.
- Bot 462, 463. **Mycology.** (G) 3 hours winter, spring. 1 ① 2 ③  
*Winter:* identification of fungi with emphasis on plant pathogenic forms. *Spring:* special problems. Prerequisite: Bot 461. ROTH.
- Bot 470. **Microtechnique.** (G) 4 hours winter. 3 ③  
Preparation of permanent microscope slides of plant materials. Prerequisite: Bot 201, 202, and two terms of upper division biology. SMITH.
- Bot 471. **Plant Anatomy.** (G) 4 hours fall. 2 ① 2 ③  
Origin, structure, and development of plant tissues. Prerequisite: Bot 201, 202, 371 and two terms of upper division botany or equivalent. SMITH.

- Bot 472. **Plant Cytology.** (G) 5 hours spring. 3 ① 2 ②  
Cell components: nuclear and cell division, meiosis, heteroploidy, gametophyte development, and fertilization. Prerequisite: Bot 201, 202, and two terms of upper division botany or equivalent. SMITH.
- Bot 490. **Paleobotany.** (G) 4 hours spring. 2 ① 2 ③  
Paleobotanically important plants; plant history revealed in fossil records; tertiary flora of Oregon. Prerequisite: general geology or general botany. Offered alternate years. Offered 1960-61. PHINNEY.

**Graduate Courses**

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

- Bot 501. **Research.** Terms and hours to be arranged.
- Bot 503. **Thesis.** Terms and hours to be arranged.
- Bot 505. **Reading and Conference.** Terms and hours to be arranged.
- Bot 507. **Seminar.** 1 hour. Terms and hours to be arranged.  
GENERAL SEMINAR.  
PLANT PATHOLOGY SEMINAR.
- Bot 511. **Fresh-Water Algae.** 4 hours spring. 2 ① 2 ③  
Taxonomy and ecology of the fresh-water algae. 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 315 or 351, or equivalent and consent of instructor. Offered alternate years. Not offered 1960-61. ROHR.
- Bot 531, 532, 533. **Research Methods in Plant Physiology.** 2 hours each term. 2 ③  
Laboratory experiments employing modern methods used in research in plant physiology supplemented by assigned reading and conference. Prerequisite or parallel: Bot 431, and consent of instructor. BELKENGREN.
- Bot 541. **Plant Geography.** 3 hours fall. 2 ① 1 ③  
Origin, development, and distribution of major units of vegetation, with emphasis on western United States. Prerequisite: Bot 321, 341, 441. Offered alternate years. Not offered 1960-61. CHILCOTE.
- Bot 542. **Plant Communities.** 3 hours winter. 2 ① 1 ③  
Major plant communities, their structure, composition, and phytosociological status; ecology of principal species. Emphasis on North America and the Pacific Northwest. Prerequisite: Bot 321, 331, 341, 442. Offered alternate years. Not offered 1960-61. CHILCOTE.
- Bot 543. **Field Ecological Methods.** 3 hours spring. 1 ① 2 ③  
Statistical analysis of the plant community; measurement of the physical environment; use of ecological instruments. Prerequisite: Bot 341, 443, 542. Offered alternate years. Not offered 1960-61. CHILCOTE.
- Bot 551. **Virus Diseases of Plants.** 3 hours fall. 2 ① 1 ③  
Nature and properties of plant viruses; plant reactions; classification and nomenclature; transmission; control. Prerequisite: Bot 351, six hours upper division biological science, and consent of instructor. MILBRATH.
- Bot 552. **Bacterial Diseases of Plants.** 3 hours winter. 2 ① 1 ③  
Symptoms, etiology, and control; determination and classification of causal agents. Prerequisite: Bot 351, Bac 204, 6 hours upper division biology, and consent of instructor. Offered alternate years, not offered 1960-61. YOUNG.
- 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  
Principles of nematology; identification and biology of nematodes; symptoms and control of nematode diseases. Consent of instructor required. 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 of control; mode of action of fungicides and antibiotics. Prerequisite: Bot 351, Ch 226, 227, or equivalent. Offered alternate years. Offered 1960-61. YOUNG.
- 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 580. **Biological Micrography.** 2 hours winter. 2 ③  
Problems involved in applying optical research tools to various types of biological materials and problems. Prerequisite: graduate standing in biological science. PHINNEY.

## Chemistry

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

- <sup>1</sup>Ch 101, 102, 103. **General Chemistry.** 3 hours each term. 2 ① 1 ③  
A basic sequence covering fundamentals of chemistry. Students whose college aptitude test scores indicate the need will be permitted to attend one extra recitation per week without additional credit. High school chemistry is not prerequisite.
- Ch 111, 112. **Chemistry Survey.** 1 hour winter and spring. 1 ① 1 ②  
To acquaint students with chemistry as a profession, and orient them in chemical methodology.
- <sup>1</sup>Ch 130. **Descriptive General Chemistry.** 3 hours spring. 3 ①  
Nonlaboratory course as an aid to better understanding of the numerous chemical developments in the commercial and industrial world. May not be substituted for other chemistry courses.
- <sup>1</sup>Ch 201, 202, 203. **General Chemistry.** 3 hours each term. 2 ① 1 ③  
Course content particularly adapted for students in engineering.
- <sup>1</sup>Ch 204, 205. **General Chemistry.** 5 hours each term. 3 ① 2 ③  
Basic principles of general chemistry for students majoring in chemistry, pharmacy, and certain other curricula. High school chemistry recommended as prerequisite.
- <sup>1</sup>Ch 206. **Qualitative Analysis.** 5 hours spring or fall. 3 ① 2 ③  
Chemistry of selected metallic elements and semimicro qualitative analysis. A sequence with Ch 204 and 205, or with Ch 101, 102, 103.
- <sup>1</sup>Ch 221. **Organic Chemistry.** 4 hours. 3 ① 1 ③  
Organic chemistry adapted to use of home economics students. Prerequisite: Ch 103.
- Ch 226, 227. **Organic Chemistry.** 5 hours. 3 ① 2 ③  
General service course covering aromatic and aliphatic chemistry. Prerequisite: Ch 206 or Ch 103.
- <sup>1</sup>Ch 232, 233. **Quantitative Analysis.** 4 or 5 hours each term, winter and spring. 2 ①, 2 or 3 ③  
Fundamental principles and laboratory practice. For chemistry majors 5 hours; for chemical engineering majors 4 hours. Prerequisite: Ch 206.
- <sup>1</sup><sup>2</sup>Ch 234. **Quantitative Analysis.** 5 hours fall, winter, or spring. 2 ① 3 ③  
Principles of gravimetric analysis and volumetric analysis. Service course for pharmacy, premedical, and medical-technology students. Prerequisite: Ch 103.
- Ch 241. **Chemical Theory.** 4 hours fall. 3 ① 1 ②  
Theory and calculations in general chemistry as a foundation for physical and engineering chemistry. Prerequisite: Ch 206.
- Ch 243. **Commercial Methods of Analysis.** 4 hours spring. 2 ① 2 ③  
Theory and practice in analysis and testing of water, oil, gaseous and solid fuels, and other materials of industrial importance. Prerequisite: Ch 232.
- Ch 250. **Elements of Biochemistry.** 4 hours winter. 3 ① 1 ③  
Proteins, carbohydrates, fats, and other compounds having biochemical significance; fundamentals of analysis as applied to this work. Prerequisite: Ch 221 or equivalent.
- <sup>1</sup>Ch 251, 252. **Organic and Agricultural Biochemistry.** 5 hours fall, 3 hours winter. 3 ① 2 ③, 3 ①  
*Fall:* a one-term course in organic chemistry, intended to provide a background for elementary biochemistry; Prerequisite: Ch 103. *Winter:* an introductory study of the chemistry and biochemistry of carbohydrates, lipids, and proteins. Prerequisite: For Ch 252, Ch 251 or equivalent.

<sup>1</sup> 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. Ch 226, 227, and Ch 432 can be used as a sequence, but this does not give upper division credit for Ch 226, 227. Credit cannot be had for both Ch 232 and Ch 234.

<sup>2</sup> Ch 234 will be offered with 4 hours credit in special section for students majoring in curricula of the School of Agriculture.

## Upper Division Courses

- Ch 321, 322, 323. **Metallurgical Chemistry.** 3 hours each term. 1 ① 1 ⑤  
Chemistry and techniques in winning various metals from ores, including principles of fire assaying; special attention to chemical treatment and analysis of Northwest minerals. Prerequisite: Ch 203. CALDWELL.
- Ch 340. **Elementary Physical Chemistry.** 3 hours. 3 ①  
Aspects of physical chemistry having application in engineering, biological sciences, and medicine. Use of mathematics minimized. Some knowledge of physics required. Prerequisite: Ch 203 or equivalent.
- Ch 350, 351, 352. **Biochemistry.** 3 hours each term. 3 ①  
Service course for students majoring in agriculture and home economics. Prerequisite: Ch 227.
- 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  
Practice in manipulation of glass and assembling setups. Prerequisite: Ch 226, Ph 311, or graduate standing. May be started any term.
- Ch 401. **Research.** Terms and hours to be arranged.
- Ch 403. **Thesis.** Terms and hours to be arranged.
- Ch 405. **Reading and Conference.** Terms and hours to be arranged.
- Ch 407. **Seminar.** Terms and hours to be arranged.
- Ch 411, 412, 413. **Descriptive Inorganic Chemistry.** (G) 2 hours each term. 2 ①  
Chemistry of inorganic elements and compounds from standpoint of periodic table and atomic structure; chemical conversion of inorganic materials for industrial use. Prerequisite: three years of college chemistry. CALDWELL, PARSONS, HEDBERG.
- Ch 414. **Inorganic Laboratory.** (G) 1 hour each term, maximum 3 hours. 1 ③
- Ch 415. **Principles of Research.** (g) 1 hour. 1 ①  
Principles underlying experimentation and research and the application of the principles to actual experimental situations. Prerequisite: three years of college chemistry.
- Ch 418. **History of Chemistry.** (G) 3 hours. 3 ①  
Rise and development of chemical theories and laws. Prerequisite: three years of chemistry. SLABAUGH.
- Ch 419. **Radioactive Tracer Methods.** (g) 4 hours. 2 ① 2 ③  
Elements of radiochemistry; safe handling of radioactive isotopes; measurement of radioactivity; principles and techniques in applying tracer methods in various fields. Prerequisite: two years of chemistry. WANG.
- Ch 420, 421, 422. **Advanced Quantitative Analysis.** (g) 3 hours each term. 1 ① 2 ③  
Analytical procedures such as those of electroanalysis, fuel analysis, analysis of non-ferrous alloys, water, iron, and steel. Prerequisite: three years of college chemistry. FREUND.
- Ch 424. **Chemical Microscopy.** (G) 3 hours fall. 1 ① 2 ③  
Theory and use of microscope in microscopic measurements, quantitative analysis of mixtures, identification of organic compounds, optical crystallography, crystallization phenomena, etc. Prerequisite: three years of college chemistry, college physics. WILLIAMS.
- Ch 427, 428, 429. **Advanced Laboratory Methods.** (G) 2 hours each term. 1 ① 1 ③  
Principles and practice in advanced organic laboratory techniques; distillation, fractionation, crystallization, filtration, chromatography, extraction, high and low pressure hydrogenation, chlorination, oxidation, and important methods of synthesis. Prerequisite: Ch 432, 442. CHRISTENSEN.

- Ch 430, 431, 432. **Organic Chemistry.** (g) 4 or 5 hours each term. 3 ① 1 ③, 3 ① 2 ③  
Professional course to meet the requirement of majors in chemistry and chemical engineering. Prerequisite: two years of college chemistry. CHRISTENSEN.
- Ch 434. **Organic Preparations.** (G) 1 or 2 hours each term, maximum 5 hours. 1 ③ 2 ③  
Important methods of synthesis, such as Grignard's, Friedel-Craft's, Perkin's reaction, and others. Prerequisite: Ch 432 or equivalent. PEASE.
- Ch 435, 436. **Organic Analysis.** (G) 2 hours winter, 3 hours spring. 1 ① 1 ③, 1 ① 2 ③  
Qualitative tests and analysis of organic compounds and mixtures. Prerequisite: Ch 232, Ch 432 or 227. PEASE.
- Ch 437, 438. **Survey of Organic Chemistry.** (G) 3 hours each term. 3 ①  
Designed 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 432 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: quantitative analysis, and calculus. GILBERT, DECUS.
- Ch 443, 444, 445. **Physical Chemistry Laboratory.** (g) 1 hour each term. 1 ③
- Ch 448, 449. **Colloidal Chemistry.** (G) 3 hours each term. 3 ①  
Classical and modern surface theory, absorption, membrane and bulk diffusion, nucleation and Donnan potential, lyophilic and lyophobic colloids, including proteins and clays. Prerequisite: three years of college chemistry. SLABAUGH.
- Ch 450, 451, 452. **Biochemistry.** (g) 2, 3, or 5 hours each term. 3 ① 2 ③  
Lectures (3 hours) and laboratory (2 hours) may be taken either together or separately. *Fall:* Carbohydrates, proteins, and fats of importance in biological systems. *Winter:* Enzymes and vitamins. *Spring:* Metabolism. Prerequisite: Ch 227, 234, 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. BUTTS, CHELDELIN.
- Ch 453. **Plant Biochemistry.** (G) 3 or 5 hours spring. 3 ① 2 ③  
Chemical processes and metabolism in plant systems. Prerequisite: Ch 451. REMMERT.
- Ch 454, 455, 456. **Agricultural Biochemical Methods.** (G) Hours to be arranged. 2 ①, 2 or 3 ③  
Advanced theory and practice on the chemistry of colloids, carbohydrates, lipids, amino acids and proteins, vitamins, enzymes, pigments, etc., of both plant and animal significance. Emphasis on newer analytical methods and techniques, both instrumental and chemical. Prerequisite: Ch 452. REESE.
- Ch 457. **Dairy Chemistry.** (g) 3 hours. 3 ①  
Physical, physicochemical, and chemical properties of milk and milk products; chemistry of the individual constituents of milk, including the enzyme systems; principles involved in processing dairy products. Prerequisite: Ch 251. Ch 340 recommended. RICHARDSON.
- Ch 458. **Dairy Chemistry Laboratory.** (g) 2 hours. 2 ③  
Laboratory course to accompany Ch 457. RICHARDSON.
- Ch 467. **Molecular Spectroscopy.** (G) 2 hours. 1 ① 1 ③  
Use of infrared and other types of spectroscopy for the identification and analysis of gases, liquids, crystalline and polymeric solids. Determination of molecular structure. Prerequisite: Ch 442.
- Ch 468. **Chemical Kinetics.** (G) 3 hours. 3 ①  
Measurement of reaction rates, experimental methods, mechanisms of elementary processes, complex inorganic reactions, complex organic reactions, catalysis, general theories, and potential energy surfaces. Prerequisite: Ch 442.

- Ch 470. **Forest Products Chemistry.** (G) 3 hours fall. 3 ①  
Chemistry of natural plant materials with special attention to woods and other sources of cellulose, hemicellulose, lignin, and extractives. Prerequisite: Ch 432. KURTH.
- Ch 471. **Chemical Analysis of Wood and Related Products.** (G) 3 hours winter. 1 ① 2 ③  
Laboratory methods of analysis of woods and related fibrous materials. Prerequisite: Ch 234, 432. KURTH.
- Ch 472, 473. **Pulp and Paper Chemistry.** (G) 3 hours winter and spring. 3 ①  
Fundamental chemical processes of pulp and paper industry. Prerequisite: Ch 470. KURTH.
- Ch 474. **Pulp and Paper Chemistry.** (G) 3 hours spring. 1 ① 2 ③  
Laboratory studies on preparation of chemical and semichemical wood cellulose pulps and their evaluation; beating characteristics, bleachability measurement and bleaching, copper number, viscosity, fiber classification, and strength properties. Prerequisite: Ch 472, 473.
- Ch 480, 481. **Survey of Physical Chemistry.** (G) 3 hours each term. 3 ①  
Designed for advanced chemistry students who are not major students 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 or equivalent. STAFF.
- Ch 482, 483. **Thermodynamics.** (G) 3 hours. 3 ①  
Chemical principles from standpoint of thermodynamics. Prerequisite: Ch 442. GILBERT.
- 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. **Biochemistry.** (G) 3 hours winter and spring. 3 ①  
Professional course majors in biochemistry and others with prerequisites: *Winter*: Major chemical constituents of biological materials and enzymes. *Spring*: Biological oxidation and intermediary metabolism. Students who have taken the lecture for 3 hours each term may take the laboratory for 2 hours in later terms. Prerequisite: Three years of college chemistry, including Ch 234, 340, 432 or equivalent; consent of instructor.
- Ch 493, 494. **Biochemistry Laboratory.** (G) 2 hours. 2 ③  
Laboratory work to accompany Ch 490, 491.

#### Graduate Courses

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

- Ch 501. **Research.** Terms and hours to be arranged.
- Ch 503. **Thesis.** Terms and hours to be arranged.  
Qualified students have all the facilities of the laboratory at their disposal and receive the advice and assistance of the department.
- Ch 505. **Reading and Conference.** Terms and hours to be arranged.
- Ch 507. **Seminar.** Terms and hours to be arranged.  
A reading knowledge of German and French is expected.
- Ch 511, 512, 513. **Advanced Inorganic Chemistry.** 2 hours each term. 2 ①  
Chemistry of several groups of nonmetals and metals, complex compounds, and acid-base reactions and reactions in nonaqueous solvents. Prerequisite: Ch 442. NORRIS.
- Ch 516, 517, 518. **Radiochemistry.** 2 hours each term. 2 ①  
Radioactivity, nuclear properties, nuclear reaction, and associated nuclear-chemical phenomena; application to theoretical and applied chemistry; instrumentation and laboratory techniques: Prerequisite: Ch 442. NORRIS.

- Ch 519. **Radioactive Tracer Technology.** 3 hours spring. 1 ① 2 ③  
 Fundamental principles and experiments on radioactivity measurements; characteristics of radioactive substances; design of simple tracer experiments; synthesis and degradation of labeled compounds. Prerequisite: Ch 432, Ch 442, and Ch 518 may be taken concurrently, or Ph 474, 475, 476. WANG.
- Ch 520, 521, 522. **Advanced Analytical Chemistry.** 3 hours each term. 3 ①  
 Two terms on principles underlying modern methods of analysis and their application to the analytical chemistry of the elements. Third term devoted to special fields of current interest. Prerequisite: Ch 442. FREUND.
- Ch 523. **Organic Quantitative Microanalysis.** 3 hours. 1 ① 2 ③  
 Laboratory practice in methods of quantitative organic microanalysis. Prerequisite: Ch 233, 432. WANG.
- Ch 525, 526. **Instrumental Analysis.** 3 hours winter and spring. 1 ① 2 ③  
 Principles and practice in use of special optical and electrical instrumental methods of analysis; spectroscopy, colorimetry, spectrophotometry, etc. Prerequisite: Ch 442. WILLIAMS, FREUND.
- Ch 527. **Organic Radioactive Tracer Techniques.** 3 hours. 1 ① 2 ③  
 Design of tracer experiments; synthesis of labeled compounds; application of tracer technique in reaction mechanism and biochemical studies; isolation and isotopic dilution technique; radioautograph; degradation studies. Prerequisite: Ch 519 or equivalent. WANG.
- Ch 530, 531, 532. **Advanced Organic Chemistry.** 2 hours each term. 2 ①  
 Course in organic chemistry designed to give advanced students intimate acquaintance with facts and theories essential to organic research. Prerequisite: passing grade in graduate qualifying examination. STAFF.
- Ch 533, 534, 535. **Theoretical Organic Chemistry.** 2 hours each term. 2 ①  
 A three-term sequence on the theories of organic chemistry. Physical basis for structural organic chemistry, reaction mechanisms. Prerequisite: Ch 438, 481, or equivalent and consent of instructor. MARVELL.
- Ch 536, 537, 538. **Selected Topics in Organic Chemistry.** 2 hours each term. 2 ①  
 Topics: (1) Organic nitrogen compounds, PEASE; (2) Carbohydrates, PEASE; (3) Terpenes, PEASE; (4) Organic-metallic compounds, LOGAN; (5) Steroids; (6) Heterocyclic compounds, CHRISTENSEN. Prerequisite: Ch 432 or equivalent.
- Ch 540, 541, 542. **Advanced Physical Chemistry.** 3 hours each term. 3 ①  
 Theories of atomic and molecular structure; nature of chemical bond; statistical calculation of 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; solution chemistry. Not all topics are covered each year. GILBERT, SCOTT, DECIUS, and HEDBERG.
- Ch 546. **Chemical Literature.** (G) 1 hour. 1 ①  
 Use of the chemical literature; character of various chemical journals, dictionaries, reference books, and other sources of information. GILBERT.
- Ch 550, 551, 552. **Selected Topics in Biochemistry.** 3 hours each term. 3 ①  
 Nonsequence courses designed to acquaint student with recent advances in biochemistry and their application to special fields of study. 1960-61: Ch 550, proteins, nucleic acids; Ch 551, 552, biological oxidations. Prerequisite: Ch 491. Students who have not had Ch 491 must have consent of instructor.
- Ch 554. **Biochemical Preparations.** 1 or 2 hours each term.  
 Preparation, purification, and analysis of compounds of biological importance; chemical and biological resolutions. Maximum credit 6 hours. Prerequisite: Ch 432.
- Ch 555. **Biochemical Techniques.** 3 hours winter. 1 ① 2 ③  
 Concentration of biochemical compounds (enzymes, coenzymes, and various physiologically important intermediates and metabolites) by recently developed methods; study of their properties by enzymic, manometric, and other special techniques. Prerequisite: quantitative analysis, Ch 452 or 453 or equivalent. KING.



## Entomology

Entomology courses are planned to acquaint the student with the proper 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 needs of students from other departments who desire work in entomology. The department affords opportunity to major in entomology for a liberal arts degree as well as to prepare for professional service in entomology or allied fields. Advanced work is offered in the fields of general entomology, economic entomology, forest entomology, insect toxicology, aquatic entomology, and systematic entomology. Advanced courses are planned to equip students specializing in entomology with a fundamental groundwork in the science sufficient to prepare them for effective service in applied 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 4-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 new forest insect research laboratory. Graduate assistantships, available to qualified graduate students, provide valuable work experience.

### Lower Division Course

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

### Upper Division Courses

- Ent 314. **Economic Entomology.** 4 hours fall or winter. 2 ① 2 ②  
Primarily for agriculture students. Typical economic insect forms; insect-pest control. Prerequisite: one term of zoology or chemistry.
- Ent 321. **Forest Entomology.** 3 hours fall. 2 ① 1 ②  
Forest losses due to insects; the groups responsible; prevention and control. Prerequisite: one year of forestry, or Ent 200 or equivalent.
- Ent 333. **Insect Anatomy.** 3 hours spring. 3 ②  
External anatomy of adult insects, mouthparts, appendages, and body regions. Prerequisite: Ent 200, 314.
- Ent 341. **Aquatic Entomology.** 3 hours spring. 1 ① 2 ②  
Identification, collection, and ecology of aquatic insects. Prerequisite: upper division standing.
- Ent 401. **Research.** Terms and hours to be arranged.  
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 411. **Fruit Insects.** (G) 3 hours fall. 2 ① 1 ②  
Major pests and their control. Especially for students in horticulture. Prerequisite: Ent 314 or equivalent. RITCHER.

- Ent 412. **Insects Affecting Man and Animals.** (G) 3 hours fall. 2 ① 1 ②  
Life histories, disease vectors and carriers, control measures. Prerequisite: fundamental courses in entomology or zoology. Offered alternate years. Offered 1960-61. GOULDING.
- Ent 413. **Field and Truck-Crop Insects.** (G) 3 hours spring. 2 ① 1 ②  
Major pests and their control; especially for farm crops, vegetable crops, and entomology students. Prerequisite: Ent 314 or equivalent. Offered alternate years. Not offered 1960-61. CROWELL.
- Ent 423. **Advanced Forest Entomology.** (G) 3 hours winter. 2 ① 1 ③  
Bark beetles, sawflies, lepidoptera, and homoptera injurious to forest trees. Prerequisite: Ent 321 or equivalent. Offered alternate years. Offered 1960-61. 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 1960-61.
- Ent 451, 452, 453. **Systematic Entomology.** (G) 3 hours each term. 2 ③  
Taxonomy, nomenclature, literature, phylogeny, and distribution of insects. Prerequisite: Ent 200, 314. LATTIN.
- Ent 461. **General Acarology.** (G) 3 hours fall. 1 ① 2 ②  
Taxonomy of mites and ticks; methods of collection and preservation. Consent of instructor required. Prerequisite: Ent 314. Offered alternate years. Not offered 1960-61. KRANTZ.
- Ent 463. **Historical Entomology.** (G) 3 hours winter. 3 ①  
History of basic and applied entomology and its relationship to the development of natural science. Prerequisite: Ent 200 or equivalent. LATTIN.
- Ent 473. **Insect Ecology.** (G) 3 hours fall. 3 ①  
Influence of environment on insect development, distribution, and behavior. Prerequisite: Ent 200 or 314. Offered alternate years. Not offered 1960-61. MARTIN.
- Ent 474. **Insect Toxicology.** (G) 3 hours spring. 2 ① 1 ③  
Mode of action of insecticides; physical and chemical properties; mammalian toxicity; insect resistance to insecticides; testing, formulation and application. Prerequisite: 2 terms organic chemistry or biochemistry. Offered alternate years. Not offered 1960-61. TERRIERE.
- Ent 481. **Insect Morphology.** (G) 3 hours fall. 2 ① 1 ③  
Morphology of the external skeleton and its appendages. Prerequisite: Ent 200 or 314. Offered alternate years. Offered 1960-61. MARTIN.
- Ent 482. **Insect Morphology.** (G) 3 hours winter. 3 ②  
Morphology of the internal organs. Prerequisite: Ent 200 or 314. Offered alternate years. Offered 1960-61. MARTIN.

#### Graduate Courses

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

- Ent 501. **Research.** Terms and hours to be arranged.
- Ent 503. **Thesis.** Terms and hours to be arranged.
- Ent 505. **Reading and Conference.** Terms and hours to be arranged.
- Ent 507. **Seminar.** Terms and hours to be arranged.
- Ent 515. **Principles of Research.** 3 hours winter. 2 ① 1 ①  
Investigative procedures; applied biometry; insect populations. Prerequisite: Ent 314 or equivalent, Ent 473, St 421. Offered alternate years. Not offered 1960-61. MARTIN.
- Ent 525. **Insect Transmission of Plant Viruses.** 3 hours fall. 2 ① 1 ③  
Principles of plant virus transmission by arthropods and application to field and laboratory problems. Prerequisite: Ent 452, Bot 551. Offered alternate years. Offered 1960-61. SWENSON.

- Ent 533. **Aquatic Entomology.** 4 hours spring. 2 ① 2 ②  
Aquatic insects with emphasis on biologies, habitats; classification of major groups. Prerequisite: Ent 341 or equivalent. LATTIN.
- Ent 554. **Immature Insects.** 3 hours winter. 3 ②  
Methods of collection, preservation, and identification; emphasis on taxonomy and morphology of families of immature insects. Prerequisite: Ent 453, 481. RITCHER.
- Ent 572. **Insect Physiology.** 3 hours spring. 2 ① 1 ③  
Emphasis on peculiar hexapod systems and functions such as metamorphosis, excretion, the integument and haemolymph. Prerequisite: Ent 482 and organic chemistry. Offered alternate years. Offered 1960-61. CROWELL.
- 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 1960-61. STEPHEN.
- Ent 583. **Speciation and Distribution.** 3 hours winter. 3 ①  
Distributional patterns exhibited by insects, other animals, and plants from early geological time to present and significance in evolution; genetic and systematic views on formation of specific and infraspecific categories. Prerequisite: Systematic entomology, zoology or botany; genetics. Students who have not had genetics must have consent of instructor. Offered alternate years. Not offered 1960-61. STEPHEN.

## Geology

Geology is the science of the earth. 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 the student to make 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 9 hours is prerequisite to candidacy for an advanced degree.

### Lower Division Courses

- <sup>1</sup>G 200. **Physical Geology.** 3 hours. 3 ①  
Elective short course on earth materials, processes, and history.
- <sup>1</sup>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.

### Upper Division Courses

- <sup>1</sup>G 312, 313, 314. **Mineralogy and Rock Study.** 4 hours each term. 2 ① 2 ③  
Crystal forms, physical and chemical properties; identification of economic and rock-forming minerals; common rock types of special industrial importance. Prerequisite: chemistry. Students who have not had chemistry may take it concurrently.
- <sup>1</sup>G 315, 316, 317. **Mineralogy and Rock Study.** 3 hours each term. 1 ① 2 ②  
Prerequisite: one year of physical science.

<sup>1</sup>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 and G 201.

- G 321. **Structural Geology.** 4 hours spring. 3 ① 1 ③  
Origin, interpretation, and mapping of joints, faults, cleavage, plutons, and folds. Prerequisite: G 201, 202.
- G 322. **Geomorphology.** 4 hours winter. 3 ① 1 ③  
Development of the surface features of the earth by erosion, deposition, earth movements, and volcanism. Prerequisite: general geology.
- G 323. **Sedimentology.** 4 hours fall. 3 ① 1 ③  
Genesis and subsequent history of stratified rocks; geologic processes concerned with sedimentation. Prerequisite: G 201, 202, 203.
- 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 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 340, 341, 342. **Invertebrate Paleontology.** 4 hours each term. 2 ① 2 ③  
Major phyla of fossil invertebrates, with emphasis on comparative morphology of fossil and living representatives; important Paleozoic and Mesozoic guide fossils. Prerequisite: general geology or one year of biological science.
- G 350. **Rocks and Minerals.** 3 hours fall. 2 ① 1 ②  
Prerequisite: upper division standing.
- G 352. **Geology of Oregon.** 3 hours spring. 3 ①  
Origin and geologic history of landscape features of Oregon; for students without prior geologic background.
- G 380. **Field Methods.** 3 hours. 1 ① 1 ⑥  
Geologic mapping and surveying methods; pace-and-compass traverses, plane table plotting. Prerequisite: one year of general geology.
- G 401. **Research.** Terms and hours to be arranged.
- G 403. **Thesis.** Terms and hours to be arranged.
- G 405. **Reading and Conference.** Terms and hours to be arranged.
- G 407. **Seminar.** 1 hour any term. 1 ①
- G 412, 413, 414. **Petrography.** (G) 4 hours each term. 2 ① 2 ③  
Use of microscope in identification of minerals and in rock classification. Prerequisite: G 312, 313, 314. TAUBENECK.
- G 420. **Geophysical Exploration.** (g) 3 hours. 3 ①  
Physical methods used in mining and oil prospecting, emphasizing geologic interpretation. Prerequisite: Ph 203, G 321, 323. WILKINSON.
- G 421, 422. **Mining Geology and Industrial Minerals.** 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. KOCH.
- G 423. **Oil Geology.** 3 hours spring. 3 ①  
Origin, occurrence, exploration, and technology of gas and oil. Prerequisite: G 201, 202, 203. Some field trips required. KOCH.
- G 424. **Biostratigraphy.** (G) 4 hours fall. 2 ① 2 ③  
Principles of stratigraphic paleontology governing use of fossils in chronology and correlations; paleo-ecology; stratigraphic succession of invertebrates; experience in collection, preparation, and identification of megafossils. Prerequisite: G 340, 341, 342.

- G 430. **Principles of Stratigraphy.** (G) 4 hours fall. 3 ① 1 ③  
Interpretation of stratigraphic column; environmental, biologic, tectonic factors; correlation; field and laboratory procedures. Prerequisite: two years of geology including G 323.
- G 431. **Stratigraphy of North America.** (G) 4 hours. 4 ①  
The geologic development of the North American continent. Prerequisite: G 323, 430.
- G 432. **Geologic History of the Pacific Coast.** (G) 4 hours. 4 ①  
Prerequisite: G 323, 340, 341.
- G 440. **Micropaleontology.** (g) 4 hours. 2 ① 2 ③  
Collecting, preparation, classification, and identification of microfossils; elements of biostratigraphy and ecologic evaluation of fossil foraminiferal assemblages. Prerequisite: 3 years of geology or zoology, G 340. BOSTWICK.
- G 441. **Advanced Micropaleontology.** (G) Terms and hours to be arranged.  
Morphologic and stratigraphic studies of Paleozoic microfossils; fusulinids, conodonts, and ostracodes; techniques for study and photography of microfossils. Prerequisite: G 440. BOSTWICK.
- G 471, 472. **Map Interpretation.** 2 hours each term. 1 ① 1 ③  
Structural, stratigraphic, and historical interpretation of geologic and topographic maps. Prerequisite: G 321, 322.
- G 473. **Photogeology.** 2 hours. 1 ① 1 ③  
Stereoscopic analysis of aerial photographs as a tool for geologic mapping. Prerequisite: G 471, 472.
- G 480. **Field Geology.** 12 hours.  
Intensive study of small area, conducted in 8-week summer camp. Prerequisite: G 380. WILKINSON.

#### Graduate Courses

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

- G 501. **Research.** Terms and hours to be arranged.
- G 503. **Thesis.** Terms and hours to be arranged.
- G 505. **Reading and Conference.** Terms and hours to be arranged.
- G 507. **Seminar.** Terms and hours to be arranged.
- G 512, 513, 514. **Petrology.** Hours to be arranged.  
Petrogenesis of igneous and metamorphic rocks. Prerequisite: G 414. TAUBENECK.
- G 520. **Petroleum Geology.** 3 hours spring. 2 ① 1 ③  
Origin, occurrence, and exploration of natural gas, petroleum, and oil shales. Prerequisite: G 321. KOCH.
- G 521, 522. **Economic Geology.** 3 hours each term. 2 ① 1 ③  
Origin and occurrence of metallic and nonmetallic ore deposits. Prerequisite: G 312, 313, 314, 414. KOCH.
- G 523, 524, 525. **Sedimentary Petrology.** 3 hours each term. 1 ① 2 ③  
Laboratory analysis of sedimentary rocks. Prerequisite: G 323, 414.
- G 541. **Spore and Pollen Analysis.** 4 hours spring. 2 ① 2 ③  
Preparation of sediments for identification of spores, pollen grains, plant microfossils, classification, nomenclature of plant microfossils; stratigraphic, ecologic, and chronologic interpretation of pollen profiles and diagrams. Prerequisite: G 440 or graduate standing in botany. HANSEN.
- G 580. **Graduate Field Geology.** Terms and hours to be arranged.  
Advanced field problems assigned to meet the requirements of the graduate student. STAFF.

## Mathematics

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

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

**Undergraduate majors.** Several informal options are offered: Pure, applied, or actuarial mathematics; secondary teaching; and digital computing. Suggested course programs for these options, details about Honors degrees, and other information are included in a special departmental publication, obtainable on request.

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

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

### Lower Division Courses

- Mth 5. **Elementary Mathematics.** 3 hours. 3 ①  
Numerical calculations, designed for students entering with a deficiency in elementary school mathematics. Credit not counted toward graduation.
- Mth 10. **Elementary Algebra.** 4 hours. 4 ①  
Fundamental operations with polynomials and rational fractions, linear equations and stated problems. For students with little or no algebra. Credit not counted toward graduation.
- Mth 100. **Intermediate Algebra.** 4 hours. 4 ①  
Functions and graphs, linear equations in two unknowns, quadratic equations, negative and fractional exponents, radicals, progressions, binomial theorem, logarithmic computation. Prerequisite: Mth 10 or equivalent.
- Mth 101. **College Algebra.** 4 hours. 4 ①  
Review of high school algebra with emphasis on the number system, logarithms, progressions, binomial series, theory of equations, determinants. Prerequisite: Mth 100 or equivalent.
- Mth 102. **Trigonometry.** 4 hours. 4 ①  
Trigonometric functions for general angles, solution of triangles, addition formulas, trigonometric equations, graphs, complex numbers, and De Moivre's theorem. Prerequisite: Mth 101 or equivalent.

- <sup>1</sup>Mth 104, 105, 106. **Mathematics for Business and Industry.** 3 hours. 3 ①  
 each term.  
 Fundamentals of arithmetic and algebra; simple and compound interest, discount, annuities, amortization of debts, sinking funds.
- Mth 111, 112. **Mathematics for Elementary Teachers.** 3 hours each term. 3 ①  
 To aid prospective elementary teachers in understanding the nature of Arithmetic. Concepts stressed rather than techniques.
- Mth 200, 201, 202, 203. **Calculus.** 4 hours each term. 4 ①  
*Mth 200:* Differentiation and integration: applications to rates, areas, volumes. *Mth 201:* Applications in mechanics; plane analytic geometry, elementary transcendental functions. *Mth 202:* Techniques of integration, vectors, solid analytic geometry. *Mth 203:* Partial differentiation, multiple integration, infinite series. Prerequisite: Mth 102.

**Upper Division Courses**

- Mth 311. **History of Elementary Mathematics.** 3 hours. 3 ①  
 Prerequisite: upper division standing.
- Mth 321, 322. **Differential Equations.** 3 hours each term. 3 ①  
 Ordinary differential equations arising in geometry, physics, and engineering. Exact and approximate solutions, Laplace transform. Prerequisite: Mth 203.
- Mth 334. **Computer Coding.** 3 hours. 3 ①  
 Coding instruction and practical laboratory work on electronic digital computer. Prerequisite: Mth 100 or 106.
- Mth 335. **Computer Laboratory.** 1 hour. 1 ①  
 To accompany Mth 334. Prerequisite: Mth 100 or Mth 106.
- Mth 337. **Probability.** 3 hours. 3 ①  
 Combinatorial problems, continuous distributions, expectation, laws of large numbers. Prerequisite: Mth 200.
- Mth 338. **Finite Differences.** 3 hours. 3 ①  
 Use of difference techniques in finite integration and series summations; solution of difference equations. Prerequisite: Mth 200.
- Mth 339. **Linear Programing and Games.** 3 hours. 3 ①  
 Optimization subject to linear constraints, zero-sum two-person games. Applications to industrial and economic problems. Prerequisite: Mth 200.
- Mth 342. **Theory of Equations.** 3 hours. 3 ①  
 Properties and methods of solution of algebraic equations; brief study of determinants and their applications. Prerequisite: Mth 200.
- Mth 343. **Theory of Numbers.** 3 hours. 3 ①  
 Properties of integers, Euclid's algorithm, diophantine equations, prime numbers, congruences, residues of powers, and quadratic residues. Prerequisite: Mth 200.
- Mth 351. **Projective Geometry.** 3 hours. 3 ①  
 Introduction to analytic and synthetic projective geometry. Prerequisite: Mth 200.
- 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 410. **Foundations of Elementary Mathematics.** (g) 3 hours. 3 ①  
 Fundamental concepts and logical structure of arithmetic, algebra, and geometry. Designed for prospective teachers of high school mathematics and mathematics majors. Prerequisite: Mth 200.

<sup>1</sup> Mth 104, 105 are remedial algebra courses open only to Business and Technology students. At most 4 credits will be given for Mth 105 and Mth 100. Mth 100, 104, 105 may not be taken for credit after successful completion of Mth 101.

- Mth 411, 412, 413. **Calculus.** (G) 3 hours each term. 3 ①  
 Partial differentiation with applications, Stieltjes, integral, multiple integrals, line and surface integrals, indeterminate forms, infinite series, improper integrals. Prerequisite: Mth 203.
- Mth 417, 418, 419. **Mathematics for Secondary Teachers.** (g) 3 hours each term. 3 ①  
*Mth 417:* Foundations of arithmetic. *Mth 418:* Algebra. *Mth 419:* Geometry. History, number systems, basic laws and operations, measurement, solution of equations, curve-tracing, geometrical proof and constructions, non-Euclidean geometry. Prerequisite: Mth 200. Enter any term. Equivalent to summer session courses Mth 591, 592, 593.
- Mth 423. **Partial Differential Equations.** (G) 3 hours. 3 ①  
 Introduction to concepts and methods of partial differential equations of first and higher orders; applications to problems of physics and engineering. Prerequisite: Mth 322.
- Mth 432, 433. **Mathematical Methods in Statistics.** (G) 3 hours each term. 3 ①  
 Mathematical derivation of various formulas used in statistical analysis and some applications of these formulas to practical problems. Prerequisite: Mth 337, Mth 411.
- Mth 434, 435, 436. **Numerical Calculus.** (G) 3 hours each term. 3 ①  
 Finite differences, interpolation, numerical differentiation and integration, numerical solution of differential equations, use of electronic digital computer. Prerequisite: Mth 322 and Mth 334.
- Mth 441. **Matrices and Quadratic Forms.** (G) 3 hours. 3 ①  
 Vectors in  $n$ -dimensional linear spaces; linear transformations and matrices; matrix algebra: vector and matrix norms; determinants; quadratic forms, characteristic numbers and vectors, reduction to canonical form by orthogonal transformations. Prerequisite: Mth 322 or consent of instructor.
- Mth 442. **Logic and Boolean Algebra.** (G) 3 hours. 3 ①  
 Logical constants and variables; sentences; sentential and designatory functions; quantifiers; connectives; truth functions; postulates for sentential calculus; postulates for Boolean algebra and examples; partial ordering, lattices. Prerequisite: Mth 322 or consent of instructor.
- Mth 443. **Abstract Algebra.** (G) 3 hours. 3 ①  
 Mappings and semigroups, isomorphism, equivalence; groups, rings, integral domains, ideals; examples from number theory, algebra, logic, matrix theory and analysis. Prerequisite: Mth 322 or consent of instructor.
- Mth 451, 452, 453. **Principles of Geometry.** (G) 3 hours each term. 3 ①  
 Hilbert's axioms; coordinate systems, linear transformations and matrices; the affine and projective groups and geometries, Mobius transformations; the elliptic, parabolic, and hyperbolic groups, and representations of the geometries of Lobachevski and Riemann. Prerequisite: Mth 322 or consent of instructor. Offered alternate years. Offered 1960-61.
- Mth 461. **Vector Analysis.** (g) 3 hours. 3 ①  
 Modern vector and matrix methods with applications for students of physics, engineering, and mathematics. Prerequisite or parallel: Mth 322.

#### Graduate Courses

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

- Mth 501. **Research.** Terms and hours to be arranged. Staff.
- Mth 503. **Thesis.** Terms and hours to be arranged. Staff.
- Mth 505. **Reading and Conference.** Terms and hours to be arranged. Staff.
- Mth 507. **Seminar.** Terms and hours to be arranged. Staff.
- Mth 511, 512, 513. **Introduction to Higher Analysis.** 3 hours each term. 3 ①  
 Real and complex number systems, convergence of infinite processes, Riemann integration; analytic functions of one complex variable, including theory and application of contour integration. Prerequisite: Mth 411, 412, 413, or consent of instructor.



- Mth 521, 522, 523. **Partial Differential Equations of Physics.** 3 hours each term. 3 ①  
Second order partial differential equations governing various physical phenomena; vibrational problems and equations of hyperbolic type; heat-flow and diffusion problems and equations of parabolic type; stationary problems and equations of elliptic type; orthogonal expansions, Green's functions.
- Mth 524. **Calculus of Variations.** 3 hours. 3 ①  
Elements of variational calculus with applications.
- Mth 531, 532, 533. **Theory of Probability.** 3 hours each term. 3 ①  
Classical problems, theorems of total and compound probabilities; Riemann-Stieltjes integrals and random variables; James Bernoulli's theorem, laws of large numbers, approach to normal distribution; small sample theory; estimation, testing hypotheses; Markov chains, physical applications. Prerequisite: Mth 411, 412, 413.
- Mth 541, 542, 543. **Modern Algebra.** 3 hours each term. 3 ①  
Advanced theory of matrices, finite groups, rings, and fields. Galois theory of equations; associative linear algebras, nonassociative algebras, group representations. Prerequisite: Mth 441, 443. Offered alternate years. Offered 1960-61.
- Mth 551, 552, 553. **Differential Geometry.** 3 hours each term. 3 ①  
Metric geometry of 3-space with introduction to tensor theory of Riemannian space. Prerequisite: Mth 321, 322.
- Mth 554, 555, 556. **Topology.** 3 hours each term. 3 ①  
Point sets, metrisation, compactness, continua, mappings, homology, combinatorial topology. Prerequisite: Mth 413.
- Mth 561, 562, 563. **Mathematics in Engineering and Physics.** 3 hours each term. 3 ①  
Analytical methods in obtaining solutions of problems in engineering and physics. Dynamics, vibrating systems, boundary value problems in electricity and elasticity, operational calculus, numerical methods.
- Mth 571, 572, 573. **Theory of Functions of Real Variables.** 3 hours each term. 3 ①  
Measurable sets and functions, Lebesgue-Stieltjes and other integrals in one and several dimensions. Applications to such topics as Fourier series, surface area, and probability. Prerequisite: Mth 511, 512, 513. Students who have not had prerequisites must have consent of instructor. Offered alternate years. Offered 1960-61.
- Mth 574, 575, 576. **Theory of Functions of Complex Variables.** 3 hours each term. 3 ①  
Advanced topics in theory of functions of one or several complex variables, such as differential equations in the complex domain, elliptic functions, Abelian integrals, conformal mapping. Prerequisite: Mth 511, 512, 513. Students who have not had prerequisites must have consent of instructor. Offered alternate years. Not offered 1960-61.
- Mth 577, 578, 579. **Limit Theorems and Stochastic Processes.** 3 hours each term. 3 ①  
Limit theorems; central-limit problem in modern form; extensions to theory of stochastic processes. Prerequisite: Mth 533; Mth 573 or concurrent registration in Mth 571, 572, 573.

## Natural Resources

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

The major program at the undergraduate level is designed to provide background in related sciences, study of world resources as the basis of man's economies, geographic point of view, experience in library and field research,

and in report writing. At the graduate level emphasis is placed on study of United States resources, practice in resource and area analysis, and in writing and making oral reports. Advanced students may develop concentration in systematic resource geography, in physical geography, and in selected areas.

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

#### Lower Division Courses

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

#### Upper Division Courses

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

#### Graduate Courses

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

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

- NR 507. Seminar. Terms and hours to be arranged.
- NR 511. Conservation in the United States. 3 hours fall. 3 ①  
Analysis of principles and needs of conservation. Prerequisite: graduate standing. HIGHSMITH.
- NR 512. Asiatic Pacific. 3 hours. 3 ①  
Resource geography of the Asiatic Pacific. HEINTZELMAN.
- NR 513. Pacific Latin America. 3 hours. 3 ①  
Resource geography of Pacific Latin America. JENSEN.
- NR 527, 528, 529. United States. 3 hours each term. 3 ①  
Resource inventory, distribution, development, and potentialities. *Fall*: agricultural geography. *Winter*: minerals. *Spring*: forest, range, and seas. Prerequisite: NR 327, 328, 329 or equivalent. HIGHSMITH, JENSEN, HEINTZELMAN.
- NR 538. Soviet Union. 3 hours. 3 ①  
Strengths and weaknesses of Soviet Union; resource inventory, distribution, development, potentialities, and problems. HIGHSMITH.

## Nursing Education

A shortened basic curriculum leading to the degree of Bachelor of Science in Nursing can now be offered by the School of Nursing, which is located on the campus of the Medical School of the University of Oregon in Portland. Beginning Fall Term 1960, classes will be admitted to the School of Nursing only once a year.

In the first year, which may be taken on the Oregon State College campus, the student begins a broad preparation in humanities, social sciences, and natural sciences, which are essential as a foundation for the professional courses which follow in the clinical division of the School of Nursing.

For further information on the complete nursing education program and programs for registered nurses, see the Bulletin of the School of Nursing.

### Lower Division Courses

- Nur 111, 112, 113. Backgrounds for Nursing. 1 hour each term. 1 ①  
Backgrounds of modern social and health movements; relation to evolution of nursing as a profession; present aims and problems in nursing at home and abroad.

### Upper Division Courses

- Nur 331, 332, 333. Modern Nursing Problems. 1 hour each term. 1 ①  
Aims and problems of nursing at home and abroad. Open only to registered nurses.

## Oceanography

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

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

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

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

Students are expected to take part in field work and research projects carried out by the department.

#### Upper Division Courses

- OC 331. **Introduction to Oceanography.** 3 hours winter. 3 ①  
Elective nontechnical course designed to give student broad general background. Emphasis on relationship between oceanography and other fields. Prerequisite: junior standing. BURT.
- GS 431. **Physical Limnology.** (G) 3 hours winter. 3 ①  
Physical and chemical processes in lakes and rivers; methods of making physical measurements; some field work. Prerequisite: senior or graduate standing, two years of biological science. BURT.
- OC 432. **Physical Oceanography.** (G) 3 hours winter. 3 ①  
Physical processes in ocean and estuaries; some field work. Prerequisite: senior or graduate standing, one year of mathematics, one year of physics. BURT.

#### Graduate Courses

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

- OC 501. **Research.** Terms and hours to be arranged.
- OC 503. **Thesis.** Terms and hours to be arranged.
- OC 505. **Reading and Conference.** Terms and hours to be arranged.
- OC 507. **Seminar.** Terms and hours to be arranged.

## 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. The lower division program should include mathematics through the calculus, general chemistry, and ordinarily two years of physics. Those planning for graduate study and research should lay foundations of a reading knowledge of German, Russian, or French, or all three. In special cases courses in related departments, involving considerable study of physical principles, may be accepted as part of a major in physics.

#### Lower Division Courses

- Ph 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.

- <sup>1</sup>Ph 201, 202, 203. **General Physics.** 4 hours each term. 2 ① 2 ②  
Mechanics, sound, heat, light, electricity and magnetism. Prerequisite: Mth 101 prerequisite 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.
- <sup>1</sup>Ph 207, 208, 209. **Engineering Physics.** 4 hours each term. 2 ① 1 ② 1 ③  
Studies in general and modern physics adapted to students in engineering. Prerequisite: GE 103, Mth 200; Mth 201, 202, 203 previously or parallel.
- <sup>1</sup>Ph 211, 212. **Abridged General Physics.** 3 hours each term. 1 ① 2 ②  
Mechanics, heat, light, electricity. Sequence is started fall and winter.

#### Upper Division Courses

- Ph 311, 312, 313. **Introduction to 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, nuclear physics. Prerequisite: Ph 203 or 209, Mth 200; Mth 201, 202, 203 previously or parallel.
- Ph 324, 325, 326. **Mechanics.** 3 hours each term. 3 ①  
Kinematics, dynamics of particles and rigid bodies; generalized coordinates. Prerequisite: Ph 203 or 209, Mth 322. BOLINGER.
- 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  
Underlying principles; vacuum tubes and solid state electronic devices, circuits; antennas and wave propagation. Prerequisite: Ph 203 or 209. Students who have not had prerequisites must have consent of instructor.
- Ph 353. **Thermodynamics and Heat Measurements.** 4 hours. 3 ① 1 ②  
Prerequisite: Ph 203 or 209, Mth 203.
- Ph 361. **Photography.** 3 hours any term. 1 ① 2 ②  
Hand and miniature cameras and their uses; film processing, printing, toning, enlarging. Prerequisite college chemistry or physics or previous photographic experience with consent of instructor.
- Ph 362. **Commercial Photography.** 3 hours winter. 1 ① 2 ②  
View camera; copying, photography of small objects, lighting, photo-sketching, photographic solutions. Prerequisite: Ph 361.
- Ph 363. **Commercial Photography.** 3 hours spring. 1 ① 2 ②  
Continuation of Ph 362. Composition; exteriors, interiors, flashlights, infrared.
- Ph 390. **Basic Meteorology.** 3 hours. 2 ① 1 ②  
Weather phenomena; weather instruments. Consent of instructor required. Prerequisite: Ph 202 or 208 or consent of instructor.
- Ph 391, 392, 393. **Synoptic Meteorology.** 3 hours each term. 2 ① 1 ②  
Weather analysis and forecasting techniques with laboratory applications to classical meteorological situations. Prerequisite: Ph 203 or 209.
- Ph 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.

<sup>1</sup> 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. For each term of Ph 202, 203, and Ph 208, 209, either consent of instructor is required or the preceding course in the same sequence is prerequisite.

- Ph 407. **Seminar.** Terms and hours to be arranged.
- Ph 414, 415, 416. **Biophysics.** (G) 3 hours each term. 2 ① 1 ②  
Physical phenomena and measurements applied to biological problems. Prerequisite: one year of college physics; one year of college biology; senior standing in one of the biological or physical sciences. Offered alternate years. Not offered 1960-61.
- Ph 430. **Electronics.** 3 hours. 2 ① 1 ③  
Thermionic and solid state electronic devices and circuits. Prerequisite: Ph 332.
- Ph 431, 432, 433. **Experimental Electronics and High-Frequency Measurements.** (G) 3 hours each term. 1 ① 2 ②  
Special topics to fit needs of individual students. May include: microwaves; electronic and high-frequency techniques; modern electronic devices and research methods as applied to physics, chemistry, engineering, psychology, and medicine. Prerequisite: Ph 439 or EE 323. Offered alternate years. Not offered 1960-61.
- Ph 437, 438, 439. **Electronics and Radio.** 3 hours each term. 2 ① 1 ②  
Alternating current theory; circuits; electron tubes and solid state electronic devices; amplification; radio frequency generators; modulation; timing circuits; transmission and radiation; measurements at audio and high frequencies. Prerequisite: Ph 332 or EE 203.
- Ph 461, 462, 463. **Advanced Photography.** (G) 3 hours each term. 1 ① 2 ②  
Color, X-ray, and ultraviolet photography; stereophotographs, photomicrography, photography of cathode ray screens. Students may enter any term. Prerequisite: Ph 362. Offered alternate years. Not offered 1960-61.
- Ph 465, 466. **Geometrical and Physical Optics.** 3 hours each term. 2 ① 1 ②  
Prerequisite: Ph 203 or 209, Mth 203.
- Ph 468. **Spectroscopy.** (G) 3 hours. 2 ① 1 ③  
Instruments, sources, spectra; qualitative and quantitative analysis. Prerequisite: Ph 313.
- Ph 470. **X-Rays.** (G) 3 hours. 2 ① 1 ③  
Production, absorption, scattering, spectra. applications. Prerequisite: Ph 313, Mth 203.
- 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 with approval of instructor.
- <sup>1</sup>Ph 477, 478, 479. **Introduction to Field Theory.** (G) 3 hours each term. 3 ①  
Theories underlying the study of fields. Applications to the motion of rigid bodies, elasticity, fluid flow, heat flow, gravitation, electromagnetic fields, and the theory of relativity. Three years of approved physics required. Prerequisite: Mth 322.
- Ph 491, 492, 493. **Meteorology.** (G) 3 hours each term. 3 ①  
Theories of atmospheric processes; structure of the atmosphere; theory of atmospheric measurements. Prerequisite: Ph 203 or 209, Ph 390 or 393, Mth. 203.

#### Graduate Courses

*Graduate courses are given only when warranted by demand. The dates are given when courses are offered alternate years. Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit.*

- Ph 501. **Research.** Terms and hours to be arranged.
- Ph 503. **Thesis.** Terms and hours to be arranged.
- Ph 505. **Reading and Conference.** Terms and hours to be arranged.
- Ph 507. **Seminar.** Terms and hours to be arranged.

<sup>1</sup> Required of all physics majors planning to earn the doctorate at OSC.

- Ph 511, 512, 513. **Introduction to Theoretical Physics.** 3 hours each term. 3 ①  
 A mathematical treatment of the theories of classical physics. Required of all physics majors for the master's degree. Prerequisite: Three years of approved physics. Mth 322 required.
- Ph 515. **Relativity.** 3 hours. 3 ①  
 Application of Lorentz transformation theory to mechanics and electrodynamics; introduction to general relativity. Prerequisite: Ph 479.
- Ph 517, 518, 519. **Quantum Mechanics.** 3 hours each term. 3 ①  
 Transformation theory; quantum mechanical equations of motion and their solutions; transition probabilities; introduction to relativistic quantum theory; illustrative applications. Prerequisite: Ph 476, 479, 521.
- Ph 521. **Dynamics.** 3 hours. 3 ①  
 Lagrangian and Hamiltonian mechanics. Prerequisite: three years of approved physics.
- Ph 523. **Statistical Mechanics.** 3 hours. 3 ①  
 Prerequisite: Ph 521 or 528.
- Ph 531, 532. **Electromagnetic Theory.** 3 hours each term. 3 ①  
 Mathematical treatment of classical theories of electricity and radiation. Consent of instructor required. Prerequisite: Ph 479 or 513 with consent of instructor.
- Ph 537. **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 313, 475. Students who have graduate standing in chemistry, mathematics, or engineering may take course with consent of instructor.
- Ph 557. **Thermodynamics.** 3 hours. 3 ①  
 Prerequisite: Ph 523, Mth 322. Offered alternate years. Offered 1960-61.
- Ph 558. **Kinetic Theory.** 3 hours. 3 ①  
 Three years of approved physics required. Prerequisite: Ph 326, Mth 322. Offered alternate years. Offered 1960-61.
- Ph 562, 563. **Physical Optics.** 3 hours each term. 3 ①  
 Electromagnetic theory of light; theory of optical instruments. Prerequisite: Ph 531.
- Ph 572, 573. **Nuclear Physics.** 3 hours each term. 3 ①  
 Prerequisite: Ph 519. NICODEMUS.
- 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 cyclotrons and reactors; various experiments in nuclear physics using radioactive materials and the OSC machines. Prerequisite: Ph 572, 573 previously or concurrently. SCHECTER.
- Ph 578, 579. **Physics of the Solid State.** 3 hours each term. 3 ①  
 Dielectric properties; paramagnetism; free electron theory; semiconductors; transistor theory; imperfections. Prerequisite: Ph 313, 475. Students who have graduate standing in chemistry, mathematics, or engineering may take course with consent of instructor.

## 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 or emphasis on sub-

<sup>1</sup> Required of all physics majors for whom the masters is to be a terminal degree. Not required for physics majors working toward the doctorate.

ject matter or professional preparation. Combination of subjects to be taught and scope of preparation desired influence the choice of major school.  
For description of courses see SCHOOL OF EDUCATION.

## Statistics

The Department of Statistics offers three beginning courses, each designed to fit the needs of a particular group of students. St 311 is intended for the undergraduate student who desires only a cursory view of the field of statistics. The sequence St 314, 315 is intended to acquaint the undergraduate student with the basic techniques of statistics. The sequence St 421, 422, 423 is designed for prospective research workers and is taught as the technology of the scientific method. Graduate students may take work leading to a master's degree in statistics, or to a minor for an advanced degree in another field. No undergraduate degrees in statistics are offered.

The department also offers consulting and computing services.

### Upper Division Courses

- St 311. **Descriptive Statistics.** 3 hours. 3 ①
- St 314, 315. **Statistical Techniques.** 3 hours each term. 3 ①  
Prerequisite: Junior standing, Mth 100 or equivalent.
- St 401. **Research.** Terms and hours to be arranged.
- St 405. **Reading and Conference.** Terms and hours to be arranged.
- St 407. **Seminar.** Terms and hours to be arranged.
- St 411. **Data Processing.** (G) 2 hours. 1 ① 1 ②  
Machine processing of statistical data. Prerequisite: St 422. LINK.
- St 421, 422, 423. **Statistical Inference.** (G) 3 hours each term. 3 ①  
Prerequisite: Senior standing, Mth 100 or equivalent. LI.
- St 431. **Design of Experiments.** (G) 3 hours. 3 ①  
Principles used in designing experiments; general comparison of designs; interpretation of results. Prerequisite: St 423. LI.
- St 441. **Sampling Methods.** (G) 3 hours. 3 ①  
Simple and stratified random sampling, systematic sampling; estimates and their sampling errors; estimation of sample size. Prerequisite: St 315 or 422. CALVIN.

### Graduate Courses

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

- St 501. **Research.** Terms and hours to be arranged.
- St 503. **Thesis.** Terms and hours to be arranged.
- St 505. **Reading and Conference.** Terms and hours to be arranged.
- St 507. **Seminar.** Terms and hours to be arranged.
- St 521, 522, 523. **Theory of Statistics.** 3 hours each term. 3 ①  
Sampling distributions, estimation, and tests of hypotheses. Prerequisite: Mth 203. LINK.
- St 524, 525. **General Regression Analysis.** 3 hours each term. 3 ①  
Application of the method of least squares to general linear regression models; analysis of nonorthogonal experiment data. Prerequisite: St 423. LI, PETERSEN.



## Zoology

Basic requirements for an undergraduate major in zoology, whether for a liberal arts degree or as preparation for professional study at the graduate level, are included in the Curriculum in Zoology printed on a previous page. Approved electives in invertebrate zoology may be taken at a marine station.

The undergraduate student must also select one of the following options:

A. Minimum of 9 term hours selected from: Natural History of Oregon III (Z 376), Ornithology (Z 371), Mammalogy (Z 372), Herpetology (Z 473), Animal Ecology (Z 483).

B. 8 or more term hours selected from: Comparative Vertebrate History (Z 461), Microtechnique (Z 462), Experimental Embryology (Z 463).

C. Microtechnique (Z 462) and any two of the courses listed under option A, above.

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 Doctor of Philosophy degree are strongly advised to spend one summer at a marine station.

### Lower Division Courses

- <sup>1</sup>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 populations; history of life on earth. ANDERSON.
- Z 117, 118, 119. **Human Biology Laboratory.** 1 hour each term. 1 ②  
Laboratory work to accompany Z 114, 115, 116. ANDERSON.
- <sup>1</sup>Z 200. **General Zoology.** 5 hours spring. 3 ① 2 ③  
Introduction to basic topics in present-day zoology. For students of biology, agriculture, and others. OW CZARZAK.
- Z 201, 202, 203. **General Zoology.** 3 hours each term. 2 ① 1 ③  
For zoology majors and premedical, pre dental, pre nursing, pharmacy, physical education, psychology, fish and game management students, and others. HISAW.

### Upper Division Courses

- Z 321, 322. **Elementary Human Anatomy.** 3 hours each term, fall and winter. 2 ① 1 ②  
Designed especially to meet the needs of physical education students. Prerequisite: Z 114, 115, 116, or equivalent. ALLMAN.
- Z 323. **Applied Human Anatomy.** 3 hours spring. 2 ① 1 ②  
For physical education students. Prerequisite: Z 321, 322. ALLMAN.
- Z 324, 325. **Comparative Vertebrate Anatomy.** 4 hours winter and spring. 2 ① 2 ③  
Gross dissection and comparison of organ systems in representative vertebrates. Prerequisite: Z 200 or Z 203. HILLEMANN.

<sup>1</sup> Credit is granted for only one of the following combinations: Z 114, 115, 116; or Z 201, 202, 203; or Z 200.

- Z 326. **Comparative Vertebrate Embryology.** 4 hours fall. 2 ① 2 ③  
Comparative study of development of several representative vertebrate forms. Prerequisite: Z 200 or Z 203. HILLEMANN.
- Z 331, 332. **Physiology.** 3 hours fall and winter, or winter and spring. 2 ① 1 ②  
For students in home economics, medical technology, pharmacy, and physical education; not for zoology majors. Prerequisite: Z 200, 230, or 116; or one year of any laboratory science as required in home economics. FRITCHARD, HISAW.
- Z 336. **Applied Human Physiology.** 3 hours spring. 2 ① 1 ②  
For students in physical education. Prerequisite: Z 331, 332. ALLMAN.
- Z 341. **Genetics.** 3 hours fall and spring. 3 ①  
The gene as basis of variation and heredity; introduction to principles of genetics. Prerequisite: college course in zoology, botany, or biology. MOHLER.
- Z 345. **Evolution.** 3 hours spring. 3 ①  
Evidences and mechanisms of evolution, including genetic variation, selection, isolation, etc. Prerequisite: College course in zoology, botany, or biology. MOHLER.
- Z 371. **Ornithology.** 3 hours spring. 2 ① 1 ③  
Structure, classification, distribution, and life habits of birds. Prerequisite: Z 200 or Z 203. Students who have not had prerequisites 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, or consent of instructor. STORM.
- Z 374, 375. **Natural History of Oregon I, II.** 3 hours each term, fall and winter. 2 ① 1 ③  
Environment: influence of topography, climate, and plant cover on distribution of animals. Common invertebrates; local distribution, habits, collection and maintenance in laboratory. Prerequisite: one year of biology. GORDON.
- Z 376. **Natural History of Oregon III.** 4 hours spring. 2 ① 2 ③  
Identification, distribution, and habits of common land vertebrates. Prerequisite: Z 374, 375. Students who have not had prerequisites must have consent of instructor. GORDON.
- Z 401. **Research.** Terms and hours to be arranged.
- Z 403. **Thesis.** Terms and hours to be arranged.
- Z 405. **Reading and Conference.** Terms and hours to be arranged.  
Reading and reports on special topics.
- Z 407. **Seminar.** 1 hour each term. 1 ①
- Z 434, 435, 436. **General and Comparative Physiology.** (G) 3 hours each term. 2 ① 1 ③  
Discussion of function both at the cellular and organismal level. Emphasis placed on comparison of physiological systems among major animal groups. FRITCHARD.
- 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 each term, winter and spring. 3 ① 2 ③  
Structure, classification, distribution, and life histories of the invertebrates. Prerequisite: two years of zoology. PRATT.
- Z 456. **Parasites of Man.** (G) 4 hours fall. 2 ① 2 ③  
Identification, bionomics, prophylaxis, treatment, and geographic distribution. Prerequisite: two years of biology. PRATT.
- Z 457. **Parasites of Fish.** (G) 2 hours fall. 1 ① 1 ③  
Life histories, identification, economic importance, and control of more common parasites of fish. Prerequisite: two years of biology. PRATT.

- Z 461. **Comparative Vertebrate Histology.** (G) 5 hours fall. 3 ① 3 ②  
Comparative microscopic study of tissues and organs, with special attention to their evolutionary relationships and functional adaptations. Prerequisite: Z 324, 325, 326. OWCZARZAK.
- Z 462. **Microtechnique.** (G) 4 hours winter. 1 ① 3 ③  
Principles and practice in methods of preparing 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  
Mechanics of cleavage and gastrulation; inductors and organizers; gradient fields; integration; regeneration; genic action. Prerequisite: Z 324, 325, 326. 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. 2 ① 2 ③  
Problems, principles, and methods in field zoology, including wildlife photography. Prerequisite: two years of upper division biology. STORM.
- Z 483. **Animal Ecology.** (G) 3 hours fall. 2 ① 1 ③  
Living animals in relation to their environment. Prerequisite: two years of biology. Students who have not had prerequisite must have consent of instructor. GORDON.

**Graduate Courses**

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

- Z 501. **Research.** Terms and hours to be arranged.
- Z 503. **Thesis.** Terms and hours to be arranged.
- Z 505. **Reading and Conference.** Terms and hours to be arranged.
- Z 507. **Seminar.** Terms and hours to be arranged.
- Z 508. **Advanced Field Zoology.** 2 to 6 hours.  
Special problems in field work; intensive studies of limited areas. Conducted 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  
Use of zoological literature; character of zoological 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  
Lectures on embryonic and fetal physiology; laboratory work on the later stages of morphogenesis (organogeny); student projects in developmental anatomy and physiology. Prerequisite: Z 331, 332, and 326 or equivalent. HILLEMANN.
- Z 531, 532, 533. **Mammalian Physiology.** 3 hours each term. 3 ①  
Neuromuscular system, central nervous system, autonomic system, circulation, respiration, gastro-enterology, kidney secretion, metabolism. Prerequisite: general zoology, histology, comparative vertebrate anatomy, general chemistry or equivalents. KRUEGER.
- 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 542, 543. **Theoretical Genetics.** 3 hours fall and winter. 3 ①  
Genetical phenomena discussed at advanced levels with emphasis on contemporary problems in research. Prerequisite: Z 341 or equivalent. MOHLER.
- Z 551. **Biology of Protozoa.** 3 hours fall. 2 ① 1 ③  
Morphology, physiology, and ecology of freshwater, marine, terrestrial, and parasitic protozoa. Prerequisite: Z 451, 452. PRATT.
- Z 553. **Invertebrate Embryology.** 3 hours spring. 2 ① 1 ③  
Cleavage, organogeny, and larval development of marine and freshwater invertebrates. Prerequisite: Z 451, 452. PRATT.
- Z 558. **Parasitology.** 3 hours winter. 2 ① 1 ③  
Collection, preparation, and identification of parasites; culturing of parasitic forms; systematics; evolution and phylogeny of parasitism. Prerequisite: Z 456 or 457 or equivalent. PRATT.
- Z 561, 562, 563. **Biology of the Cell.** 3 hours each term. 2 ① 1 ③  
Structure, physics, and chemistry of cellular components; cellular physiology; chromosomes in genetics and evolution; problems of differentiation. Prerequisite: Z 461, 462, 463. 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 microscopic cytochemistry, tissue culture, electron microscopy, etc. Choice of topic variable and determined by demand. Prerequisite: Z 461, 462, 561, 562, 563, and biochemistry. DORNFELD, OW CZARZAK.
- Z 571, 572, 573. **Ichthyology.** 3 hours each term. 2 ① 1 ③  
Taxonomy of orders and families of fishes; intensive study of morphology, distribution, and ecology of selected groups and species. Prerequisite: FG 274, 275, 276, or equivalent. BOND.
- Z 581. **Zoogeography.** 3 hours winter. 3 ①  
Factors affecting distribution of animals; general principles; faunal areas of world and of North America. Prerequisite: Z 371, 372, and 483. Students who have not had prerequisites must have consent of instructor. GORDON.

# School of Agriculture

## Faculty

*As of January 1960*

- FREDERICK EARL PRICE, B.S., Dean of the School of Agriculture.  
WILBUR TARLTON COONEY, M.S., Associate Dean of the School of Agriculture.  
WILLIAM MARTIN LANGAN, B.S., Head Counselor.
- Agricultural Economics:** Professors WOOD (department head), BLANCH, CASTLE, DAVIS, HOLLANDS, KORZAN, MUMFORD, POTTER (emeritus); Associate Professors BECKER, BROWN, CHRISTENSEN, PLATH, SITTON<sup>1</sup>; Assistant Professor LANGMO.
- Agricultural Education:** Professor TEN PAS (department head); Assistant Professor DAVIS.
- Agricultural Engineering:** Professors RODGERS (department head), CROPSEY, LUNDE, SINNARD; Associate Professors KIRK, LONG, WOLFE; Assistant Professors BONNICKSEN, BOOSTER, CHRISTENSEN; Instructor SCHOOF.
- Dairy and Animal Husbandry:** Professors MILLER (department head), BOGART, HAAG, JONES, KRUEGER, MCKENZIE, NELSON (emeritus), OLDFIELD, POULTON; Associate Professors FOX, HEDRICK<sup>2</sup>, OLIVER, WOLBERG; Assistant Professors CHURCH, ENGLAND, HUETER, KENNICK, WU; Instructors DRISCOLL, RUTLAND.
- Extension Methods:** Professor CHARLES W. SMITH.
- Farm Crops:** Professors COWAN (department head), DAVIS<sup>3</sup>, FOOTE, FORE<sup>1</sup>, HILL (emeritus), POULTON; Associate Professors FURTICK, HEDRICK<sup>2</sup>, JENSEN, MCGUIRE, METZGER; Assistant Professors CHING, SCUDEL; Instructors BRAY, CALLIHAN, DRISCOLL, KRONSTAD, MCGUIRE.
- Fish and Game Management:** Professors DIMICK (department head), DOUDOROFF, RAYNER; Associate Professors BOND, KUHN, LONG, WARREN; Assistant Professors CAMPBELL, LIGHTFOOT; Instructor HORTON; Graduate Assistant REEHER.
- Food and Dairy Technology.** Professors SCHULTZ (department head), CAIN, LITWILLER, RICHARDSON, WILSTER (emeritus); Associate Professors ONSDORFF, SAMUELS, SINNHUBER, STEIN, WILDER, WORTHINGTON, YANG; Assistant Professors DAY, DIETZ, SATHER, YOUNG.
- Horticulture:** Professors APPLE (department head), BOUQUET (emeritus), FRAZIER, HANSEN, HARTMAN (emeritus), ROBERTS; Associate Professors BLANEY, COMPTON, WADSWORTH, WESTWOOD, ZIELINSKI; Assistant Professors BAGGETT, CRABTREE, GARREN, MACK; Instructors CLINE, LAGERSTEDT.
- Poultry Husbandry:** Professors PARKER (department head), BERNIER, HARPER; Associate Professor ARSCOTT; Assistant Professor McCLUSKEY.
- Soils:** Professors CHENEY (department head), JOHNSGARD, POWERS (emeritus), RUZEK (emeritus), STEPHENSON (emeritus), YOUNGBERG; Associate Professors DAWSON<sup>1</sup>, EVANS, HARWARD, JACKSON, KNOX; Assistant Professor ALBAN; Instructor ASHCROFT; Teaching Assistant CATTANI.
- Veterinary Medicine:** Professors DICKINSON (department head), SHAW; Associate Professors BARCOCK, BONE, PETERSON; Instructor HARR<sup>2</sup>.

## General Statement

**P**ROGRAMS OF STUDY in the School of Agriculture cover a wide variety of professional and vocational fields in agriculture and related industries. The School seeks to assist young men and women to become good farmers, stockmen, dairymen, poultrymen, or fruit or truck crop growers and wise users of the land and related resources; to become efficient managers of farm or orchard properties, commercial creameries, cheese plants, ice cream factories, market milk plants, and other enterprises in which a knowledge of practical and scientific agriculture is of value; to serve as agricultural advisers and land appraisers for banks, trust companies, land companies, and realtors; to become specialists in the U. S. Department of Agriculture and the Department of the Interior; to work in agricultural colleges as teachers, investigators, ex-

<sup>1</sup> On leave 1959-60.

<sup>2</sup> Visiting Professor.

<sup>3</sup> On Military Leave to 3-15-60.

tension specialists, or county extension agents; to serve as teachers of agriculture in secondary schools; to become specialists in research and control laboratories and in sales departments of industries related to or serving agriculture.

The School also prepares students for employment with manufacturers and dealers in farm implements, machinery, equipment, and building materials; for work in food procurement, marketing, and preservation; and for work in landscape construction and maintenance and nursery management.

Two curricula are offered for students planning to enter the fields of wildlife management, fur farming, and fisheries. Many of the courses in these programs are also available to students in allied fields who wish to understand the practical aspects of wildlife conservation, especially as it relates to the livestock industry and public land-use problems.

Other study programs lead directly into graduate work and the attainment of advanced degrees such as Master of Agriculture, Master of Science, or Doctor of Philosophy. Specialized and technical fields of work and research require this additional training in order that the individual may be adequately prepared to engage in tasks that will confront him.

Oregon State College, through the School of Agriculture, is cooperating with the Conference on Relationships between Colleges of Agriculture and Theological Seminaries to afford students who are preparing to enter the rural "town and country" ministry the opportunity to complete a major in agriculture before entering a theological seminary.

Major courses of study and curricula are listed on following pages.

**High school preparation.** Because of ever-increasing technical developments in agriculture, all students, regardless of major interest, should come to college prepared to study basic sciences, particularly chemistry, bacteriology, botany, zoology, and entomology. In many programs of study physics is essential. Courses in economics and marketing are required in most curricula. Each student should possess a good understanding of fundamental principles of grammar and be able to demonstrate these principles through effective oral and written expression. He should also be able to demonstrate a reasonable degree of competence in arithmetic, algebra, and geometry. Study in agriculture requires an ability to perceive, analyze, and work with problems involving surface areas, configurations, volumes, and equations in which at least one unknown exists. The ability to work with problems involving fractions, percentages, and proportions is necessary. Students in agriculture should be completely familiar with weights and measures in the metric system. The ability to read rapidly with good comprehension and to study effectively is extremely valuable.

**Individual counseling.** Every student is an important individual, and his or her study program will be developed with the aid of efficient and sympathetic counselors to assume maximum benefits from college work. Where previous preparation is found inadequate, the student will be encouraged to enroll in courses that will provide training and experience necessary to help assure success at college level even though such work may require one or more additional terms to complete a prescribed 4-year curriculum. Faculty members of the School of Agriculture accept their responsibility to provide each student with opportunities for discovering, improving, and developing an appreciation of social, aesthetic, and ethical values. These opportunities are provided through the many courses offered on the campus and through extracurricular student activities. This school is dedicated to the philosophy of promoting the well-being of each student to the extent of his capacity.

**Navy ROTC.** In any of the curricula which follow, students desiring to register for Naval Science instead of Air or Military Science should consult with the Dean of Agriculture.

## Curricula for Undergraduates

### Common Freshman Year

	Term hours		
	F	W	S
General Chemistry (Ch 101, 102, 103).....	3	3	3
General Botany (Bot 201, 202).....	3	3	.....
Intermediate Algebra (Mth 100) or equivalent.....	.....	.....	4
Elements of Horticulture (Hrt 111), Introduction to Agricultural Economics (AEc 111).....	3	3	(3)
<sup>1</sup> Introduction to Dairy and Animal Science (DAH 121), Poultry Production (P 121), Extempore Speaking (Sp 111).....	3	3	3
Air or Military Science.....	1	1	1
Physical Education.....	1	1	1
	14	14	12

### Common Sophomore Year

English Composition (Wr 111, 112, 113).....	3	3	3
<sup>2</sup> Biochemistry, Statistics, or Journalism.....	5	(3-5)	(3)
<sup>3</sup> Crop Production (FC 211), or Plant Propagation (Hrt 311).....	(3-5)	3-5	(3-5)
Soils (Sls 211, 212).....	3	3	.....
<sup>4</sup> General Zoology (Z 200), or Physical Geology (G 200), or General Bacteriology (Bac 204).....	(3)	(3)	3-5
<sup>5</sup> Principles of Economics (Ec 201, 202, 203) or Outlines of Economics (Ec 212); Practical Psychology (Psy 212); Introduction to Sociology (Soc 212).....	3	3	3
<sup>6</sup> Agricultural Engineering Survey (AE 211).....	(3)	3	(3)
Principles of Farm Management (AEc 211).....	(5)	.....	5
Air or Military Science.....	1	1	1
Physical Education.....	1	1	1
	14-16	17-19	16-18

## Curriculum in General Agriculture

### B.S. Degree

(See Common Freshman and Sophomore years)

Junior Year		Senior Year	
	Hours		Hours
General Bacteriology (Bac 204).....	3	Principles of Agricultural Marketing (AEc 341).....	3
Economic Entomology (Ent 314).....	4	Farm Buildings (AE 361), or House Planning and Architectural Drawing (AA 178).....	3
Genetics (Z 341).....	3	Real Estate Law (BA 414).....	3
American Governments (PS 201).....	3	Disease of Livestock (VM 341) or Plant Pathology (Bot 351).....	4-5
Journalism (J 111).....	3	Elective in animal or plant nutrition.....	3
Basic Accounting and Financial Analysis (BA 217).....	3	<sup>7</sup> Electives.....	34-33
Food Industry Survey (FDT 340).....	3		
<sup>7</sup> Electives.....	30		

<sup>1</sup> Students may take only one of these courses any one term.

<sup>2</sup> Dairy, animal, and poultry husbandry students take Organic and Agricultural Biochemistry (Ch 226-250 or 251-252); agricultural economics students take Fundamentals of Accounting (BA 214, 215); agricultural journalism students take Journalism (J 111); soils students take Abridged General Physics (Ph 211, 212).

<sup>3</sup> Horticulture students take Plant Propagation (Hrt 311). Poultry students may take Incubation (P 321) as sophomores and Crop Production (FC 211) as juniors.

<sup>4</sup> Dairy, animal, and poultry husbandry students take General Zoology (Z 200). Soils students take Basic Accounting and Financial Analysis (BA 217) and Physical Geology (G 200); Agricultural Economics students take General Bacteriology (Bac 204).

<sup>5</sup> Agricultural Economics students take Principles of Economics (Ec 201, 202, 203) plus Practical Psychology (Psy 212) and American Governments (PS 201).

<sup>6</sup> Agricultural Economics students may substitute Production (BA 311).

<sup>7</sup> Electives selected in conference with adviser and Dean to include a total of at least 45 upper division hours with 24 in agriculture.

### Curriculum in General Agriculture with Minor in Journalism

*B.S. Degree*

(See Common Freshman and Sophomore years)

Junior Year		Senior Year	
	Hours		Hours
Soil Management and Conservation (Sls 314)	4	Special Feature Articles (J 317)	3
Editorial Writing (J 223) or approved elective	3	Radio Speaking (Sp 361, 362, 363)	9
Public Information Methods (J 318)	3	Technical Writing (J 319)	3
Journalism (J 112)	3	American Governments (PS 201)	3
Journalism Projects (J 351, 352, 353) or approved electives	6	Soil Fertility Lectures (Sls 424)	3
Photography (Ph 361)	3	Farm Crops (upper division)	3
Principles of Agricultural Marketing (AEc 341)	3	Horticulture (upper division)	3
Economic Entomology (Ent 314)	4	Dairy and Animal Husbandry (upper division)	6
Upper division courses in agriculture	9	Electives	16
Electives	14		

### Curriculum in Agricultural Economics

*B.S. Degree*

*Farm and Ranch Management*

*Agricultural Business Management*

*General Agricultural Economics*

#### Farm and Ranch Management

(See Common Freshman and Sophomore years)

Junior Year		Senior Year	
	Hours		Hours
Applied Agricultural Economics (AEc 312)	3	Farm Organization (AEc 414)	3
Principles of Agricultural Marketing (AEc 341)	3	Agricultural Finance (AEc 431)	3
Agricultural Cooperation (AEc 342)	3	Federal Programs and the Farmer (AEc 418) or Conservation of Agricultural Resources (AEc 461) or Agricultural Land Economics (AEc 462)	3
Soil Management and Conservation (Sls 314)	4	Agricultural Appraisal (AEc 425)	3
<sup>1</sup> Statistics	3	Agricultural Prices (AEc 451)	3
Farm Income Tax Management (AEc 311)	2	Agricultural Policy (AEc 411)	3
Sociology of Rural Life (Soc 364)	3	Seminar (AEc 407)	3
Agriculture—upper division. Not Agricultural Economics	9	Current Economic Theory and Problems (Ec 475, 476)	6
Humanities electives	9	Electives	20
Electives	12		

#### Agricultural Business Management

(See Common Freshman and Sophomore years)

Junior Year		Senior Year	
	Hours		Hours
Applied Agricultural Economics (AEc 312)	3	Agricultural Finance (AEc 431)	3
Principles of Agricultural Marketing (AEc 341)	3	Agricultural Prices (AEc 451)	3
Agricultural Cooperation (AEc 342)	3	Agricultural Policy (AEc 411)	3
<sup>1</sup> Statistics	6	Consumers and the Market (AEc 412)	3
Sociology of Rural Life (Soc 364)	3	Marketing Efficiency Analysis (AEc 421)	3
Production (BA 311)	4	Seminar (AEc 407)	3
Finance (BA 312)	4	Current Economic Theory and Problems (Ec 475, 476)	6
Business electives	7	Business Law (BA 411, 412, 413)	9
Humanities electives	9	Electives	19
Electives	12		

In cooperation with production departments concerned, students may emphasize the marketing of fruits, vegetables, dairy products, poultry, livestock, or farm crops.

<sup>1</sup> In School of Business or School of Science.



**General Agricultural Economics**

(See Common Freshman and Sophomore years)

Junior Year		Senior Year	
	Hours		Hours
Applied Agricultural Economics (AEc 312).....	3	Farm Organization (AEc 414).....	3
Principles of Agricultural Marketing (AEc 341).....	3	Agricultural Finance (AEc 431).....	3
Agricultural Cooperation (AEc 342).....	3	Federal Programs and the Farmer (AEc 418), or Conservation of Agricultural Resources (AEc 461) or Agricultural Land Economics (AEc 462)	3
Sociology of Rural Life (Soc 364).....	3	Agricultural Appraisal (AEc 425).....	3
Statistics.....	6	Agricultural Policy (AEc 411).....	3
Agriculture—upper division. Not Agricultural Economics.....	6	Seminar (AEc 407).....	3
Business electives.....	6	Current Economic Theory and Problems (Ec 475, 476, 477).....	9
Humanities electives.....	9	Electives.....	21
Electives.....	12		

**Curriculum in Agricultural Education***B.S. Degree*

For Curriculum see SCHOOL OF EDUCATION

**Curricula in Dairy and Animal Husbandry***B.S. Degree**Dairy Husbandry      Animal Husbandry      Range Management (See page 218)***Dairy Husbandry**

(See Common Freshman and Sophomore years)

Beginning in the junior year, students interested in allied fields of Dairy and Animal Husbandry are encouraged to select elective courses in other departments and schools which will prepare them for opportunities in business and industry related to their major field of interest.

Junior Year		Senior Year	
	Hours		Hours
General Bacteriology (Bac 204).....	3	Animal Nutrition II (DAH 411).....	4
Anatomy and Physiology of Domestic Animals (VM 320, 321).....	8	Principles of Agricultural Marketing (AEc 341).....	3
Diseases of Livestock (VM 341).....	4	Seminar (DAH 407).....	2
Dairy Herd Management (DAH 322)....	3	Dairy and Animal Husbandry electives..	12
Genetics (Z 341).....	3	Science and Social Science electives.....	9
Market Milk (FDT 310).....	3	Electives.....	18
Technical Report Writing (Wr 227) or Journalism (J 111).....	3		
American Governments (PS 201).....	3		
Electives.....	20		

**Animal Husbandry**

(See Common Freshman and Sophomore years)

Junior Year		Senior Year	
	Hours		Hours
Genetics (Z 341).....	3	Animal Nutrition II (DAH 411).....	4
Anatomy and Physiology of Domestic Animals (VM 320, 321).....	8	Range Management (DAH or FC 341)..	3
General Bacteriology (Bac 204).....	3	Seminar (DAH 407).....	2
Animal Fertility (DAH 316).....	3	American Governments (PS 201).....	3
Principles of Agricultural Marketing (AEc 341).....	3	Dairy and Animal Husbandry electives..	12
Business Law (BA 411).....	3	Electives.....	24
Technical Report Writing (Wr 227) or Journalism (J 111).....	3		
Electives.....	24		

<sup>1</sup> In School of Business or School of Science.

**Curriculum in Farm Crops***B.S. Degree**Farm Crops**Range Management***Farm Crops**

(See Common Freshman and Sophomore years)

Junior Year		Senior Year	
	Hours		Hours
Genetics (Z 341).....	3	Seed Production (FC 414).....	3
Plant Pathology (Bot 351).....	5	Crop Inspection (FC 411).....	4
Cereal Crops (FC 322).....	4	Plant Breeding (FC 415).....	3
Plant Physiology (Bot 331).....	5	American Governments (PS 201).....	3
Principles of Agricultural Marketing (AEc 341).....	3	Animal Nutrition I (DAH 311) or Ani- mal Nutrition II (DAH 411).....	4
General Bacteriology (Bac 204).....	3	Seminar (FC 407).....	3
Economic Entomology (Ent 314).....	4	Electives.....	28
Journalism (J 111).....	3		
Soil Management and Conservation (Sls 314).....	4		
Forage Crops (FC 324).....	3		
Weed Control (FC 317).....	4		
Seed Identification (FC 332).....	3		
Electives.....	12		

**Curriculum in Fisheries***B.S. Degree*

Freshman Year		Sophomore Year	
	Hours		Hours
English Composition (Wr 111, 112, 113).....	9	Economic Ichthyology (FG 274, 275, 276).....	9
General Zoology (Z 201, 202, 203).....	9	Journalism (J 111).....	3
Wildlife Conservation (FG 251, 252).....	6	Extempore Speaking (Sp 111).....	3
Wildlife Technique (FG 261).....	3	Principles of Economics (Ec 201, 202, 203).....	9
General Botany (Bot 201) and Field Botany (Bot 203).....	6	General Chemistry (Ch 101, 102, 103).....	9
Agricultural Engineering Survey (AE 211).....	3	Wildlife Management (FG 281, 282, 283).....	9
Intermediate Algebra (Mth 100).....	4	Descriptive Statistics (St 311).....	3
Air or Military Science.....	3	Air or Military Science.....	3
Physical Education.....	3	Physical Education.....	3
Junior Year		Senior Year	
	Hours		Hours
Commercial Fisheries (FG 464, 465, 466).....	9	Management of Game Fish (FG 454, 455, 456).....	9
Abridged General Physics (Ph 211, 212).....	6	Invertebrate Zoology (Z 451, 452).....	10
Aquatic Plants (Bot 316).....	3	Technical Writing (J 319).....	3
Organic and Agricultural Biochemistry (Ch 251, 252).....	8	Sanitary Water Measurements (CE 414).....	3
Quantitative Analysis (Ch 234).....	5	Animal Nutrition I (DAH 311).....	3
General Bacteriology (Bac 204).....	3	Parasites of Fish (Z 457).....	2
Aquatic Entomology (Ent 341).....	4	Seminar (FG 407).....	3
American Governments (PS 201).....	3	Electives.....	16
Genetics (Z 341).....	3		
Electives.....	6		

**Curricula in Food and Dairy Technology***B.S. Degree**Food Technology**Dairy Technology*

Common Freshman Year		Common Sophomore Year	
	Hours		Hours
Food Grades and Standards (FDT 271).....	3	General Bacteriology (Bac 204).....	3
English Composition (Wr 111, 112, 113).....	9	Organic Chemistry (Ch 226, 227).....	10
General Chemistry (Ch 101, 102, 103 or 204, 205, 206).....	9-15	Food Manufacturing Methods (FDT 221, 222, 223).....	9
Mathematics (Mth 101, 102).....	8	General Botany (Bot 201) or General Zoology (Z 200).....	3-5
Analytical Geometry and Calculus (Mth 200).....	4	American Governments (PS 201).....	3
Food and Dairy Technology (FDT 111).....	3	Extempore Speaking (Sp 111).....	3
Elements of Horticulture (Hrt 111) or Introduction to Dairy and Animal Science (DAH 121).....	3	Food Plant Graphics (AE 351).....	3
Physical Education, General Hygiene.....	3	Outlines of Economics (Ec 212).....	3
Air, Military, or Naval Science (men).....	3-9	Quantitative Analysis (Ch 234).....	4
		Physical Education.....	3
		Air, Military, or Naval Science (men).....	3-9

**Food Technology**

Junior Year		Senior Year	
	Hours		Hours
Biochemistry (Ch 350).....	3	Refrigeration & Cold Storage (ME 335)	3
Biochemistry Laboratory (Ch 353).....	1	Statistical Techniques (St 314, 315).....	6
Food Sanitation Bacteriology (Bac 411)	4	Detergency and Waste Disposal (FDT 412) .....	3
Principles of Agricultural Marketing (AEc 341).....	3	Food Plant Mechanics (AE 352).....	3
Fundamentals of Accounting (BA 214, 215) .....	6	Heat Transfer in Food Manufacturing (FDT 433).....	4
Abridged General Physics (Ph 211, 212) .....	6	Seminar (FDT 407).....	3
Technical Writing (J 319).....	3	Food Packaging (FDT 431).....	3
Food Bacteriology (Bac 460).....	4	Food Analysis (FDT 423).....	4
Food Science (FDT 342, 343).....	8	Federal and State Food Regulations (FDT 421).....	2
Approved social science.....	3	Approved course in nutrition.....	3
Approved electives.....	9	Approved electives.....	15

**Dairy Technology**

Junior Year		Senior Year	
	Hours		Hours
Biochemistry (Ch 350).....	3	Principles of Agricultural Marketing (AEc 341).....	3
Biochemistry Laboratory (Ch 353).....	1	Refrigeration and Cold Storage (ME 335).....	3
Food Sanitation Bacteriology (Bac 411)	4	Statistical Techniques (St 314, 315).....	6
Fundamentals of Accounting (BA 214, 215) .....	6	Detergency and Waste Disposal (FDT 412) .....	3
Abridged General Physics (Ph 211, 212) .....	6	Food Plant Mechanics (AE 352).....	3
Technical Writing (J 319).....	3	Heat Transfer in Food Manufacturing (FDT 433).....	4
Dairy Bacteriology (Bac 412).....	4	Seminar (FDT 407).....	3
Dairy Chemistry (Ch 457).....	3	Dairy Products Processing (FDT 441, 442, 443).....	15
Dairy Chemistry Laboratory (Ch 458).....	2	Approved electives.....	12
Market Milk (FDT 310).....	3		
Approved social science.....	3		
Approved course in nutrition.....	3		
Approved electives.....	9		

**Curricula in Horticulture**

*B.S. Degree*

*Pomology and Vegetable Crops*

*Floriculture and Nursery Management*

*Landscape Construction and Maintenance*

**Pomology and Vegetable Crops**

(See Common Freshman and Sophomore years)

Junior Year		Senior Year	
	Hours		Hours
Basic Horticulture (Hrt 315).....	3	<sup>1</sup> Systematic Pomology (Hrt 433) or Systematic Vegetable Crops (Hrt 443).....	4-3
Fruit and Nut Production (Hrt 333).....	4	<sup>1</sup> Fruit Handling and Distribution I (Hrt 431) or Vegetable Handling and Distribution (Hrt 441).....	4-3
Commercial Vegetable Production (Hrt 342) .....	4	Spraying, Dusting, and Fumigation (Hrt 415).....	3
Plant Physiology (Bot 331).....	5	Plant Materials (LA 326).....	3
Economic Entomology (Ent 314).....	4	History and Literature of Horticulture (Hrt 317).....	2
Plant Pathology (Bot 351).....	5	Horticultural Plant Breeding (Hrt 413) or Business Law (BA 413).....	3
Food Industry (FDT 340).....	3	Principles of Agricultural Marketing (AEc 341).....	3
Genetics (Z 341).....	3	American Governments (FS 201).....	3
General Bacteriology (Bac 204).....	3	Principles of Accounting (BA 211).....	3
Home-Ground Planning (LA 279).....	3	Journalism (J 111).....	3
Electives .....	16	Electives .....	17

<sup>1</sup> Pomology majors take Hrt 433 and Hrt 431. Vegetable crops majors take Hrt 443 and Hrt 441.

## Floriculture and Nursery Management

Freshman Year		Sophomore Year	
	Hours		Hours
General Botany (Bot 201, 202) Field Botany (Bot 203).....	9	Home-Ground Planning (LA 279).....	3
General Chemistry (Ch 101, 102, 103).....	9	Soils (Sls 211, 212).....	6
English Composition (Wr 111, 112, 113).....	9	<sup>1</sup> Organic and Agricultural Biochemistry (Ch 251).....	5
Elements of Horticulture (Hrt 111).....	3	Outlines of Economics (Ec 212).....	3
General Floriculture (Hrt 151).....	3	American Governments (PS 201).....	3
Intermediate Algebra (Mth 100) or equivalent.....	4	Approved social science.....	3
Physical Education, General Hygiene.....	3	Plant Propagation (Hrt 311).....	3
Air or Military Science (men).....	3	Greenhouse Construction and Management (Hrt 313).....	3
		Basic Horticulture (Hrt 315).....	6
		Herbaceous Plant Materials (Hrt 355).....	3
		Flower Arrangement (Hrt 253) or approved elective.....	3
		Plant Physiology (Bot 331).....	5
		Journalism (J 111).....	3
		Physical Education.....	3
		Air or Military Science (men).....	3
Junior Year		Senior Year	
	Hours		Hours
Lower Division Landscape Design (LA 290).....	6	Principles of Accounting (BA 211, 212).....	6
<sup>2</sup> Commercial Floriculture (Hrt 351, 352) or Nursery Management (Hrt 361, 362).....	6-8	Planting Plans (LA 392, 393, 394).....	6
Commercial Floriculture (Hrt 353) or approved elective.....	3	Horticultural Plant Breeding (Hrt 413).....	3
Plant Materials (LA 326, 327, 328).....	9	Business Law (BA 413).....	3
History and Literature of Horticulture (Hrt 317).....	2	Extempore Speaking (Sp 111).....	3
Spraying, Dusting, Fumigation (Hrt 415).....	3	Salesmanship (BA 463).....	3
Plant Pathology (Bot 351).....	5	Handling and Distribution of Florist Crops (Hrt 453) or Principles of Plant Ecology (Bot 341).....	3-4
Economic Entomology (Ent 314).....	4	Flower Shop Operation (Hrt 451) or Land Drainage (AE 319).....	3
Genetics (Z 341).....	3	Electives.....	17
Electives.....	6		

## Two-Year Curriculum in Nursery Management

The American Association of Nurserymen, after study of more than 100 universities, has selected Oregon State College as one of seven best situated and prepared to offer a 2-year curriculum which will help meet a nationwide need. The proposed curriculum is as follows:

First Year		Second Year	
	Hours		Hours
General Chemistry (Ch 101, 102, 103).....	9	Nursery Management (Hrt 361, 362).....	8
General Botany (Bot 201, 202), Field Botany (Bot 203).....	9	Plant Materials (LA 326, 327, 328).....	9
English Composition (Wr 111, 112, 113).....	9	Soils (Sls 211, 212).....	6
Elements of Horticulture (Hrt 111).....	3	Herbaceous Plant Materials (Hrt 355).....	3
Plant Propagation (Hrt 311).....	3	Plant Pathology (Bot 351).....	5
Home-Ground Planning (LA 279).....	3	Economic Entomology (Ent 314).....	4
Air or Military Science.....	3	Spraying, Dusting, Fumigation (Hrt 415).....	3
Physical Education.....	3	Principles of Accounting (BA 211) or Basic Accounting and Financial Analysis (BA 217).....	3
		Greenhouse Construction and Management (Hrt 313).....	3
		Real Estate Law (BA 414).....	3
		Air or Military Science.....	3
		Physical Education.....	3

<sup>1</sup> Other science courses may be substituted for Ch 251 with approval of major professor.

<sup>2</sup> Students majoring in nursery management will take Nursery Management (Hrt 361, 362) instead of Commercial Floriculture.

## Landscape Construction and Maintenance

Freshman Year		Sophomore Year	
	Hours		Hours
General Botany (Bot 201, 202), Field Botany (Bot 203).....	9	Lower Division Landscape Design (LA 290).....	6
General Chemistry (Ch 101, 102, 103).....	9	History and Literature of Landscape Architecture (LA 356, 357, 358).....	6
English Composition (Wr 111, 112, 113).....	9	Soils (Sls 211, 212).....	6
Lower Division Architectural Design (AA 297).....	3	Photography (Ph 361).....	3
Elements of Horticulture (Hrt 111).....	3	Surveying for Landscape Architecture Students (CE 224, 225).....	6
Home-Ground Planning (LA 279).....	3	Basic Accounting and Financial Analysis (BA 217).....	3
Intermediate Algebra (Mth 100).....	4	American Governments (PS 201).....	3
Physical Education, General Hygiene.....	3	Approved social science.....	6
Air or Military Science (men).....	3	Physical Education.....	3
		Air or Military Science (men).....	3
Junior Year		Senior Year	
	Hours		Hours
Intermediate Landscape Design (LA 390).....	9	Planting Plans (LA 392, 393, 394).....	6
Maintenance and Construction (LA 359, 360, 361).....	9	Layout of Small Properties (LA 382, 383, 384).....	6
Plant Materials (LA 326, 327, 328).....	9	Plant Pathology (Bot 351).....	5
Plant Propagation (Hrt 311).....	3	Economic Entomology (Ent 314).....	4
Real Estate Law (BA 414).....	3	Principles of Plant Ecology (Bot 341).....	4
Basic Horticulture (Hrt 315).....	3	Nursery Management (Hrt 361, 362).....	8
Electives.....	14	Lawns and Turfs (FC 313).....	2
		Land Drainage (AE 319).....	3
		Electives.....	11

## Curriculum in Mechanical Technology in Agriculture

## B.S. Degree

Freshman Year		Sophomore Year	
	Hours		Hours
Mechanical Problems in Agriculture (AE 101, 102, 103).....	6	English Composition (Wr 111, 112, 113).....	9
General Chemistry (Ch 101, 102, 103).....	9	Mathematics (Mth 101, 102).....	8
Elements of Horticulture (Hrt 111).....	3	Plane Surveying (CE 226).....	3
Farm Mechanics (AE 221).....	3	Abridged General Physics (Ph 211, 212).....	6
Introduction to Dairy and Animal Science (DAH 121) and Poultry Production (P 121).....	6	House Planning and Architectural Drawing (AA 178).....	3
Intermediate Algebra (Mth 100).....	4	Outlines of Economics (Ec 212).....	3
General Botany (Bot 201).....	3	Machine Tool Practices (IE 260).....	2
Crop Production (FC 211).....	5	Soils (Sls 211, 212).....	6
Extempore Speaking (Sp 111).....	3	Principles of Farm Management (AE 211).....	5
Engineering Drawing (GE 115).....	3	Physical Education.....	3
Physical Education, General Hygiene.....	3	Air or Military Science.....	3
Air or Military Science.....	3		
Junior Year		Senior Year	
	Hours		Hours
General Bacteriology (Bac 204).....	3	Business Law (BA 411).....	3
General Bacteriology (Bac 205) or science elective.....	3	Farm Buildings (AE 361).....	3
Social science.....	6	Seminar (AE 407).....	2
Engines and Tractors (AE 311).....	3	Pumps and Irrigation Equipment (AE 321).....	3
Motor Vehicles (AE 313).....	3	Land Drainage (AE 319).....	3
Farm Electricity (AE 331).....	3	Household Utilities (AE 435).....	3
Journalism (J 111) or Technical Report Writing (Wr 227).....	3	Air or Military Science or electives.....	9
Elementary Hydraulics (CE 322).....	3	Electives.....	18
Farm Implements (AE 391).....	3		
Soil Water and Irrigation (Sls 311).....	3		
Basic Accounting and Financial Analysis (BA 217).....	3		
Air or Military Science or electives.....	9		
Electives.....	3		

<sup>1</sup> To meet minimum requirements set forth in the training program of the National Landscape Nurserymen's Association students must elect at least 4 term hours of Construction (AA 218, 219) and 3 approved term hours of business administration. Suggested electives: AA 160, 161, 295; AA 211, 212; AE 451; Hrt 315, 355.

### Curriculum in Poultry Husbandry

(See Common Freshman and Sophomore years)

Junior Year		Senior Year	
	Hours		Hours
Genetics (Z 341).....	3	Poultry Feeding (P 411, 412).....	4
Principles of Agricultural Marketing (A.Ec 341).....	3	<sup>1</sup> Marketing Poultry Products (P 421)....	3
<sup>1</sup> Turkey Management (P 351).....	3	<sup>1</sup> Poultry Plant Management (P 431)....	3
<sup>1</sup> Incubation (P 321).....	3	<sup>1</sup> Poultry Breeding (P 441).....	3
Basic Accounting and Financial Analy- sis (BA 217).....	3	Seminar (P 407).....	2
Journalism (J 111).....	3	Electives .....	33
Anatomy and Physiology of the Fowl (VM 311).....	3		
American Governments (PS 201).....	3		
<sup>1</sup> Poultry Judging (P 341).....	3		
Diseases of Poultry (VM 351).....	4		
Brooding and Broiler Production (P 322) .....	3		
Electives .....	19		

### Curriculum in Range Management

*B.S. Degree*

*Administered jointly by Dairy and Animal Husbandry and Farm Crops Departments*

Freshman Year		Sophomore Year	
	Hours		Hours
General Chemistry (Ch 101, 102, 103)....	9	Organic and Agricultural Biochemistry (Ch 251).....	5
General Botany (Bot 201, 202), Field Botany (Bot 203).....	9	Principles of Economics (Ec 201, 202, 203) .....	9
Extempore Speaking (Sp 111).....	3	Systematic Botany (Bot 321).....	4
English Composition (Wr 111, 112, 113)	9	General Bacteriology (Bac 204).....	3
General Zoology (Z 200).....	5	Soils (Sls 211, 212).....	6
Introduction to Dairy and Animal Sci- ence (DAH 121).....	3	Intermediate Algebra and Trigonometry (Mth 100, 102).....	8
Physical Education.....	3	Crop Production (FC 211).....	5
Air or Military Science.....	3	Physical Education.....	3
		Air or Military Science.....	3
Junior Year		Senior Year	
	Hours		Hours
Range Management (DAH or FC 341)..	3	Range Methods (DAH or FC 441).....	4
Range Improvement (DAH or FC 342)..	3	Beef Cattle Production (DAH 424)....	3
Range Plants (DAH, FC 343).....	3	Animal Nutrition II (DAH 411).....	4
Forest Engineering (FE 123).....	3	Agricultural Land Economics (A.Ec 462) .....	3
Plant Physiology (Bot 331).....	5	American Governments (PS 201).....	3
Plant Ecology (Bot 341).....	4	Diseases of Livestock (VM 341).....	4
Agrostology (Bot 314).....	3	Genetics (Z 341).....	3
Farm Forestry (F 344).....	3	Elective (Range Management) (DAH or FC).....	3
Forest Wildlife Management (FG 310, 311) .....	6	Electives .....	21
Technical Report Writing (Wr 227) or Journalism (J 111).....	3		
Statistical Techniques (St 314).....	3		
Electives .....	10		

<sup>1</sup> Offered alternate years. May be taken in junior or senior year.

**Curriculum in Soils***B.S. Degree*

(See Common Freshman and Sophomore years)

Junior Year		Senior Year	
	Hours		Hours
General Bacteriology (Bac 204).....	3	Land Drainage (AE 319) or Pumps and Irrigation Equipment (AE 321).....	3
Plant Physiology (Bot 331).....	5	Soil Fertility Lectures (Sls 424).....	3
Rocks and Minerals (G 350).....	3	Soil Survey (Sls 432).....	4
Soil Water and Irrigation (Sls 311).....	3	Soil Seminar (Sls 407).....	2
Soil Management and Conservation (Sls 314).....	4	Genetics (Z 341).....	3
American Governments (PS 201).....	3	Economic Entomology (Ent 314) or Plant Pathology (Bot 351).....	4
Organic and Agricultural Biochemistry (Ch 251) or Quantitative Analysis (Ch 234).....	5	Weed Control (FC 317).....	4
Journalism (J 111).....	3	Electives.....	25
Electives.....	20		

**Curriculum in Wildlife Management***B.S. Degree*

Freshman Year		Sophomore Year	
	Hours		Hours
English Composition (Wr 111, 112, 113).....	9	Economics and social sciences.....	9
General Zoology (Z 201, 202, 203).....	9	General Chemistry (CH 104, 105, 106).....	12
Wildlife Conservation (FG 251, 252).....	6	Wildlife Management (FG 281, 282, 283).....	9
Wildlife Technique (FG 261).....	3	General Botany (Bot 201, 202), Field Botany (Bot 203).....	9
Tree Identification (F 153).....	3	Economic Ichthyology (FG 274).....	3
Elements of Agronomy I (FC 111).....	3	Mammalogy (Z 372).....	3
Intermediate Algebra (Mth 100).....	4	Ornithology (Z 371).....	3
Agricultural Engineering Survey (AE 211).....	3	Air or Military Science.....	3
Air or Military Science.....	3	Physical Education.....	3
Physical Education.....	3		
Junior Year		Senior Year	
	Hours		Hours
Management of Game Birds (FG 451, 452, 453).....	9	Management of Game Fish (FG 454, 455, 456).....	9
Aquatic Plants (Bot 316).....	3	Management of Big Game (FG 457, 458).....	6
Principles of Plant Ecology (Bot 341).....	4	Management of Fur Bearers (FG 460).....	3
Aquatic Entomology (Ent 341).....	4	Parasitic Diseases of Domestic and Game Animals (VM 361).....	4
Anatomy and Physiology of Domestic Animals (VM 320, 321).....	8	American Governments (PS 201).....	3
Descriptive Statistics (St 311).....	3	Technical Writing (J 319).....	3
Genetics (Z 341).....	3	Seminar (FG 407).....	3
Animal Nutrition I (DAH 311).....	3	Electives.....	17
Journalism (J 111).....	3		
Extempore Speaking (Sp 111).....	3		
Electives.....	11		

**Two-Year Terminal Curriculum***Certificate in Agriculture*

First Year		Second Year	
	Hours		Hours
Biological or Physical Science.....	9	Principles of Farm Management (AEC 211).....	5
Elements of Horticulture (Hrt 111).....	3	Basic Accounting and Financial Analy- sis (BA 217).....	3
Introduction to Dairy and Animal Sci- ence (DAH 121, 122).....	5	Crop Production (FC 211).....	5
Poultry Production (P 121).....	3	Diseases of Livestock (VM 341).....	4
Agricultural Engineering Survey (AE 211).....	3	Farm Buildings (AE 361) or House Planning and Architectural Draw- ing (AA 178).....	3
Air or Military Science.....	3	American Governments (PS 201).....	3
Physical Education.....	3	Public Speaking.....	3
Electives.....	16	Air or Military Science.....	3
		Physical Education.....	3
		Electives.....	13

## Agricultural Economics

*Options in FARM AND RANCH MANAGEMENT,  
AGRICULTURAL BUSINESS MANAGEMENT,  
and GENERAL AGRICULTURAL ECONOMICS*

The Department of Agricultural Economics emphasizes the business and economic aspects of agriculture. A wide range of electives also permits a student in this department to choose courses in the agricultural sciences, social sciences, business, or education. Thus a student can adapt his study program to his interests and needs.

Freshmen and sophomore students generally follow a common program. During his last two years, however, each student selects an area of concentration in either farm and ranch management, agricultural business management, or general agricultural economics. The farm and ranch management option serves for those preparing for employment as farmers or ranchers, farm or ranch managers, county extension agents, or soil conservation supervisors. The agricultural business management option is intended for those preparing for employment in business serving agriculture. The option in general agricultural economics prepares a student for employment with State and Federal services and land-grant colleges or Departments of Agriculture. It also is for those who desire a more general background than either farm and ranch management or agricultural business management.

The program for any one of the options also prepares students for graduate study aimed at a professional career as a teacher, a research worker, or an extension specialist in agricultural economics. Graduate study is integrated with research. The Department gives major emphasis to training graduate students in the application of scientific methodology to obtain realistic solutions to problems of farmers and agricultural industry. A student working for a Master of Science or Doctor of Philosophy degree in agricultural economics may emphasize Agricultural Marketing, Agricultural Policy, Agricultural Finance, Agricultural Prices, Land Economics, or Production Economics and Farm Management and may carry out a research project in any one of these areas. A graduate student in another department may take a minor in Agricultural Economics.

### Lower Division Courses

- AEc 111. **Introduction to Agricultural Economics.** 3 hours. 3 ①  
Nature of agricultural resources and their management, buying of farm production supplies, selling of farm products, financing of farm operations, and introduction to farm policies and programs. Staff.
- AEc 211. **Principles of Farm Management.** 5 hours fall and spring. 5 ①  
Farming as a business; reasons for success and failure; what and how much to produce; acquiring and combining land, labor, and capital resources. Prerequisite: sophomore standing in agriculture. CASTLE, BECKER.

### Upper Division Courses

- AEc 311. **Farm Income Tax Management.** 2 hours spring. 1 ① 1 ②  
Management and accounting procedures as influenced by Federal income tax laws and regulations. Computation of State and Federal taxable income. Prerequisite: AEc 211. BECKER.
- AEc 312. **Applied Agricultural Economics.** 3 hours fall. 3 ①  
Use of economic principles in solving problems of costs and returns of specific farm enterprises; capital, labor, size of business; yields, feeding; production possibilities and markets. Prerequisite: Ec 203 or equivalent. BLANCH.



- AEc 331. Food and Agriculture.** 3 hours fall. 3 ①  
 Role of agriculture in meeting population and industrial growth in a developing economy; influence of technology in production and marketing. Offered alternate years. Not offered 1960-61. HOLLANDS.
- AEc 341. Principles of Agricultural Marketing.** 3 hours fall or winter. 3 ①  
 Marketing farm products; markets, marketing services, prices; role of producers, middlemen, and consumers; improving the marketing of major agricultural products. Prerequisite: Ec 203 or 212. Students who have not had prerequisites must have consent of instructor. HOLLANDS, CHRISTENSEN.
- AEc 342. Agricultural Cooperation.** 3 hours spring. 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 specific locality in Oregon in areas of agricultural marketing, policy, finance, and farm management.
- AEc 411. Agricultural Policy.** (g) 3 hours spring. 3 ①  
 Application of economic principles to agricultural problems, and particularly to agricultural policies established by State and Federal agencies. Prerequisite: Ec 203 or 214. Wood.
- AEc 412. Consumers and the Market.** 3 hours winter. 3 ①  
 Theory of consumer behavior, the consumer in the market, consumption patterns, business and pricing practices, with laboratory periods devoted to sound buying practices discussed by representatives of businesses and professions. Prerequisite: Ec 203 or 212. Students who have not had prerequisites must have consent of instructor. HOLLANDS.
- AEc 414. Farm Organization.** (G) 3 hours fall. 2 ① 1 ③  
 Application of farm management principles to the organization of the individual farm; trips to farms showing specific organizational features; organization plans for selected farms. 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, AMS, State and county committees) as they affect the operation of Oregon farms. Prerequisite: senior standing. MUMFORD.
- AEc 421. Marketing Efficiency Analysis.** (G) 3 hours winter. 3 ①  
 Techniques for determining costs and efficiency of marketing and processing operations of agricultural products; reducing costs and improving efficiency through work methods, equipment, materials handling, and plant layout. Prerequisite: senior standing, Ec 212, AEc 341. LANGMO.
- AEc 425. Agricultural Appraisal.** (G) 3 hours spring. 2 ① 1 ③  
 Appraisal principles and purposes. Commercial and Federal appraisal methods; field work in appraisal of land and farms of different types. Consent of instructor required. Prerequisite: senior standing. BLANCH.
- AEc 431. Agricultural Finance.** (G) 3 hours spring. 3 ①  
 Principles of credit and finance as applied to agriculture; credit requirements of agriculture; existing credit agencies, strength and weakness. Prerequisite: Ec 203, upper division standing. BLANCH.
- AEc 440. Livestock Economics.** (G) 3 hours fall. 3 ①  
 Economic and financial phases of the livestock industry, trends in investment, cost-price relationships, and development of market functions and institutions. Prerequisite: upper division standing. CHRISTENSEN.

- AEc 444. Marketing Dairy Products.** (G) 3 hours winter. 3 ①  
Trends in production and consumption, agencies and institutions in marketing, current research and development, and marketing as affected by present State and Federal regulations. Prerequisite: AEc 341 or consent of instructor. Offered alternate years. Offered 1960-61. CHRISTENSEN.
- AEc 451. Agricultural Prices.** (g) 3 hours fall. 3 ①  
Price trends; prices of agricultural and nonagricultural products; prices in relation to production and marketing programs; elasticity functions. Prerequisite: St 311, AEc 341. KORZAN.
- AEc 461. Conservation of Agricultural Resources.** (G) 3 hours winter. 3 ①  
Benefits and costs of developing and conserving water, soil, and timber resources; types of management necessary to attain various public and private ends. Prerequisite: upper division standing. Offered alternate years. Not offered 1960-61. CASTLE.
- AEc 462. Agricultural Land Economics.** (g) 3 hours winter. 3 ①  
Supply of and demand for agricultural land; population pressure on land; economic principles governing value and use of land; institutional factors. Prerequisite: Ec 203, upper division standing.
- Graduate Courses**
- Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit. Courses Ec 413, 435, 440, 475, 476, 477, 510, 511, 512, 513, 514, 515, 516 (Department of Economics) may be taken as part of a graduate major in agricultural economics.
- AEc 501. Research.** Terms and hours to be arranged.
- AEc 503. Thesis.** Terms and hours to be arranged.
- AEc 505. Reading and Conference.** Terms and hours to be arranged.
- AEc 507. Seminar.** 1 hour. 1 ①
- AEc 508. Workshop.** Terms and hours to be arranged.  
Application of agricultural economics to specific locality in Oregon in areas of agricultural marketing, policy, finance, and farm management.
- Ec 512, 513. Economic History.** 3 hours each term. 3 ①  
Economic history of Europe and United States (alternate years) with emphasis on major trends in agriculture, manufacturing, trade, transportation, money, banking, and finance. Limited to candidates for advanced degrees in Department of Agricultural Economics.
- 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. Limited to candidates for advanced degrees in Department of Agricultural Economics.
- AEc 520. Research Methodology.** 3 hours winter. 3 ①  
Logic of the sciences; deduction and induction in research; use of theory and statistics in research, with particular attention to integrating deductive and inductive phases of research; preparation of research reports. Prerequisite: consent of instructor. BROWN.
- AEc 521, 522. Agricultural Production Economics.** 3 hours fall and winter. 3 ①  
AEc 521: Principles of production economics applied to individual farms; conditions of risk and uncertainty. AEc 522: Principles applied to agricultural industry; obstacles to efficiency; functioning of land, capital, and labor markets. CASTLE, BROWN.
- AEc 523. Analysis of Agricultural Policies.** 3 hours spring. 3 ①  
Economic and social criteria for public policy; value conflicts; welfare and efficiency goals in agricultural policy; process in development of policy; integration of economic and political objectives; critical appraisal of current and proposed agricultural policies. WOOD.
- 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. Limited to candidates for advanced degrees in Department of Agricultural Economics.

- AEc 562. **Advanced Agricultural Land Economics.** 3 hours winter. 3 ①  
Contemporary land problems and policies; distribution of major land uses, reclamation, conservation, and techniques and objectives of land planning and classification. Prerequisite: AEc 462.
- AEc 572. **Advanced Agricultural Marketing.** 3 hours fall. 3 ①  
Functions of the market, characteristics of demand and supply in marketplace; establishment of guideposts in development of marketing programs; analysis of selected research results in marketing farm products. HOLLANDS.
- AEc 573. **Agricultural Price Analysis.** 3 hours fall. 3 ①  
Supply and demand theory; market prices under perfect and imperfect competition; relation of price research to production and distribution of agricultural commodities. Prerequisite: two terms of statistics; Ec 475, 476, 477; AEc 451 or equivalent. KORZAN.

## 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 Department of Agricultural Engineering, a joint department within the Schools of Agriculture and Engineering, offers three types of instruction: (1) A curriculum leading to a Bachelor of Science degree in Mechanical Technology in Agriculture. (2) A curriculum leading to a Bachelor of Science degree in Agricultural Engineering. (See SCHOOL OF ENGINEERING.) (3) Service courses for students majoring in other departments.

The curriculum in Mechanical Technology in Agriculture 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 study qualifies him for work of an applied nature in industry and in public and self-employment. Students majoring in other departments may take courses in this department if they have proper prerequisites or consent of instructor.

The increasing importance of modern agricultural machinery in reducing production costs and improving rural living conditions necessitates more complete and effective utilization 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 and types of building material. Models of farm water systems and centrifugal and turbine pumps for sprinkler irrigation systems are available for study.

## Lower Division Courses

- AE 101, 102, 103. **Mechanical Problems in Agriculture.** 2 hours each term. 1 ① 1 ②  
Lectures and elementary problems in the mechanics of agriculture. LONG.
- AE 211. **Agricultural Engineering Survey.** 3 hours any term. 1 ① 2 ②  
Principles of mechanics, hydraulics, soil conservation, and electricity applied to farm problems. Prerequisite: Mth 100 or equivalent. LONG.
- AE 213. **Mechanical Applications in Agriculture.** 3 hours spring. 1 ① 2 ③  
Practical field work in farm surveying, mechanics, maintenance of equipment, and dehydration problems. Prerequisite: AE 211. LONG.
- AE 221. **Farm Mechanics.** 3 hours any term. 1 ① 2 ③  
Use of hand and power tools for wood and metal working, roof framing, arc and acetylene welding, construction of wood and metal farm appliances, concrete work. KIRK.
- AE 222. **Farm Mechanics.** 3 hours spring. 1 ① 2 ③  
Maintenance and adjustment of farm machinery; construction of farm equipment; maintenance and use of farm-type electrical equipment. Prerequisite: AE 221. CHRISTENSEN.

## Upper Division Courses

- AE 311. **Engines and Tractors.** 3 hours any term. 2 ① 1 ③  
Internal combustion engine as used in agriculture. Gasoline and diesel engine principles, construction; parts, accessories, lubrication and fuels. Tractor design and construction. Cannot be taken for college credit if credit has previously been earned in AE 312. LUNDE.
- AE 312. **Motor Vehicles.** 3 hours fall. 2 ① 1 ③  
The automobile, its parts, and accessory units; their design, function, operation, adjustment, lubrication and fuels; current developments. Cannot be taken for college credit if credit has previously been earned in AE 311. LUNDE.
- AE 313. **Motor Vehicles.** 3 hours any term. 1 ① 2 ③  
Practical problems in 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  
Study and use of precision diagnostic, test, and repair equipment and tools for automotive vehicle maintenance. Engine and other major unit rebuilding procedures; electrical systems. Prerequisite: AE 313. LUNDE.
- AE 319. **Land Drainage.** 3 hours spring. 2 ① 1 ③  
Planning and surveying for surface and subsurface farm drainage systems; soil erosion control. Prerequisite: Sls 212. SCHOOF.
- AE 321. **Pumps and Irrigation Equipment.** 3 hours fall. 2 ① 1 ③  
Selection, operation, and testing of pumps, household water systems, and sprinkler irrigation equipment; planning sprinkler and gravity irrigation systems; farm water systems. Recommended: Sls 311, CE 322. SCHOOF.
- AE 331. **Farm Electricity.** 3 hours winter. 2 ① 1 ③  
Fundamentals of electricity, wiring, electric motors, and the use of electricity on the farm. Prerequisite: AE 211 or equivalent. CROSBY.
- AE 341. **Use of Explosives.** 2 hours winter. 1 ① 1 ③  
Use of explosives in removing stumps, constructing drainage ditches, and rock blasting; 30 hours of field work arranged on Saturdays. SCHOOF.
- AE 351. **Food Plant Graphics.** 3 hours winter. 1 ① 2 ③  
Mechanical and architectural drawing; blueprint reading; reproduction processes; bill of materials; food plant layout. BONNICKSEN.
- AE 352. **Food Plant Mechanics.** 3 hours winter. 2 ① 1 ③  
Fundamentals of mechanics and plant equipment used in the food processing industry; demonstrations and practice in performing related shop operations. Prerequisite: Ph 212 or consent of instructor. KIRK.

- AE 361. **Farm Buildings.** 3 hours spring. 1 ① 2 ②  
Materials and types of construction; services, uses, and economics of farm buildings; farmstead and building planning. BONNICKSEN.
- AE 371. **Seed Processing.** 3 hours fall. 2 ① 1 ③  
Effective seed cleaning requirements; seed separation principles and characteristics; machinery operation and plant layout. Prerequisite: AE 211. BOOSTER.
- AE 381, 382, 383. **Farm Skills.** 1 hour each term. 1 ②  
Farm arc welding and gas welding techniques; application for high school farm mechanics instruction in repair and construction of farm machinery and equipment.
- AE 391. **Farm Implements.** 3 hours fall or spring. 2 ① 1 ③  
Construction, operation, and hitching of equipment used for seed-bed preparation; planting, fertilizing, cultivation, and harvesting machinery. Prerequisite: Mth 100 or equivalent. RODGERS.
- AE 401. **Research.** Terms and hours to be arranged.
- AE 405. **Reading and Conference.** Terms and hours to be arranged.
- AE 406. **Projects.** Terms and hours to be arranged.
- AE 407. **Seminar.** Terms and hours to be arranged.
- AE 408. **Workshop.** Terms and hours to be arranged.
- AE 435. **Household Utilities.** (g) 3 hours spring. 2 ① 1 ③  
Home utilities, their functions and economy. Heating, air conditioning, plumbing, and electricity. Prerequisite: AE 361 or AA 178, or senior standing. CROPSEY.
- AE 451. **Rural House Planning.** (g) 3 hours winter. 1 ① 2 ②  
Structural materials and methods of construction; fundamental design of typical dwellings using planning and building standards developed by Agricultural Experiment Station and other research. Prerequisite: AA 178 and senior standing. SINNARD.

#### Graduate Courses

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

- AE 501. **Research.** Terms and hours to be arranged.
- AE 503. **Thesis.** Terms and hours to be arranged.
- AE 505. **Reading and Conference.** Terms and hours to be arranged.
- AE 506. **Projects.** Terms and hours to be arranged.
- AE 507. **Seminar.** Terms and hours to be arranged.
- AE 508. **Workshop.** Terms and hours to be arranged.

## Dairy and Animal Husbandry

Courses in dairy and animal husbandry are designed to acquaint students with the importance and place of farm animals in our total agricultural and national economy. Principles of breeding, feeding, management, and marketing of farm animals and their products are stressed. Courses in range management and improvement are integrated with the Farm Crops Department to provide sound training in livestock and range problem areas.

The department maintains extensive purebred herds and flocks of dairy cattle, beef cattle, sheep, and swine, and an experimental mink farm. Well-equipped laboratories supplement the herds and flocks for advanced training

and research in physiology, genetics, nutrition, meats, wool, and production problems. Graduate students under supervision of staff members work on Agricultural Experiment Station research problems in pursuit of advanced degrees and all students have opportunity to observe progress and results of research in all areas of dairy and animal husbandry.

Major and minor curricular options are planned for specialized training in livestock and dairy production, farm and ranch management, and for positions in allied industries. Students interested in advanced degrees elect courses which prepare them for graduate programs leading to the M.S. and Ph.D. degrees.

Graduates in dairy and animal husbandry operate their own farms and ranches, become farm and ranch managers, and occupy many responsible positions in the feed, meat, dairy, credit, marketing, and other industries related to agriculture. Extension, research, college teaching, industry, and State and Federal agencies employ many advanced degree graduates.

#### Lower Division Courses

- DAH 121. **Introduction to Dairy and Animal Science.** 3 hours any term. 3 ①  
WOLBERG.
- DAH 122. **Dairy and Animal Science Laboratory.** 2 hours spring. 2 ②  
Prerequisite: DAH 121, prerequisite or parallel.
- DAH 200. **Livestock Management.** 2 hours spring. 2 ②  
Livestock skills necessary in operation of an efficient enterprise. Prerequisite: DAH 121. Staff DAH and VM.
- DAH 221. **Horse Husbandry.** 3 hours fall. 2 ① 1 ②  
Feeding, care, and management of light horses.
- DAH 231. **Selection of Farm Animals.** 2 hours spring. 2 ③
- DAH 311. **Animal Nutrition.** 3 hours fall. 3 ①  
Animal nutrition; digestion and metabolism of nutrients; nutritional deficiencies. Not recommended for animal, dairy, or poultry husbandry majors. Credit will not be given for both DAH 311 and 411. Prerequisite: Ch 103. CHURCH.
- DAH 316. **Animal Fertility.** 3 hours winter. 3 ①  
Male and female genital organs; estrus, semen; fertility and factors affecting it—nutritional, genetical, hormonal; artificial insemination; fertility complex and control over breeding efficiency. MCKENZIE.
- DAH 321. **Dairy Cattle Judging.** 3 hours spring. 2 ③  
Comparative judging of dairy breeds; show-ring terminology; fitting for show. Prerequisite: DAH 231. WOLBERG.
- DAH 322. **Dairy Herd Management.** 3 hours fall. 3 ①  
Breed characteristics, individual selection; factors influencing growth and milk production; management practices. Prerequisite: DAH 121. JONES.
- DAH 331. **Market Livestock Evaluation.** 3 hours winter. 3 ③  
Prerequisite: DAH 121. KENNICK.
- DAH or FC 341. **Range Management.** 3 hours fall or winter. 2 ① 1 ②  
Principles and practices of range and pasture management, orientation in land-use management. Prerequisite: junior standing.
- DAH or FC 342. **Range Improvement.** 3 hours winter. 2 ① 1 ②  
Reseeding, improvement, and maintenance of range, cutover, overflow, marginal, and other grazing lands. Prerequisite: DAH or FC 341. POULTON.
- DAH or FC 343. **Range Plants.** 3 hours spring. 3 ②  
Occurrence, physiology, ecology, and nutritive value of important grass, forb, and browse plants on United States and Oregon ranges. Prerequisite: Bot 321, DAH or FC 341.

- DAH 351. **Meats.** 3 hours fall or spring. 1 ① 2 ③  
Meats of all meat animals; slaughtering, cutting, sanitation and inspection, packing houses, retail markets. Prerequisite: junior standing and consent of instructor. KENNICK.
- DAH 352. **Wholesale and Retail Meat.** 3 hours winter. 2 ① 1 ③  
Identification, selection, and utilization. Prerequisite: junior standing. KENNICK. Offered alternate years. Offered 1960-61.
- DAH 401. **Research.** Terms and hours to be arranged.
- DAH 405. **Reading and Conference.** Terms and hours to be arranged.
- DAH 407. **Seminar.** 1 hour fall, winter, or spring. Staff. 1 ②
- DAH 411. **Animal Nutrition II.** (g) 4 hours fall. 3 ① 1 ②  
Nutrition principles; requirements for growth, maintenance, reproduction, lactation; functions and metabolism of nutrients in animal body; relation of chemical composition of feeds to their functions. Prerequisite: Ch 251. Recommended: Ch 252. OLDFIELD.
- DAH 412. **Livestock Feeding.** (G) 3 hours winter. 3 ①  
Application of nutrition principles to livestock feeding; reference to research at agricultural experiment stations and elsewhere. Prerequisite: DAH 311 or 411. OLDFIELD.
- DAH 413. **Dairy Cattle Feeding.** (G) 3 hours spring. 3 ①  
Rations for growth, maintenance, reproduction, and milk production; experimental studies and techniques. Prerequisite: DAH 322, 411. JONES.
- DAH 414. **Breeding Dairy Cattle.** (G) 3 hours winter. 3 ①  
Origin and development of dairy cattle; systems of breeding; inherited characteristics; progeny tests; planning breeding program. Prerequisite: Z 341. JONES.
- DAH 422. **Sheep Production.** (G) 3 hours winter. 2 ① 1 ②  
Prerequisite: Z 341 and DAH 311 or 411. FOX.
- DAH 423. **Swine Production.** (G) 3 hours winter. 2 ① 1 ②  
Prerequisite: Z 341 and DAH 311 or 411. ENGLAND.
- DAH 424. **Beef Cattle Production.** (G) 3 hours spring. 2 ① 1 ②  
Prerequisite: Z 341 and DAH 311 or 411. MILLER.
- DAH 426. **Stock Judging.** 1 hour fall. 1 ③  
Judging and selection of swine, sheep, beef and dairy cattle; emphasis on differences between show-ring and ranch-production. Prerequisite: DAH 321 or equivalent.
- DAH 427. **Artificial Insemination.** 3 hours winter. 1 ① 2 ②  
Consent of instructor required. Prerequisite: DAH 316. WOLBERG, MCKENZIE.
- DAH 432. **Milk Secretion.** (G) 3 hours spring. 2 ① 1 ③  
The anatomical, physiological, and biochemical aspects of milk secretion. Consent of instructor required. Prerequisite: VM 321, Ch 252. Offered alternate years. Not offered 1960-61. HUETER.
- DAH 433. **Pedigree and Herd Records.** (G) 3 hours spring. 2 ① 1 ②  
Blood lines in development of dairy breeds. Interpretation of production, breeding, and health records. Prerequisite: DAH 322, Z 341. Offered alternate years. Offered 1960-61. JONES, WOLBERG.
- DAH or FC 441. **Range Methods.** (g) 4 hours spring. 3 ① 1 ③  
Methods in evaluating ranges; techniques for measurement of forage utilization, range condition, and trend and inventory; field problems; use of aerial photographs and application of sampling theory. Prerequisite: DAH or FC 341.
- DAH or FC 442. **Range Management Planning.** (G) 3 hours winter. 2 ① 1 ③  
Administration and management of range lands; elements of range management applied to actual problems; making and executing plans. Prerequisite: DAH or FC 441. Offered alternate years. Offered 1960-61.

- DAH or FC 443. **Range Management.** (G) 3 hours winter. 1 ① 2 ②  
See description under FARM CROPS.
- DAH 476. **Reproduction Problems.** (G) 3 hours spring. 1 ① 2 ②  
Breeding efficiency of livestock; effect of nutritional, genetic, and physiological factors; care and management of young and breeding animals; artificial insemination. Prerequisite: DAH 316. KRUEGER, MCKENZIE, WU.
- DAH 478. **Livestock Improvement.** (G) 3 hours spring. 3 ①  
Application of genetics, breeding systems, and selection principles to livestock improvement. Prerequisite: Z 341. BOGART, ENGLAND.
- DAH 481. **Wool Production.** (G) 3 hours fall. 2 ① 1 ②  
Commercial value; physical structure; preparation and marketing; sorting; grading, scouring; manufacture. Fox.
- DAH 483. **Wool Technology.** (G) 2 hours spring. 1 ① 1 ③  
Techniques in evaluating physical properties. Prerequisite: DAH 481. Fox.

#### Graduate Courses

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

- DAH 501. **Research.** Terms and hours to be arranged.
- DAH 503. **Thesis.** Terms and hours to be arranged.
- DAH 505. **Reading and Conference.** Terms and hours to be arranged.
- DAH 507. **Seminar.** Terms and hours to be arranged.
- DAH 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, DAH 411, or their equivalents. Offered alternate years. Offered 1960-61. HAAG.
- DAH or FC 541. **Range Research Methods.** 3 hours spring. 3 ①  
Problem analysis approach to range and pasture investigations; techniques used to facilitate integration of plant and animal research. Prerequisite: St 421, 422, DAH 441. Offered alternate years. Offered 1960-61.
- DAH or FC 543. **Range Management.** 3 hours winter. 1 ① 2 ②  
Physiological, sociological, and nutritional problems in range management. Land use philosophies on a worldwide basis with emphasis on the role of range management. Offered alternate years. Offered 1960-61.
- DAH 550, 551, 552. **Topics in Animal Nutrition.** 2 hours each term. 2 ①  
Recent advances in areas of animal nutrition. Different topic covered each term. Prerequisite: DAH 411. OLDFIELD, CHURCH, HUETER.
- DAH 573. **Physiology of Reproduction in Domestic Animals.** 3 hours spring. 3 ①  
Physiology of ovaries, testes, uterus; role of genetic, nutritional, and endocrine factors in reproduction; role of physical factors and management; influence of micro-organisms on fertility and prenatal growth. Prerequisite: DAH 476. Offered alternate years. Not offered 1960-61. BOGART, KRUEGER, MCKENZIE, OLDFIELD, WU.
- DAH 574. **Growth in Domestic Animals.** 3 hours fall. 3 ①  
Endocrines and growth; bioenergetics and differentiation; genetic, bacterial, and nutritional aspects of growth. Prerequisite: Ch 452, Z 533, DAH 411, 578. Offered alternate years. Offered 1960-61. BOGART, KRUEGER, OLDFIELD, WU.
- DAH 578. **Livestock Genetics.** 4 hours spring. 2 ① 2 ②  
Inheritance of anatomical and physiological abnormalities; genetic significance and efficiency of breeding methods; genetic, physiological interrelations. Prerequisite: Z 341. BOGART.



## Extension Methods

Instruction in extension methods is intended to assist in training for positions as county extension agents in agriculture, as 4-H Club and home economics extension workers, as extension specialists, and as specialists in similar professional fields where extension methods are commonly used. It also gives students in other fields an understanding of how to take advantage of services available through the county extension agents.

An extension worker must know not only subject matter but also methods by which extension work succeeds. He must be able to give or know how to obtain authoritative advice for his community or county on problems related to his field of service. He must know the technique of platform speaking and demonstration, radio speaking, conducting discussions, and publicizing the extension program. Combining a major in agriculture or home economics with training in journalism, speech and dramatics, economics, sociology, and other departments, supplemented by work in extension methods, should materially assist in meeting the need for better trained extension workers.

### Upper Division Courses

- EM 405. Reading and Conference. Terms and hours to be arranged.
- EM 411. Extension Methods. (G) 3 hours winter. 3 ①  
Philosophy and organization of extension work; methods employed by extension specialists, county agricultural and home demonstration agents, 4-H Club leaders, etc.
- EM 412. Extension Methods. (G) 3 hours winter. 3 ①  
Application of knowledge and skills gained in EM 411 and other college courses such as journalism, radio, etc., in the fields of agriculture and home economics extension. Offered alternate years. Not offered 1960-61.
- EM 453. Field Work in Home Economics Extension. (G) Terms and hours to be arranged.  
Field practice in county extension work under supervision of professor of extension methods and county extension agents. Prerequisite: EM 411. MACK.

### Graduate Courses

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

- EM 505. Reading and Conference. Terms and hours to be arranged.

## Farm Crops

The work of the Department of Farm Crops is closely related to six important fields: (1) daily food supply for our human population; (2) feed requirements of all classes of farm animals; (3) growth of plants for textiles; (4) seed and special crops such as drug plants; (5) plant problems of soil conservation; (6) range and wildlife food crops.

Problems of production, improvement, marketing, manufacture, and use of each of field crops produced for food, forage, textile, and special purposes are dealt with by this department. The primary purpose of the major curriculum is to teach students scientific, practical, and economical methods of crop production, marketing, and improvement. The courses make constant application of scientific principles from such fields of study as soils, physics, chemistry, bacteriology, plant pathology, and plant physiology.

The curricula are designed to enable men to fit themselves for business positions in connection with the marketing of seeds and other farm crops; for civil service positions in agronomy, forage crops, soil conservation, range management, grain standardization, plant breeding, and crop marketing; and for experiment station, extension, and teaching work. The object is to develop men trained for leadership in agriculture and to provide scientific training in professional and technical agriculture. Considerable flexibility in electives and the study of original problems is encouraged.

#### Lower Division Courses

- FC 211. **Crop Production.** 5 hours. 3 ① 2 ②  
Field crop production including seeding, establishment, tillage, rotations, culture, production hazards, improvement and quality of cereals, forage, and other field crops. Prerequisite: Bot 201.

#### Upper Division Courses

- FC 311. **Potato Growing.** 2 hours winter. 2 ①  
Production; improvement; storage; cost; marketing; distribution; uses; experimental work; varietal studies; identification, judging, and scoring. SCHUDEL.
- FC 313. **Lawns and Turfs.** 2 hours winter. 1 ① 1 ②  
Turf plants and seeds; seedbed preparation, seeding, fertilization management, weed and pest control for lawns, golf courses, grass nurseries, etc. SCHUDEL.
- 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. FURTTICK.
- 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 of cereal grains. Prerequisite: FC 211.
- FC 324. **Forage Crops.** 3 hours spring. 2 ① 1 ②  
Cultivated hay and pasture; grasses and legumes; pasture establishment and management; hay and silage production; forage crop improvement. Prerequisite: FC 211. MCGUIRE.
- FC 331. **Seed Testing Technique.** 3 hours spring. 1 ① 1 ④  
Techniques of determining seed quality; use and care of laboratory equipment. Prerequisite: FC 211.
- FC 332. **Seed Identification.** 3 hours winter. 2 ① 1 ②  
Identification of seeds of field crops and weeds by external characteristics and internal structures. Prerequisite: FC 211, Bot 203 or 321.
- FC or DAH 341. **Range Management.** 3 hours fall or winter. 2 ① 1 ②  
Principles and practices of range and pasture management, orientation in land-use management. Prerequisite: junior standing.
- FC or DAH 342. **Range Improvement.** 3 hours winter. 2 ① 1 ②  
Reseeding, improvement, and maintenance of range, cutover, overflow, marginal, and other grazing lands. Prerequisite: FC or DAH 341.
- FC or DAH 343. **Range Plants.** 3 hours spring. 3 ②  
Occurrence, physiology, ecology, and nutritive value of important grass, forb, and browse plants on United States and Oregon ranges. Prerequisite: Bot 321, DAH or FC 341.
- FC 401. **Research.** Terms and hours to be arranged.
- FC 403. **Thesis.** Terms and hours to be arranged.
- FC 405. **Reading and Conference.** Terms and hours to be arranged.
- FC 407. **Seminar.** 1 hour each term. 1 ①

- FC 411. **Crop Inspection.** (G) 4 hours winter. 2 ① 2 ②  
Commodity grading and standardization with special emphasis on inspection, grading, and evaluation of cereals, hay, forage, potatoes, beans, seeds, etc. Prerequisite: FC 211, 322, 323, Ch 251, or equivalent. SCHUDEL.
- 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  
Practical application of genetics to improvement of field and horticultural plants. Consent of instructor required. Prerequisite: Z 341, senior standing. FOOTE.
- FC 419. **Industrial Crops.** (g) 3 hours winter. 3 ①  
Production of field crops for industrial uses and products; emphasis on adaptation, agronomic practices, and special qualities. Prerequisite: FC 322. FOOTE.
- <sup>1</sup>FC or DAH 441. **Range Methods.** (g) 4 hours spring. 3 ① 1 ③
- <sup>1</sup>FC or DAH 442. **Range Management Planning.** (G) 3 hours winter. 2 ① 1 ③  
Offered alternate years. Offered 1960-61.
- FC or DAH 443. **Advanced Range Management.** (G) 3 hours winter. 1 ① 1 ②  
Current technical developments in range management, both domestic and foreign. Prerequisite: DAH or FC 341 or consent of instructor.

For the 4-year curriculum in Range Management see page 218.

#### Graduate Courses

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

- FC 501. **Research.** Terms and hours to be arranged.
- FC 503. **Thesis.** Terms and hours to be arranged.
- FC 505. **Reading and Conference.** Terms and hours to be arranged.
- FC 507. **Seminar.** 1 hour each term. 1 ①
- FC 515. **Plant Breeding.** 3 hours fall. 3 ①  
Underlying genetic and cytogenetic principles, methodologies, and theories in improvement of cereal and forage crops. Consideration is given to current literature. Prerequisite: Z 341, FC 517 or equivalent. COWAN.
- FC 516. **Field-Plot Technique.** 3 hours spring. 2 ① 1 ②  
Experimental procedures, methods, and techniques of field-plot experimentation; application of experimental designs to field crop research; interpretation of experimental results. Prerequisite: St 421, 422, or equivalent. FOOTE.
- FC 517. **Plant Genetics.** 3 hours winter. 2 ① 1 ②  
Theories and principles of plant inheritance studies. Prerequisite: Z 341 and consent of instructor. FOOTE.
- FC 518. **Herbicides and Plant Growth Regulators.** 3 hours fall. 3 ①  
Chemicals for weed control and other agronomic purposes; growth regulators, defoliants, and preharvest sprays and their physiological effects; research methods. Prerequisite: FC 317, Ch 252, Bot 331, senior standing. Offered alternate years. Offered 1960-61. FURTICK.
- FC 519. **Crop Seed Physiology.** 4 hours spring. 2 ① 2 ②  
Metabolic changes and affecting factors during stages of seed development, storage, and germination. Prerequisite: Bot 331, 431, Ch 252. CHING.
- 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; plans for dike and streambank protection, sodded waterways, and slope maintenance. Prerequisite: FC 211 and senior standing. MCGUIRE.

<sup>1</sup> For course description see DAIRY AND ANIMAL HUSBANDRY, page 228.

- FC 521. **Concepts of Crop Science.** 3 hours. 3 ①  
Emphasis on history and current literature relative to understanding the concepts of crop production and its role in agriculture. Prerequisite: FC 317, 322, 324.
- FC or DAH 541. **Range Research Methods.** 3 hours spring. 3 ①
- FC or DAH 543. **Range Management.** 3 hours winter. 1 ① 2 ②  
Physiological, ecological, and nutritional problems in range management. Land use philosophies on a worldwide basis with emphasis on the role of range management. Offered alternate years. Offered 1960-61.

## Fish and Game Management

Major students in this department are prepared chiefly for professional careers in wildlife management and in fisheries as biologists, managers, and administrators with State and Federal agencies, land- and water-using industries, and public-health organizations. The curriculum in wildlife management emphasizes the ecological requirements of wild birds and mammals of recreational and economic importance in relation to multiple-use principles of land and water management. An additional curriculum is offered for students planning to enter the fields of commercial and game fisheries.

Strategically located for the study of fish and game management, Oregon State College has within easy access state fish hatcheries, a game farm, refuges, the E. E. Wilson Game Management Area, a fish physiology and toxicity laboratory, and a marine fishery station. Most forms of Oregon's varied wildlife are only a few hours' travel from Corvallis. Research by the U. S. Fish and Wildlife Service and the Oregon State Game Commission conducted at the College in cooperation with the Agricultural Experiment Station is of basic value to the instructional programs. Cooperative water-pollution investigations with the Fish Toxicology and Physiology Unit of the U. S. Public Health Service are important aspects of the graduate studies program.

### Lower Division Courses

- FG 251, 252. **Wildlife Conservation.** 3 hours each term, fall and winter. 3 ①  
Wildlife as a valuable economic and social resource; the need of its conservation through scientific administration and manipulation; the general problems of wildlife management; an introduction to the important wild animal groups of birds, mammals, and fishes.
- FG 261. **Wildlife Technique.** 3 hours each term, fall or spring. 3 ① 1 ②  
Techniques and equipment used by sportsmen in harvesting the game and fish crop; shotguns and elementary ballistics; bait and fly casting; hunting dogs; dressing and caring for flesh of game and fish.
- FG 274, 275, 276. **Economic Ichthyology.** 3 hours each term. 3 ① 1 ②  
Classification and distribution of fishes; general consideration of orders and families with special attention to those of economic and recreational importance in North America and adjacent marine areas. Prerequisite: Z 203.
- FG 281, 282, 283. **Wildlife Management.** 3 hours each term. 2 ① 1 ②  
Management principles applied to wildlife species; measurements of animal populations and productivity; refuge management, hunting and predatory control, food and cover improvements, and other techniques used in controlling wild animal populations. Prerequisite: Z 203, FG 252.

<sup>1</sup> For course description see DAIRY AND ANIMAL HUSBANDRY, page 229.

**Upper Division Courses**

- FG 310, 311, 312. **Forest Wildlife Management.** 3 hours each term. 3 ①  
 Game and fish management in forest areas; measurement and diagnosis of productivity; control of factors inimical to wildlife species; environmental improvements. *Fall term:* big game and fur animals. *Winter term:* game and forest birds. *Spring term:* game fishes.
- FG 319. **History and Literature of Wildlife Management.** 3 hours.  
 winter. 3 ①  
 Brief history of wildlife conservation; survey of literature of wildlife management; sources of wildlife management literature.
- FG 320. **Rodent Control Methods.** 3 hours spring. 2 ① 1 ②  
 Classifications, life histories, and control of rodents important in human disease transmission and in destruction of agricultural crops. Prerequisite: Z 372.
- FG 340. **Field Work.** 1 to 6 hours to be arranged.  
 Practical field work between sophomore and senior years carried on with public agencies and private concerns; written report based on an approved outline. Student registers in absentia. See page 106.
- FG 341. **Fish and Game Law Enforcement.** 3 hours winter. 2 ① 1 ②  
 National and State game laws; law enforcement and scientific methods of evidence collection, preservation, and presentation.
- FG 401. **Research.** Terms and hours to be arranged.
- FG 405. **Reading and Conference.** Terms and hours to be arranged.
- FG 407. **Seminar.** Terms and hours to be arranged.
- FG 440. **Field Studies.** (G) 1 to 6 hours to be arranged.  
 Advanced field problems assigned to meet specific needs of senior and graduate students assigned to field stations. Prerequisite: FG 283 or equivalent.
- FG 451, 452, 453. **Management of Game Birds.** 3 hours each term.  
 2 ① 1 ②  
 Identification, distribution, life histories, ecology, and management of important game bird species. Waterfowl and related forms, fall and winter terms; upland birds, spring term. Prerequisite: Z 371, FG 283.
- FG 454, 455, 456. **Management of Game Fish.** (G) 3 hours each term.  
 2 ① 1 ②  
 Freshwater fishes of North America; trout, salmon, and spiny-rayed fishes; biologies of important species; limnology; dams, fishladders, diversion ditches; pollution; farm fish ponds; and hatchery methods and techniques. Prerequisite: FG 274.
- FG 457, 458. **Management of Big Game.** (G) 3 hours fall and spring.  
 2 ① 1 ②  
 Species of game mammals; habits, distribution, management under natural conditions; values; laws. Prerequisite: Z 372, FG 283.
- FG 460. **Management of Fur Bearers.** (G) 3 hours winter. 2 ① 1 ②  
 Species of wild fur-bearing mammals, identification, life histories, habits, distributions, economic importance and management. Prerequisite: Z 372, FG 283.
- FG 464, 465, 466. **Commercial Fisheries.** 3 hours each term. 2 ① 1 ②  
 Biologies of important species; values; harvesting; regulating fisheries resources. Prerequisite: FG 276.

**Graduate Courses**

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

- FG 501. **Research.** Terms and hours to be arranged.
- FG 503. **Thesis.** Terms and hours to be arranged.

- FG 505. **Reading and Conference.** Terms and hours to be arranged.
- FG 507. **Seminar.** Terms and hours to be arranged.
- FG 561, 562. **Invertebrate Fisheries.** 3 hours winter and spring. 2 ① 1 ②  
Life histories, distribution, identification, harvesting, and utilization of economic mollusca, crustaceans, and other important invertebrates fished and cultivated. DIMICK.
- FG 567, 568, 569. **Fisheries Research Methods.** 3 hours each term. 2 ① 1 ③  
Scientific methods, techniques, and apparatus used in fishery investigations; growth, numbers, and availability of fishes; theories and application of sampling, experimental design, and interpretation of data. Prerequisite: one term of statistics and senior or graduate standing. WARREN.
- FG 570. **Pollution Problems in Fisheries.** 3 hours. 2 ① 1 ②  
Biology of polluted waters; sources, measures, biological indices, and abatement of water pollution affecting fisheries; water requirement and toxicology of fishes and associated aquatic organisms. Prerequisite: FG 456 or equivalent. DOUBOROFF.
- Z 571, 572, 573. **Ichthyology.** 3 hours each term. 2 ① 1 ③  
For course description see *ZOOLOGY*.

## Food and Dairy Technology

**Food Technology** is the application of the sciences and engineering to the manufacture, preservation, storage, transportation, and consumer use of food products. **Dairy technology** deals specifically with milk and milk products.

Processing of the basic raw materials—fruits, vegetables, seafoods, meats, milk, and grains—into consumer products by canning, freezing, dehydrating, fermenting, fabricating, etc., is taught with emphasis on basic principles rather than on specific procedures. Therefore, young men and women who plan to enter food technology or dairy technology must have an interest in the sciences, particularly chemistry, bacteriology, and biology.

Because of the emphasis on the scientific aspects of foods, those who complete one of these curricula have excellent opportunities in the major fields of technology in the largest industry in the world—the food industry. These include operation of food or dairy products manufacturing plants, research and development in industry, government, or college, and regulation of food quality through government agencies and within companies.

**A 4-year program** (page 214) leads to the Bachelor of Science degree. Students following the food technology or the dairy technology curriculum take courses in common during the freshman and sophomore years and many courses in common during the junior and senior years. However, the dairy technology program is more specialized in the last 2 years. Students having an interest in food plant management may select courses related to business as their electives. Students wishing to study a specific phase of foods should enroll for a fifth year leading to the Master of Science degree.

**Graduate programs** leading to the Master of Science and Doctor of Philosophy degrees in *food technology*, *dairy technology*, or *food science* permit intensified study in the subject areas of special interest. Students whose undergraduate major emphasis was in one of the sciences will usually follow the food science program which is concerned with pure science and basic research involving the chemical, physical, and microbiological properties of foods. The Department of Food and Dairy 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 manufacturing. They include well equipped laboratories and pilot plants for teaching and research. In one branch of the Department, the Seafoods Laboratory at Astoria, students may supplement their work at Corvallis by becoming acquainted with various phases of the seafoods industry.

#### Lower Division Courses

- FDT 111. **Food and Dairy Technology.** 3 hours winter. 3 ①  
Food industry and role of food and dairy technologies in its development; nature of foods and the relationship of science and engineering to food manufacture.
- FDT 221, 222, 223. **Food Manufacturing Methods.** 3 hours each term. 2 ① 1 ③  
Unit operations and unit processes applied to food manufacture and preservation.
- FDT 271. **Food Grades and Standards.** 3 hours fall or winter. 3 ②  
Federal, State, and industrial food inspection; quality grading; dairy products standards. Fall for FDT students; Winter for non-FDT students.

#### Upper Division Courses

- FDT 310. **Market Milk.** 3 hours fall. 2 ① 1 ③  
Methods of producing and processing milk; sanitation; legal standards; milk and cream testing. Prerequisite: Bac 204.
- FDT 311. **Food Manufacturing Plants and Equipment.** 3 hours fall. 2 ① 1 ③  
Designing plants and estimating costs; location, construction, equipment, operation; field trips to processing plants. Prerequisite: FDT 223, AE 351, or consent of instructor.
- FDT 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: FDT 271.
- FDT 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 opportunity for any other food and dairy technology course.
- FDT 342, 343. **Food Science.** 4 hours winter and spring. 3 ① 1 ③  
Physical, chemical, and microbiological principles governing manufacture, preservation, and deterioration of foods. Prerequisite: FDT 223, Bac 204, Ch 350, 353.
- FDT 350. **Principles of Food Preservation.** 4 hours spring. 3 ① 1 ③  
Scientific factors in food manufacture, preservation, and deterioration. For students in fields other than food and dairy technology. Prerequisite: Ch 103, Bac 204.
- FDT 372. **Extraneous Materials in Foods.** 3 hours spring. 1 ① 2 ②  
Principles of detection, extraction, and identification of extraneous materials in foods. Maximum of 8 students per laboratory section. Prerequisite: Bac 204.
- FDT 401. **Research.** Terms and hours to be arranged.
- FDT 405. **Reading and Conference.** Terms and hours to be arranged.
- FDT 407. **Seminar.** 1 hour each term. 1 ①
- FDT 412. **Detergency and Waste Disposal.** (G) 3 hours winter. 2 ① 1 ③  
Detergency and methods of evaluating detergents and chemical sterilizers; water conditioning; waste disposal. Prerequisite: Bac 411, Ch 227, 234.

- FDT 413. Laboratory Methods.** (G) 3 hours spring. 2 ① 1 ③  
Chemical and physical methods for laboratory control of dairy products and processes; tests for quality of dry milks, casein, dried whey, and other byproducts; methods of analysis of dairy products. Prerequisite: Ch 457. Ch 234 recommended.
- FDT 417. Dairy Foods.** 3 hours spring. 3 ①  
Principles and procedures for processing major dairy foods. For students in fields other than dairy technology. Prerequisite: Bac 204.
- FDT 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.
- FDT 423. Food Analysis.** (g) 4 hours winter. 2 ① 2 ③  
Systematic analysis of foods other than dairy products; practice in the physical, chemical, and organoleptic laboratory techniques. Prerequisite: FDT 343, Ch 234, 350, 353.
- FDT 424. Food Analysis.** (g) 3 hours spring. 1 ① 2 ③  
Continuation of FDT 423. Prerequisite: FDT 423.
- FDT 430. Utilization of Dairy Products.** (G) 3 hours spring. 3 ①  
Evaluation of milk and milk products; principles of preserving nutritive quality; by-products, their composition and utilization in food and nonfood products. Prerequisite: Ch 457. Students who have not had prerequisite must have consent of instructor.
- FDT 431. Food Packaging.** (G) 3 hours fall. 2 ① 1 ③  
Objectives, requirements, composition, characteristics, merits, selection, and adaptation of packaging materials and packages; chemical and physical properties; adhesives, lacquers, plasticizers, sizers, coatings, laminates, and closures. Prerequisite: FDT 223, 343, or 310, Ch 234.
- FDT 433. Heat Transfer in Food Manufacturing.** (G) 4 hours spring. 3 ① 1 ③  
Heat transfer in canning, dehydration, evaporation, and freezing. Prerequisite: FDT 223; Ph 212; ME 335; AE 352.
- FDT 441, 442, 443. Dairy Products Processing.** (g) 5 hours each term. 3 ① 1 ③  
Application of basic science to current industrial processing of butter, cheese and cheese products, frozen dairy products, concentrated milk products, and market milk products. Prerequisite: Ph 212; Ch 234, 350; Bac 411.

#### Graduate Courses

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

- FDT 501. Research.** Terms and hours to be arranged.
- FDT 503. Thesis.** Terms and hours to be arranged.
- FDT 505. Reading and Conference.** Terms and hours to be arranged.
- FDT 507. Seminar.** Terms and hours to be arranged.
- FDT 511. Food Industries Research Methods.** 3 hours winter. 3 ①  
Scientific research; industrial research; personal effectiveness in selection, design, interpretation, and reporting of experiments; creativity and attitudes; industrial research management. Prerequisite: upper division science, upper division food technology, and St 422. Offered alternate years. Not offered 1960-61.
- FDT 521. Color and Flavor Evaluation.** 3 hours winter. 2 ① 1 ③  
Basic theory as foundation for actual practice in measurement of food qualities and consumer acceptance; advantages and limitations of various techniques. Prerequisite: Ch 350, 353. Offered alternate years. Offered 1960-61.
- FDT 523. Quality Control Methods and Systems.** 3 hours fall. 2 ① 1 ③  
Scope, general principles, organization, and functioning of quality control systems; types of controls and points of application; sampling in specific food industries; development of objective tests; field trips. Prerequisite: FDT 271, 423, St 421. Offered alternate years. Offered 1960-61.



- FDT 532. **Edible Oils.** 3 hours spring. 2 ① 1 ③  
 Production and processing of fats and oils which are used in food products; antioxidants. Prerequisite: Ch 350, 353. Offered alternate years. Not offered 1960-61.
- FDT 542. **Food Fermentation.** 3 hours spring. 2 ① 1 ③  
 Industrial utilization of fermentable foods and food wastes. Prerequisite: FDT 342. Offered alternate years. Not offered 1960-61.
- FDT 551. **Thermal Processing of Canned Foods.** 3 hours fall. 2 ① 1 ③  
 Thermal processes; graphical, mathematical, nomogram methods; time-temperature relationships; convection, conduction, and high-temperature short-time processes. Prerequisite: Bac 460, Mth 102, Ph 212. Offered alternate years. Not offered 1960-61.

## Horticulture

The Department of Horticulture offers courses of study which represent the major phases of Oregon's extensive and highly diversified horticultural industry and affords students a wide choice of vocations and careers.

**Curricula in pomology and vegetable crops** cover the broad and general fields of fruit, nut, and vegetable growing, distribution, and marketing. They prepare students for fruit and vegetable farming and for technical and executive positions. Adjustments of curricula are made to accommodate students preparing for research and technical work with State and Federal agencies, colleges and experiment stations, private laboratories, or research foundations.

**Curricula in floriculture and nursery management** provide intensive instruction in scientific and applied phases of these professions and offer a fairly wide range of subjects to provide a liberal or cultural background. They prepare students for participation in various branches of the florist and nursery business and for positions as teachers, research workers, and technicians. The 2-year terminal curriculum in Nursery Management provides instruction and training for those students interested in doing general nursery management work as nursery foremen, propagators, planting foremen, assistant nursery superintendents, and in related positions.

**The curriculum in landscape construction and maintenance** prepares for professional careers in the laying out, planting, care, and supervision of country and municipal homes, parks, playground areas, and highway landscape developments. Emphasis is laid on practical application of landscape knowledge and on fundamentals of ornamental plant culture.

### Lower Division Courses

- Hrt 111. **Elements of Horticulture.** 3 hours. 2 ① 1 ②  
 Beginning course in horticulture; principles underlying the culture and utilization of fruits, nuts, vegetables, and ornamental plants. Prerequisite to all horticultural courses except Hrt 253.
- 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.
- Hrt 253. **Flower Arrangement.** 3 hours fall or spring. 2 ① 1 ②  
 Basic principles of flower arrangement as applied to florist work.

## Upper Division Courses

- Hrt 311. **Plant Propagation.** 3 hours winter. 1 ① 2 ②  
Methods of propagating or perpetuating plants by means of seeds, cuttings, layers, tubers, bulbs, budding, and grafting. Practice in the greenhouse, nursery, field, and orchard.
- Hrt 313. **Greenhouse Construction and Management.** 3 hours winter. 2 ① 1 ②  
Details of planning, layout, construction, and heating of modern greenhouses; factors involved in the efficient operation of a greenhouse range. Offered alternate years. Offered 1960-61.
- Hrt 315. **Basic Horticulture.** 3 hours fall. 2 ① 1 ②  
Continuation of Hrt 111. Consideration and application of principles underlying horticultural practices and techniques.
- Hrt 317. **History and Literature of Horticulture.** 2 hours winter. 2 ①  
Brief history of horticulture; systematic survey of the literature of horticulture acquainting the student with the source of horticultural knowledge.
- Hrt 333. **Fruit and Nut Production.** 4 hours spring. 3 ① 1 ②  
Problems of fruit and nut production; economics and geography of fruit and nut growing; heat, water, and light requirements of fruit plants; winter hardiness and frost prevention; orchard soil management; pollination, thinning, pruning, and other practices.
- Hrt 341. **Principles of Vegetable Gardening.** 4 hours winter. 3 ① 1 ②  
Seeding; plant production; varieties; soil and climatic influences; home vegetable gardens. Basic course for students specializing in vegetable production; adapted to vocational agriculture and extension studies.
- Hrt 342. **Commercial Vegetable Production.** 4 hours spring. 3 ① 1 ②  
Problems of vegetable production; economic aspects of vegetable industry; environmental effects; seed, plant production, irrigation, nutrition, and other aspects of major vegetable crop plants. Offered alternate years. Not offered 1960-61.
- Hrt 351, 352, 353. **Commercial Floriculture.** 3 hours each term. 2 ① 1 ②  
Culture of cut flowers, pot plants, and forced bulbous crops grown on a commercial scale; modern techniques and recent research findings. Offered alternate years. Not offered 1960-61.
- 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.
- Hrt 361, 362. **Nursery Management.** 4 hours fall and winter. 3 ① 1 ②  
Organization and management of nurseries; propagation techniques, planting, culture, digging, packing, and storing of nursery stock; inspection, quarantine regulations; transportation and marketing.
- 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  
Application of principles of genetics to improvement of horticultural plants; origin of horticultural strains and varieties; breeding techniques as applied to horticultural plants.
- Hrt 415. **Spraying, Dusting, and Fumigation.** (g) 3 hours spring. 2 ① 1 ②  
Insect and disease control; preparation and application of sprays, dusts, and fumigants; spray combinations and compatibility; equipment; spray calendars and programs.

- Hrt 431. **Fruit Handling and Distribution I.** (g) 4 hours winter. 3 ① 1 ②  
Problems of fruit handling; harvesting, grading, packing, inspection, storage, transportation, and marketing.
- Hrt 433. **Systematic Pomology.** (G) 4 hours fall. 2 ① 2 ②  
Fruit taxonomy; fruit groups and botanical relationships; variety description, nomenclature and classification; judging and displaying.
- Hrt 441. **Vegetable Handling and Distribution.** (G) 3 hours winter. 2 ① 1 ②  
Harvesting; grading; packing; inspection; transportation; storage and distribution.
- Hrt 443. **Systematic Vegetable Crops.** (G) 3 hours fall. 1 ① 2 ②  
Botanical relationships; variety descriptions and values; identification; classification; displaying and judging. Offered alternate years. Not offered 1960-61.
- 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 1960-61.
- Hrt 453. **Handling and Distribution of Florist Crops.** 3 hours fall. 2 ① 1 ②  
Problems of precooling, packaging, storing, transporting, and distributing florist crops. Offered alternate years. Offered 1960-61.
- Graduate Courses**  
Courses numbered 400-499 and designated (g) or (G)  
may be taken for graduate credit.
- Hrt 501. **Research.** Terms and hours to be arranged.
- Hrt 503. **Thesis.** Terms and hours to be arranged.
- Hrt 505. **Reading and Conference.** Terms and hours to be arranged.
- Hrt 507. **Seminar.** Terms and hours to be arranged.
- Hrt 511. **Horticultural Genetics Lectures.** 3 hours fall. 3 ①  
Special attention to application of genetic theories and fundamental principles in development of horticultural plants. Inheritance studies; mutation phenomena; polyploidy and interspecific hybridization. Prerequisite: Hrt 413, Z 341. Offered alternate years. Not offered 1960-61. ZIELINSKI.
- Hrt 512. **Horticultural Genetics Laboratory.** 2 hours. 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 1960-61.
- Hrt 513. **Horticultural Genetics Lectures.** 3 hours winter. 3 ①  
Continuation of Hrt 511. Offered alternate years. Not offered 1960-61. ZIELINSKI.
- Hrt 514. **Horticultural Genetics Laboratory.** 2 hours winter. 2 ②  
Continuation of Hrt 512. Offered alternate years. Not offered 1960-61. ZIELINSKI.
- 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 1960-61.
- Hrt 516. **Horticultural Plant Nutrition Problems.** 4 hours. 4 ①  
Plant nutrition as applied to horticultural crop production. Prerequisite: Hrt 315, Bot 433, or equivalent, or consent of instructor. Offered alternate years. Offered 1960-61.
- Hrt 531. **Fruit Handling and Distribution.** 4 hours. 4 ①  
Fundamentals of fresh fruit handling. One period, other periods to be arranged. Prerequisite: Hrt 431 or equivalent, consent of instructor. Offered alternate years. Not offered 1960-61. HANSEN.

- Hrt 533. **Fruit and Nut Production.** 4 hours spring. 4 ①  
 Fundamentals of fruit and nut production. One period, other periods to be arranged. Prerequisite: Hrt 315, 333, Bot 331, Ch 251, or equivalents. Offered alternate years. Offered 1960-61.
- Hrt 541. **Vegetable Crop Problems.** 4 hours. 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 315, 341, or their equivalent. Offered alternate years. Not offered 1960-61. FRAZIER, APPLE.

## Poultry Husbandry

With the development of the chicken and turkey industries has come a demand for persons trained in poultry husbandry. Besides the actual production of eggs, broilers, and turkeys for market there are opportunities for efficient hatchery operators as well as chicken and turkey breeders. There is an increasing demand for Federal and State extension and experiment station workers, field service men and feed specialists with feed companies, and personnel for processing concerns and cooperative associations.

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.

### Lower Division Course

- P 121. **Poultry Production.** 3 hours any term. 2 ① 1 ②  
 Various phases of poultry industry; kinds of poultry; physiology, reproduction, feeding, housing, brooding, and management practices. PARKER, McCLUSKEY.

### Upper Division Courses

- P 321. **Incubation.** 3 hours winter. 2 ① 1 ②  
 The incubation requirements of chicken and turkey eggs. Students may work on a selected problem. Prerequisite: P 121. Offered alternate years. Offered 1960-61. BERNIER.
- P 322. **Brooding and Broiler Production.** 3 hours spring. 3 ①  
 Brooding requirements of chickens and turkey poults; types of brooding equipment; commercial broiler production. Prerequisite: P 121. McCLUSKEY.
- P 341. **Poultry Judging.** 3 hours winter. 2 ① 1 ②  
 Judging poultry for standard and production qualities. Prerequisite: P 121. Offered alternate years. Not offered 1960-61. PARKER.
- P 351. **Turkey Management.** 3 hours fall. 2 ① 1 ②  
 Practical details in the breeding, feeding, rearing, and marketing of turkeys. Prerequisite: P 121. Offered alternate years. Offered 1960-61. HARPER.
- P 403. **Thesis.** Terms and hours to be arranged.
- P 405. **Reading and Conference.** Terms and hours to be arranged.
- P 407. **Seminar.** 1 hour winter and spring terms. 1 ①
- P 411. **Poultry Feeding.** (g) 3 hours fall. 3 ①  
 Systems of feeding poultry, and nutritional requirements; formulation of rations; common nutritional deficiencies. Prerequisite: P 121. ARSCOTT.
- P 412. **Poultry Feeding Laboratory.** (g) 1 hour. 1 ②  
 Laboratory work to accompany P 411.

- P 413. **Poultry Nutrition.** (G) 3 hours spring. 3 ①  
 Proteins, minerals, energy, vitamins, antibiotics, other feed additives in chicken and turkey nutrition. Digestion and metabolism of these substances. Prerequisite: nutrition and organic or biochemistry. ARSCOTT.
- P 421. **Marketing Poultry Products.** (g) 3 hours fall. 2 ① 1 ②  
 Preparation of poultry and eggs for market. Commercial handling of poultry products. Prerequisite: P 121. Offered alternate years. Not offered 1960-61. HARPER.
- P 431. **Poultry Plant Management.** (g) 3 hours spring. 3 ①  
 Location, layout, and arrangement of buildings and equipment. Management practices. Visits to commercial poultry farms. Prerequisite: P 121 and one other poultry course. Offered alternate years. Offered 1960-61. PARKER.
- P 441. **Poultry Breeding.** (g) 3 hours fall. 3 ①  
 Inheritance of egg and meat production in domestic fowls. Prerequisite: P 121. Offered alternate years. Not offered 1960-61. BERNIER.
- P 442. **Population Genetics and Breeding Improvement.** (G) 3 hours spring. 3 ①  
 Population genetics and application of selection and mating for improvement of quantitative characters. Prerequisite: Z 341, St 421, 422 or equivalent. BERNIER.
- P 451. **Commercial Practices.** (G) 3 hours winter. 3 ①  
 Operations and practices in commercial poultry production. Prerequisite: senior standing. PARKER and staff.

#### Graduate Courses

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

- P 501. **Research.** Terms and hours to be arranged.
- P 503. **Thesis.** Terms and hours to be arranged.
- P 505. **Reading and Conference.** Terms and hours to be arranged.
- P 507. **Seminar.** Terms and hours to be arranged.

## Soils

The intelligent development, management, and conservation of Oregon soil and water resources are essential for the State's welfare. The objective of the curriculum in soils is to give students a scientific and practical understanding of soils and their management, with training in related fields of agriculture and science. A total of 45 elective hours in junior and senior years permits the student to adapt the program to his interests and needs.

Students in soils interested in farming or positions as county extension agents requiring a broad knowledge of agriculture may take work in closely related fields of agriculture, and in social science. Soils majors may prepare for work in soil conservation planning, soil survey, land appraisal, fertilizer sales, irrigation work, or as field men with vegetable and fruit processing or other commercial organizations. They may prepare for more technical soils positions, such as teaching or research in colleges or universities, research in other State or Federal agencies and industry, or other specialized soils positions requiring a strong background in the basic sciences. Such positions usually require graduate training.

Students interested in preparing for graduate studies in soils should consult with the head of the department as early in their college program as possible. A sequence of courses will be developed to meet the student's particular

needs, including the following courses: Mth 101, 102, 103, 201, 202, 203; Ch 204, 205, 206, 232, 233; Ph 201, 202, 203. Where desirable, certain substitutions will be arranged. Students potentially capable of maintaining a high scholastic record in basic sciences and desiring intensive training in a specialized field will be encouraged to adopt this type of program. Graduate work is offered leading to the degrees of Master of Science and Doctor of Philosophy in soils. Students majoring in other departments may minor in soils. Soil fertility, soil physics, soil chemistry, irrigation, forest soils, or soil genesis, morphology, and classification may be emphasized in graduate programs.

#### Lower Division Courses

- Sls 211, 212. **Soils.** 3 hours each term. 2 ① 1 ③  
Soil origin, formation, classification; physical, chemical, and biological characteristics; effects of tillage, drainage, irrigation, and organic matter; plant nutrients and fertilizers; rotations. Prerequisite: Ch 103, Mth 100. JOHNSGARD.
- Sls 214. **Forest Soils.** 4 hours spring. 3 ① 1 ③  
Origin, development, characteristics, and classification of forest soils, relation of soils to forest types, to rate of forest growth and methods of forest management, to vegetation, moisture reaction and fertility; soil management and conservation. Prerequisite: Ch 102. YOUNGBERG.

#### Upper Division Courses

- Sls 311. **Soil Water and Irrigation.** 3 hours fall. 2 ① 1 ③  
Fundamentals of supply, delivery, and application of water to the land; basic principles of water-soil relationships; quality of water, water rights; management of water, soil, and cropping practices for permanent irrigation agriculture. Prerequisite: Sls 212. EVANS.
- Sls 314. **Soil Management and Conservation.** 4 hours spring. 3 ① 1 ③  
Identifying, analyzing, and solving soil management and conservation problems; maintaining and increasing soil productivity; conservation farming; climate, topography, vegetation, slope, soil; drainage, irrigation, erosion control, tillage, fertility, organic matter, crop rotation, salinity-alkalinity. Prerequisite: Sls 212. 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 212, 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 212. Introductory courses in mathematics and physics recommended. ASHCROFT.
- Bac 421, 422. **Soil Bacteriology.** (G) 4 and 3 hours. 4 ①; 3 ①  
See BACTERIOLOGY and HYGIENE 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. ASHCROFT.
- Sls 424. **Soil Fertility Lectures.** (g) 3 hours winter. 3 ①  
Chemical, physical, and biological properties of soils in relation to the availability of nutrient elements; soil amendments, fertilizers, manure and crop rotations in a fertility management program. Prerequisite: Sls 212. CHENEY.

- Sls 425. **Soil and Plant Analysis.** (g) 3 hours spring. 1 ① 2 ③  
Chemical methods, interpretation and correlation of analyses with crop response, current literature on methods. Prerequisite: Sls 424, Ch 234. ALBAN.
- Sls 432. **Soil Survey.** (g) 4 hours spring. 3 ① 1 ③  
Description, identification, and classification of soils; soils of Oregon; techniques of making and using soil surveys, 2 all-day field trips required. Prerequisite: Sls 212, course in geology. KNOX.

#### Graduate Courses

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

- Sls 501. **Research.** Terms and hours to be arranged.
- Sls 503. **Thesis.** Terms and hours to be arranged.
- Sls 505. **Reading and Conference.** Terms and hours to be arranged.
- Sls 507. **Seminar.** Terms and hours to be arranged.
- Sls 511. **Soil Genesis, Morphology, and Classification.** 3 hours winter. 3 ①  
Soil forming processes; morphology; classification; geographical distribution of soils. Two all-day field trips required. Prerequisite: consent of instructor; physical geology and rocks and minerals courses recommended. Offered alternate years. Offered 1960-61. KNOX.
- Sls 512. **Soil Colloids.** 4 hours winter. 3 ① 1 ③  
Structures of clay minerals, methods of identification including X-ray diffraction, chemistry of weathering and formation, physical and colloidal chemistry of soils, hydration of soil colloids, electro-kinetic properties. Prerequisite: Sls 212, 412, Ch 234 or equivalents. Ch 442 recommended. Offered alternate years. Not offered 1960-61. HARWARD.
- Sls 513. **Soil Fertility.** 3 hours winter. 3 ①  
Concepts and approaches to soil fertility; relations of soil chemistry, plant physiology, and crop sciences to soil fertility; current literature. Prerequisite: Sls 421; Sls 412 recommended. Offered alternate years. Offered 1960-61. HARWARD.
- Sls 514. **Forest Soils.** 3 hours. 3 ①  
Forest growth; physical, chemical, and biological properties in occurrence and growth of forests. Prerequisite: consent of instructor. Soil survey and forest ecology courses recommended as preparation. Offered alternate years. Not offered 1960-61. 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 1960-61. EVANS.
- Sls 522. **Soil Physical Conditions and Plant Growth.** 3 hours spring. 3 ①  
Relations of soil moisture, temperature, air, and mechanical impedance to seed germination, shoot emergence, and plant growth. Prerequisite: Sls 421. Offered alternate years. Offered 1960-61. EVANS.

## Veterinary Medicine

The courses in veterinary medicine aim to fit the student for successful handling of livestock. Anatomy and physiology of domestic animals familiarize him with normal structures and functions of the animal body, thus laying a foundation for courses in judging, breeding, feeds and feeding, nutrition, and diseases of animals. The study of diseases is taken up from the standpoint of the livestock owner. The student learns to recognize disease, to care for sick animals, and to prevent disease through proper methods of sanitation and management. Importance of quarantine, different methods of control and eradication of disease, and role of stock owners in maintaining this work are considered. The department does not train men to enter the veterinary profession.

**Upper Division Courses**

- VM 311. **Anatomy and Physiology of the Fowl.** 3 hours winter. 2 ① 1 ②  
Structure and physiology of body of fowl.
- VM 320. **Anatomy and Physiology of Domestic Animals.** 4 hours fall. 1 ① 3 ②
- VM 321. **Anatomy and Physiology of Domestic Animals.** 4 hours winter. 2 ① 2 ②  
Prerequisite: VM 320.
- 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 351. **Diseases of Poultry.** 4 hours spring. 3 ① 1 ②  
Poultry hygiene and sanitation; nature and cause of common poultry diseases; relation of management to control of diseases. Prerequisite: VM 311. Offered alternate years. Not offered 1960-61.
- VM 355. **Diseases of Game Birds.** 3 hours spring. 2 ① 1 ②  
Similar to VM 351, but concerned with game birds. Prerequisite: VM 311.
- VM 361. **Parasitic Diseases of Domestic and Game Animals.** 4 hours winter. 2 ① 2 ②  
Intensive study of common parasitic diseases of domestic animals.
- VM 441, 442. **Sanitation and Disease Control.** (g) 4 hours fall and winter. 3 ① 1 ②  
Predisposing and primary causes of disease, epizootology, and practical disease control. Prerequisite: VM 321.

**Graduate Courses**

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

- VM 501. **Research.** Terms and hours to be arranged.
- VM 503. **Thesis.** Terms and hours to be arranged.
- VM 505. **Reading and Conference.** Terms and hours to be arranged.
- VM 507. **Seminar.** Terms and hours to be arranged.



# School of Business and Technology

## Faculty

*As of January, 1960*

CLIFFORD ELGES MASER, Ph.D., Dean of the School of Business and Technology.

LOUIS L. EDWARDS, M.E., Head Counselor and Placement Director.

**Business Administration:** Professors LEMASTER (department chairman), CAMPBELL, CRAIG, MASER, NEWTON, PFANNER, SEATON; Associate Professors EASTON, GODDARD, MENGLER, STRICKLER; Assistant Professors ALLAN, BLAKENEY, DALBEY, DAVIDSON, SCHREIMA, SJOGREN; Instructors EDWARDS, MASSEY, NELSON.

**Business Education:** Professors YERIAN (department head), LARSE, WINGER; Assistant Professor BARBER.

**Secretarial Science:** Professors YERIAN (department head), LARSE, WINGER; Associate Professors SRUTZ (emeritus), Assistant Professors BARBER, JONES, ORNER; Instructors PERKINS, WIPER.

## Statement of Objectives

**T**HE OBJECTIVE of the Oregon State College School of Business and Technology is to help prepare those it serves to find self-fulfillment, to accept responsible membership and leadership in a free democratic society, and to function effectively in a free enterprise business community. This goal is approached through activities in resident instruction, services rendered to the business community, and through professional activity and scholarly research on the part of its faculty.

The School of Business and Technology at Oregon State College offers:

- (1) major work in business administration in combination with a technology;
- (2) major work in secretarial science;
- (3) in conjunction with the School of Education, major work in business education for the preparation of teachers.

## Educational Objective Defined

In working toward its objective the School of Business and Technology, as an undergraduate collegiate School of Business, accepts its primary responsibility to be that of resident instruction. The most important means of accomplishment is through its professional curricula. These include the following approaches to the achievement of the School's stated aims:

1. To prepare those it serves for responsible entrepreneurial or professional management roles in the modern free enterprise business community. Courses offered by the Department of Business Administration in the basic principles and applications of business organization, management, and control, are included in the curriculum to help achieve this objective. Functionally specialized courses are purposely held to a minimum in favor of the broadest possible liberal and professional education.

2. To prepare men and women for the teaching of business subjects in the secondary schools and for responsible secretarial or office management positions. Courses offered by the Departments of Business Education and Secretarial Science, in both principles and techniques, are designed to help achieve this objective.

3. To acquaint those it serves with a basic knowledge of the vocabulary, materials, methods, and techniques of industry to the end that, as prospective business managers, they may understand the technological aspects of the enterprise in which they may be engaged and may adequately communicate concerning them. Courses offered by the Schools of Agriculture, Engineering, Forestry, Home Economics, and Science, are built, as technical minors, into the curriculum of each business administration student for the purpose.

4. To stimulate each individual it serves to: work at his intellectually creative best, keep his imagination free, measure his judgments against well considered value standards, and find articulate self-expression. Humanities courses in the curriculum help the student to reach this goal.

5. To bring to those it serves an awareness of the functions and problems of the human society so that they may live to appreciate its worth and contribute to the opportunities and freedom it provides. Social science courses are included in the curriculum to help achieve this objective.

6. To explain to those it serves the nature of the universe about them so that they may better understand some of the wonders of creation and the relationship of the human being to his physical environment. An integrated course in the biological and physical sciences is included in the curriculum to help achieve this objective.

7. To build the foundation for further, more highly specialized, business studies at the graduate level.

## General Statement

**High School Preparation.** A student intending to major in the School of Business and Technology will be well served through the completion of the following courses in high school: English, four years; algebra, two years; history and social studies, three years; typing, two years; natural science, two years.

**Transfer Students.** A student contemplating transferring to the School of Business and Technology from another institution or from another school at Oregon State College should do so, if at all possible, prior to or during the sophomore year. Experience indicates that the fulfillment of course requirements within the normal 4-year period becomes progressively more difficult to accomplish with each term that is completed prior to the 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 to a faculty adviser immediately after registering in the school. The adviser stands ready at all times to assist the student in such matters as career requirements and opportunities, course and curricular requirements and academic counseling. The student may exercise the prerogative of asking to be assigned to a different adviser, if after having become better acquainted with the staff, it seems preferable to make such a change.

**Placement.** The Placement Director of the School of Business and Technology operates through the Office of the Dean. His services are available to all students seeking information concerning placement opportunities, interviews with visiting firms, and general information concerning career objectives.

**Double Degrees.** Increasing numbers of students majoring in agriculture, engineering, forestry, home economics, and science have come to the conclusion that preparation in business administration, in addition to work in their original major field, will prove to be of great value. As a result, a significant number have been completing requirements for degrees in more than one field.

The requirements which a student would need to fulfill in order to qualify for two or more Baccalaureate degrees are listed on page 101. 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.

## Major Fields

**Business Administration and Technology.** The major curricula in business administration consist of a core of required courses: Introduction to Business, Accounting, Finance, Production, Marketing, Statistics, Business Law, Human Relations in Business and Industry, Government Relations in Business and Industry, and Business and Industrial Policy. In addition, the student must complete, during his junior and senior years, 18 term hours of upper division business or related courses, selected in terms of his career objectives. These courses may be chosen with a view to gaining a broad general training in business, or may be selected from one of five areas of concentrated study: Industrial Accounting and Cost Control, Industrial Finance, Production Management, Industrial Marketing and Selling, Industrial Relations and Personnel Management.

Students majoring in Business Administration and Technology combine any one of the major business curricula with a technical minor of 27 term hours, over and above such prerequisite and related courses as mathematics, physics, and chemistry. Technical minors and their specific course requirements are listed on pages 254-259.

No graduate work is offered for majors in business administration and technology. Graduate students majoring in other fields may apply toward their minor requirements courses designated (g).

The School of Business Administration at the University of Oregon offers major work, both undergraduate and graduate, in all fields of business where the interests of a student do not demand that technical training be taken in combination with business administration.

**Business Education.** The Department of Business Education offers a full 4-year major curriculum designed to prepare high school business teachers. The fact that students completing this curriculum are prepared to enter both the teaching and the secretarial fields has made this program of study increasingly attractive. Both fields offer excellent opportunities to men and women.

For requirements for a State Teacher's Certificate, a list of teaching minors, and further information in regard to both undergraduate and graduate work in this department see SCHOOL OF EDUCATION.

**Secretarial Science.** Responsible secretarial and allied positions such as office manager, administrative assistant, and research assistant, are going more and more to the college-trained person. Such positions require, in addition to the secretarial skills, background training in business administration, English and business correspondence, economics, psychology, and liberal arts. Students

who come with previous training in typing and stenography are permitted to register in advanced classes according to their abilities. Many high school graduates begin with second-year stenography.

Special 1- and 2-year terminal programs are arranged for those who do not plan to be graduated.

## Curriculum in Business Administration and Technology

*B.S., B.A. Degrees\**

### Lower Division Curriculum

	Term hours		
	F	W	S
<b>Freshman Year</b>			
Introduction to Business and Industry, BA 111.....	4	....	....
<sup>1</sup> Intermediate Algebra, Mth 100.....	....	4	....
<sup>2</sup> Natural science sequence.....	3	3	3
<sup>3</sup> Social science sequence.....	3	3	3
<sup>4</sup> Social science elective.....	....	3	3
<sup>5</sup> English Composition, Wr 111, 112, 113.....	3	3	3
Electives.....	3	....	3
<sup>6</sup> Air, Military, or Naval Science (men), -S 111, 112, 113.....	1-3	1-3	1-3
<sup>7</sup> Physical Education, PE 190, 190, 190.....	1	1	1
	17-19	18-20	17-19
<b>Sophomore Year</b>			
Principles of Economics, Ec 201, 202, 203.....	3	3	3
Principles of Accounting, BA 211, 212, 213.....	3	3	3
Production, BA 311.....	4	(4)	(4)
Finance, BA 312.....	(4)	4	(4)
Marketing, BA 313.....	(4)	(4)	4
<sup>8</sup> Technical minor.....	3	3	3
Electives.....	3	3	3
<sup>6</sup> Air, Military, or Naval Science (men), -S 211, 212, 213.....	1-3	1-3	1-3
Physical Education, PE 190, 190, 190.....	1	1	1
	18-20	18-20	18-20

\* Requirements for degrees and certificates are listed on page 100.

<sup>1</sup> Students who are required to complete Elementary Algebra, Mth 10, as the result of the mathematics placement test, will move the course in Intermediate Algebra, Mth 100, to the spring term at the expense of the listed elective.

<sup>2</sup> The natural science sequence must be completed through the selection of any of the science group courses listed in the Lower Division section of the College Catalog, pages 133 and 134. Courses in mathematics and psychology are precluded from such selection.

<sup>3</sup> The social science sequence must be completed through the selection of any of the social science "Group Courses" listed on page 133 of the College Catalog. The course entitled "Background of Social Science," SSc 101, 102, 103, is precluded from such selection.

<sup>4</sup> Electives in the social sciences may be chosen from any of the courses offered by the Social Science Departments, excluding SSc 101, 102, 103.

<sup>5</sup> Students who do not earn a minimum rating in the English placement examination are advised to take extra work concurrently with Wr 111; students who show exceptional ability on this examination are placed in honors sections.

<sup>6</sup> Students registered for Naval Science courses may defer to the junior year the social science sequence listed in the freshman year and may drop the Technical Minor courses listed for the sophomore year. Upper division Naval Science courses may be taken to fulfill the Technical Minor courses requirement in the junior and senior years.

<sup>7</sup> 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.

<sup>8</sup> At the beginning of their sophomore year, students majoring in Business Administration and Technology are required to select a Technical Minor. The Technical Minors are listed on pages 254 through 259.

**Upper Division Curriculum**

	Term hours		
	F	W	S
<b>Junior Year</b>			
Business Law, BA 411, 412, 413.....	3	3	3
Business and Industrial Statistics, BA 431, 432.....	3	3	3
<sup>1</sup> Business Administration (Concentration).....	3	3	3
Business Administration elective.....	3	3	3
Technical Minor.....	3	3	3
Electives .....	3	3	3
	15	15	15
<sup>2</sup> Electives (Optional).....	3	3	3
	18	18	18
<b>Senior Year</b>			
Human Relations in Business and Industry, BA 497.....	3	(3)	(3)
Government Relations in Business and Industry, BA 498.....	(3)	3	(3)
Business and Industrial Policy, BA 499.....	(3)	(3)	3
Business Administration (Concentration).....	3	3	3
<sup>3</sup> Social Science Sequence.....	3	3	3
Technical Minor.....	3	3	3
Electives .....	3	3	3
	15	15	15
<sup>2</sup> Electives (Optional).....	3	3	3
	18	18	18

**Areas of Concentration**

In addition to core curriculum requirements, 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. Concentration in General Business and Industry.
- II. Concentration in any one of five functional areas of Business Administration.

**I. General Business and Industry Concentration**

The student in the General Business and Industry concentration will be expected to program his 18 hours of upper division business administration or related courses at the beginning of his junior year in terms of his career objectives, after consultation and with the approval of his faculty adviser.

A maximum of three upper division courses in economics may be accepted in lieu of approved business administration courses.

	Term hours		
	F	W	S
<b>Junior Year</b>			
Approved Business Administration courses.....	3	3	3
<b>Senior Year</b>			
Approved Business Administration courses.....	3	3	3

**II. Functional Areas of Business Concentration**

The student may select, as an area of concentration, any one of the following functional fields: Accounting, Industrial Finance, Industrial Marketing and Selling, Industrial Relations and Personnel Management, Production Management, Agricultural Business Management. He will be expected to select his area of concentration at the beginning of his junior year, after consultation with an instructor teaching in the area in which he proposes to concentrate and with the approval of his faculty adviser. Some substitution of courses may be permitted for exceptionally well-qualified students or for students with unusual objectives.

<sup>1</sup> Students majoring in Business Administration and Technology are required to choose an Area of Concentration in Business Administration at the beginning of their junior year. The Areas of Concentration are listed on pages 249 through 251.

<sup>2</sup> No student is required to register for any of the optional electives. However, considerable enrichment of the educational program may be gained through the completion of such added courses. It is, therefore, strongly recommended to all students who have earned a cumulative grade-point average of 2.50 or above that they add some or all of the optional electives to their program.

<sup>3</sup> The social science sequence must be completed through the selection of any of the social science "Group Courses" listed on page 133 of the College Catalog. The course entitled "Background of Social Science," SSsc 101, 102, 103, is precluded from such selection.

**Industrial Accounting and Cost Control**

	Term hours		
	F	W	S
<b>Junior Year</b>			
Advanced Accounting (BA 321, 322, 323).....	3	3	3
<b>Senior Year</b>			
Industrial Cost Accounting (BA 421, 422).....	3	3	...
Industrial Auditing (BA 427, 428).....	3	3	...

**RELATED COURSES**

Industrial Cost Accounting (BA 423)	Controllership (BA 429)
Accounting Theory (BA 424)	Income Tax Procedure (BA 434)
Analysis of Financial Statements (BA 425)	Typing (SS 121, 122, 123)
Accounting Systems (BA 426)	Business Machines (SS 215, 216)

**Industrial Finance**

	Term hours		
	F	W	S
<b>Junior Year</b>			
General Insurance (BA 435).....	...	3	...
Investments (BA 436).....	...	...	3
Related course.....	3	...	...
<b>Senior Year</b>			
Industrial Finance (BA 437, 438).....	3	3	...
Case Problems in Industrial Finance (BA 439).....	...	...	3

**RELATED COURSES**

Real Estate Law (BA 414)	Reading and Conference (BA 405) (3 term hours)
Analysis of Financial Statements (BA 425)	Business Fluctuations (Ec 421)
Credits and Collections (BA 433)	Money and Banking (Ec 424)
Income Tax Procedure (BA 434)	Public Finance (Ec 427)

**Production Management**

	Term hours		
	F	W	S
<b>Junior Year</b>			
Industrial Cost Accounting (BA 421).....	3	...	...
Labor Problems (Ec 425).....	...	4	...
Related course.....	...	...	3
<b>Senior Year</b>			
Production Management (BA 441, 442).....	3	3	...
Case Problems in Production Management (BA 449).....	...	...	3

**RELATED COURSES**

Industrial Purchasing (BA 461)	Methods and Motion Study (IE 391)
Collective Bargaining and Labor Legislation (Ec 426)	Time Study (IE 392)
Safety in Industry (IE 390)	Materials Handling (IE 394)

**Industrial Marketing and Selling**

Students emphasizing **MARKETING MANAGEMENT** will pursue the following program:

	Term hours		
	F	W	S
<b>Junior Year</b>			
Related courses.....	3	3	3
<b>Senior Year</b>			
Industrial Marketing (BA 467, 468).....	3	3	...
Case Problems in Marketing (BA 469).....	...	...	3

**RELATED COURSES**

Industrial Purchasing (BA 461)	Export and Import Management (BA 473)
Retail Merchandising (BA 463)	Office Organization and Management (SS 422)
Advertising (BA 464)	Transportation (Ec 435)
Salesmanship (BA 465)	International Trade (Ec 443)
Sales Management (BA 466)	

Students emphasizing SELLING will pursue the following program:

	Term hours		
	F	W	S
<b>Junior Year</b>			
Advertising (BA 464).....	3	.....	.....
Salesmanship (BA 465).....	.....	3	.....
Sales Management (BA 466).....	.....	.....	3
<b>Senior Year</b>			
Related courses.....	3	3	.....
Case Problems in Marketing (BA 469).....	.....	.....	3

RELATED COURSES

Credits and Collections (BA 433)	Export and Import Management (BA 473)
Investments (BA 436)	Industrial Marketing (BA 467, 468)
Retail Merchandising (BA 463)	Office Organization and Management (SS 422)

**Industrial Relations and Personnel Management**

	Term hours		
	F	W	S
<b>Junior Year</b>			
Labor Problems (Ec 425).....	.....	4	.....
Collective Bargaining and Labor Legislation (Ec 426).....	.....	.....	4
Related course.....	3	.....	.....
<b>Senior Year</b>			
Personnel Management (BA 451, 452).....	3	3	.....
Case Problems in Personnel Management (BA 459).....	.....	.....	3

RELATED COURSES

Courses in Psychology	Marriage (FL 222)
Courses in Sociology	Courses in Industrial Engineering
Family Relationships (FL 422)	Office Organization and Management (SS 422)

**Agricultural Business Management**

	Term hours		
	F	W	S
<b>Junior Year</b>			
Food and Agriculture (AEc 331).....	3	.....	.....
Principles of Agricultural Marketing (AEc 341).....	.....	3	.....
Agricultural Cooperation (AEc 342).....	.....	.....	3
<b>Senior Year</b>			
Agricultural Prices (AEc 451).....	3	.....	.....
Agricultural Policy (AEc 411).....	.....	.....	3
Agricultural Finance (AEc 431).....	.....	.....	3

RELATED COURSES

Applied Agricultural Economics (AEc 312)	Marketing Dairy Products (AEc 444)
Consumers and the Market (AEc 412)	Agricultural Land Economics (AEc 462)
Marketing Efficiency Analysis (AEc 421)	Current Economic Theory and Problems (Ec 475, 476)
Livestock Economics (AEc 440)	Money and Banking (Ec 424)

# Curriculum in Business Education

*B.A., B.S. Degrees*

## Lower Division Curriculum

	Term hours		
	F	W	S
<b>Freshman Year</b>			
<sup>1</sup> Typing (SS 121, 122, 123).....	2	2	2
<sup>1</sup> Stenography (SS 111, 112, 113).....	3	3	3
English Composition (Wr 111, 112, 113).....	3	3	3
Introduction to Business and Industry (BA 111).....	4	(4)	(4)
<sup>2</sup> Group requirement in literature or science.....	3	3	3
Air, Military, or Naval Science (men) or electives.....	1-3	1-3	1-3
Physical Education.....	1	1	1
<sup>3</sup> Electives.....	3	3	3
	17-19	16-18	16-18
<b>Sophomore Year</b>			
Field Experience (Ed 200).....	2	(2)	(2)
Applied Stenography (SS 211, 212, 213).....	3	3	3
Principles of Accounting (BA 211, 212, 213).....	3	3	3
Principles of Economics (Ec 201, 202, 203).....	3	3	3
General Psychology (Psy 201, 202).....	3	3	3
Business English (Wr 214).....	3	3	3
Air, Military, or Naval Science (men) or electives.....	1-3	1-3	1-3
<sup>4</sup> Physical Education.....	2	1	1
Extempore Speaking (Sp 111).....	3	3	3
	17-19	16-18	17-19

## Upper Division Curriculum

<b>Junior Year</b>			
Office Procedure (SS 311, 312, 313).....	4	4	4
School in American Life (Ed 310).....	3	(3)	(3)
Educational Psychology (Ed 312).....	3	(3)	(3)
Methods in Reading (Ed 350).....	(3)	3	(3)
Special Secondary Methods (Ed 408) (Nonskill and Bookkeeping).....	(3)	3	3
Special Secondary Methods (Ed 408) (Typewriting).....	3	(3)	(3)
Special Secondary Methods (Ed 408) (Shorthand).....	3	(3)	(3)
Business and Industrial Statistics (BA 431).....	3	(3)	(3)
Business Law (BA 411, 412, 413).....	3	3	3
Human Development (Psy 311).....	3	(3)	(3)
Electives.....	3	3	3
	16	16	16
<b>Senior Year</b>			
<sup>5</sup> Office Organization and Management (SS 421, 422).....	3	(3)	3
Seminar (SS 407).....	1	(1)	(1)
Secretarial Problems (SS 411).....	3	3	(3)
Production (BA 311).....	4	(4)	(4)
Finance (BA 312).....	(4)	4	(4)
Marketing (BA 313).....	(4)	(4)	4
Student Teaching (Ed 416).....	(9)	(9)	9
Seminar (BE 407) (Student Teachers).....	(1)	(1)	1
Electives in Science or Social Science.....	3	3	3
<sup>6</sup> Electives.....	6	6	6
	17	16	17

<sup>1</sup> Students who have had previous training in stenography and typing will be placed in classes commensurate with their abilities.

<sup>2</sup> For a bachelor's degree, 9 term hours are required in each of two of three fields: Arts and Letters, Science, and Social Science. Since Social Science (Principles of Economics) must be taken in sophomore year, student must choose between literature and science for the remaining 9 hours.

<sup>3</sup> The student should decide during the first year whether he desires the Bachelor of Science or the Bachelor of Arts degree. This decision will influence his choice of electives.

<sup>4</sup> 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.

<sup>5</sup> SS 421 offered fall and winter terms.

<sup>6</sup> The student should select by the beginning of the sophomore year one of the teaching minors (excluding Business Administration) listed in SCHOOL OF EDUCATION section under "Teaching Majors and Minors in High School Fields," and "Additional Teaching Minors." His elective hours can be used toward the teaching minor.



# Curriculum in Secretarial Science

*B.A., B.S. Degrees*

## Lower Division Curriculum

	Term hours		
	F	W	S
<b>Freshman Year</b>			
<sup>1</sup> Stenography (SS 111, 112, 113).....	3	3	3
<sup>1</sup> Typing (SS 121, 122, 123).....	2	2	2
Introduction to Business and Industry (BA 111).....	4	(4)	.....
<sup>1</sup> Group requirement in literature or science.....	3	3	3
English Composition (Wr 111, 112, 113).....	3	3	3
Air, Military, or Naval Science (men) or electives.....	1-3	1-3	1-3
Physical Education.....	1	1	1
Electives .....	.....	3	3
	17-19	16-18	16-18

## Sophomore Year

Applied Stenography (SS 211, 212, 213).....	3	3	3
Principles of Economics (Ec 201, 202, 203).....	3	3	3
Principles of Accounting (BA 211, 212, 213).....	3	3	3
American Governments (PS 201).....	3	(3)	(3)
History of American Civilization (Hst 226).....	.....	3	3
Business English (Wr 214).....	(3)	3	(3)
Air, Military, or Naval Science (men) or electives.....	1-3	1-3	1-3
<sup>2</sup> Physical Education.....	2	1	1
	15-17	14-16	14-16

## Upper Division Curriculum

### Junior Year

Office Procedure (SS 311, 312, 313).....	4	4	4
Business Law (BA 411, 412, 413).....	3	3	3
Business and Industrial Statistics (BA 431).....	3	(3)	3
General Psychology (Psy 201, 202).....	3	3	.....
Applied Psychology (Psy 205).....	.....	.....	3
<sup>3</sup> Science or Social Science electives.....	3	3	3
Electives .....	.....	3	3
	16	16	16

### Senior Year

Technical Reporting (SS 321).....	.....	3	.....
Seminar (SS 407).....	1	(1)	.....
Secretarial Problems (SS 411).....	.....	3	(3)
Secretarial Practice (SS 412).....	(3)	(3)	3
Office Organization and Management (SS 421*, 422).....	3	(3)	3
Retail Merchandising (BA 463).....	3	(3)	(3)
Production (BA 311).....	4	(4)	(4)
Finance (BA 312).....	(4)	4	(4)
Marketing (BA 313).....	(4)	(4)	4
Science or Social Science electives.....	.....	3	3
Electives .....	4	3	3
	15	16	16

<sup>1</sup> See notes 1 and 2 on previous page.

<sup>2</sup> 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.

<sup>3</sup> The student will need to accumulate 36 term hours in Social Science or Science, or a combination of the two fields totaling 45 term hours, to earn the Bachelor of Science degree at end of senior year. If a Bachelor of Arts degree is desired, 36 term hours in Arts and Letters (including 2 years of college language, or one year of college language at the second-year or higher level) is required.

\* SS 421 offered fall and winter terms.

## Technical Minors

Technical fields in which minors are authorized are: Agriculture, Applied Physics, Engineering, Forestry, Home Economics, Industrial Chemistry, Mining or Petroleum Geology. In addition to the technical minors in these fields outlined below, similar technical minors within these authorized fields may be arranged where necessary to meet the objectives of individual students. A special technical minor in Naval Science can be arranged.

### SCIENCE:

*Applied Physics*  
*Industrial Chemistry*  
*Mining or Petroleum Geology*

### ENGINEERING AND INDUSTRIAL ARTS:

*Industrial Arts—Building Construction*  
*Industrial Arts—Metal Option*  
*Industrial Arts—Woodworking*

### AGRICULTURE:

*Animal Husbandry and Farm Crops*  
*Dairy Technology*  
*Farm Crops*  
*Floriculture*  
*Food Technology*  
*Horticulture*  
*Mechanical Technology in Agriculture*  
*Poultry Husbandry*

### FORESTRY

*General Forestry*

### HOME ECONOMICS:

*Clothing, Textiles, and Related Arts*  
*Institution Management*

## Dairy and Animal Husbandry and Farm Crops

Professor C. E. POULTON, Adviser

	Term hours		
	F	W	S
<b>Sophomore year:</b>			
General Botany (Bot 201).....	3	(3)	...
General Chemistry (Ch 101, 102).....	(3)	3	3
<b>Junior year:</b>			
Crop Production (FC 211).....	...	5	...
Soils (Sls 211, 212).....	3	3	...
Introduction to Dairy and Animal Science (DAH 121).....	(3)	(3)	3
<b>Senior year:</b>			
Animal Nutrition I (DAH 311).....	3	...	...
Range and Pasture Management (DAH or FC 341).....	3	(3)	...
Related courses.....	(3)	3	3

### RELATED COURSES

Weed Control (FC 317)	Livestock Feeding (DAH 412)
Forage Crops (FC 324)	Seed Production (FC 414)
Genetics (Z 341)	Sheep Production (DAH 422)
Range Improvement (DAH or FC 342)	Beef Cattle Production (DAH 424)
Wholesale and Retail Meat (DAH 352)	

## Applied Physics

Professor E. A. YUNKER, Adviser

<b>Sophomore year:</b>			
Mathematics (Mth 101, 102).....	4	4	...
Analytical Geometry and Calculus (Mth 200).....	...	...	4
General Physics (Ph 201, 202, 203) or Engineering Physics (Ph 207, 208, 209).....	4	4	4
<b>Junior year:</b>			
Introduction to Modern Physics (Ph 311, 312, 313).....	3	3	3
Differential and Integral Calculus (Mth 201, 202, 203).....	4	4	4
<b>Senior year:</b>			
Electricity and Magnetism (Ph 331, 332) or Electronics and Radio (Ph 437, 438, 439) or Fundamentals of Radio (Ph 334) and Geometrical and Physical Optics (Ph 465, 466) or Commercial Photography (Ph 361, 362, 363) or Synoptic Meteorology (Ph 391, 392, 393).....	3	3	3



**Floriculture**

Professor STANLEY E. WADSWORTH, Adviser

	Term hours		
	F	W	S
Sophomore year:			
Elements of Horticulture (Hrt 111).....	3	.....	.....
General Floriculture (Hrt 151).....	.....	3	.....
Flower Arrangement (Hrt 253).....	.....	.....	3
Junior year:			
Commercial Floriculture (Hrt 351, 352, 353) or Flower Shop Operation (Hrt 451) Plant Propagation (Hrt 352) Herbaceous Plant Materials (Hrt 355).....	3	3	3
Senior year:			
Handling and Distribution of Florist Crops (Hrt 453).....	3	.....	.....
Greenhouse Construction and Management (Hrt 313) or Basic Design (AA 295).....	.....	3	.....
Reading and Conference (Hrt 405).....	.....	.....	3

**Food Technology**

Professor C. E. SAMUELS, Adviser

Sophomore year:			
General Chemistry (Ch 101, 102, 103).....	3	3	3
Junior year:			
Food Manufacturing Methods (FDT 221, 222, 223).....	3	3	3
Senior year:			
General Bacteriology (Bac 204).....	3	(3)	.....
Food Grades and Standards (FDT 271).....	.....	3	.....
Principles of Food Preservation (FDT 350).....	.....	.....	4
Federal and State Food Regulations (FDT 421).....	.....	.....	2
Related courses.....	3	3	(3)

## RELATED COURSES

Meats (DAH 351)	Vegetable Handling and Distribution (Hrt 441)
Dairy Foods (FDT 417)	Food Manufacturing Plants and Equipment (FDT 311)
Elements of Horticulture (Hrt 111)	
Fruit Handling and Distribution I (Hrt 431)	

**Forestry**

Professor W. I. WEST, Adviser

Sophomore year:			
Conservation of Natural Resources (F 260).....	3	.....	.....
Mathematics (Mth 102).....	(4)	4	(4)
<sup>1</sup> Tree Identification (F 153).....	.....	.....	3
Junior year:			
Forest Engineering (FE 123).....	3	.....	.....
Forest Mensuration (F 224).....	.....	5	.....
Wood Technology (FP 210).....	.....	.....	3
Senior year:			
Wood Utilization (FP 310).....	3	.....	.....
Logging Methods (FE 392).....	.....	3	.....
Forest Economics (F 412).....	.....	.....	3

<sup>1</sup> Must precede all forestry courses except F 260; may be interchanged in sequence. All other forestry subjects should be taken in order indicated; deviation may be permitted if prerequisites are met and upon consulting adviser.

**Horticulture**

Professor SPENCER B. APPLE, Adviser

	Term hours		
	F	W	S
Sophomore year:			
General Chemistry (Ch 101, 102).....	3	3	.....
Elements of Horticulture (Hrt 111).....	.....	.....	3
Junior year:			
Basic Horticulture (Hrt 315).....	3	.....	.....
Plant Propagation (Hrt 311).....	.....	3	.....
Soils (Sls 211).....	3	.....	.....
Senior year:			
Systematic Pomology (Hrt 433) or Systematic Vegetable Crops (Hrt 443).....	4-3	.....	.....
Fruit Handling and Distribution I (Hrt 431).....	.....	4	.....
Fruit and Nut Production (Hrt 333).....	.....	.....	4
Vegetable Production (Hrt 341).....	.....	.....	4

**Industrial Arts—Building Construction**

Professor G. B. Cox, Adviser

Sophomore year:			
House Planning and Architectural Drawing (AA 178, 179, 180).....	3	3	3
Junior year:			
Methods in Woodworking (IE 112, 113).....	.....	3	3
Construction (AA 219, 220).....	.....	2	2
Senior year:			
Mill Work—Machine Woodwork (IE 311).....	3	.....	.....
Carpentry and Building Construction (IE 333).....	.....	3	.....
Building Cost Estimating (AE 465).....	.....	.....	3

RELATED COURSES

Home Furnishing (CT 231)	Rural House Planning (AE 451)
Home-Ground Planning (LA 279)	Elements of Interiors (AA 223)
Farm Buildings (AE 361)	

**Industrial Arts—Metal Option**

Professor MILTON C. SHEELY, Adviser

Sophomore year:			
Engineering Drawing (GE 121, 122).....	3	3	.....
Pattern Making (IE 111).....	.....	.....	3
Junior year:			
Foundry Practices (IE 140).....	3	.....	.....
Forging and Welding (IE 150).....	.....	3	.....
Machine Tool Practices (IE 160).....	.....	.....	3
Senior year:			
Methods and Motion Study (IE 391).....	3	.....	.....
Time Study (IE 392).....	.....	3	.....
Materials Handling (IE 394) or Safety in Industry (IE 390).....	.....	.....	3-2

RELATED COURSES

Abridged General Physics (Ph 211, 212) or	Casting Processes (IE 344)
General Physics (Ph 201, 203)	Mass Production Methods (IE 361)
Motor Vehicles (AE 312, 313, 314)	Sheet Metalwork (IE 380)

**Industrial Arts—Woodworking**

(Including Furniture Construction)

Professor G. B. Cox, Adviser

	Term hours		
	F	W	S
<b>Sophomore year:</b>			
Engineering Drawing (GE 121, 122).....	3	3	3
Industrial Arts Drawing and Design (AA 281).....	.....	.....	3
<b>Junior year:</b>			
Pattern Making (IE 111).....	3	.....	.....
Methods in Woodworking (IE 112, 113).....	.....	3	3
<b>Senior year:</b>			
Mill Work—Machine Woodwork (IE 311).....	3	.....	.....
Furniture Design and Construction (IE 312, 313, 314).....	2	2	2

## RELATED COURSES

Elements of Interiors (AA 223)  
Home Furnishings (CT 231)

Textiles (CT 250)

**Industrial Chemistry**

Professor BERT E. CHRISTENSEN, Adviser

<b>Sophomore year:</b>			
College Algebra (Mth 101).....	4	.....	.....
General Chemistry (Ch 101, 102, 103).....	3	3	3
<b>Junior year:</b>			
Organic Chemistry (Ch 226, 227).....	5	5	.....
Elementary Physical Chemistry (Ch 340).....	.....	.....	3
<b>Senior year:</b>			
Biochemistry (Ch 350, 351, 352).....	3	3	3

**Institution Management**

Professor HELEN MULHERN, Adviser

<b>Sophomore year:</b>			
General Chemistry (Ch 101).....	3	.....	.....
Food Preparation (FN 218, 219).....	.....	3	3
<b>Junior year:</b>			
Quantity Cookery (IM 311).....	4	.....	.....
General Bacteriology (Bac 204).....	.....	3	.....
Nutrition (FN 225).....	.....	.....	3
<b>Senior year:</b>			
Institution Organization and Administration (IM 430).....	3	.....	.....
Purchasing for Institutions (IM 440).....	.....	3	.....
Institution Experience (IM 450).....	.....	.....	4
Related course.....	3	(3)	(3)

## RELATED COURSES

General Chemistry (Ch 102, 103)  
Principles of Food Preservation (FDT 350)  
Meats (DAH 351)  
Meat Identification and Selection (DAH 352)Food Grades and Standards (FDT 271)  
Food Sanitation Bacteriology (Bac 411)  
Quantity Textile Purchasing (CT 351)

**Mechanical Technology in Agriculture**

Professor J. B. RODGERS, Adviser

	Term hours		
	F	W	S
Sophomore year:			
<sup>1</sup> Engineering Drawing (GE 121).....	3	.....	.....
Farm Mechanics (AE 221).....	.....	3	.....
Agricultural Engineering Survey (AE 211).....	.....	.....	3
Junior year:			
Farm Implements (AE 391).....	3	.....	.....
<sup>1</sup> Abridged General Physics (Ph 211).....	.....	3	.....
Mechanical Applications in Agriculture (AE 213).....	.....	.....	3
Senior year:			
Engines and Tractors (AE 311) or Motor Vehicles (AE 312).....	3	.....	.....
Farm Electricity (AE 331) or Motor Vehicles (AE 313).....	.....	3	.....
Related courses.....	3	.....	3

RELATED COURSES

Motor Vehicles (AE 314)	Farm Buildings (AE 361)
Land Drainage (AE 319)	Household Utilities (g) (AE 435)
Pumps and Irrigation Equipment (AE 321)	Rural House Planning (g) (AE 451)

**Mining or Petroleum Geology**

Professor W. D. WILKINSON, Adviser

Sophomore year:			
Geology (G 201, 202, 203).....	3	3	3
Geology Laboratory (G 204, 205, 206).....	1	1	1
Junior year:			
Mineralogy and Rock Study (G 315, 316, 317).....	3	3	3
Senior year:			
Mining Geology and Industrial Minerals (G 421, 422).....	3	3	.....
Oil Geology (G 423).....	.....	.....	3

**Poultry Husbandry**

Professor W. H. McCLUSKEY, Adviser

Sophomore year:			
Poultry Production (P 121).....	3	.....	.....
Incubation (P 321).....	.....	3	.....
Brooding and Broiler Production (P 322).....	.....	.....	3
Junior year:			
Poultry Feeding (P 411).....	3	.....	.....
Anatomy and Physiology of the Fowl (VM 311).....	.....	3	.....
Diseases of Poultry (VM 351).....	.....	.....	4
Senior year:			
Marketing Poultry Products (P 421).....	3	.....	.....
Poultry Breeding (P 441).....	3	.....	.....
Poultry Plant Management (P 431).....	.....	.....	3

RELATED COURSES

Poultry Judging (P 341)	Genetics (Z 341)
Turkey Management (P 351)	Seminar (P 407)
Commercial Practices (P 451)	

<sup>1</sup> With consent of the adviser, course may be waived and related course substituted, if student's background in the area is deemed adequate.

## Business Administration

Courses in business and industrial administration are offered in the Department of Business Administration. The courses aim in the first 2 years to orient the student in the field and in the last 2 years to provide professional preparation. Courses offered in the Department of Economics supplement the work of the Department of Business Administration.

Courses numbered in the 400's are restricted to students with junior or senior standing.

### Lower Division Courses

- BA 111. **Introduction to Business and Industry.** 4 hours. 4 ①  
Survey of 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 211, 212, 213. **Principles of Accounting.** 3 hours each term. 3 ①  
*First Term:* Introduction to terminology, content, and form of financial statements for single proprietorships, partnerships, and corporations; recording of 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; introduction to analysis and interpretation of financial statements.  
*Third Term:* Methods of recording and reporting incomes and expenses; introduction to functions and procedures of cost accounting for managerial use in controlling business operations; introductions to financial control through use of budgets.
- BA 214, 215. **Fundamentals of Accounting.** 3 hours each term. 3 ①  
Similar to BA 211, 212, 213, but with increased attention to managerial uses of accounting data and less on detailed record keeping procedures. Primarily for engineering and forestry students.
- BA 217. **Basic Accounting and Financial Analysis.** 3 hours. 3 ①  
For students who take only one term of accounting. Methods of recording, summarizing, and presenting accounting data. Emphasis on basic principles and terminology; significance, analysis, and interpretation of accounting data; accounting as tool of management.

### Upper Division Courses

- BA 311. **Production.** 4 hours. 4 ①  
Operating techniques used in administration of manufacturing plants together with application to other areas of business management; organization, supervision problems, employee relations, wage payment, output standards, plant location, equipment layout, scientific management.
- BA 312. **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.
- BA 313. **Marketing.** 4 hours. 4 ①  
Survey of industrial and consumer markets and of activities and enterprises involved in distributing goods to those markets. Objective is to develop understanding of distribution processes, marketing problems and principles.
- BA 321, 322, 323. **Advanced Accounting.** 3 hours each term. 3 ①  
Comprehensive review of basic accounting theory and critical study of conventional accounting procedures. Survey of more difficult problems encountered in accumulation and presentation of financial data; presentation and interpretation of balance sheets and other financial reports, measuring costs and revenues, problems in partnership accounting, installments, consignments, agency and branch accounting, consolidations and fiduciary accounting. Prerequisite: BA 213 or 215.
- 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 conferences, reports, and appraisals. Prerequisite: upper division standing.
- BA 411. **Business Law.** 3 hours. 3 ①  
Basic rules of law for conduct of business generally. Creates an awareness of proper legal practices, including the desirability of professional supervision. Primary emphasis on requirements of formation, performance, and methods of discharge of contracts. Related treatment of quasi-contracts and torts.
- BA 412. **Business Law.** 3 hours. 3 ①  
Nature of personal property including sales, bailments, chattel mortgages, and conditional sales; law of negotiable instruments including promissory notes, bills of exchange, and checks. Prerequisite: BA 411.
- BA 413. **Business Law.** 3 hours. 3 ①  
Law of business ownership and organization including individual proprietorship, agency, partnership, cooperations, cooperative associations, and business trusts.
- BA 414. **Real Estate Law.** 3 hours. 3 ①  
Primary features of legal ownership of land including 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 421, 422, 423. **Industrial Cost Accounting.** (g) 3 hours each term. 3 ①  
*First Term:* Materials, 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. **Accounting Theory.** (g) 3 hours. 3 ①  
Development of accounting theory under influence of economic factors, law, and administrative ruling; evolution of concepts and procedures for measuring income, cost, value, and results of price level change; accounting ethics. Prerequisite: BA 321, 322, 323. If students have not had prerequisites they must have consent of instructor.
- BA 425. **Analysis of Financial Statements.** 3 hours. 3 ①  
The preparation, analysis, and interpretation of balance sheets and operating reports for effective management and control of industrial and trading concerns. Prerequisite: BA 211, 212, 213 or BA 214, 215.
- BA 426. **Accounting Systems.** (g) 3 hours. 3 ①  
Systems for accumulating, recording, and summarizing financial data; use of machines in these processes. Demonstrations and field trips. Prerequisite: BA 321, 322, 323.
- BA 427, 428. **Industrial Auditing.** (g) 3 hours. 3 ①  
Personal standards and verification procedures for auditors of business enterprises; methods of surveying adequacy and effectiveness of accounting system and internal control; practice in application of auditing procedures and in preparation of working papers; certification of financial statement information. Prerequisite: BA 321, 322, 323.
- BA 429. **Controllership.** (g) 3 hours. 3 ①  
Functions of the controller and his organization; techniques employed in the coordination and control of accounting, budgeting and planning; controllership's contributions to management and responsibilities for office organization and procedures. Prerequisite: BA 321, 322, 323.
- BA 431, 432. **Business and Industrial Statistics.** (g) 3 hours. 3 ①  
Statistical techniques for collecting and analyzing business data; statistical source materials; methods for dealing statistically with problems of inspection, quality control, personnel testing, financial analysis, and market research; development of facility in use of business data in reports; sharpening of critical faculties for appraisal of statistical "facts" and "proofs." Prerequisite: Mth 104, 105, or Mth 100.

- BA 433. **Credits and Collections.** 3 hours. 3 ①  
 Management functions performed by a credit department; relation to other functions of the business enterprise; nature of consumer credit and mercantile credit, sources of credit information, evaluation of credit risks, and credit controls useful to business firms; credit policy determination.
- BA 434. **Income Tax Procedure.** 3 hours. 3 ①  
 Federal and State income tax regulations, and court decisions applicable to individuals, partnerships, and corporations; differences between managerial and tax accounting and between Federal and State tax requirements; computing taxable income and preparing official returns.
- BA 435. **General Insurance.** 3 hours. 3 ①  
 Aims to familiarize students with 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 436. **Investments.** (g) 3 hours. 3 ①  
 Investment objectives and risks; investment program planning; corporate securities and securities markets; government bonds, real estate, savings institutions; interest income and stock yields; security analysis. Prerequisite: BA 312.
- BA 437, 438. **Industrial Finance.** (g) 3 hours each term. 3 ①  
 Financial administration of an industrial enterprise; financial coordination of purchases, inventories, production, and sales; managing cash, receivables, inventories, investments, and working capital position; financial control of plant, equipment, leases, and industrial property. Prerequisite: BA 312. Either BA 437 or BA 438 may be taken separately.
- BA 439. **Case Problems in Industrial Finance.** (g) 3 hours. 3 ①  
 Problems of financial management are studied, using actual situations drawn from the current business scene. Written reports are prepared by the student for each case problem; emphasis on the analysis of the pertinent facts, weighing of alternate solutions. Prerequisite: BA 312.
- BA 441, 442. **Production Management.** (g) 3 hours each term. 3 ①  
 Problems of production, factory organization, and factory management, from point of view of production manager. Prerequisite: BA 311. Either BA 441 or BA 442 may be taken separately.
- BA 449. **Case Problems in Production Management.** (g) 3 hours. 3 ①  
 Designed primarily to enable student to formulate an over-all picture of interrelationship of major aspects of production. Intensive case study of actual cases drawn from industry. Prerequisite: BA 441, 442, or consent of instructor.
- BA 451, 452. **Personnel Management.** (g) 3 hours each term. 3 ①  
*First Term:* Survey of objectives, functions, and practices of personnel administration which contribute to effective achievement of aims of organization.  
*Second Term:* Detailed consideration of techniques, uses, and limitations of such personnel activities as job analysis, job evaluation, evaluation of employees, employee services, employee publications, and suggestion system.
- BA 459. **Case Problems in Personnel Management.** (g) 3 hours. 3 ①  
 Case studies to help develop facility in using facts to diagnose causes of personnel problems and in working out plans for improving productivity of personnel. Opportunity is given to use knowledge and experience in situational thinking. Prerequisite: BA 451.
- BA 461. **Industrial Purchasing.** 3 hours. 3 ①  
 Significant managerial problems raised by 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 463. **Retail Merchandising.** (g) 3 hours. 3 ①  
 Principles of organizing and operating retail institutions; store location, store layout, buying and selling, operating activities, personnel and control.
- BA 464. **Advertising.** 3 hours. 3 ①  
 Advertising as a tool of marketing management; preparation of advertisements; copy, illustration, and layout; use of media: newspapers, magazines, direct mail, radio, and television.
- BA 465. **Salesmanship.** 3 hours. 3 ①  
 Principles and practice of salesmanship; preapproach, gaining the interview, approach, demonstration, meeting objections, and the close; class work correlated with student's major interests in selling.

- BA 466. **Sales Management.** 3 hours. 3 ①  
Function of sales manager in marketing process; his administrative and executive duties; analysis of market, policy formulation, recruiting, selecting, contracting, training, equipping, compensating, supervising, and evaluating salesmen.
- BA 467, 468. **Industrial Marketing.** (g) 3 hours each term. 3 ①  
Management of marketing activities among enterprises serving industrial market; planning, organization, and control of various elements of marketing program; product planning and policies; market research; use of middlemen and agencies; selling methods; pricing and terms of sale. Prerequisite: BA 313 for 467; BA 467 for 468. If students have not had BA 467, they must have consent of instructor to take BA 468.
- BA 469. **Case Problems in Marketing.** (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 313.
- BA 471. **Industrial Traffic Management.** (g) 3 hours. 3 ①  
Functions and procedures of traffic departments in industrial enterprises; use of tariffs; choice of agencies; control of transportation costs; government rate regulation procedures.
- BA 473. **Export and Import Management.** (g) 3 hours. 3 ①  
Activities and procedures peculiar to exporting and importing; obtaining transportation services; packing requirements; custom requirements; financing methods; insurance.
- BA 497. **Human Relations in Business and Industry.** (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 and Industry.** (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 and Industrial Policy.** (g) 3 hours. 3 ①  
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 Service Courses

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

## Business Education

Professional preparation for teachers of business subjects is provided in the Department of Business Education, a joint department in the School of Business and Technology and the School of Education. A student may major in either school, but before registering he must confer with the head of the Department of Business Education.

**Baccalaureate Degrees.** The program for undergraduates for a baccalaureate degree is outlined in the curriculum on a previous page. Courses from business administration, business education, education, and secretarial science form the major background. A liberal number of elective hours permits the selection of a teaching minor. The requirements for a State High School Teacher's Certificate are listed under SCHOOL OF EDUCATION.

**Advanced Degrees.** Graduate study with a major in business education is available through the School of Education for all those who complete the

undergraduate curriculum or its equivalent. Thirty of the required 45 term hours for the Master of Science or the Master of Arts degree are taken in business education (including the thesis). Other master degree options are described under GRADUATE SCHOOL. A choice of graduate program can be made following a conference with the head of the Department of Business Education.

#### Upper Division Courses

- 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 SCHOOL OF EDUCATION.)

#### Graduate Courses

- BEd 501. **Research.** Terms and hours to be arranged.  
 BEd 503. **Thesis.** Terms and hours to be arranged.  
 BEd 505. **Reading and Conference.** Terms and hours to be arranged.  
 BEd 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.  
 BEd 536. **Problems and Research Techniques in Business Education.** 3 hours. 1 ①  
 Trends in high school business curriculum; evaluation of 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 of measurement in business education; testing in specific areas; construction of sample tests; evaluation of 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.  
 BEd 538. **Current Trends in Office Procedure.** 3 hours. 3 ①  
 Types of clerical and secretarial procedure programs used in secondary and collegiate schools; course content, teaching methods and materials; organization of laboratories; development of 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.  
 BEd 539. **Current Trends in Basic Business Subjects.** 3 hours. 3 ①  
 BEd 540. **Administration and Supervision of Business Education.** 3 hours. 3 ①  
 BEd 541. **Current Practices in Typewriting.** 3 hours fall. 3 ①  
 Principles underlying development of typing skills; motivation, supplementary materials, and special devices. Prerequisite: Ed 408. Students who have not had Ed 408 must have had teaching experience in typing.  
 BEd 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 of touch typing; 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  
 Intensive skill building in speed, accuracy, figures, and techniques. Use is made 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  
 Operation of 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. Not open to students who have completed SS 215.

### Upper Division Courses

- SS 311, 312, 313. **Office Procedure.** 4 hours each term. 2 ① 2 ②  
 The 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 each term winter and spring. 3 ②  
 Advanced stenographic training in specialized business fields. Prerequisite: SS 123 and SS 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.

### Graduate Courses

Courses numbered 400-499 and designated (g) may be taken for graduate credit.  
 For graduate courses in business education, see SCHOOL OF EDUCATION.

# School of Education

## Faculty

*As of January 1960*

FRANKLIN ROYALTON ZERAN, Ph.D., Dean of the School of Education.

KATHRYN SMITH, Teacher Placement Secretary.

**Education:** Professors ZERAN (department head), BERGSTROM, CLINTON, DIXON, GOODE, JEWELL (emeritus), LANGTON, MUNFORD, REICHART, SALSER (emeritus), SEEN, W, VAN LOAN, WILLIAMSON; Associate Professors AINSWORTH, BARON, GILL, HALL, MARK-SHEFFEL, MILLIKEN, PARKS, WEIR; Assistant Professors CANNON, FOX, LELAND, LEMON, REES, SABAROFF, SEVEREIDE, SEYMOUR, E. SMITH, K. SMITH; Instructor LUMPKIN.

**Agricultural Education:** Professor TEN PAS (department head); State Supervisor and Teacher Trainer MORGAN; Assistant Professor DAVIS.

**Business Education:** Professors YERIAN (department head), LARSE, WINGER; Assistant Professor BARBER.

**Home Economics Education:** Professors DuBois (department head); State Supervisor and Teacher Trainer KOHLHAGEN; Associate Professor McQUESTEN; Instructor WOHLGENANT.

**Industrial Education:** Professor Cox (department head); State Director for Vocational Education PAULSON; State Supervisor and Teacher Trainer LOOMIS; Associate Professor AINSWORTH; Assistant Professors CANNON, SMITH.

**Science Education:** Professor WILLIAMSON (department head); Associate Professor FOSTER; Assistant Professor FOX; Instructor CRAVEN.

## General Statement

**T**HE SCHOOL OF EDUCATION at Oregon State College offers undergraduate work in elementary education, undergraduate and graduate work in secondary education, graduate work in higher education, and instruction, principally at the graduate level, in guidance and personnel work.

Distinctive elements in the School of Education are its Department of Trade and Industrial Education and the Departments of Agricultural, Business, Home Economics, and Science Education, which also are departments in their respective schools of subject specialization. Degrees in physical education are granted through the School of Education (see DIVISION OF PHYSICAL EDUCATION).

The School does not offer a major in school administration but does offer the courses required for an elementary or secondary school principalship in Oregon.

**Elementary Education.** To qualify for an Elementary Teacher's Certificate in Oregon a person must have graduated from a 4-year program of elementary teacher education in a college or university approved by the State Board of Education for the preparation of elementary teachers. The curriculum must include at least 6 term hours of supervised teaching at elementary level.

The curriculum (page 269) includes both the courses required for graduation by Oregon State College and those required for an Elementary Teacher's Certificate.

**Secondary Education.** The State Board of Education issues the following types of Secondary Teachers' Certificates:

*Provisional Certificates.* Until such time as secondary teachers have completed the 5-year secondary teacher education program, they are issued a provisional certificate *A, B, C, D, or E*; each is issued for one year only and is *not renewable*. Applicants should apply for the provisional certificates in

turn as they go through the schedule outlined below. When they are eligible for the regular 5-year secondary certificate, they should make application for this credential. It is not mandatory that a teacher hold all five provisional certificates to qualify for the 5-year certificate. Persons who have had issued to them the 5-year secondary certificate are not eligible for further provisional certification.

*Provisional Certificate A* may be issued to those otherwise qualified applicants who present official evidence of the following:

1. A baccalaureate degree from a standard college, university, or teachers college.

2. 21 quarter hours in secondary school education, at least 9 quarter hours of which shall be high school supervised teaching—grades 9 through 12 in high school, or grades 7, 8, or 9 in a regularly organized junior high school.

*Provisional Certificates B, C, D, and E* may be issued to those persons who have met all requirements for and held the preceding provisional certificate and who have completed 9 quarter hours of upper division or graduate work in secondary teacher preparation applicable to the fifth-year program and over and beyond requirements for preceding provisional certificate.

*The regular 5-year State Secondary Certificate* may be issued to those persons who have completed a 5-year secondary teacher education program in a standard college, university, or teachers college approved by the State Board of Education for preparation of secondary teachers, provided the 5-year program includes:

1. A baccalaureate degree from a standard college, university, or teachers college.

2. A master's degree in secondary teacher preparation, or 45 quarter hours of secondary teacher preparation completed subsequent to baccalaureate degree. (Upper division or graduate credit in secondary teacher preparation in excess of that required for completion of requirements for the baccalaureate degree may be applied on the fifth year when marked on the official transcript or indicated by course number and title on an official report from the degree-granting institution as reserved for Oregon certification. The number of hours so applied may in no case exceed 12 quarter hours.)

3. Preparation subsequent to the baccalaureate degree distributed as follows: (a) 21 quarter hours in subjects taught in high school, at least 15 quarter hours of which shall be upper division or graduate. (b) 9 quarter hours in secondary education earned subsequent to baccalaureate degree and of upper division level or graduate level. (c) 15 quarter hours of upper division or graduate study as electives.

4. 36 quarter hours of secondary education of upper division or graduate level, at least 9 quarter hours of which shall be completed subsequent to baccalaureate degree as indicated in 3-b, and which shall include: (a) Educational Psychology. (b) Human Growth and Development. (c) School in American Life. (d) Special methods in a subject taught in high school. (e) General high school methods or special methods in a second subject taught in high school. (f) High school supervised teaching, 9 quarter hours. (To be done in grades 9 through 12 in the high school, or in grades 7, 8, or 9 of a regularly organized junior high school.) (g) Preparation in any two of the following areas: curriculum and instruction, guidance and counseling, measurement and evaluation, social foundations of education, improvement of reading in high school.

The State Department of Public Instruction charges a fee of \$2 for each of the types of certificates or for renewal of a 5-year certificate.

More detailed information concerning regulations governing certification and progression from provisional to regular certification may be obtained from the School of Education. Completion of either of the curricula listed on pages 270, 271 will fulfill requirements for a provisional certificate.

**Higher Education.** The School of Education cooperates with the major departments on the campus through the Graduate School in a graduate minor in college teaching which may be elected by candidates for advanced degrees, especially the doctorate. In addition, graduate students may elect courses in higher education and utilize special courses in preparation for positions in junior colleges, colleges, and universities.

**Guidance and Personnel Work.** Oregon State College offers a comprehensive program at the graduate level in Guidance and Personnel Work. This program prepares students for work as counselors in schools and colleges, as deans of boys or girls or of men or women, and as directors of student personnel, counselor trainers, and state supervisors of guidance.

An individual desiring to major at the master's level in Guidance must elect Option B. The minor (15 hours) must be in psychology, at least 6 hours of which must be in psychological tests and testing. The candidate completes 45 term hours of graduate work but does not present a thesis or field studies. He takes written comprehensive examinations upon completion of the 45 hours.

*The required courses in Option B (Guidance) are as follows:*

Principles and Practices of Guidance Services (Ed 485)

Occupational and Educational Information (Ed 486)

Counseling Techniques (Ed 487)

Diagnostic and Remedial Techniques in Reading (Ed 468)

Supervised Counseling Techniques (Ed 588)

Research Procedures in Education (Ed 512); or Measurements in Education (Ed 424); or Statistical Inference (St 421).

**COUNSELOR TRAINING** (Four of the following courses selected with assistance of adviser): Group Procedures (Ed 577); or Organization and Administration of Guidance Services (Ed 589); or The Maladjusted Child (Ed 463); or Psychology of the Exceptional Child (Ed 462)—not offered at OSC; or Principles and Techniques of Speech Correction (Sp 493); or Psychology of Adolescence (Ed 461); or Psychology of Childhood (Ed 460); or The College Student (Ed 556); or Behavior of Young Children (FL 421); or Family Relationships (FL 422); or Parent Education (FL 423); or Social Psychology (Soc 474); or Community Organizations (Soc 475); or Social Problems (Soc 411).

### **Minor (Psychology)—15 hours**

*At least 6 of the 15 hours must be in Psychological Tests and Testing.*

Before a person may be admitted to candidacy for the Doctor of Education degree in Guidance and Personnel Work he must have had at least two years paid teaching experience at the elementary or secondary level and in addition two years of paid counseling experience in a school or college.

**Enrollment as Freshman.** High school graduates who plan to teach should enroll in the School of Education as freshmen. In this way requirements will be most easily and certainly met, an adviser will be available at all times, appropriate teaching fields will be chosen, and the most valuable supporting courses will be selected and worked into the student's program.

**Psychology Requirement.** General Psychology (Psy 201, 202), is prerequisite to all upper division education courses. Psychology courses Psy 201, 202, 311 are the only psychology courses which may be counted as a part of the education major of 36 term hours.

**Supervised Teaching.** In their senior year, student teachers observe teaching by experienced instructors, work out lesson plans under the direction



of the supervisors, and teach kindergarten, elementary, or high school classes under supervision. *In addition to other requirements, a student must be in full-time residence at Oregon State College and taking courses in his teaching field, normally in the term immediately preceding the one in which he plans to do supervised teaching.*

**Placement Bureau.** The School of Education maintains a Teacher Placement Bureau to assist Oregon State College graduates and other teachers in obtaining teaching positions suited to their preparation and qualifications. Credentials are handled for kindergarten, elementary, junior high school, senior high school, and college placement. Qualified undergraduate students who are completing degree requirements at Oregon State College are given initial placement service for 12 months without charge. All others who are qualified pay a \$5 initial registration fee which entitles them to service for a 12-month period. The fee for reregistration or activation of papers after the lapse of 12 months subsequent to the initial registration will be \$5. Service for reregistration will be granted during a 12-month period.

**Graduate Study.** Graduate work in education is offered through the Graduate School. Students may pursue graduate study for a master's or doctor's degree as preparation for junior or senior high school, junior college, or college teaching in fields allocated as majors at Oregon State College, or for counseling, guidance, and personnel work in secondary schools or in colleges. Programs of graduate students are worked out for individuals according to their needs and objectives and regulations of the Graduate School. Specialized graduate work is offered in school administration and supervision.

For an M.A. or M.S. degree, the student must complete a graduate major in education and a graduate minor in a subject-matter field; for the M.A. degree a reading knowledge of a relevant foreign language is required.

For the Ed.M. the candidate must complete a graduate major and one graduate minor. For the Ed.D. degree the student must complete a graduate major and two graduate minors one of which must be in a field outside education. For the Ed.D. degree the candidate must submit a record of successful paid teaching experience of at least two years at the elementary or secondary level. Reading knowledge of French, German, or other language may be required if regarded as essential to the student's program. Since the doctoral candidate works closely with his adviser and committee and since the staff approved to advise doctoral candidates is small, the School of Education limits the number of students admitted to the Graduate School with a view to working on the doctorate. Transcript, four letters of recommendation, Graduate Record Examination results, completed doctoral applicant questionnaire, and application for admission to the Graduate School must be on file by March 14 of the year preceding the September in which the student desires to begin his doctoral program. Candidates are notified immediately after March 14 as to whether they are accepted.

## Curricula for Undergraduates

### CURRICULUM IN ELEMENTARY EDUCATION

*B.S. Degree*

#### General Note

General Hygiene (PE 150, 1 term hour for men; PE 160, 2 term hours for women) is taken one term in place of physical education.

Freshman Year		Sophomore Year	
	<i>Hours</i>		<i>Hours</i>
English Composition (Wr 111, 112, 113)	9	Literature	6
History of American Civilization (Hst 224, 225, 226)	9	Field Experience (Ed 200)	2
Mathematics for Elementary Teachers (Mth 111, 112)	6	General Psychology (Psy 201, 202)	6
Introductory Geography (Geog 105, 106)	6	Human Development (Psy 311)	3
Speech	3	General Biology (GS 101, 102)	8
Physical Education	3	Music for Elementary Teachers (Mus 381, 382, 383)	9
Air, Military, or Naval Science (men) or electives	3-9	Physical Education	3
Electives	9-12	Air, Military, or Naval Science (men) or electives	3
		Electives	8-11
Junior Year		Senior Year	
	<i>Hours</i>		<i>Hours</i>
School in American Life (Ed 310)	3	Student Teaching: Elementary (Ed 415)	12
Educational Psychology: Learning (Ed 312)	3	Methods in Reading (Ed 350)	3
Methods and Materials: Social Science (Ed 369)	3	Physical Education in the Elementary School (PE 420)	3
Methods and Materials: Science and Mathematics (Ed 368)	5	Children's Literature and Library (Eng 388)	3
Games and Relays for the Elementary School (PE 321)	1	Principles and Techniques of Speech Correction (Sp 493)	3
Creative Arts and Crafts for Classroom Teachers (AA 311, 312, 313)	9	Electives	24
Physical Science (GS 104, 105)	8		
School Health Education (SEd 321) or School Health Services (SEd 322)	3		
Methods and Materials: Language Arts (Ed 367)	3		
Electives	10		

### CURRICULUM IN SECONDARY EDUCATION

*B.A., B.S., Ed.B., M.A., M.S., Ed.M., Ed.D. Degrees*

#### General Notes

a. The recommended electives for freshmen and sophomores are designed to broaden the experience and preparation of students. Early attention should be given to the fullest preparation in a teaching major and to one or two teaching minors. Some preparation in an additional field should be included, if possible, and also one or more extracurricular activities. The School of Education provides a large number of electives in each term of the 4-year program for the bachelor's degree.

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

Freshman Year		Sophomore Year	
	<i>Hours</i>		<i>Hours</i>
English Composition (Wr 111, 112, 113)	9	Field Experience (Ed 200)	2
<sup>1</sup> Laboratory Science or Mathematics	9-15	General Psychology (Psy 201, 202)	6
Air, Military, or Naval Science (men)	3-9	Literature	9
Physical Education	3	Speech	3
Electives in teaching fields	9-15	History of American Civilization (Hst 224, 225, 226)	9
Other electives	9-15	Air, Military, or Naval Science (men)	3-9
		Physical Education	3
		Electives in teaching fields	6-12

<sup>1</sup> Psychology plus laboratory is not acceptable as a substitute for a laboratory science.

Junior Year	Hours	Senior Year	Hours
School in American Life (Ed 310).....	3	Methods in Reading (Ed 350).....	3
Educational Psychology: Learning (Ed 312).....	3	Special Secondary Methods (Ed 408)....	3
Human Development (Psy 311).....	3	Student Teaching: Secondary (Ed 416) 3-12	30
Outlines of Economics (Ec 212) or Economic Development of the United States (Ec 215).....	3	Electives .....	30
American Governments (PS 201).....	3		
General Sociology (Soc 212).....	3		
Electives in teaching fields.....	18		
Other electives.....	12		

**Fifth Year**

Fifth-year students desiring to meet certification requirements are not required to work for a master's degree. For most high school positions, however, a master's degree is desirable. Students preparing to enter counseling, guidance, and personnel work must qualify for a master's degree.

**TEACHING MAJORS AND MINORS IN HIGH SCHOOL FIELDS**

Under current regulations, new teachers employed in a standard secondary school and teachers reassigned must be assigned to teach only in those subject-matter fields in which they have completed adequate preparation in a standard college or university.

The courses which Oregon State College requires for minimum subject preparation in the several teaching fields satisfy the subject-preparation standards of the State Board of Education. In planning his program of study, however, a student should note that they satisfy *minimum* requirements only. Students must consult members of the faculty of the schools or departments in which they are taking subject-preparation courses concerning additional courses they should elect to strengthen their preparation. Certain courses not listed in either the major or minor requirements can be of great help to teachers.

*A student preparing to teach in secondary schools must have a teaching major and at least one teaching minor.* If he can supervise at least one co-curricular activity and has more than one teaching minor, he will find job opportunities better when he graduates. His teaching major must be in one of the fields in which Oregon State College offers student teaching: biology, health education, general science, mathematics, physical science, agriculture, business, home economics, industrial arts, trade and industrial education, or physical education. The teaching minor may be in one of these same fields, if it is listed as a minor, or may be in one of the following: architecture, art, business administration, English, French, German, journalism, music, recreation, social science, Spanish, or speech. Co-curricular activities which provide excellent training and experience for prospective teachers include intercollegiate and intramural sports, journalism, art, dramatics, debating, oratory, orchestra, band, glee club, writing and producing radio programs, and participating in student self-government.

**Science Education**

**Biological Science: General Biology**

	Term Hours
<b>Requirements for MAJOR:</b>	
General Zoology (Z 201, 202, 203), General Botany (Bot 201, 202), Field Botany (Bot 203), Natural History of Oregon I, II, III (Z 374, 375, 376), Principles of Bacteriology (Bac 230), Introduction to Economic Entomology (Ent 314).....	35
<b>ABOVE COURSES CONSTITUTE THE MINOR</b> .....	35
Additional requirements for MAJOR: upper division electives in biology.....	9
Recommended electives: courses in ecology, physiology, evolution; genetics; and systematic botany.	
<b>Total requirements for teaching MAJOR</b> .....	44
Required to accompany MAJOR: General Chemistry.	
<b>Requirements for MINOR:</b> Courses constituting minor listed above.....	35

**Biological Science: Health Education**

Must be accompanied by adequate science preparation.

**Requirements for MAJOR:**

Introduction to Health Education (SEd 123), General Hygiene (PE 170), Nutrition (FN 225), School Health Education (SEd 321), School Health Services (SEd 322), First Aid (PE 358), Safety Education (Ed 360), Community Health Problems (Bac 424), Special Secondary Methods in Health Education (Ed 408i).

	<i>Term Hours</i>
ABOVE COURSES CONSTITUTE THE MINOR.....	27
Additional requirements for MAJOR: Seminar (SEd 407), and 9 hours from following approved electives: Community Health Problems (Bac 424, 425, 426), School Health Problems (SEd 431, 432, 433), Health Education (SEd 441, 442, 443).....	12
Total requirements for teaching MAJOR.....	39
Requirements for MINOR: Courses constituting minor listed above.....	27

**General Science**

*Preparation for teaching grades 7, 8, and 9*

**Requirements for MAJOR:**

General Biology (GS 101, 102, 103), Chemistry (Ch 101, 102, 103), Physics (Ph 211, 212), 6 hours of electives in biological or physical science.

ABOVE COURSES CONSTITUTE THE MINOR.....	33
Additional requirements for MAJOR: Natural History of Oregon I, II, III (Z 374, 375, 376), 9 hours of upper division physical science.....	19
Total requirements for teaching MAJOR.....	52
Recommended electives: general entomology, principles of bacteriology, photography, astronomy, geology of Oregon, advanced field geology, ornithology, evolution, physical geography.	
Requirements for MINOR: Courses constituting minor listed above.....	33

**Mathematics****Requirements for MAJOR:**

College Algebra (Mth 101); Trigonometry (Mth 102); Calculus (Mth 200, 201, and 202). Electives to complete MINOR (15 hours).

ABOVE COURSES CONSTITUTE THE MINOR.....	35
Additional requirements for MAJOR: Mathematics for Secondary Teachers (Mth 417, 418, and 419). Electives (3 hours).....	12
Total requirements for teaching MAJOR.....	47
Recommended electives: History of Elementary Mathematics (Mth 311); Probability (Mth 337); Finite Differences (Mth 338); Linear Algebra (Mth 341); Theory of Equations (Mth 342); Theory of Numbers (Mth 343); Projective Geometry (Mth 351); and/or Foundations of Elementary Mathematics (Mth 410).	
Requirements for MINOR: Courses constituting minor listed above.....	35

**Physical Science****Requirements for MAJOR:**

General Chemistry (Ch 101, 102, 103 or Ch 204, 205), Qualitative Analysis (Ch 206), General Physics (Ph 201, 202, 203), electives 6-10 hours.

ABOVE COURSES CONSTITUTE THE MINOR.....	33-37
Additional requirements for MAJOR: Organic Chemistry (Ch 226, 227), Elementary Physical Chemistry (Ch 340), Introduction to Modern Physics (Ph 311, 312, 313), electives to total 12 to 16 hours. ....	12-16
Total requirements for teaching MAJOR.....	49-53
Required to accompany major: Biological science sequence.	
Requirements for MINOR: Courses constituting minor listed above.....	33-37

**Agriculture****Requirements for MAJOR:**

Introduction to Agricultural Economics (AEc 111), Principles of Farm Management (AEc 211), Farm Organization (AEc 414); Agricultural Engineering Survey (AE 211). Farm Mechanics (AE 221); Introduction to Dairy and Animal Science (DAH 121); Poultry Production (P 121), Animal Nutrition I (DAH 311) or Animal Nutrition II (DAH 411), Range Management (DAH 341) or Plant Genetics (FC 517); Elements of Agronomy I (FC 111), Crop Production (FC 211), Elements of Horticulture (Hrt 111), Soils (Sls 211 and 212).  
A B.S. degree in agriculture is required of all majors in agricultural education.

**Business Education**

**Requirements for MAJOR:**

*Term  
Hours*

Stenography (SS 111, 112, 113), Typing (SS 121) or equivalent and the following: Typing (SS 122, 123), Applied Stenography (SS 211, 212, 213), Office Procedure (SS 311, 312), Office Organization and Management (SS 421), Introduction to Business and Industry (BA 111), Principles of Accounting (BA 211, 212, 213), Business Law (BA 411, 412).

ABOVE COURSES CONSTITUTE THE MINOR..... 43  
 Additional requirements for MAJOR: Office Procedure (SS 313), Secretarial Problems (SS 411), Retail Merchandising (BA 463)..... 10

Total requirements for teaching MAJOR..... 53  
 Special Secondary Methods courses in Bookkeeping and Non-Skill, Shorthand, and Typing are to be taken by the student majoring in Business Education. Students who minor will take two of the three methods courses.

**Requirements for MINOR:**

Courses constituting Minor listed above..... 43

**Home Economics**

**Requirements for MAJOR:**

Foods (FN 211, 212, or for students electing chemistry, FN 220, 221, 313), Nutrition (FN 225), Clothing and Textiles (CT 210, 211, 212, 250), Child Development (FL 311, 313), The Nursery School Child (FL 425), Family Living (FL 223) or Marriage (FL 222), Management in Family Living (HAd 240).

ABOVE COURSES CONSTITUTE THE MINOR..... 37  
 Additional requirements for MAJOR: Electives from at least two of the following groups: (A) Foods, (B) Clothing, (C) Family Life and Home Administration..... 8  
 Total requirements for teaching MAJOR..... 45

Area of concentration for elementary teachers: Clothing Selection (CT 211 or CT 217), Clothing Construction (CT 218), Textiles (CT 250), Marriage (FL 222) or Family Living (FL 223), Child Care (FL 225), Home Management (HAd 440), Foods (FN 218), Nutrition (FN 225), and Special Secondary Methods (Ed 408d).. 27

**Industrial Arts**

For a major in Industrial Arts see PROFESSIONAL CURRICULUM IN INDUSTRIAL ARTS, page 277.

**Physical Education**

**Major for Men**

**Requirements for MAJOR:**

Professional Activities (PE 194, 3 terms; PE 294, 3 terms; PE 394, 1 term), Evaluation of Physical Education (PE 443), School Programs and Organization (PE 442), and any three of the following: Football Coaching (PE 365), Basketball Coaching (PE 366), Baseball Coaching (PE 367), and Track and Field Coaching (PE 368).

ABOVE COURSES CONSTITUTE THE MINOR..... 28  
 All teachers of physical education in Oregon are also required to have at least 18 hours in health education. Courses in health education include: PE 170; PE 358; SEd 321, 322; Ed 360; Bac 261; Bac 321; Bac 425, 426; Bac 453; FN 225; FL 225. Students interested in teaching physical education or biological science, or both, may include a minor in health education.

Additional requirements for MAJOR: See DIVISION OF PHYSICAL EDUCATION.

Requirements for MINOR: Courses constituting minor listed above..... 28

**Major for Women**

**Requirements for MAJOR:**

Physical Education Technique (PE 333, 334), Evaluation of Physical Education (PE 443), School Programs and Organization (PE 442), Recreation Leadership (PE 240), 12 hours in physical education activities.

ABOVE COURSES CONSTITUTE THE MINOR..... 27

Additional requirements for MAJOR: See DIVISION OF PHYSICAL EDUCATION.

Requirements for MINOR: Courses constituting minor listed above..... 27

**Health Education**

See BIOLOGICAL SCIENCE: HEALTH EDUCATION, page 272.

	<i>Term Hours</i>
<b>Recreation</b>	
Requirements for <b>MINOR</b> : Laboratory Practice in Camping Skills (Ed 364), Introduction to Recreation (Ed 121), Youth Agencies (Ed 425), Recreation Leadership (PE 240), Playground Leadership (PE 435), Field Work (Ed 347), electives, on advice of minor adviser, selected from the following fields: arts and crafts, music, drama, physical education (in addition to college requirements) or natural sciences.	27
<b>Camp Education</b>	
Requirements for <b>MINOR</b> : Camp Counseling (Ed 263), Laboratory Practice in Camping Skills (Ed 364), Camp Management (Ed 365), Group Dynamics (Psy 361), Public School Camping (Ed 366), electives approved by Camp Education Minor adviser, representing areas of arts, natural sciences, and physical education....	27
<b>Dance</b>	
Requirements for <b>MINOR</b> : Introduction to Dance Education (PE 253), Physical Education Techniques (PE 333, 334, 335), Professional Activity (PE 194, 3 terms), electives approved by Dance Minor adviser selected from music, speech or dramatics, arts and crafts, and recreation.....	27

### ADDITIONAL TEACHING MINORS

Student teaching is not offered in these fields.

#### Agricultural Engineering

For agricultural education majors only.

Requirements for <b>MINOR</b> : Intermediate Algebra (Mth 100), Farm Mechanics (AE 221, 222), Farm Implements (AE 391), Agricultural Engineering Survey (AE 211), Workshop: Welding (AE 408, 1 hour each term, 3 terms), Farm Motors and Tractors (AE 331), Special Secondary Methods in Shop Skills (Ed 408a, section 2)	28
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#### Architecture

For industrial arts majors only.

##### Architecture and Construction

Requirements for <b>MINOR</b> : Graphics I (AA 111, 112), Graphics II (AA 211, 212), House Planning and Architectural Drawing (AA 178), Construction (AA 218, 219, 220), Basic Design (AA 295), Lower Division Architectural Design (AA 297)	27-33
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##### Architecture and Allied Arts

Requirements for <b>MINOR</b> : House Planning and Architectural Drawing (AA 178, 179, 180), Elements of Interiors (AA 223), Survey of Visual Arts (AA 203), Lower Division Architectural Design (AA 297), Rural House Planning (AE 451), 6 hours of electives in architectural and allied arts.....	30
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#### Art

##### Drawing and Painting

Requirements for <b>MINOR</b> : Basic Design (AA 295), Survey of Visual Arts (AA 201, 202, 203), Painting (AA 290), Drawing (AA 291).....	30
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##### Art Crafts

Requirements for <b>MINOR</b> : Basic Design (AA 295), Survey of Visual Arts (AA 201, 202, 203); 9 hours selected from this group: Leathercraft (AA 254), Ceramics (AA 255), Jewelry (AA 257), Art Metalcraft (AA 258), Art Craft (AA 259); 6 hours of electives in art.....	30
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#### Art

For industrial arts majors only.

Requirements for <b>MINOR</b> : Industrial Arts Drawing and Design (AA 281, 282, 283), Leathercraft (AA 254), Ceramics (AA 255), Jewelry (AA 257), Art Craft (AA 259), Graphic Arts (AA 275 or 276 or 277), Elementary Sculpture (AA 293); 3 hours of electives to reflect extended interest in one of the above.....	30
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**Business Administration**

(May not be offered as a teaching minor by business education teaching majors.)

	<i>Term Hours</i>
Requirements for MINOR: Principles of Accounting (BA 211, 212, 213), Production (BA 311), Finance (BA 312), Marketing (BA 313), Business Law (BA 411, 412, 413).....	30

**English**

Requirements for MINOR: Survey of English Literature (Eng 101, 102, 103), Survey of American Literature (Eng 253, 254, 255), one course in Shakespeare (Eng 201, 202, or 203), Literature for Teachers (Eng 488), Development of English Language (Eng 490), English Composition for Teachers (Wr 411).....	30
Recommended electives: Shakespeare (Eng 201, 202, 203), Elementary School Library (Lib 379), Children's Literature and Library (Eng 388), Literature for High School Libraries (Eng 385).	

**French**

Requirements for MINOR: FL 50, 51, 52 (first year), or equivalent, and the following courses: Second-year French (RL 101a, 102a, 103a), Second-year French (RL 101b, 102b, 103b) (conversational drill), Directed Reading in French (RL 211, 212, 213), Survey of French Literature (RL 311, 312, 313).....	30
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**German**

Requirements for MINOR: GL 50, 51, 52 (first year), or equivalent, and the following courses: Second-year German (GL 101a, 102a, 103a), Second-year German (GL 101b, 102b, 103b) (conversational drill), Scientific German (GL 320, 321, 322), Survey of German Literature (GL 343, 344, 345).....	30
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**Journalism**

Must be accompanied by another teaching minor.

Requirements for MINOR: Journalism (J 111, 112), Copyediting (J 214), Editorial Writing (J 223), Special Feature Articles (J 317), Public Information Methods (J 318), 9 hours of approved electives.....	27
Suggested electives: Technical Writing (J 319), Journalism Projects (J 351, 352, 353), Creative Writing (Wr 218), English Composition for Teachers (Wr 411), Advertising (BA 464), Photography (Ph 361).	

**Music**

**Vocal**

Requirements for MINOR: Music Theory I (Mus 111, 112, 113), *History of Music (Mus 364, 365), †Applied Music (Mus 190-390) or Class Lessons in Voice (Mus 191)—5 hours as directed, Choral Conducting (Mus 324, 325), Music for the High School Teacher (Mus 350).....	30
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**Instrumental**

Requirements for MINOR: Music Theory I (Mus 111, 112, 113), *History of Music (Mus 364, 365), †Applied Music (Mus 190-390)—4 hours as directed, Instrumental Conducting (Mus 321, 322), Band and Orchestra Techniques (Mus 335, 336).....	30
Suggested electives: Band (Mus 195-395), Orchestra (Mus 196-396), Chorus (Mus 197, 397), Music Theory II (Mus 211, 212, 213), Choral Conducting (Mus 326), Band Arranging (Mus 354, 355).	

**Russian**

Requirements for MINOR: SL 50, 51, 52 (First-Year Russian) or equivalent, and the following courses: Second-Year Russian (reading and grammar review) (SL 101a, 102a, 103a), Second-Year Russian (conversational drill) (SL 101b, 102b, 103b), Scientific Russian (SL 320, 321, 322), Survey of Russian Culture (Hum 327, 328, 329).....	30
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\* Introduction to Music (Mus 221) prerequisite.

† The subject for applied music (voice, piano, violin, or other) will be determined by the student with the guidance of his adviser in the department.

**Social Science***Term  
Hours*

Requirements for MINOR: HISTORY (18 hours): History of Western Civilization (Hst 101, 102, 103), History of American Civilization (Hst 224, 225, 226).

ECONOMICS (6 hours): Outlines of Economics (Ec 212) and Economic Development of the United States (Ec 215).

GEOGRAPHY (6 hours): Introductory Geography (Geog 105, 106).

POLITICAL SCIENCE (6 hours): American Governments (PS 201) and either PS 202 or PS 203.

SOCIOLOGY (6 hours): Introduction to Sociology (Soc 212) and one of the following: Soc 411 (g), 412 (g), 413 (g), 474 (g), or 490 (g).....

42

**Spanish**

Requirements for MINOR: RL 60, 61, 62 (first year), or equivalent, and the following courses: Second-Year Spanish (RL 107, 108, 109), Survey of Spanish Literature (third year) (RL 341, 342, 343), 9 hours of electives approved by department

27

**Speech****General Speech**

Requirements for MINOR: Speech Science (Sp 480), Voice and Diction (Sp 120), Extempore Speaking (Sp 111, 112), Interpretation (Sp 121, 122), and 12 hours from the following courses: Extempore Speaking (Sp 113), Interpretation (Sp 123), Parliamentary Procedure (Sp 231), Group Discussion (Sp 232), Argumentation (Sp 237), Persuasion (Sp 238), Stagecraft and Lighting (Sp 244), Community Drama (Sp 247), Radio Speaking (Sp 361), Basic Television (Sp 367), or Principles and Techniques of Speech Correction (Sp 493) (G).....

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**Dramatics**

Requirements for MINOR: Interpretation (Sp 121, 122), Voice and Diction (Sp 120), Extempore Speaking (Sp 111), Stagecraft and Lighting (Sp 244), Community Drama (Sp 247, 248, 249), Speech Science (Sp 480).....

27

**Forensics**

Requirements for MINOR: Extempore Speaking (Sp 111, 112), Voice and Diction (Sp 120), Interpretation (Sp 121), Argumentation (Sp 237), Persuasion (Sp 238), Parliamentary Procedure (Sp 231), Group Discussion (Sp 232), Speech Science (Sp 480) .....

27

**Radio and Television**

Requirements for MINOR: Extempore Speaking (Sp 111), Interpretation (Sp 121), Voice and Diction (Sp 120), Speech Science (Sp 480), Radio Speaking (Sp 361, 362, 363), Basic Television (Sp 367), Television Programming (Sp 368).....

27

**Speech Correction**

Requirements for MINOR: Voice and Diction (Sp 120), Extempore Speaking (Sp 111, 112), Interpretation (Sp 121), Speech Science (Sp 480), Principles and Techniques of Speech Correction (Sp 493) (G), Clinic Procedures (Sp 494) (G), Electives in Speech.....

27



**CURRICULUM IN INDUSTRIAL ARTS**

*B.S. Degree*

**General Notes**

a. All students following the professional curriculum for Industrial Arts will report directly to the head of the department for counseling on objectives, program planning, and occupational opportunities.

b. General Hygiene (PE 150, 1 term hour for men; PE 160, 2 term hours for women) is taken one term in place of physical education.

c. Technical electives must be related directly to the major option of the student and are selected with approval of the major adviser.

d. Students who are not candidates for the Oregon Credential, but who wish recommendations for teaching certificates based on a 4-year curriculum (instead of the 5-year certification requirement) will omit IEd 420. To complete graduation requirements and be eligible for certification and teaching recommendations it will be necessary to complete either IEd 472, IEd 473, or IE 511 as a substitute for the course omitted.

Freshman Year		Sophomore Year	
	Hours	NORM	Hours
Pattern Making (IE 111).....	3	Industrial Arts Drawing and Design (AA 281, 282).....	6
Methods in Woodworking (IE 112, 113)	6	House Planning and Architectural Drawing (AA 178, 179).....	2
Foundry Practices (IE 140).....	3	Field Experience (Ed 200).....	6
Forging and Welding (IE 150).....	3	General Psychology (Psy 201, 202).....	4
Machine Tool Practices (IE 160).....	3	Intermediate Algebra (Mth 100).....	8
Engineering Graphics (GE 111, 112, 113).....	6	Math or Science Electives.....	3
Physical Science Survey (GS 104, 105, 106).....	12	Physical Education.....	3-9
English Composition (Wr 111, 112, 113)	9	Air, Military, or Naval Science.....	3-9
Physical education and general hygiene (See note b above).....	3		38-44
Air, Military, or Naval Science, or elec- tives.....	3-9		
	51-57		

**WOOD INDUSTRIES OPTION**

	Hours
Sophomore Year Norm.....	38-44
Wood Turning (IE 220).....	2
Machine and Tool Maintenance (Wood Shop) (IE 225).....	2
Mill Work—Machine Woodwork (IE 311).....	3
Industrial Arts Drawing and Design (AA 283).....	3
Technical Elective (See note c above).....	2
	50-56

**METAL INDUSTRIES OPTION**

	Hours
Sophomore Year Norm.....	38-44
Machine and Tool Maintenance (Wood Shop) (IE 225).....	2
Machine Tool Maintenance (IE 265)....	2
Carpentry and Building Construction (IE 333).....	3
Stagecraft and Lighting (Sp 244).....	3
	48-54

**Junior Year**

NORM

	Hours
School in American Life (Ed 310).....	3
Educational Psychology: Learning (Ed 312).....	3
Methods in Reading (Ed 350).....	3
History of American Civilization (Hst 224, 225, 226).....	9
Extempore Speaking (Sp 111).....	3
Social Science Electives.....	6
General Electives.....	6

33

**Senior Year**

NORM

	Hours
Special Secondary Methods (Ed 408e)....	3
Industrial Arts Organization (IEd 420) (See note d above).....	3
Student Teaching: Secondary (Ed 416)..	12
Human Development (Psy 311).....	3
Projects or Reading and Conference (IE 406 or 405).....	2
General Electives.....	6
	29

WOOD INDUSTRIES OPTION		WOOD INDUSTRIES OPTION	
	<i>Hours</i>		<i>Hours</i>
Junior Year Norm.....	33	Senior Year Norm.....	32
Furniture Construction (IE 312, 313, 314).....	6	Stagecraft and Lighting (Sp 244).....	3
Wood and Metal Finishing (IE 316).....	3	Sheet Metalwork (IE 380).....	3
Carpentry and Building Construction (IE 333).....	3	Metal Crafts (IE 387).....	3
Applied Electricity (IE 370).....	3	Approved Technical Electives.....	2
	48		43
	48		43
METAL INDUSTRIES OPTION		METAL INDUSTRIES OPTION	
	<i>Hours</i>		<i>Hours</i>
Junior Year Norm.....	33	Senior Year Norm.....	32
Foundry Practice (IE 340).....	3	Millwork-Machine Woodwork (IE 311).....	3
Forging and Welding (IE 350).....	3	Wood and Metal Finishing (IE 316).....	3
Machine Shop Practice (IE 360).....	3	Approved Technical Electives.....	4
Applied Electricity (IE 370).....	3		42
Sheet Metalwork (IE 380).....	3		42
Metal Crafts (IE 387).....	3		42
	51		42
	51		42

## 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 College gives teacher training, the history and philosophy of education, guidance, counseling, and personnel work.

### Lower Division Courses

- Ed 101. **Methods of Study.** 3 hours. 2 ① 1 ②  
Specific methods of study as applied to various subject-matter fields; the general principles of note taking; study schedule; fixing study habits; evaluation of the various broad fields of human learning. Laboratory work also scheduled.
- Ed 121. **Introduction to Recreation.** 3 hours. 3 ①  
Concept of community recreation; growth and development of public recreation movement; types of recreation; role of 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.
- 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, examination of 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 is required.

### Upper Division Courses

- Ed 310. **School in American Life.** 3 hours. 3 ①  
Problems of elementary and high schools from standpoint of teacher; aims, functions, and characteristics. Prerequisite: Psy 201, 202.
- 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  
Observation and participation in planning, operation, and administration of wide variety of functioning recreation or youth organization programs under direction and supervision of trained leaders. Prerequisite: junior standing.
- Ed 350. **Methods in Reading.** 3 hours. 3 ①  
Prerequisite: Ed 310.
- Ed 360. **Safety Education.** 3 hours. 3 ①  
Background and knowledge of all phases of safety; home, fire, industrial, water, rural, school, and traffic safety; elementary, secondary, and adult. Prerequisite: Ed 310, 312, 408.
- Ed 364. **Laboratory Practice in Camping Skills.** 3 hours. 3 ①  
Practical experience and development of skills in a variety of camping activities.
- Ed 365. **Camp Management.** 3 hours. 3 ①  
Directed toward preparation for camp administration. Prerequisite: Ed 263 or camp counseling experience.
- Ed 366. **Public School Camping.** 3 hours. 3 ①  
Role of camping in education; study of school camp, its organization, administration, and leadership. Prerequisite: Ed 365.
- Ed 367. **Methods and Materials: Language Arts.** 3 hours. 3 ①  
Method course designed to help prepare elementary school teachers to present language skill as a tool of communication, especially to set up developmental program stressing skills of listening, observing, speaking, reading, and writing. Prerequisite: Ed 310.
- Ed 368. **Methods and Materials: Science and Mathematics.** 5 hours. 5 ①  
Problems, methods, and techniques in selecting and organizing content and experiences in elementary school science and mathematics; goals in teaching; multisensory and resource aids available for classroom use. Prerequisite: Ed 310.
- Ed 369. **Methods and Materials: Social Science.** 3 hours. 3 ①  
Aims, evaluation, and procedures in presenting social studies at various levels in elementary schools. Prerequisite: Ed 310.
- Ed 401. **Research.** Terms and hours to be arranged.
- Ed 405. **Reading and Conference.** Terms and hours to be arranged.
- Ed 407. **Seminar.** 1, 2, or 3 hours any term. 1, 2, 3 ①  
Prerequisite: Ed 310, 312, 350, 408. If students have not had prerequisites, 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, (t) trade and industrial education. Prerequisite: Ed 310, 312, 350. (Six hours maximum allowed toward certification.)
- Ed 414. **Student Teaching: Kindergarten.** 3 to 15 hours.  
Open only to students in Elementary Education. Prerequisite: Ed 415 (Elementary) minimum of 6 quarter hours; Ed 451 Preprimary Education (Kindergarten) 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.** 3 to 15 hours.  
Open only to students in Elementary Education. Senior standing in Elementary Education or consent of instructor required.
- Ed 416. **Student Teaching: Secondary.** 3 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, (t) trade and industrial education. Arrangements to do student teaching must be made during registration for winter term of junior year. Prerequisite: Ed 310, 312, 350, 408 and consent of director of teacher training. *Student must have grade-point average of 2.50 in his teaching major at the beginning of the term in which he does student teaching and must not be on probation. He must also have a teaching minor.*

- Ed 421. **Principles and Philosophy of Recreation.** (g) 3 hours. 3 ①  
Foundations and understandings of 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, content, 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; study of problems in recreation. Prerequisite: Ed 349.
- Ed 424. **Measurements in Education.** (G) 3 hours. 3 ①  
Use of standard tests and scales to measure achievement in school subjects; elements of statistical method. Prerequisite: senior standing.
- Ed 425. **Youth Agencies.** (G) 3 hours. 3 ①  
Survey of 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 inter-relationships of community agencies offering recreation programs. Prerequisite: Ed 423.
- Ed 431. **Junior High School Curriculum.** (G) 3 hours. 3 ①  
Curriculum needs of junior high school pupil; scheduling, core program, instructional materials in relation to ability and maturity of pupil. Prerequisite: Ed 310, 312.
- Ed 432. **Junior High School Guidance.** (G) 3 hours. 3 ①  
Diagnosis and evaluation of individual pupil; his abilities, interests, and aptitudes. Organization and administration of program, role of teachers and auxiliary service staff. Prerequisite: Ed 310, 312.
- Ed 434. **Preparation of Audio-Visual Aids.** (G) 3 hours. 1 ① 2 ②  
Aids for more efficient teaching in large and diversified classes; diagrams, charts, illustrated instruction sheets, and blackboard illustrations. Prerequisite: senior standing. Students who do not have senior standing must have consent of instructor.
- Ed 435. **Audio-Visual Aids.** (G) 3 hours. 1 ① 2 ②  
Film, slide, chart, and other visual materials; selection and use to best advantage; operation of projectors and other equipment. Prerequisite: senior standing. Students who do not have senior standing must have consent of instructor.
- Ed 440. **History of Education.** (G) 3 hours. 2 ① 1 ②  
Growth and development of education; Plato, Aristotle, Renaissance educators, Comenius, Locke, Rousseau, Pestalozzi, Froebel, Herbart, Herbert Spencer, and Dewey. Prerequisite: senior standing.
- Ed 451. **Preprimary Education: Kindergarten.** (G) 3 hours. 3 ①  
Building good attitudes toward school, group adjustment, work habits, readiness for first-grade subjects. Prerequisite: Ed 310, 312, 367, 368. Limited to students enrolled in or having a degree in elementary education.
- Ed 460. **Psychology of Childhood.** (G) 3 hours. 3 ①  
Growth of behavior during the prenatal period, infancy, and childhood; development of muscular activities, perception, emotional adjustment, intelligence, language, and social behavior in childhood. 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  
The discovery and treatment of the emotionally and socially maladjusted child; the home, school, and community in relation to the child's mental health. Prerequisite: Ed 310, 312.
- Ed 465. **Diagnostic and Remedial Techniques.** (G) 3 hours. 3 ①  
Diagnostic, remedial, and corrective techniques in basic school subjects; application of techniques to actual cases. Prerequisite: Ed 310, 312.

- Ed 468. **Diagnostic and Remedial Instruction in Reading.** (G) 3 hours. 3 ①  
Nature of the reading process, reading readiness, reading skills; causes of retardation; methods of diagnosing difficulties and evaluating progress; and procedures and materials for the development of reading abilities. Prerequisite: Ed 310, 312, 350.
- Ed 476. **School Law and Organization.** (G) 2 hours. 2 ①  
Oregon school system and laws on which it is based; 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, 2 terms. 3 ①  
Administration and evaluation of diagnostic tests; remedial techniques in reading; diagnosis; planning and executing corrective procedures. Consent of instructor required. Prerequisite: Ed 468.
- Ed 484. **The Junior High School.** (G) 3 hours. 3 ①  
Development of junior high school; purpose and objectives; general organization; courses of study; present practices in leading representative junior high schools; direction of classroom activities; provision for individual differences; pupil personnel. Prerequisite: Ed 310, 312.
- Ed 485. **Principles and Practices of Guidance Services.** (G) 3 hours. 3 ①  
Beginning course in guidance. Overview of guidance and personnel work; vocational, educational, health, social, personality, recreational, and individual development; participation of teachers, counselors, administrators, parents, and community organizations in guidance program. For teachers and administrators. Prerequisite: senior standing.
- Ed 486. **Occupational and Educational Information.** (G) 3 hours. 3 ①  
Materials available regarding occupations; interpretations of 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, methods in educational and vocational counseling. Prerequisite: Ed 485.
- Ed 494. **Principles and Objectives of Vocational Education.** (G) 3 hours. 3 ①  
Basic principles and development of vocational education; review of history and legislation; analysis of objectives of vocational schools and vocational programs in relationship to the total program of education. Consent of instructor required.
- Ed 495. **Organization and Administration of Vocational Education.** (G) 3 hours. 3 ①  
Federal vocational education acts; state boards for vocational education; local boards of education; analysis of laws, regulations, policies; problems and principles of vocational education as related to organization, administration, cooperating personnel, agencies, finances, budgets, and committees. Consent of instructor required.
- Ed 498. **Organization and Supervision for High School Teachers.** (G) 3 hours. 3 ①  
Administrative organization, methods, and purposes of supervision as they involve the classroom teacher. Prerequisite: Ed 310, 312.

#### Graduate Courses

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

- Ed 501. **Research.** Terms and hours to be arranged.  
In addition to regular courses listed, members of the staff supervise research and investigation by qualified graduate students. Registration by permission of staff members. Prerequisite: graduate standing in education. See also AEd 501, BEd 501, HEd 501, IEd 501, SEd 501.  
Problems in Curriculum and Instruction—WILLIAMSON.  
Problems in Educational Psychology—REICHART.  
Problems in Guidance—ZERAN.  
Problems in History or Philosophy of Education—REICHART.  
Problems in Measurements—BARON.
- Ed 502. **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 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**—Experience in planning curricula for specific situations. 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 for doing research work; meaning of scientific method; ways of locating and formulating problems; techniques for solving problems; necessary statistical tools; collection and interpretation of data; preparation of research reports.
- Ed 522. **Secondary School Curriculum.** 3 hours. 3 ①  
Advanced course for experienced teachers. Schools in the community; guidance activities in school; extra class activities; role of school in contemporary society; teacher in local community. Prerequisite: graduate standing in education.
- Ed 523. **School Activities.** 3 hours. 3 ①  
Principles and purposes of school activities; pupil participation in school government; assemblies, clubs, social activities, drama, speech activities, music, and publications; evaluation of activity program. Prerequisite: Ed 310, 312.
- Ed 524. **Construction and Use of Objective Examinations.** 3 hours. 3 ①  
Principles and statistics involved in the selection of test items; types of examinations; validity; reliability; administering, scoring, grouping results. Prerequisite: graduate standing.
- Ed 527. **Secondary School Administration and Supervision.** 3 hours. 3 ①  
Principalship; principles of administration, staff relationships, public relations, professional growth; business administration; administration of guidance services, curriculum, activities; evaluation of secondary schools. Prerequisite: secondary certificate, one year secondary teaching experience.
- Ed 533. **Psychological Aspects of Vocations.** 3 hours. 3 ①  
Psychological principles applied to: (1) choice of occupations, (2) adjusting or aiding others in adjusting, and (3) 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 development of America with special reference to education. Prerequisite: graduate standing in education.
- Ed 546. **Philosophy of Education.** 3 hours. 3 ①  
Fundamental problems of education, with some attempt at their solution; meaning of philosophy; philosophy of education; value for teacher and administrator. Prerequisite: graduate standing in education.
- Ed 550. **The Junior College.** 3 hours. 3 ①  
Early junior colleges; junior college movement; aims and functions; curriculum; organization and operation; relation to secondary and higher education. Prerequisite: consent of instructor.
- 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 elementary teaching experience.
- Ed 554. **Elementary School Supervision and Administration.** 4 hours. 4 ①  
Role duties, needs, problems of supervision; evaluation and improvement of teaching-learning situation. Prerequisite: elementary certification, one year elementary teaching experience.

- Ed 555. **Student Personnel Work in Higher Education.** 3 hours. 3 ①  
 Overview of student personnel services in colleges and universities; philosophy, organization, administration of personnel program at this level; specific services provided. Opportunity to visit and study college personnel programs. Prerequisite: graduate standing.
- Ed 556. **The College Student.** 3 hours. 3 ①  
 Student as central factor in college and university teaching; hereditary background, physical environment, cultural environment, and group relationships as contributors to his maturation; learning as nurture; motivation and direction of college student's learning. Prerequisite: graduate standing.
- Ed 557. **College and University Teaching.** 3 hours. 3 ①  
 Evaluation, aims, procedures, and outcomes in college and university teaching; professional relationships and interests; individual studies according to student's field. Prerequisite: graduate standing.
- Ed 558. **American Higher Education.** 3 hours. 3 ①  
 Development of the American college and university; the old liberal arts college; influence of German university; rise of American university; current problems in structure and curriculum; international higher education.
- Ed 561. **Advanced Educational Psychology.** 3 hours. 3 ①  
 Experimental material that seems most useful and relevant to educational psychology. Prerequisite: graduate standing in education.
- Ed 566. **Curriculum Construction.** 3 hours. 3 ①  
 Building elementary and secondary school curricula; theories and policies since 1900; selecting and organizing subject matter; courses of study; curriculum organization. Prerequisite: 24 hours of upper division credit in education including student teaching.
- Ed 574. **School Supervision.** 3 hours. 3 ①  
 Purpose and plans for supervision; use of tests, diagnosis of pupil difficulty. Prerequisite: elementary or secondary certification, one year 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 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; survey of group dynamics; evaluation of leader's role in group; process of attitudinal change and its results; approaches to group and play therapy; relation between individual and group counseling methods. Prerequisite: Ed 485, 487.
- Ed 581, 582. **Counselor Training.** 3 hours each. 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 587. **Adult Education.** 3 hours. 3 ①  
 Development, methods, and results; public schools, extension instruction, industrial and commercial organizations, radio, and other agencies of adult learning. At least senior standing required.
- Ed 588. **Supervised Counseling Techniques.** 3 hours each term, two terms. 3 ①  
 Provides actual counseling experience in counseling laboratory. Interviewing; administering, scoring, and interpreting psychological tests; writing case studies. Consent of instructor required. Prerequisite: Ed 485, 487, Psy 478, 479, 480.
- Ed 589. **Organization and Administration of Guidance Services.** 3 hours. 3 ①  
 Criteria for evaluating present personnel services, setting up guidance committees, selection of personnel, responsibilities and duties of staff, development of program of services, and in-service training program. Prerequisite: Ed 485, 487.

## Agricultural Education

The Department of Agricultural Education, a joint department within the Schools of Agriculture and Education, trains teachers and supervisors of agriculture for secondary schools and for schools and classes of adult farmers and young men not enrolled in regular dayschools. The strong demand for teachers of vocational agriculture in Oregon, in the Pacific Region including Hawaii, and throughout the United States, is expected to continue indefinitely. Special consideration is given to George-Barden Act and to Smith-Hughes Act. Field activities, followup for new teachers, and preparation of instructional material for agricultural instructors are handled by this department in cooperation with staff of the School of Agriculture.

**Requirements for Teaching Agriculture.** The prospective vocational agriculture teacher should confer early with the department head. Discussion will center on attainment of certain fundamental qualifications and knowledge as well as the high level of practical ability necessary for admission to this field of teaching.

### Requirements in Agriculture:

- Graduation from a college of agriculture of standard rank.
- 80 term hours or equivalent, or special work in agriculture. Courses depend somewhat on previous training and experience and recommendations of department head.

### Requirements in Education and for Certification:

- Course requirements in Education: A minimum of 25 term hours in the 4-year 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 4-year curriculum, will continue systematic work in education and agriculture, as needed, through summer courses and otherwise during their period of employment in full-time teaching. Such work may carry college credit leading to a master's degree.

**Graduate Study.** For those wishing to continue studies beyond a bachelor's degree, a program of experience and graduate study leading to a master's degree will be developed to meet individual needs.

### Upper Division Courses

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

AEd 405. **Reading and Conference.** Terms and hours to be arranged.

AEd 407. **Seminar.** Terms and hours to be arranged.

Ed 408. **Special Secondary Methods.** 3 hours. (See page 279.)

*Section 1: Supervised Farming, FFA. Section 2: Shop and Manipulative Skills.*

AEd 411. **Program Report Analysis.** 2 hours fall or spring. 2 ①  
Analysis of Federal, State, and local reports and records prepared by the Vocational Agriculture Teacher.

AEd 417. **The Agricultural Curriculum.** (G) 3 hours. 3 ①  
Determining course content and evaluating types of course organization with reference to the objectives to be attained in the field of agriculture. Prerequisite: Ed 312, 416. TEN PAS.

AEd 418. **Adult Education in Agriculture.** (G) 3 hours. 3 ①  
Developing programs for young and adult farmer groups; supervision of classes for young farmers, for older farmers, and for farm veterans and special classes of veterans. Prerequisite: AEd 417. TEN PAS.



**Graduate Courses**

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

- AEd 501. **Research.** Terms and hours to be arranged.
- AEd 503. **Thesis.** Terms and hours to be arranged.
- AEd 505. **Reading and Conference.** Terms and hours to be arranged.
- AEd 507. **Seminar.** Terms and hours to be arranged.
- AEd 516. **Extension Course in Teacher Training.** Hours to be arranged.  
Enables present and prospective teachers of agriculture to continue professional improvement; conferences, followup instruction, supervision, correspondence, reports. Prerequisite: Ed 310, 312.
- AEd 533. **Rural Survey Methods.** 3 hours. 1 ③  
Technique of surveys; analyzing, interpreting, and using results in evaluating and formulating programs in agricultural education; field studies. Prerequisite: Ed 310, 312, teaching experience.
- AEd 541. **Community Programs of Agricultural Education.** 3 hours. 3 ①  
Developing the natural and human resources of a community through agricultural education. Prerequisite: Ed 408a, teaching experience.

**Business Education**

Professional preparation for teachers of business subjects is provided in the Department of Business Education, a joint department in the School of Business and Technology and the School of Education. A student may major in either school, but before registering he must confer with the head of the Department of Business Education.

**Baccalaureate Degrees.** The program for undergraduates for a baccalaureate degree is outlined in the curriculum on a previous page. Courses from business administration, business education, education, and secretarial science form the major background. A liberal number of elective hours permits the selection of a teaching minor. The requirements for a State High School Teacher's Certificate are listed on pages 266, 267.

**Advanced Degrees.** Graduate study with a major in business education is available through the School of Education for all those who complete the undergraduate curriculum or its equivalent. Thirty of the required 45 term hours for the Master of Science or the Master of Arts degree are taken in business education (including the thesis). Other master's degree options are described under GRADUATE SCHOOL. A choice of graduate program can be made following a conference with the head of the Department of Business Education.

**Upper Division Courses**

- BEEd 401. **Research.** Terms and hours to be arranged.
- BEEd 403. **Thesis.** Terms and hours to be arranged.
- BEEd 405. **Reading and Conference.** Terms and hours to be arranged.
- BEEd 407. **Seminar.** Terms and hours to be arranged.
- Ed. 408. **Special Secondary Methods.** 3 hours. (See page 279.)

**Graduate Courses**

- BEd 501. **Research.** Terms and hours to be arranged.
- BEd 503. **Thesis.** Terms and hours to be arranged.
- BEd 505. **Reading and Conference.** Terms and hours to be arranged.
- BEd 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.
- BEd 536. **Problems and Research Techniques in Business Education.** 3 hours. 1 ①  
 Trends in high school business curriculum; evaluation of 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 of measurement in business education; testing in specific areas; construction of sample tests; evaluation of available testing materials; use of tests in diagnostic and remedial teaching. Prerequisite: Ed 408 or teaching experience in business subjects; BEd 536.
- BEd 538. **Current Trends in Office Procedure.** 3 hours. 3 ①  
 Types of clerical and secretarial procedure programs used in secondary and collegiate schools; course content, teaching methods and materials; organization of laboratories; development of objectives, standards, instruction sheets, courses of study, and miscellaneous teaching aids. Prerequisite: Ed 408 or teaching experience in business subjects; BEd 536.
- BEd 539. **Current Trends in Basic Business Subjects.** 3 hours. 3 ①
- BEd 540. **Administration and Supervision of Business Education.** 3 hours. 3 ①
- BEd 541. **Current Practices in Typewriting.** 3 hours fall. 3 ①  
 Principles underlying development of typing skills; motivation, supplementary materials, and special devices. Prerequisite: Ed 408 or teaching experience in typing.
- BEd 542. **Current Practices in Shorthand.** 3 hours winter. 3 ①  
 Correct writing habits; correlation of sound and symbol response; word and sentence building and transcription technique. Prerequisite: Ed 408 or teaching experience in stenography.

**Home Economics Education**

Professional preparation for teachers of home economics is provided by the Department of Home Economics Education. A student in either the School of Education or School of Home Economics may meet certification requirements. Before registering for teacher preparation courses, every student should receive permission for registering and guidance for selection of courses from the Home Economics Education staff.

**Lower Division Courses**

- Ed 200. **Field Experience.** 2 hours. (See SCHOOL OF EDUCATION.)

**Upper Division Courses**

- HEd 401. **Research.** Terms and hours to be arranged.
- HEd 403. **Thesis.** Terms and hours to be arranged.
- HEd 405. **Reading and Conference.** Terms and hours to be arranged.
- HEd 407. **Seminar.** Terms and hours to be arranged.  
PLANNED HOME EXPERIENCES.  
 PROBLEMS OF BEGINNING TEACHERS.
- Ed 408. **Special Secondary Methods.** 3 hours. (See page 279.)
- HEd 422. **Organization and Administration of Homemaking Education.**  
 (G) 3 hours. 3 ①  
Organizations 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.  
Stimulation of interest in assuming leadership in programs of home and family living by extension of secondary homemaking departments into school and community through development of home and family life education at all levels of day-school and adult-education programs under vocational education.

**Graduate Courses**

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

- HEd 501. **Research.** Terms and hours to be arranged.
- HEd 503. **Thesis.** Terms and hours to be arranged.
- HEd 505. **Reading and Conference.** Terms and hours to be arranged.
- HEd 507. **Seminar.** Terms and hours to be arranged.  
HOME AND COMMUNITY EXPERIENCES  
 AUDIOVISUAL AIDS FOR TEACHING HOMEMAKING  
 EVALUATION OF HOMEMAKING INSTRUCTION  
 STUDIES IN HOME ECONOMICS EDUCATION
- HEd 511. **Current Methods in Teaching Homemaking.** 3 hours. 3 ①  
Application of current trends in education to homemaking education. Prerequisite: Ed 408 (d).
- HEd 512. **Supervision of Home Economics Education.** 3 hours. 3 ①  
Philosophy and practices of inservice and preservice home economics supervision. Prerequisite: Ed 408 (d) and teaching experience.
- HEd 554. **Community Programs in Homemaking.** 3 hours. 3 ①  
Planning, organizing, coordinating, directing, and appraising total community programs in family life education; emphasis on adult education. Prerequisite: HEd 440.

**Industrial Education**

Jointly with the Department of Industrial Engineering and Industrial Arts (School of Engineering), the Department of Industrial Education prepares teachers and supervisors in industrial-arts education and in trade and industrial (Smith-Hughes vocational) education. While the department is organized as part of the School of Education, and offers no technical courses or curricula of its own, it makes use of such courses in other schools and departments as serve its needs. Special attention is called to the joint administration of cur-

ricula for teacher training in industrial-arts education and in vocational trade and industrial education. The Department of Industrial Engineering and Industrial Arts is responsible for the technical training, while the Department of Industrial Education (School of Education) is responsible for the professional curriculum and for the teacher-education courses and applied teaching methods. The preparation for vocational teachers in trade and industrial education is carried on cooperatively with the State Department of Vocational Education in Salem.

**Undergraduate Curriculum for Industrial Arts Education.** The 4-year professional program, leading to the degree of Bachelor of Science, meets certification requirements of any state except those requiring graduate study as a prerequisite to certification. In such cases it furnishes an excellent foundation for the required graduate study, which may be completed at Oregon State College or elsewhere.

**Undergraduate Curriculum for Trade and Industrial Education.** The 4-year professional program leading to the bachelor's degree in trade and industrial education provides opportunity for candidates to receive some credit based on trade or industrial experience; but they must fulfill the regular institutional requirements listed under DEGREES AND CERTIFICATES. In order to be admitted to this program a candidate must present evidence of three years above the standard learning experience, or acceptable trade or industrial experience, or he must present credentials indicating that he is qualified to teach or supervise reimbursed Smith-Hughes classes in his state. He must also be engaged in teaching (or about to be so engaged), or be employed as a vocational supervisor.

**Graduate Study in Industrial Education.** Many school systems, and some state departments of education, now require all teachers to present graduate study or a master's degree as a principal prerequisite to a teaching credential for the secondary schools. Since the demands upon teachers the country over are becoming increasingly exacting each year, graduate work in industrial education brings its proportional rewards and is usually necessary for those who desire to enter the field of supervision, administration, or teacher education. Programs of study leading to the degree of Master of Science or Master of Education are outlined by this department for both *industrial-arts* and *trade-industrial* students and teachers with approved graduate standing.

### Courses for Industrial Arts Students

See also courses in the Department of Education, especially Ed 408, and courses in technical subject matter appropriate to industrial arts teachers in the Department of Industrial Engineering and Industrial Arts (SCHOOL OF ENGINEERING).

#### Upper Division Courses

- IEd 311, 312. **Elementary School Industrial Arts.** 3 hours each term. 3 ①  
Objectives, methods, techniques of *expressional* industrial arts in elementary schools.  
*First term:* Objectives and techniques; group projects in home room; creative expression. *Second term:* Individual projects for special displays; tools and materials for special-subjects room. Prerequisite: Ed 310 or junior standing.
- IEd 401. **Research.** Terms and hours to be arranged.
- IEd 403. **Thesis.** Terms and hours to be arranged.
- IEd 405. **Reading and Conference.** Terms and hours to be arranged.
- IEd 407. **Seminar.** Terms and hours to be arranged.

- IEd 420. **Industrial Arts Organization.** (g) 3 hours. 3 ①  
Diversified programs for smaller high schools; evaluation of jobs, projects, and class problems; survey of appropriate teaching aids; development of professional relationships. Prerequisite: Ed 408e and senior standing.
- IEd 470. **History of Manual and Industrial Education.** (G) 3 hours. 3 ①  
Historical development and present-day aims of industrial-arts and vocational-industrial education. Prerequisite: senior standing.
- IEd 472. **Occupational Analysis.** (G) 3 hours. 3 ①  
Analysis of an occupation, trade, or job into its component subdivisions, blocks, operations, and teaching units; occupational analysis in teaching procedure. Prerequisite: Ed 408, and technical background.
- IEd 473. **The General Shop and Its Problems.** (G) 2 hours. 2 ①  
The "general shop" type of organization; advantages and limitations; probable future; content, organization, and methods of presenting subject matter; class control. Prerequisite: Ed 408e.
- IEd 475. **Project Analysis and the Contract Plan.** (G) 2 hours. 2 ①  
Projects for various types of shop teaching; history and development of the contract plan; technique of preparing contracts; suggestions for use in industrial-arts classes. Prerequisite: IEd 472 or equivalent.
- IEd 476. **Supervision of Industrial Arts.** (G) 2 hours. 2 ①  
Functions, techniques of supervisor; supervision principles from teacher's viewpoint; teacher-supervisor relationships. Problems of supervisor in large and small school systems. Prerequisite: graduate standing and teaching experience in industrial arts.

#### Graduate Courses

(For both Industrial Arts and Trade Education students)  
Courses numbered 400-499 and designated (g) or (G)  
may be taken for graduate credit.

- IEd 501. **Research.** Terms and hours to be arranged.
- IEd 503. **Thesis.** Terms and hours to be arranged.
- IEd 505. **Reading and Conference.** Terms and hours to be arranged.
- IEd 507. **Seminar.** Terms and hours to be arranged.

### Undergraduate Curriculum for Trade and Industrial Education

The 4-year professional program leading to the bachelor's degree in trade and industrial education provides opportunity for candidates to receive some credit based on trade or industrial experience; but they must fulfill the regular institutional requirements listed under DEGREES AND CERTIFICATES. In order to be admitted to this program, a candidate must present evidence of three years above the standard learning experience, or acceptable trade or industrial experience, or he must present credentials indicating that he is qualified to teach or supervise reimbursed Smith-Hughes classes in his state. He must also be engaged in teaching (or about to be so engaged), or be employed as a vocational supervisor.

**Required Professional Courses.** General Psychology (Psy 201, 202), School in American Life (Ed 310), Educational Psychology: Learning (Ed 312), Special Secondary Methods (Trade and Industrial Education) (Ed 408t), and the following Trade and Industrial Education courses: IEd 381, 382, 480, 481, 482, and 491. The student's program must also include 16 hours of approved electives in Trade and Industrial Education to make a total of 48 hours of required professional courses.

**Recommended Professional Electives.** Principles and Objectives of Vocational Education (Ed 494), Conference Leader Training (Ed 496), Organization and Administration of Vocational Education (Ed 495), and the following Trade and Industrial Education courses: IEd 383, 483, 484, 485, 486, 487, 488, 490, 407.

**Credit through Examination.** Students with three or more years above the standard learning period of trade or industrial experience may be granted a maximum of 48 term hours of credit for such experience. This credit is granted upon the candidate's successful performance on a special examination.

A year's trade or industrial experience is defined as 48 weeks as a wage earner. Experience in the employment of school boards or in the armed services will not be accepted. The minimum period of experience acceptable under one employer is 3 months. In those trades or occupations where assignment to short time jobs is made through a union hiring hall, the assigning union may be considered as the employer. Experience in scattered fields is not acceptable.

**Summary:**

Required courses (general).....	54 term hours
Required courses (professional).....	48 term hours
Credit through examination (maximum).....	48 term hours
General electives.....	42 term hours

Total required for bachelor's degree.....192 term hours

Additional information in regard to provisions for obtaining credit for experience through examination may be obtained from the School of Education. Courses listed below are offered only infrequently, extramurally or in summer session in cooperation with the Department of Vocational Education.

## Courses for Trade and Industrial Education Students

### Upper Division Courses

- IEd 381. Introduction to Industrial Education.** 2 hours. 2 ①  
Orientation in and purposes and operation of vocational education emphasizing trade and industrial aspects; practice in organizing materials, planning lessons, and developing teaching techniques. Prerequisite: three years' practical trade experience.
- IEd 382. Analysis and Course Construction.** 3 hours. 3 ①  
Course construction based on trade analysis: selection of 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  
Psychology applied to 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 vocational instructor.
- IEd 480. Shop Organization and Management.** (g) 3 hours. 3 ①  
Organizing and controlling 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  
Types of instructional aids and methods of evaluating them; practice in techniques of development, preparation, and construction; methods of using instructional aids; the operation of audiovisual equipment in vocational classes. Prerequisite: IEd 382 or teaching experience.
- IEd 482. Development, Organization, and Use of Instructional Materials.** (g) 2 hours. 2 ①  
Sources, values, limitations, and classification of instruction sheets and reference materials. Techniques of developing and using 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 of effective coordination applied to diversified occupations programs; 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; problems of 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  
 Supervisory techniques applied to local and State-level programs. Analysis of supervisory needs for individual situations; planning supervisory programs to meet the needs. 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 that will enable a vocational teacher to serve as an outpost of guidance counselor's office; number of workers in trade, working conditions, rates of compensation, special laws pertaining to occupation, opportunities for advancement, and necessary preparation for promotion and success in different phases of the occupation. Prerequisite: IEd 382 or equivalent.
- IEd 487. **Industrial and Public Relations for Trade and Industrial Teachers.** (G) 3 hours. 3 ①  
 History and development of industrial, civic, and labor organizations; techniques necessary to promote wholesome relationships with the 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 in building and maintaining good personnel relations; methods of handling individual and group relations and problems. Prerequisite: IEd 484 or IEd 485 or equivalent.
- IEd 490. **Shop Design and Layout for Trade and Industrial Teachers.** (G) 2 hours. 2 ①  
 Shop planning and layout principles applied to vocational or trade school; planning, designing, and layout of vocational-type shops. Prerequisite: IEd 480 or equivalent.
- IEd 491. **Testing for Trade and Industrial Teachers.** (g) 3 hours. 3 ①  
 Selection and construction of tests to measure effectiveness of trade teacher and advancement of pupils; types of tests; techniques of construction and administration; possibilities and limitations; reliability and validity. Prerequisite: IEd 382, IEd 482, or equivalent.

#### Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit. See also IEd 501-507, page 289.

## 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 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.

See the DIVISION OF PHYSICAL EDUCATION for outline of a suggested Student's Basic Program for a major in physical education.

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.

## 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 or emphasis on subject matter or professional preparation. Combination of subjects to be taught and scope of preparation desired influence the choice of major school.

The requirements for the State High School Teacher's Certificate and list of approved teaching majors and minors in science on page 271 may be supplemented by additional courses in the several fields. Teaching majors in general biology, general science, mathematics, and physical science provide electives that permit flexibility in selection of courses. The major in health education is made up of required courses and may well be augmented by additional courses in biology and related fields. A wide range of health education courses is available in the Schools of Science, Education, Agriculture, Engineering, and Home Economics, and the Division of Physical Education. Both undergraduate and graduate majors in hygiene and sanitation are offered in the Department of Bacteriology and Hygiene.

### Lower Division Course

- SEd 123. **Introduction to Health Education.** 3 hours spring. 3 ①  
Background and philosophy of health education; statistical facts that indicate need for health education; modern practices in, and organizations for, health education; opportunities for professional work in field.

### Upper Division Courses

- SEd 321. **School Health Education.** 3 hours. 3 ①  
Procedures, processes, and techniques in 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  
School procedures in development, maintenance, and protection of health of student; organization of 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  
Maintenance of 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 of health education; organization and administration; health education curriculum; coordination of school health activities with other health resources. Prerequisite: one year of upper division biological science and SEd 321 and 322, or equivalent.



- SEd 481. **Alcohol Studies in School Curriculum.** (G) 3 hours. 3 ①  
Incorporation of scientific information about alcohol in school curriculum; physiological, psychological, sociological, and legal aspects of alcoholism. Prerequisite: 24 hours upper division education.

#### Graduate Courses

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

- SEd 501. **Research.** Terms and hours to be arranged.
- SEd 503. **Thesis.** Terms and hours to be arranged.
- SEd 505. **Reading and Conference.** Terms and hours to be arranged.
- SEd 507. **Seminar.** Terms and hours to be arranged.
- SEd 591. **Practicum in Biological Science.** 3 hours. 2 ① 1 ②  
To develop competencies in laboratory and demonstrative skills, program planning, maintaining and designing laboratory materials. Prerequisite: Ed 408 (b), Ed 416, and teaching major in biological science. WILLIAMSON.
- SEd 592. **Practicum in Physical Science.** 3 hours. 2 ① 1 ②  
To develop competencies in laboratory and demonstration skills, program planning, maintaining and designing laboratory materials. Prerequisite: Ed 408 (g), Ed 416, and teaching major or minor in physical science. FOX.
- SEd 595. **Evaluation Techniques.** 3 hours. 3 ①  
Trends, practices, and techniques of evaluation in science education, with emphasis on construction of tests, rating scales, check lists, and development of criteria for analysis of student work product. Prerequisite: Ed 408 (b, g, or f), Ed 416, and teaching experience.
- SEd 597. **Administration and Supervision of Programs.** 3 hours. 3 ①  
Purposes, problems, and procedures for developing and directing science education programs; individual problems studied and reported. Prerequisite: Ed 408 (b, 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 science program. Prerequisite: 24 hours upper division education including Ed 416. WILLIAMSON.

# School of Engineering and Industrial Arts

## Faculty

*As of January 1960*

GEORGE WALTER GLEESON, Ch.E., Dean of the School of Engineering and Industrial Arts.

JAMES GEORGE KNUDSEN, Ph.D., Assistant Dean.

MARVIN REYNOLDS HAITH, B.S., Personnel and Placement Officer.

**General Engineering:** Professors WANLESS (department head), RICHARDSON, WILLEY (emeritus); Associate Professors GRAY, HAITH; Assistant Professors CAMPBELL, COX, HAYNES, JENSEN, MILLER, PARKINSON, SIMPSON; Instructors BUCY, CHARTERS, CROFF, DILLARD, GARRARD, SHROCK, STATON.

**Agricultural Engineering:** Professors RODGERS (department head), CROPSEY, LUNDE, SINNARD; Associate Professors KIRK, LONG, WOLFE; Assistant Professors BONNICKSEN, BOOSTER, CHRISTENSEN; Instructor SCHOOF.

**Chemical Engineering:** Professor WALTON (department head); Associate Professor WICKS; Assistant Professors MEREDITH, MOEN; Instructor MEYER.

**Civil Engineering:** Professors HOLCOMB (department head), COOPEY, McCLELLAN, MERRYFIELD; Associate Professors BEHLKE,<sup>1</sup> BURGESS, KOFOLD, PAN, SHOEMAKER; Assistant Professors BEECROFT, BELL, NORTHCRAFT, WESTGARTH<sup>1</sup>; Instructors HYDEN, MARTIN, PRITCHETT, WORTH, YODER.

**Electrical Engineering:** Professors L. N. STONE (department head), ALBERT, COCKERLINE (emeritus), FEIKERT, MAGNUSSON; Associate Professors ENGLE, MICHAEL, OORHUYNS, WEBER; Assistant Professors ALEXANDER,<sup>1</sup> JENSEN, S. A. STONE; Instructors AMORT, APPLGATE, CHURCHILL, DUBINSKI, DUNLAP, HUBER, LOONEY, NEUMAN, VINCENT.

**Industrial Engineering:** Professors COX (department head), ENGESSER, SHEELY; Associate Professors FRAZIER, MEYER (emeritus), ROBLEY, WILLIAMSON; Assistant Professors HOEYE, JOHNSON, B. E. SMITH<sup>1</sup>, E. E. SMITH, WILSON; Instructors COLE, LABAUN, LOVE, REISLAND, WITHYCOMBE.

**Mechanical Engineering:** Professors SLEGEL (department head), GRAF (emeritus), HEATH, HUGHES, MARTIN (emeritus), PAASCHE, PAUL, PHILLIPS (emeritus), THOMAS (emeritus); Associate Professors LARSON, OLLEMAN, SMITH, THORNBURGH; Assistant Professors BOUBEL, CROENI, DALY, GELLER, JOHNSON, LEVINSON, LOTHGREN, RIGGS, ZAWORSKI; Instructors GORSKI, McCLURE, WELTY, WILSON.<sup>1</sup>

## General Statement

**E**NGINEERS *apply* science. They apply scientific knowledge and principles to the design and operation of machines, to the selection of materials, and to the use of men, money, and energy. Engineering, therefore, is known as "applied science."

Men and women trained in engineering have numerous job opportunities. A continuing demand exists for personnel trained in design and in research and development. Companies search constantly for men and women capable of assuming important positions in production, operation, and construction. There are also opportunities in consulting, maintenance, sales, service, and administrative work. Salaries and rate of advancement compare favorably with other recognized professions. Personal characteristics of initiative, patience, thoroughness, orderliness, accuracy, persistence, and reliability are unusually well rewarded.

A young man or woman who plans to enter the profession of engineering must have a comprehensive knowledge of the basic sciences, particularly mathematics, physics, and chemistry. Some of this knowledge can be acquired in high school by taking the maximum number of courses available in these subjects.

<sup>1</sup> On leave of absence.

To succeed in the study of engineering in college, students should be from the upper two-thirds of their high school graduating classes. They should have demonstrated proficiency in mathematics, the physical sciences, and English. They should also have an interest in material things and a patient, sustained enthusiasm for working hard at difficult tasks.

Because engineering is a job of *heads* rather than *hands*, a person taking engineering must develop habits of problem solving which result in some final plan, or design, or procedure, or method. Many professions other than engineering involve problem solving. An engineering education, therefore, serves purposes other than those of the professional engineer. The educational pattern is strong and rigorous, compatible with the technical aspects of modern society, providing sound preparation for many pursuits other than engineering.

Those who go into professional engineering practice find that the profession is regulated by state laws. A professional engineer must have a license from the state in which he practices. To obtain such a license he must show that he has had satisfactory engineering education and practical experience. The Engineers' Council for Professional Development periodically inspects and evaluates college courses in engineering to make sure that they meet the standards of the profession. Once a curriculum of a school of engineering passes this inspection it becomes "accredited"; it keeps this rating as long as it maintains high standards. Satisfactory completion of such an accredited curriculum—that is, graduation from an accredited school of engineering—is almost everywhere a requisite for a state license or a civil service appointment.

**Departments and Options.** The School of Engineering is divided into several departments. With the exception of Production Technology students, all freshmen are enrolled in the Department of General Engineering for the first year. At the end of the common freshman year, selection of a major department is made from among the several Departments of Agricultural, Chemical, Civil, Electrical or Mechanical Engineering, or Engineering Physics. In many of the departments, various options are available which provide opportunity for specialization in secondary areas during the senior year. Four or more years, including the freshman year, are necessary to complete the requirements for a first (B.S.) degree. Additional studies lead to the M.S., Ph.D., or professional degrees.

Associated with engineering, but not an engineering curriculum, is a course of study, Production Technology, in which only the B.S. degree is offered. In this curriculum a student has a choice of one of three options: wood industries, metal industries, or tool design. This training leads to positions in the manufacturing industries associated with mass-production procedures. Freshman students who elect Production Technology as a major report directly to the Department of Industrial Engineering and Industrial Arts.

**Advisement.** Each student in the School is assigned to a faculty adviser. Details of procedure, registration, course selection, professional opportunities, personal requirements, academic regulations, and so forth, should be discussed with the adviser. Entering students whose backgrounds are weak, particularly in mathematics and English, will be advised to enroll in refresher work prior to attempting a regular course pattern. Transfer students from non-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. The School of Engineering relies upon prior advisement at the secondary school level, and, in the case of transfer

students, at the college level for basic preparation rather than upon the stipulation of specific course requirements for admission.

**Double Degrees.** Many students wish to major in more than one area. It is possible to meet the requirements for more than one degree, either within or outside of the School. The additional degree generally involves extension of time beyond four years. Persons interested in second degrees are referred to section on DEGREES AND CERTIFICATES, particularly the section *Requirements for Bachelor's Degree*, in the General Catalog.

**Requirements for Advanced Degrees.** Advanced degrees of Master of Science, Master of Arts, and Doctor of Philosophy are offered in the several departments. Programs for advanced degrees are developed to satisfy the interests and objectives of the individual candidate. General regulations and requirements for all advanced degrees, including professional degrees, are printed under GRADUATE SCHOOL.

**Placement.** The School of Engineering maintains an organized, central placement office under the immediate direction of the Dean of Engineering. The service of the placement office is available to industrial organizations, undergraduate and graduate students, and alumni. Services are not restricted to Engineering, but are available to all associated fields including Chemistry, Mathematics, Physics, and Business and Technology.

## Curricula in Engineering and Industrial Arts

*B.A., B.S., M.A., M.S.,*

*A.E., Ch.E., C.E., E.E., I.E., M.E., Min.E., Ph.D. Degrees*

<i>Agricultural Engineering</i>	<i>Industrial Engineering</i>
<i>Chemical Engineering</i>	<i>Mechanical Engineering</i>
<i>Civil Engineering</i>	<i>Engineering Physics</i>
<i>Electrical Engineering</i>	<i>Production Technology</i>

### Freshman Year

Common to Agricultural, Chemical, Civil, Electrical, Industrial, and Mechanical Engineering, and Engineering Physics.

	Term hours—		
	F	W	S
Engineering Concepts (GE 101, 102, 103).....	3	3	3
Engineering Graphics (GE 111, 112, 113).....	2	2	2
Mathematics (Mth 101, 102).....	4	4	.....
Calculus (Mth 200).....	.....	.....	4
General Chemistry (Ch 201, 202, 203).....	3	3	3
English Composition (Wr 111, 112, 113).....	3	3	3
Air, Military, or Naval Science.....	1-3	1-3	1-3
Physical Education and General Hygiene.....	1	1	1

### Sophomore Year Norm

Common to Agricultural, Chemical, Civil, Electrical, Industrial, and Mechanical Engineering, and Engineering Physics.

	Term hours—		
	F	W	S
Calculus (Mth 201, 202, 203).....	4	4	4
Engineering Physics (Ph 207, 208, 209).....	4	4	4
Air, Military, or Naval Science.....	1-3	1-3	1-3
Physical Education and General Hygiene.....	1	1	1

**Agricultural Engineering***E.C.P.D. Accredited*

Sophomore Year		Junior Year	
	Hours		Hours
Sophomore Year Norm.....	30-36	Dynamics of Solids and Fluids (ME 317, 318, 319).....	9
Mechanics of Materials (ME 217, 218, 219).....	9	Engines and Tractors (AE 311).....	3
Machine Tool Practices (IE 260).....	2	Soils (Sls 211, 212).....	6
<sup>1</sup> Elements of Agronomy I (FC 111) or Elements of Horticulture (Hrt 111) or General Botany (Bot 201).....	3	Plane Surveying (CE 226) or (CE 221) Approved social science.....	9
Farm Mechanics (AE 221).....	3	Air, Military, or Naval Science, or electives.....	9
<sup>1</sup> Introduction to Dairy and Animal Science (DAH 121).....	3	Restricted electives.....	15
Senior Year			
	Hours		Hours
Farm Structures (AE 461).....	3	Differential Equations (Mth 321).....	3
Power Farming Machinery (AE 491).....	3	Electrical Fundamentals (EE 351).....	3
Rural Electrification (AE 431).....	3	Seminar.....	1
Soil and Water Conservation (AE 471).....	3	Air, Military, or Naval Science, or electives.....	9
Thermodynamics (ME 321).....	3	Restricted electives.....	18

**Chemical Engineering***E.C.P.D. Accredited*

Sophomore Year		Junior Year	
	Hours		Hours
Sophomore Year Norm.....	30-36	Chemical Engineering Thermodynamics (ChE 311, 312).....	6
Chemical Technology (ChE 211).....	2	Elementary Unit Operations (ChE 313).....	3
Industrial Stoichiometry (ChE 212).....	2	Organic Chemistry (Ch 430, 431, 432).....	12
Industrial Chemical Calculations (ChE 213).....	2	Physical Chemistry (Ch 440, 441, 442).....	9
Chemical Theory (Ch 241).....	4	Physical Chemistry Laboratory (Ch 443, 444, 445).....	3
Quantitative Analysis for Chemical Engineering Students (Ch 232).....	4	Mechanics of Materials (ME 217).....	3
Commercial Methods of Analysis (Ch 243).....	4	Strength of Materials (ME 311).....	3
		Engineering Materials (ME 315).....	3
		Field trip.....	0
		Air, Military, or Naval Science, or electives.....	12
Senior Year			
	Hours		Hours
Unit Operations (ChE 411, 412, 413).....	9	<sup>2</sup> Electrical Fundamentals (EE 351, 352), or Circuits and Fields (EE 201, 202).....	6-8
Elements of Process Industries (ChE 441, 442, 443).....	6	Field trip.....	0
Chemical Engineering Laboratory (ChE 414, 415, 416).....	9	International Politics and National Power (SSc 441, 442, 443) or other social sciences.....	9
Chemical Plant Design (ChE 432).....	3	Air, Military, or Naval Science, or electives.....	9

**Civil Engineering***E.C.P.D. Accredited*

Sophomore Year		Junior Year	
	Hours		Hours
Sophomore Year Norm.....	30-36	Dynamics and Fluid Mechanics (CE 311, 312, 313).....	9
<sup>3</sup> Introduction to Civil Engineering (CE 201, 202, 203).....	6	Structural Analysis (CE 381, 382).....	6
Mechanics and Strength of Materials (CE 211, 212, 213).....	9	Reinforced Concrete (CE 383).....	3
Plane Surveying (CE 221, 222, 223).....	9	Materials Testing Laboratory (ME 316).....	3
		Soil Mechanics (CE 372).....	3
		Industrial Electricity (EE 356, 357).....	6
		Thermodynamics and Heat Transfer (ME 321).....	3
		<sup>4</sup> Social Science or humanities.....	9
		Military Science or social science electives.....	9

<sup>1</sup> Naval Science students omit these courses.<sup>2</sup> EE 352 not required for students taking 400 sequence in ROTC.<sup>3</sup> Naval Science students omit CE 202, 203, and elective.<sup>4</sup> American Governments (PS 201), Introduction to Sociology (Soc 212), Outlines of Economics (Ec 212), International Politics and National Power (SSc 441, 442, 443), or approved humanities courses.

Senior Year		Senior Year	
	Hours		Hours
Hydrology (CE 411).....	3	Highway Engineering (CE 421).....	3
Hydraulics (CE 412).....	3	Foundations (CE 472).....	3
Structural Engineering (CE 481, 482, 483).....	9	Indeterminate Structures (CE 485).....	3
Sanitary Engineering (CE 413).....	3	Seminar (CE 407).....	1
Estimating and Contracts (CE 463).....	4	<sup>1</sup> Optional restricted electives.....	10
		Military Science or electives.....	9

### Electrical Engineering

E.C.P.D. Accredited

Sophomore Year		Senior Year	
	Hours		Hours
Sophomore Year Norm.....	30-36	Electrical Engineering Economy (EE 411).....	3
Circuits and Fields (EE 201, 202, 203).....	12	Transmission Systems (EE 421, 422).....	6
<sup>1</sup> Engineering Science.....	9	Seminar (EE 407).....	3
		Field trip.....	0
Junior Year		Senior Year	
	Hours		Hours
Electromagnetics (EE 311, 312, 313).....	9	Major electives (Communication, Control, or Power Engineering).....	9
Electronics (EE 321, 322, 323).....	9	<sup>2</sup> Air, Military, or Naval Science, or restricted technical electives.....	9
Differential Equations (Mth 321).....	3	<sup>2</sup> Engineering science.....	9
Circuit Theory (EE 330).....	3	<sup>3</sup> Humanities or social science.....	9
Electromagnetic Waves (EE 331).....	3		
<sup>2</sup> Engineering science.....	9		
<sup>3</sup> Humanities or social science electives.....	9		
<sup>4</sup> Air, Military, or Naval Science, or restricted electives.....	9		

### 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		Junior Year	
	Hours		Hours
Sophomore Year Norm.....	30-36	Introduction to Modern Physics (Ph 311, 312, 313).....	9
Mechanics of Materials (ME 217, 218, 219).....	9	Differential Equations (Mth 321, 322).....	6
Group requirements in social science.....	9	Electronics (EE 321, 322, 323).....	9
		Thermodynamics and Heat Transfer (ME 321, 322, 323).....	9
		Electricity and Magnetism (Ph 331, 332).....	8
		Air, Military, or Naval Science or elective in Language, Literature, or Social Science.....	9
Senior Year		Senior Year	
	Hours		Hours
Atomic and Nuclear Physics (Ph 474, 475, 476).....	9	Elementary Physical Chemistry (Ch 340).....	3
Introduction to Field Theory (Ph 477, 478, 479).....	9	Air, Military, or Naval Science or electives in Language, Literature, or Social Science.....	9
Geometrical and Physical Optics (Ph 465, 466).....	6	Approved technical electives.....	15

<sup>1</sup> Optional restricted electives—3 credits winter and spring—Highway Engineering (CE 422), Hydraulic Machinery (CE 433), Cement and Concrete (ME 414), Water Supply (CE 452), Sewage and Waste Disposal (CE 454), Building Design (CE 489), and Structural Analysis (CE 486).

<sup>2</sup> Specific courses and sequence to be indicated after further review of courses available or being developed.

<sup>3</sup> Choice of specific courses to be indicated after further review of courses available or being developed.

<sup>4</sup> Electives not to include humanities, social science, engineering science, or electrical engineering courses.

<sup>5</sup> Electives to be selected from electrical engineering or appropriate business administration courses.

**Industrial Engineering**

*E.C.P.D. Accredited*

Sophomore Year		Junior Year	
	Hours		Hours
Sophomore Year Norm.....	30-36	Mass Production Methods (IE 361, 362).....	6
Foundry Practices (IE 240).....	2	Methods and Motion Study (IE 391)....	3
Machine Tool Practices (IE 260).....	2	Time Study (IE 392).....	3
Introduction to Scientific Management (IE 290).....	3	Production Planning and Control (IE 393).....	3
Mechanics of Materials (ME 217, 218, 219).....	9	Field trip.....	0
Forging and Welding (IE 250).....	2	Metallurgy and Materials (ME 312, 313).....	6
Outlines of Economics (Ec 212).....	3	Dynamics of Solids and Fluids (ME 317, 318, 319).....	9
American Governments (PS 201).....	3	Practical Psychology (Psy 212).....	3
		Air, Military, or Naval Science, or electives .....	18
<b>Senior Year</b>			
	Hours		Hours
Tool Engineering (IE 464).....	3	Mechanical Engineering Analysis (ME 371).....	3
Production Planning and Control (IE 491, 492).....	6	Fundamentals of Accounting (BA 214, 215).....	6
Supervision Principles (IE 490).....	3	Industrial Cost Accounting (BA 421)....	3
Safety in Industry (IE 390).....	2	Air, Military, or Naval Science, or electives .....	9
Field trip.....	0		
Electrical Fundamentals (EE 351, 352).....	6		
Machine Design (ME 411).....	3		

**Mechanical Engineering**

*E.C.P.D. Accredited*

Sophomore Year		Junior Year	
	Hours		Hours
Sophomore Year Norm.....	30-36	Thermodynamics and Heat Transfer (ME 321, 322, 323).....	9
Mechanics of Materials (ME 217, 218, 219).....	9	Dynamics of Solids and Fluids (ME 317, 318, 319).....	9
Foundry Practices (IE 240).....	2	Gas Dynamics (ME 324).....	3
Machine Tool Practices (IE 260).....	2	Electrical Fundamentals (EE 351, 352, 353).....	9
Forging and Welding (IE 250).....	2	Mechanical Engineering Analysis (ME 371).....	3
Approved Electives in Social Science.....	9	Metallurgy and Materials (ME 312, 313).....	6
		Mechanical Laboratory (ME 351).....	3
		<sup>1</sup> Air, Military, or Naval Science, or electives .....	9
		Field Trip.....	0
<b>Senior Year</b>			
	Hours		Hours
<b>SENIOR YEAR NORM</b>		<b>AERONAUTICAL OPTION</b>	
Machine Design (ME 411, 412, 413).....	9	Senior Year Norm.....	21
Mechanical Laboratory (ME 437, 438).....	6	Theory of Structures (ME 447, 448, 449).....	9
Fuels and Lubricants (ME 425).....	3	Fluid Flow (Aerodynamics) (ME 454, 455, 456).....	9
Mechanical Engineering Economy (ME 460).....	3	Aircraft Performance (ME 457, 458)....	6
	21	Electives .....	3
<b>GENERAL OPTION</b>		<b>AIR, MILITARY, OR NAVAL SCIENCE OPTION</b>	
Senior Year Norm.....	21	Students in Air, Military, or Naval Science Option take the Senior Year Norm, 9 credit hours of Air, Military, or Naval Science, 18 hours of electives of which at least 9 hours must be in approved mechanical engineering courses.	
Vibrations (ME 419) or Elasticity (ME 416) or Theory of Structures (ME 447).....	3		
Power Plant Engineering (ME 431).....	3		
Heating and Air Conditioning (ME 421).....	3		
Refrigeration (ME 423).....	3		
Electives .....	15		

<sup>1</sup> Students in Nuclear Option take Introduction to Modern Physics (Ph 311, 312, 313).

APPLIED MECHANICS OPTION		METALLURGY OPTION	
	Hours		Hours
Senior Year Norm.....	21	Senior Year Norm.....	21
Theory of Structures (ME 447, 448, 449).....	9	Metallography (ME 482, 483, 484).....	9
Elasticity (ME 416, 417).....	6	Metallurgy (Met 331, 332, 333).....	9
Vibrations (ME 419).....	3	Electives.....	9
Electives.....	9		
AUTOMOTIVE OPTION			
Senior Year Norm.....	21	Senior Year Norm.....	21
Automotive Engineering (ME 491, 492, 493).....	9	Nuclear Reactor Analysis (ME 428, 429, 430).....	9
Gas Turbines and Jet Engines (ME 434).....	3	Atomic and Nuclear Physics (Ph 474, 475, 476).....	9
Vibrations (ME 419).....	3	Electives.....	9
Metallography (ME 482).....	3		
Electives.....	9		

### Production Technology

Freshman Year		Sophomore Year	
	Hours		Hours
Pattern Making (IE 111).....	3	Introduction to Scientific Management (IE 290) or House Planning and Architectural Drawing (AA 180).....	3
Foundry Practices (IE 140).....	3	Abridged General Physics (Ph 211, 212).....	6
Methods in Woodworking (IE 112, 113).....	6	Descriptive General Chemistry (Ch 130).....	3
Forging and Welding (IE 150).....	3	Outlines of Economics (Ec 212).....	3
Machine Tool Practices (IE 160).....	3	Economic Development of the United States (Ec 215).....	3
Engineering Graphics (GE 111, 112, 113).....	6	American Governments (PS 201).....	3
<sup>1</sup> Intermediate Algebra (Mth 100).....	4	Extempore Speaking (Sp 111).....	3
Mathematics (Mth 101, 102).....	8	Business English (Wr 214).....	3
English Composition (Wr 111, 112, 113).....	9	Technical Report Writing (Wr 227).....	3
Physical Education and General Hygiene	3	<sup>2</sup> Optional restricted electives.....	14
Air, Military, or Naval Science, or electives.....	3-9	Physical Education.....	3
		Air, Military, or Naval Science, or electives.....	3-9
Junior Year		Senior Year	
	Hours		Hours
Methods and Motion Study (IE 391).....	3	Safety in Industry (IE 390).....	2
Time Study (IE 392).....	3	Industrial Supervision Principles (IE 490).....	3
Production Planning and Control (IE 393).....	3	Field Trip.....	0
Field Trip.....	0	Business Law (BA 411, 412, or 413).....	6
Fundamentals of Accounting (BA 214, 215).....	6	Practical Psychology (Psy 212).....	3
Industrial Cost Accounting (BA 421).....	3	Money and Banking (Ec 424).....	4
Optional restricted electives; see list below.....	25	Labor Problems (Ec 425).....	4
Air, Military, or Naval Science, or electives.....	9	Optional restricted electives; see list below.....	20
		Air, Military, or Naval Science, or electives.....	9

### Optional Restricted Electives

#### METAL INDUSTRIES OPTION

SOPHOMORE YEAR: IE 265, 344, 354, 361.  
 JUNIOR YEAR: IE 345, 355, 361, 362, 363, 365; GE 311.  
 SENIOR YEAR: IE 464, 465; ME 480.

#### TOOL DESIGN OPTION

SOPHOMORE YEAR: IE 354, 361.  
 JUNIOR YEAR: IE 344, 361, 362, 363; ME 217, 218, 480; GE 311.  
 SENIOR YEAR: IE 464, 465, 466.

#### BUILDING CONSTRUCTION OPTION

SOPHOMORE YEAR: IE 220, 225, 380; AA 178, 179, 180, 223, 281.  
 JUNIOR YEAR: IE 311, 316, 333; CE 226; LA 279.  
 SENIOR YEAR: AE 465.

#### FURNITURE AND MILL-CABINET OPTION

SOPHOMORE YEAR: IE 220, 225, 380; AA 178, 179, 180, 223, 281.  
 JUNIOR YEAR: IE 311, 313, 314, 316, 333.  
 SENIOR YEAR: AE 465.

<sup>1</sup> Students electing the Tool Design option must complete mathematics through Mth 200.

<sup>2</sup> Selected upon approval of adviser, in accord with objectives of Metals Industries, Wood Industries, or Tool Design option.



## General Engineering

Engineering courses required in the common freshman year for agricultural, chemical, civil, electrical, industrial, and mechanical engineering and engineering physics are grouped in the Department of General Engineering.

### Lower Division Courses

- GE 101, 102, 103. **Engineering Concepts.** 3 hours each term. 3 ②  
Lectures and elementary problems dealing with basic concepts common to all fields of engineering; engineering analysis and methods of work. Prerequisite: Mth 100 or equivalent.
- GE 104. **Engineering Fundamentals.** 3 hours spring. 1 ① 2 ③  
Basic concepts and principles of physical science; elementary technical problems; algebraic composition; training in use of slide rule. For production technology students.
- GE 111, 112, 113. **Engineering Graphics.** 2 hours each term. 3 ②  
Fundamental principles and rules of composition of the graphic language of engineering.
- GE 115. **Engineering Drawing.** 3 hours. 1 ① 3 ②  
Fundamental principles and rules of composition of the graphic language of industry. For forestry students only.
- GE 121, 122. **Engineering Drawing.** 3 hours each term. 1 ① 3 ②  
Fundamentals of graphic composition with particular emphasis on reading and interpretation of line drawings, charts, and diagrams. For students in Business and Technology.

### Upper Division Service Courses

- GE 311. **Applied Mechanisms.** 3 hours spring. 2 ① 1 ②  
Theory, application, and selection of mechanisms as applied to product design and production tooling.
- GE 461. **Historical Development of Engineering.** (g) 3 hours. 3 ①  
Historical development of engineering processes and thought. Class investigations and case studies. Prerequisite: senior standing.

## 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 material are loaned to the institution by leading manufacturers and distributors for study and operation by the student. The tractor and automobile 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 Courses**

- AE 221. **Farm Mechanics.** 3 hours. 1 ① 2 ③  
Use of hand and power tools for wood and metal working, arc and acetylene welding, construction of wood and metal farm appliances, concrete work.

**Upper Division Courses**

- AE 311. **Engines and Tractors.** 3 hours any term. 2 ① 1 ③  
The internal combustion engine as used in agriculture. Gasoline and diesel engine principles, construction; parts, accessories, lubrication and fuels. Tractor design and construction. Cannot be taken for credit if student has had AE 312. (See Agriculture.) LUNDE.
- AE 313. **Motor Vehicles.** 3 hours any term. 1 ① 2 ③  
Practical problems in 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  
Study and use of precision diagnostic, test, and repair equipment and tools for automotive vehicle maintenance. Engine and other major unit rebuilding procedures; electrical systems. Prerequisite: AE 313. LUNDE.
- 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 spring. 2 ① 1 ③  
Fundamentals of alternating currents, code and wiring, electric motors; principles of using electricity profitably on the farm. Prerequisite: EE 351.
- AE 461. **Farm Structures.** (g) 3 hours fall. 1 ① 2 ③  
Materials and types of construction; services, uses, and economics of farm structures; structural, environmental, and system designing. Prerequisite: ME 219 or CE 213 and ME 321 recommended.
- AE 465. **Building Cost Estimating.** (g) 3 hours spring. 2 ① 1 ②  
Complete and approximate estimates; general and detailed considerations in establishing unit prices; quantity surveying; overhead costs and profit estimates; specification interpretations; estimates for separate contracts and subcontracts. Prerequisite: AA 179 or AE 361 or AE 461.
- AE 471. **Soil and Water Conservation.** (g) 3 hours fall. 3 ①  
Basic concepts of irrigation, drainage, and erosion control, including fluid flow in saturated soil; evaporation and consumptive use; soil erosion principles; hydraulics of water control structures and channels. Prerequisite: CE 313 or ME 319.
- AE 472. **Drainage Engineering.** (g) 3 hours winter. 2 ① 1 ③  
Design of surface and subsurface farm drainage systems; procedures for 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 481. **Agricultural Machine Design.** (g) 3 hours winter. 1 ① 2 ③  
Application of principles of mechanism, mechanics, and strength of materials to design of agricultural machinery. Prerequisite: ME 219.
- AE 491. **Power Farming Machinery.** (g) 3 hours winter. 2 ① 1 ③  
Modern power farming equipment; operation, maintenance, and adjustment. Prerequisite: AE 311, ME 219.

**Graduate Courses**

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

- AE 501. **Research.** Terms and hours to be arranged.
- AE 503. **Thesis.** Terms and hours to be arranged.
- AE 505. **Reading and Conference.** Terms and hours to be arranged.
- AE 506. **Projects.** Terms and hours to be arranged.
- AE 507. **Seminar.** Terms and hours to be arranged.
- AE 508. **Workshop.** Terms and hours to be arranged.
- AE 515. **Agricultural Machine Applications and Methods.** 3 hours  
winter. 2 ① 1 ③  
Application of machines to changing agricultural methods; mechanization and labor economy; labor-saving equipment and applications; hydraulic control systems; specialty crop machines. Offered alternate years. Offered 1960-61.
- AE 520. **Ground Water.** 3 hours spring. 3 ①  
Occurrence, development, and conservative use of ground waters for irrigation; permeability; flow of water into wells; ground water hydrology. Prerequisite: Mth 322, AE 471. Students who do not have prerequisites must have consent of instructor. Offered alternate years. Not offered 1960-61.
- AE 525. **Processing Equipment for Agricultural Products.** 3 hours fall.  
2 ① 1 ③  
Fundamental theory and applications of various methods and equipment in the processing of farm products. Offered alternate years. Not offered 1960-61.
- AE 530. **Agricultural Instrumentation and Application.** 3 hours spring.  
2 ① 1 ③  
Basic theory and application of instruments used in agricultural research with emphasis on pyrometry, air measurements, psychrometry, soil and field-crop moisture determinations, and water measurements. Offered alternate years. Offered 1960-61.

## Chemical Engineering

Chemical engineering is a branch of engineering based on those operations involving mass transfer, heat transfer, and energy transfer, which in their proper sequence and coordination constitute chemical processes as conducted on the industrial scale. The design of industrial equipment for carrying out such chemical processes is an important part of chemical engineering, as is research on influence of various transfer phenomena on the chemical processes themselves.

The curriculum is designed to give a broad training in the principles fundamental to chemical engineering. It aims to lay a foundation for responsible work in laboratory and plant, and to prepare for graduate work in engineering or in physical sciences. The curriculum is equally applicable in preparation for research, design, control, operation, or technical sales. The student is given a thorough foundation in chemistry, mathematics, English, and physics. This training is accompanied by professional subject matter falling into three groups: (1) courses providing a knowledge of more advanced principles of chemistry, (2) courses in engineering science, and (3) courses dealing with chemical engineering as a separate entity. The last group includes a thorough study of basic transfer phenomena including application to numerous unit operations of chemical engineering and their applications to chemical processes. Courses in nuclear energy are available.

The curriculum aims to give a broad training in fundamentals, rather than specialized training for a narrow field. A corresponding breadth of opportunity

is presented, including the entire field of chemical industry as well as allied fields. Many positions of responsibility, particularly in research and development work, demand a more extensive training than can be given in four years, and students with proper qualifications may pursue graduate work leading to advanced degrees. Some specialization is possible in the senior year.

### Courses in Chemical Engineering

#### Lower Division Courses

- ChE 211. **Chemical Technology.** 2 hours. 1 ① 1 ②  
Fundamentals of chemical engineering; graphical analysis; instrumentation; control of process variables; applications in the solution of typical problems.
- ChE 212. **Industrial Stoichiometry.** 2 hours winter. 1 ① 1 ②  
Quantitative interpretations and application of physical and chemical data to various industrial chemical processes.
- ChE 213. **Industrial-Chemical Calculations.** 2 hours spring. 1 ① 1 ②  
Introduction to engineering thermodynamics.
- ChE 263. **Assaying.** 3 hours. 1 ① 2 ③  
Commercial methods of wet and dry assay of ores, metallurgical products. Prerequisite: Ch 232 or equivalent.

#### Upper Division Courses

- ChE 311, 312. **Chemical Engineering Thermodynamics.** 3 hours fall and winter. 1 ① 2 ②  
Principles and relationships of thermodynamics applied to typical problems of chemical engineering. Prerequisite: Ch 440 or concurrent enrollment.
- ChE 313. **Elementary Unit Operations.** 3 hours. 3 ① 1 ②  
Introduction to unit operations; flow of fluids and flow of heat.
- Met 331, 332, 333. **Metallurgy.** 3 hours each term. 1 ① 2 ②  
General operations and principles of physical and extractive metallurgy; behavior and production of metals; metallurgical calculations. Prerequisite: Mth 203.
- ChE 401. **Research.** Terms and project to be arranged.
- ChE 403. **Thesis.** Terms and hours to be arranged.
- ChE 405. **Reading and Conference.** Terms, hours, and subject to be arranged.
- ChE 406. **Projects.** Terms and hours to be arranged.
- ChE 407. **Seminar.** 1 hour any term. 1 ①
- ChE 411, 412, 413. **Unit Operations.** (g) 3 hours each term. 1 ① 2 ②  
Quantitative treatment of principles of mass, energy, and heat transfer operations to typical engineering problems.
- ChE 414, 415, 416. **Chemical Engineering Laboratory.** (g) 3 hours each term. 1 ① 1 ④  
Quantitative laboratory study of the unit operations and transfer processes of chemical engineering; emphasis placed on preparation of technical reports. Prerequisite or parallel: ChE 411.
- ChE 425, 426, 427. **Chemical Engineering Calculations.** (G) 3 hours each term. 3 ①  
Mathematical analysis of chemical engineering problems with particular emphasis on setting up differential equations; special methods of solving problems. Prerequisite: ChE 313.

- ChE 432. **Chemical Plant Design.** (g) 3 hours. 2 ① 1 ②  
 Problems in the design of a chemical plant and chemical engineering equipment. Reports required. Prerequisite or parallel: ChE 413.
- ChE 441, 442, 443. **Elements of Process Industries.** (g) 2 hours each term. 1 ① 1 ②  
 Inorganic and organic chemical technology; the development and economic aspects of commercial operations; kinetics.
- ChE 451, 452, 453. **Nuclear Processes.** (g) 3 hours each term. 2 ① 1 ②  
 Theory of nuclear radiations and their effect on engineering materials; problems in chemical processing of radioactive material; laboratory experiments on interaction of nuclear radiation with materials used in chemical process industries and in construction.
- ChE 460. **Mineral Dressing.** (g) 3 hours fall. 3 ①  
 Principles of comminution, concentration, and related processes; methods of treatment and machinery used. Prerequisite or parallel: G 312.

**Graduate Courses**

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

- ChE 501. **Research.** Terms and hours to be arranged.
- ChE 503. **Thesis.** Terms and hours to be arranged.
- ChE 505. **Reading and Conference.** Terms and hours to be arranged.
- ChE 506. **Projects.** Terms and hours to be arranged.
- ChE 507. **Seminar.** Terms and hours to be arranged.
- ChE 511. **Industrial Plastics.** 3 hours. 3 ①  
 Classification of modern plastics; preparation, properties, and special fields of application; commercial processes of manufacture; fabrication. Prerequisite: Ch 432.
- ChE 512. **Economic Balance.** 3 hours. 3 ①  
 Solution of typical chemical engineering and applied chemistry problems from the standpoint of economic considerations; optimum conditions of design and operation.
- ChE 514. **Fluid Flow.** 3 hours. 2 ① 1 ②  
 Investigation of special phases of fluid flow, such as high pressure gas transmission systems, economics, and multiple, parallel lines; special attention to recent literature. Prerequisite: ChE 413.
- ChE 520, 521. **Diffusional Operations.** 3 hours each term. 2 ① 1 ②  
 Unit operations of evaporation, distillation, absorption, and extraction at an advanced level; stress on methods of solution of problems dealing with multicomponent mixtures. Prerequisite: ChE 413.
- ChE 522. **Heat Transmission.** 3 hours. 2 ① 1 ②  
 Mechanisms of transference of heat energy; engineering applications.
- ChE 531, 532, 533. **Electrochemical Engineering.** 3 hours each term. 2 ① 1 ②  
 A study of present-day electrochemical and electrometallurgical industrial practices with emphasis upon processes, efficiencies, operation, and cell or furnace design.
- ChE 537, 538. **Chemical Engineering Thermodynamics.** 3 hours each term. 2 ① 1 ②  
 Application of laws of energy and thermodynamics to chemical engineering design; irreversible processes and nonideal systems. Prerequisite: ChE 412, 413.
- ChE 540. **Applied Reaction Kinetics.** 3 hours. 2 ① 1 ②  
 Application of fundamental theories of reaction kinetics and adsorption to catalytic and noncatalytic processes; emphasis on evaluating experimental data and designing industrial reaction vessels.

## Civil Engineering

The curriculum in civil engineering is organized to train young men in those principles of engineering science and technology that are basic and common to the fields of geodesy and surveying, highways, railroads, irrigation and drainage, river and harbor improvements, structures, hydraulics, sanitation, and municipal engineering, and to permit some 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 201, 202, 203. Introduction to Civil Engineering. 2 hours each term. 2 ③  
 Fundamentals of graphic analysis, descriptive geometry, structural and topographic drafting; hydrostatics, and field geometry. Prerequisite: for CE 201: GE 113; for CE 202: GE 101; for CE 203: CE 221 or CE 226 and Mth 102.
- CE 211, 212, 213. Mechanics and Strength of Materials. 3 hours each term. 1 ① 2 ②  
*Fall:* Theory and application of force systems applied to rigid bodies. *Winter and Spring:* General principles of mechanics applied to the elements of engineering structures to determine their strength and fitness. Prerequisite: GE 101, 112, and Mth 200.
- CE 221. Plane Surveying. 3 hours. 1 ① 2 ③  
 Theory and use of engineer's transit, tape, and level; evaluation of effect of errors on observation; application of surveying methods to problems in construction and area surveys. Prerequisite: Mth 101, GE 112.
- CE 222. Plane Surveying. 3 hours. 1 ① 2 ③  
 Surveying problems relating to construction surveys, urban and rural land surveys; special computation problems in map projections, control surveys, and earthwork; tests and adjustment of engineer's transit and level. Prerequisite: CE 221.
- CE 223. Plane Surveying. 3 hours. 1 ① 1 ⑥  
 Control surveys; computation of statewide coordinates; topographic mapping; theory and use of stadia and plane table; field astronomy. Prerequisite: CE 222.
- CE 224, 225. Surveying for Landscape Architecture Students. 3 hours each term. 1 ① 2 ③  
 Practical use of engineer's level, tape, and transit in planning and layout of projects in landscape architecture; principles of topographic mapping; use of engineer's transit and telescopic alidade in making stadia surveys; practical use of plane table; practical problems in making and using topographic data.
- CE 226. Plane Surveying. 3 hours. 1 ① 2 ③  
 Theory and use of engineer's transit, tape, and level; application of surveying methods to problems in construction and area survey. Prerequisite: Mth 102.

### Upper Division Courses

- CE 311, 312, 313. Dynamics and Fluid Mechanics. 3 hours each term. 1 ① 2 ③  
 Principles and problems of kinematics and kinetics of bodies; force as a factor causing motion; work, energy, friction, and impact; application of mechanics to compressible and incompressible fluids, laws of similitude, laboratory studies. Prerequisite: CE 211, Mth 202.
- CE 322. Elementary Hydraulics. 3 hours. 2 ① 1 ③  
 Principles underlying pressure and flow of water; laboratory measurements. For students in Mechanical Technology in Agriculture. Prerequisite: Mth 200.
- CE 341. Fluid Mechanics. 3 hours any term. 1 ① 2 ③  
 For students in electrical, mining, and mechanical engineering. Prerequisite: CE 312 or ME 213, Mth 203.

- CE 342. **Hydraulic Machinery.** 3 hours. 2 ① 1 ③  
Application of the principles of hydraulics to the performance and design of pumps and turbines and the layout of pumping and power plants. Prerequisite: CE 312 or 341.
- CE 362. **Modern Construction Methods.** 2 hours. 1 ① 1 ③  
Study of construction equipment and performance factors, plant selection, calculation of productivity and costs.
- CE 372, 373. **Soil Mechanics.** 3 hours each term. 1 ① 2 ②  
Settlement, analysis, slope stability, lateral pressure, composition, and stabilization. Prerequisite: CE 213, 312.
- CE 381, 382. **Structural Analysis.** 3 hours each term. 2 ① 1 ③  
Graphical and algebraic analysis of statically determinate structures; deflection of structures; plastic analysis. Prerequisite: CE 213, Mth 203.
- CE 383. **Reinforced Concrete.** 3 hours. 2 ① 1 ③  
Study and design of the elements of reinforced concrete including beams, slabs, girders, and columns. Prerequisite: CE 213, 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: CE 312.
- CE 412. **Hydraulics.** 3 hours. 1 ① 2 ②  
Reservoirs, dams, spillways and outlet works, open channels, water hammer, pipe net works, hydraulic machinery, economic aspects of hydraulic projects, water law. Prerequisite: CE 313.
- CE 413. **Sanitary Engineering.** (g) 3 hours. 2 ① 1 ③  
Fundamental processes and operations of the conditioning of water as applied to water supply and sewage disposal. Prerequisite: CE 313.
- CE 414. **Sanitary Water Measurements.** (g) 3 hours. 1 ① 2 ③  
Measurement of sanitary quality and quantity of domestic wastes and of streams. Primarily for biology students, particularly those majoring in fisheries field. Prerequisite: Ch 103, Bac 204, FG 276.
- CE 421, 422. **Highway Engineering.** (g) 3 hours each term. 2 ① 1 ③  
Highway and street design; theory of pavement design, subgrade treatments, drainage design, highway planning, traffic surveys, highway economics and finance. Prerequisite: senior standing.
- CE 433. **Hydraulic Machinery.** 3 hours. 1 ① 2 ②  
Theory, operation, characteristics, efficiency, design, and installation of pumps and turbines; laboratory studies. Prerequisite: CE 313.
- CE 452. **Water Supply.** (g) 3 hours any term. 2 ① 1 ③  
Quality and quantity of water necessary for a municipal supply and of works for its collection, purification, and distribution. Prerequisite: CE 412.
- CE 454. **Sewage and Waste Disposal.** (g) 3 hours. 2 ① 1 ③  
Disposal and treatment of sewage; design and operation of sewage-treatment plants. Prerequisite: CE 412.
- CE 463. **Estimating and Contracts.** (g) 4 hours. 3 ① 1 ③  
Quantity surveying; study of unit prices, subcontracts, overhead costs, profits; general principles and laws of contracts applied to engineering. Prerequisite: CE 412, 421, 481.

- CE 472. **Foundations.** (g) 3 hours. 2 ① 1 ③  
Study and design of foundations for engineering structures. Prerequisite: CE 383.
- CE 481, 482, 483. **Structural Engineering.** (g) 3 hours. 2 ① 1 ③  
Study of elements of steel, timber, and concrete structures; elastic and plastic design, and detail problems. Prerequisite: CE 213, 382, 383.
- CE 485. **Indeterminate Structures.** (g) 3 hours. 2 ① 1 ③  
Elastic deflections and methods of analysis of statically indeterminate structures. Prerequisite: CE 382, CE 213.
- CE 486. **Structural Analysis.** (g) 3 hours. 2 ① 1 ③  
Study and stress analysis of statically indeterminate structures such as continuous beams and rigid frames; methods of analysis. Prerequisite: CE 485.
- CE 489. **Building Design.** (g) 3 hours. 1 ① 2 ③  
Study and design of building elements constructed of steel, reinforced concrete, timber, and miscellaneous building materials; fabrication and construction. Prerequisite: CE 472, 481.

#### Graduate Courses

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

- CE 501. **Research.** Terms and hours to be arranged.
- CE 503. **Thesis.** Terms and hours to be arranged.
- CE 505. **Reading and Conference.** Terms and hours to be arranged.
- CE 506. **Projects.** Terms and hours to be arranged.
- CE 507. **Seminar.** Terms and hours to be arranged.
- CE 519. **Soil Mechanics.** 3 hours. 3 ①  
Factors affecting settlement of building foundations; stability of earth dams and dikes; variations in shear strength of clays; principle of flow nets; trends in soil mechanics.
- CE 520. **Measurement of Water.** 3 hours. 3 ①  
Intensive study of reports on the measurement of flowing water by means of weirs, orifices, venturi meters, pitot tubes, current meters, bends, salt-velocity, and Parshall flumes.
- CE 521, 522, 523. **Fluid Mechanics.** 3 hours each term. 3 ①  
Dimensional analysis; principles of energy, continuity and momentum; boundary layer theory; unsteady flow in pipes.
- CE 525. **River Control and Utilization.** 3 hours. 3 ①  
Study of the methods of controlling flood flow in streams; design of dikes, shore protection facilities, retarding and impounding basins; laws of similitude; use of hydraulic models. Prerequisite: CE 522.
- CE 526. **Hydraulics of Open Channels.** 3 hours. 3 ①  
Steady, uniform and nonuniform flow in open channels 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  
Practical approach to solution of ground-water 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 Stresses.** 3 hours. 3 ①  
Stress analysis of space frames and continuous frames; use of elastic equations and distributed moments.



- CE 531. **Mechanical Methods of Stress Analysis.** 2 hours. 2 ①  
Theory and use of Beggs Deformeter, wire models, Gottschalk Continostat and Photo-elastic Polariscope as applied to the solution of stresses in continuous frames.
- CE 532. **Bridge Design.** 3 hours. 3 ①  
Problems in location, economic selection, and design of steel bridges.
- CE 533. **Analysis and Design of Concrete Structures.** 3 hours. 3 ①  
Problems in analysis and design of elastic concrete structures. Prerequisite: CE 483, 485.
- CE 534. **Mechanics of Materials.** 3 hours. 2 ① 1 ③  
Behavior of structural materials; theories of failure, multiaxial stress conditions, torsion, shear distortions, impact and vibrations, energy methods of analysis, stresses in plates and shells. Prerequisite: CE 313, 485.
- CE 535. **Prestressed Concrete.** 3 hours. 2 ① 1 ②  
Analysis and design of prestressed concrete structural elements; systems of prestressing, material specifications, stress analysis, linear and circular prestressing, economics. Prerequisite: CE 313, 383; ME 316.
- CE 540. **Sanitary Engineering Design.** 3 hours. 3 ①  
Measurements, computations, and estimates of storm and sanitary sewers. Flow networks investigations. Design and estimates of water and sewage treatment plants.
- CE 541. **Stream Purification.** 3 hours. 3 ①  
A study of stream pollution, oxygen sag, reaeration, and their effects.
- CE 542. **Water and Sewage Treatment Processes.** 3 hours. 3 ①  
Critical review of recent and current researches in the field of water and sewage treatment.
- CE 543. **Treatment Plant Operation and Control.** 3 hours. 3 ①  
Field analysis of water and sewage treatment plant operations and methods of control.
- CE 544, 545, 546. **Water Supply and Waste Disposal.** 3 hours each term. 2 ① 1 ③  
Engineering, mathematical, chemical, and biological aspects of domestic and industrial water supply and waste disposal. Prerequisite: CE 313, 452, 454.
- CE 550. **Highway Administration and Finance.** 3 hours. 3 ①  
Development of highway systems; organization of state and national highways; principles of highway finance; Federal aid; technical functions of various highway units.
- CE 551. **Municipal Engineering and City Planning.** 3 hours. 3 ①  
Modern city streets, boulevards, transportation systems; drainage and sanitation; water supply; lighting.
- CE 552. **Transportation Engineering.** 3 hours. 3 ①  
Study of related engineering factors pertaining to movement of freight by rail, water, air, and highways.
- CE 553. **Street and Highway Traffic Control.** 3 hours. 3 ①  
Study of various factors affecting operation of streets and highways from standpoint of efficiency and safety.

## Electrical Engineering

The curriculum is designed to provide a professional education in electrical engineering. Into it are integrated courses in physics, chemistry, mathematics, engineering science, and social science. The Electrical Engineering Department provides the additional electrical science and engineering courses in analysis and synthesis of systems required for the professional curriculum.

An experienced professional staff and adequate facilities provide competent instruction in the following major areas: communications, computers, control, electronics, electromagnetic radiation, high voltage, illumination, instrumenta-

tion, 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.

#### Lower Division Courses

- EE 201, 202, 203. **Circuits and Fields.** 4 hours each term. 2 ① 2 ②  
Fundamentals of magnetic and electric fields and associated circuits, and electric circuit theory. Prerequisite: GE 103; Mth 200, or equivalents. Ph sequence may be concurrent.

#### Upper Division Courses

- EE 311, 312, 313. **Electromagnetics.** 3 hours each term. 2 ① 1 ③  
Electromagnetic circuits and electromechanical energy conversion. Circuit characteristics of electromagnetic and electromechanical energy converters; control characteristics of rotating amplifiers. Prerequisite: EE 203, Mth 203.
- EE 321, 322, 323. **Electronics.** 3 hours each term. 2 ① 1 ③  
Fundamental theory of electronics including thermionic emission, cold cathode emission, photoelectric emission, space charge, and discharge in gases; principles of vacuum, gas, and vapor tubes, solid state electronic devices, and their basic associated circuits. Prerequisite: EE 203, Ph 209.
- EE 330. **Circuit Theory.** 3 hours. 3 ①  
Transient response of networks with lumped constants, including analysis of Laplace transformation. Prerequisite: EE 203, Mth 321.
- EE 331. **Electromagnetic Waves.** 3 hours. 3 ①  
Basic laws of electromagnetic fields and waves; propagation and reflection of plane waves. Prerequisite: EE 330.
- EE 351, 352, 353. **Electrical Fundamentals.** 3 hours each term. 1 ① 2 ②  
Fundamentals of electric circuits and equipment emphasizing the application to industry. Prerequisite: GE 103, Ph 209, Mth 203.
- EE 356. **Industrial Electricity.** 3 hours. 2 ① 1 ③  
Abbreviated course covering direct and alternating current circuits and machines. For civil engineering students. Prerequisite: junior standing.
- EE 357. **Industrial Electricity.** 3 hours. 2 ① 1 ③  
Distribution systems for industrial power and lighting, including equipment, safety appliances, and economic aspects. Prerequisite: EE 356.
- 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. 1 ②  
Presentation and evaluation of material pertinent to the professional aspects of electrical engineering and industry. Prerequisite: senior standing in electrical engineering.
- EE 411. **Electrical Engineering Economy.** (g) 3 hours. 3 ①  
Power and communication utility economy including plant investment, operation, regulation, and public relations problems; engineering management, labor relations, taxation, feasibility studies, specifications, and contracts.
- EE 414, 415, 416. **Instrumentation.** (g) 3 hours each term. 2 ① 1 ③  
Fundamentals of measurements, theory of electrical instruments and transducers; applications to measurement of both 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  
Generalized theory of transmission lines, networks, and waveguides.
- EE 431, 432, 433. **Power Engineering.** (g) 3 hours each term. 2 ① 1 ③  
Characteristics and functions of transformers, rotating electrical machines, and correlated devices related to design and analysis of electric-power systems. Prerequisite: EE 313.
- EE 461, 462, 463. **Communication Engineering.** (g) 3 hours each term. 2 ① 1 ③  
Theory and practice of electric communication including telegraphy, telephony, radio, and television. Prerequisite: EE 313, 323.
- EE 465. **Television.** (g) 3 hours. 2 ① 1 ③  
Theory of black-and-white and color television; television transmitters, antennas, and receivers. Prerequisite: EE 422, 462.
- EE 471, 472, 473. **Illumination.** (g) 3 hours each term. 2 ① 1 ③  
Fundamentals of light and sight; study of luminaries, reflectors, and diffusing media; the application of basic principles to lighting problems. Prerequisite: EE 313 or EE 323.
- EE 481, 482, 483. **Radio and Television Engineering.** 1 hour each term. 1 ②  
Engineering design and operating practices in radio and television broadcasting. Instruction given by engineers in charge KOAC and KOAC-TV. Prerequisite: senior standing.
- 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, and 330.

#### Graduate Courses

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit. Courses at the graduate level are given when warranted by demand.

- EE 501. **Research.** Terms and hours to be arranged.
- EE 503. **Thesis.** Terms and hours to be arranged.
- EE 505. **Reading and Conference.** Terms and hours to be arranged.
- EE 506. **Projects.** Terms and hours to be arranged.
- EE 507. **Seminar.** Terms and hours to be arranged.
- EE 511, 512, 513. **Electron Devices.** 3 hours each term. 2 ① 1 ③  
Theory of electron tubes and semiconductor devices emphasizing klystrons, traveling wave tubes, transistors, and their associated circuits.
- EE 521, 522, 523. **High-Voltage Systems.** 3 hours each term. 2 ① 1 ③  
Analysis and synthesis of high-voltage systems; fundamentals of dielectrics associated with high voltage; high voltage sources, corona characteristics.
- EE 525, 526, 527. **Computer Systems.** 3 hours each term. 2 ① 1 ③  
Analysis and synthesis of digital and analog computing systems; pulse and digital circuitry applied to digital computers; analysis and evaluation of computer components.
- EE 531. **Materials.** 3 hours. 2 ① 1 ③  
Properties of electrical conductors and insulators and of dielectric and magnetic materials.
- EE 535, 536, 537. **Circuits and Fields.** 3 hours each term. 3 ①  
Mathematical analysis of circuit response and of electromagnetic radiation and propagation.
- EE 541, 542, 543. **Power Systems.** 3 hours each term. 2 ① 1 ③  
Advanced study of electric power generation, transmission, distribution, and utilization.

- EE 554, 555, 556. **Control Systems.** 3 hours each term. 2 ① 1 ③  
Control system synthesis using signal flow diagrams and statistical design principles; nonlinear system analysis using describing function approach and phase-plane method.
- EE 561, 562, 563. **Communication Systems.** 3 hours each term. 2 ① 1 ③  
Theory and design of devices and circuits and their interconnection and functioning in communication systems. Prerequisite: EE 463 or equivalent.

## Industrial Engineering and Industrial Arts

The Department of Industrial Engineering and Industrial Arts provides technical and professional training for industrial engineering, production technology, production control, and other phases of scientific management vital to business and industry. Both the managers and the artisans of industry, from skilled labor to the industrial designers and production managers, are dependent upon an integral and intimate knowledge of industrial processes, the skills, and the machine applications necessary to produce the articles they collectively create. These are the specific concerns of the industrial engineer and the production technologist.

The Department of Industrial Engineering and Industrial Arts also provides instruction in the technical courses required for the preparation of industrial arts teachers (see curriculum under SCHOOL OF EDUCATION) and offers service courses in engineering shopwork. Service courses and electives are available to others as facilities permit.

The **Production Technology Curriculum** is designed to meet the demand in industry for men with basic skills and technical knowledge, supplemented with studies in scientific management and business administration. This program includes a study of accepted principles and practices by which the manufacturing industries have evolved a system of production and quality control. Correlation of the technical studies, production processes, and management principles is emphasized, so that graduates of the program can progress to supervisory and executive positions. The options (*Metal Industries* with subdivisions involving applications in Metal Castings, Machinery and Tooling, and Welded Fabrications; *Tool Design*; *Wood Industries*, with subdivisions in Building Construction and Mill-Cabinet Work) and the electives enable a student to specialize in the particular phase of industry consistent with his interests and aptitudes. The program affords opportunity in technical training and business applications appropriate for industrial technicians, tool designers, production managers, and works managers. Students in each of the several options are assigned to individual advisers. Restricted electives in each option, appropriate to the objectives of the option and compatible with the educational goal of the student, will be selected with the approval of the adviser.

The **Industrial Engineering Curriculum** is designed to train students for the engineering, production, or technological-administrative departments of industry. The youngest branch of the engineering profession, industrial engineering is represented on the Joint Engineering Council by the American Institute of Industrial Engineering. The curriculum at Oregon State College, and in 36 other such schools, 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. Students are prepared for those positions in industry which require primarily a combination of engineering and business judgment in the management of men, materials, machines, and processes. The goal of the professional industrial engineer is to produce a superior product 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.

#### Lower Division Courses

- \*IE 111. **Pattern Making.** 3 hours. 2 ① 1 ④  
Fundamentals of pattern making; relation of pattern making to drafting, design, foundry and machine-shop operation.
- \*IE 112, 113. **Methods in Woodworking.** 3 hours each term. 1 ① 2 ③  
Woodworking, with special reference to tool techniques, applied design, and craftsmanship in group and individual projects.
- \*IE 140. **Foundry Practices.** 3 hours. 2 ① 1 ④  
Constitution, properties, and design limitations of casting in gray iron, malleable iron, and steel; methods used in the production of castings.
- \*IE 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.
- \*IE 160. **Machine Tool Practices.** 3 hours. 2 ① 1 ④  
Use of basic machine tools on prescribed projects representative of industrial operations. Prerequisite: Mth 10.
- IE 220. **Wood Turning.** 2 hours. 1 ① 1 ④ or 2 ②  
Tool processes and lathe technique; designing, turning, and finishing of individual projects of merit. Prerequisite: IE 111 or IE 112.
- IE 225. **Machine and Tool Maintenance (Wood Shop).** 2 hours. 1 ① 1 ④  
Methods of care and maintenance of woodworking tools, machines, and supplementary equipment. Prerequisite: IE 111 or IE 112.
- \*IE 240. **Foundry Practices.** 2 hours any term. 1 ① 1 ④  
Introductory course covering constitution, properties, and design limitations of castings in iron and steel; fundamental methods in the production of castings.
- \*IE 250. **Forging and Welding.** 2 hours any term. 1 ① 1 ④  
Forging, forming, and heat-treating of steel, followed by gas and electric-arc welding, flame cutting, brazing, and resistance welding operations; primary attention to applications in engineering design and construction and to industrial production problems.
- \*IE 260, 261. **Machine Tool Practices.** 2 hours each term. 1 ① 1 ④  
Basic and advanced operations of machine tools on prescribed projects illustrative of industrial operations. Correlation of engineering and manufacturing problems and processes. Prerequisite: For IE 260: Mth 100; for IE 261: Mth 100 and IE 160 or IE 260.
- IE 265. **Machine and Tool Maintenance (Metals).** 3 hours. 2 ① 1 ④  
Maintenance and repair problems for mechanical equipment. Methods and procedures in tool and cutter sharpening. Prerequisite: IE 160 or IE 260.
- IE 270. **General Metals Laboratory.** 3 hours. 1 ① 2 ③  
Introductory course covering basic operations and processes of forging, heat-treating, welding, nonferrous metal casting, and machine tool work. For industrial arts teachers who wish to add these areas to a general shop program and to enrich their understanding of modern industrial metal-processing methods.
- IE 290. **Introduction to Scientific Management.** 3 hours. 3 ①  
History, development, and scope of scientific management. Laws of scientific management as applied to manufacturing.

\* In courses designated by asterisks, in addition to the regularly scheduled meetings, the student may be required to attend three general lectures during the term.

## Upper Division Courses

- IE 311. **Millwork Machine Woodwork.** 3 hours. 1 ① 2 ③  
A production course in machine woodworking. Prerequisite: IE 111 or 112.
- IE 312, 313, 314. **Furniture Design and Construction.** 2 hours each term. 2 ③  
The designing and construction of furniture and cabinet work, according to the needs and ability of the individual student. Prerequisite: For IE 312: AA 281, 282; for IE 313: IE 311.
- IE 316. **Wood and Metal Finishing.** 3 hours. 1 ① 2 ③  
Materials and processes for application of modern finishes to both old and new work on both wood and metal surfaces; brush and spray application of finishing materials. Prerequisite: IE 112.
- IE 320. **Boat Design and Construction.** 3 hours. 1 ① 2 ③  
Design and construction of small boats, with particular reference to "seaworthiness" and safety, high utility, performance, and stability. Development of typical plans and actual construction under practical conditions. Prerequisite: IE 112, IE 333.
- IE 332. **Pattern Making.** 2 hours. 1 ① 1 ④  
Continuation of IE 111, with emphasis on problems in making of patterns for more complicated machine parts and on factors influencing production costs of these parts. Prerequisite: IE 111.
- IE 333. **Carpentry and Building Construction.** 3 hours. 1 ① 2 ③  
Application of carpentry fundamentals including actual construction in miniature from architect's plans; laboratory work in framing of rafters and selected architectural sections with fullsize lumber. Prerequisite: IE 112.
- IE 340. **Foundry Practices.** 3 hours. 2 ① 1 ④  
Equipment for school and home workshops; processes and projects suited to public-school applications in industrial arts classes. Prerequisite: IE 140 or 240.
- IE 344, 345, 346. **Casting Processes.** 3 hours each term. 2 ① 1 ④  
Casting methods and techniques applied to ferrous, nonferrous, and reactive metals; foundry raw materials and controls; quality control as influenced by casting design; melting and sand practices; special molding methods; gating, risering, and solidification problems. Prerequisite: IE 140 or IE 240.
- IE 350. **Forging and Welding.** 3 hours. 2 ① 1 ③  
Experiments, practice, and projects in forging, heat-treating, and welding of ferrous and nonferrous metals; special attention to problems of instruction, equipment maintenance, and general fabrication. Intended for students in Industrial Arts (School of Education) and Production Technology (Wood Industries option). Prerequisite: IE 150 or 250.
- IE 354, 355, 356. **Welding Processes and Applications.** 3 hours each term. 2 ① 1 ③  
A study of welding processes and techniques applied to ferrous and nonferrous metals. Selection of processes for 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 economics problems involved. Prerequisite: IE 150 or 250.
- IE 360. **Machine Shop Practices.** 3 hours. 2 ① 1 ④  
Machine shop practices and techniques through individual and group projects. For industrial arts education majors. Not open to engineering majors. Prerequisite: IE 160 or 260.
- IE 361, 362, 363. **Mass Production Methods.** 3 hours each term. 2 ① 1 ④  
The selection, setup, and operation of production machines in relation to quantity and quality. The construction, use, and application of jigs and fixtures. Job shop problems. Group projects and quality control. Prerequisite: IE 160 or 260.
- IE 365. **Applied Strength of Materials.** 3 hours. 2 ① 1 ③  
Principles of mechanics applied to the elements of product design; determination of strength of tooling elements used in manufacturing processes. Prerequisite: Mth 102, junior standing. For production technology students only.

- IE 370. **Applied Electricity.** 3 hours. 1 ① 2 ③  
Basic instruction in practical electricity; principles of electrical circuits and controls, with applications in fields of light and power wiring, stagecraft and lighting, communication. Intended primarily for prospective industrial arts teachers. Prerequisite: junior standing.
- IE 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.
- IE 387. **Metal Crafts.** 3 hours. 1 ① 2 ③  
Diversified metal crafts; metal spinning, and craft work in iron, copper, and Britannia metal. Prerequisite: AA 282, IE 350 or 380.
- IE 388. **Lapidary Techniques and Processes.** 2 hours. 1 ① 1 ④  
Gem materials and methods used to process the rough material into display specimens or mounted jewelry pieces. Prerequisite: AA 281, IE 387.
- IE 390. **Safety in Industry.** 2 hours. 2 ①  
History of industrial safety; safety legislation, organizations, services, and training; accident costs and causes; methods of safe practice, safety and health standards and records. Prerequisite: junior standing.
- IE 391. **Methods and Motion Study.** 3 hours. 1 ① 2 ③  
Theory and application of methods study; 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 ③  
Theory and application of time-study techniques; job analysis and standardization; construction of standard data and formula applications; synthetic determination of time standards; wage payment systems and merit rating. Prerequisite: junior standing.
- IE 393. **Production Planning and Control.** 3 hours. 1 ① 2 ③  
Departmental organization and types of production control techniques; codification and symbolization; forecasting, materials control, routine, scheduling, dispatching, and inspecting. Prerequisite: junior standing.
- IE 394. **Materials Handling.** 3 hours. 2 ① 1 ②  
Selection of material-handling equipment, its application, coordination; effect of materials handling on plant layout in industrial situations. Prerequisite: junior standing in engineering.
- IE 405. **Reading and Conference.** Terms and hours to be arranged.
- IE 406. **Projects.** Terms and hours to be arranged.
- IE 407. **Seminar.** 2 hours. 2 ①  
Prerequisite: senior standing.
- IE 464, 465, 466. **Tool Engineering.** 3 hours each term. 1 ① 2 ③  
Fundamentals of tool engineering; tools, jigs, fixtures, and die design. Analysis of operation sequence, dimensional and quality control. Power press applications on the plastic working of metals and nonmetals. Prerequisite: IE 362.
- IE 490. **Industrial Supervision Principles.** (G) 3 hours. 3 ①  
Basic 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: IE 391, 392, 393.
- IE 491, 492. **Production Planning and Control.** (G) 3 hours each term. 3 ①  
Quantitative analysis and economic optimum selection of machines, equipment, and labor; quantitative control in inverse relationships, least-cost combinations in purchasing quantities and in seasonal production. Prerequisite: calculus and IE 391, 392, 393.
- IE 495. **Quality Control.** (G) 3 hours. 3 ①  
Principles of quality control applied to industrial production; frequency distribution, variable, and attribute control charts; acceptance sampling techniques; inspection management; introduction to probability. Prerequisite: Mth 102, IE 393.

**Graduate Courses**

Courses numbered 400-499 and designated (g) or (G) may be taken for graduate credit. Graduate courses in Industrial Education are listed under SCHOOL OF EDUCATION.

- 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 511. **Shop Planning and Organization.** 3 hours. 1 ① 2 ③  
 Planning and organizing the physical plant for different types of school shops. Prerequisite: Ed 408 and IEd 420.
- IE 525. **Recreational Handicrafts.** 3 hours. 1 ① 2 ③  
 Materials, projects, and procedures in developing a recreational handicraft program in secondary schools, on an extracurricular or curricular basis, and in evening adult classes; laboratory applications. Prerequisite: Ed 408 and courses in wood- and metal-work equivalent to IE 220, 313, and 380.
- IE 587. **Metalcraft Problems.** 3 hours. 1 ① 2 ③  
 Utilization of semiprecious metals in school and home shop work; advanced skills in metal spinning, and craft work in copper, brass, and Britannia metal; processes applied to projects of practical value and artistic merit. Prerequisite: Ed 408, AA 281, 282, 283, and IE 387.
- IE 591. **Operation Analysis.** 3 hours. 3 ①  
 Current operation analysis techniques; application of methods and cost studies to advanced problems. Prerequisite: IE 391, 392.
- IE 592. **Timing Techniques.** 3 hours. 3 ①  
 Modern time-study methods; critical study of allowances, skill levels, and other advanced problems. Prerequisite: IE 391, 392.
- IE 594. **Plant Layout.** 3 hours. 3 ①  
 Application of principles governing selection of a plant site; development of plant layout; selection and planning of building for economic production. Prerequisite: IE 392, 394, 490.

**Mechanical 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. In the senior year, opportunity is provided for limited specialization in metallurgy, applied mechanics, heating and air conditioning, power, nuclear engineering, automotive engineering, or aeronautical engineering.

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, a smoke tunnel, miscellaneous aircraft parts and instruments, and a variety of aircraft engines. Engineering laboratories include facilities and machines for testing and research on metallic and nonmetallic structural materials, and fuels and lubricants. Equipment and instruments, such as balancing machines, vibrometers, photoelasticity apparatus, and a 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.

#### Lower Division Courses

- ME 217, 218, 219. **Mechanics of Materials.** 3 hours each term. 2 ① 1 ②  
 Mechanics as applied to stress and strain distribution and deflections in machine and structural members. Prerequisite: Mth 200, GE 103.

#### Upper Division Courses

- ME 311. **Strength of Materials.** 3 hours. 2 ① 1 ②  
 Mechanics as applied to stress and strain distribution and deflections in machine and structural members. Service course for nonmajors. Prerequisite: ME 217.
- ME 312, 313. **Metallurgy and Materials.** 3 hours each term. 2 ① 1 ③  
 Nature of the solid state, atomic and crystal structure, electron and band theories of solids; constitution diagrams; solidification; deformation of metals; physical and mechanical properties of metals; methods of control of properties; corrosion; nonmetallic materials. Prerequisite: ME 218, Ph 209.
- ME 315. **Engineering Materials.** 3 hours. 2 ① 1 ③  
 Properties and structure of engineering materials. Test procedures and specifications. Prerequisite: ME 218 or ME 311.
- ME 316. **Materials Testing Laboratory.** 3 hours. 2 ① 1 ③  
 Materials of engineering construction; testing methods and specifications adopted by the American Society for Testing Materials, etc.; preparation of reports. Service course for nonmajors.
- ME 317, 318, 319. **Dynamics of Solids and Fluids.** 3 hours each term. 2 ① 1 ②  
*Fall:* Mechanics of fluid flow, compressible and incompressible fluids (fluid mechanics). *Winter:* Continuation of fluid mechanics for first half of term; second half of term covers kinematics and kinetics of solids; momentum; energy (dynamics). *Spring:* Continuation of dynamics; vibrations, balancing of rotating and reciprocating bodies; periodic motion, mechanism and introduction to vector mathematics. Prerequisite: Mth 203, ME 217, Ph 209.
- ME 321, 322, 323. **Thermodynamics and Heat Transfer.** 3 hours each term. 2 ① 1 ②  
 Study of gas laws, processes and cycles, fuels and combustion, properties of steam and other vapors, vapor cycles, boilers, steam engines and turbines, internal combustion engines, gas turbines, refrigeration cycles and heat transfer. Prerequisite: Mth 202, Ph 209, Ch 103.
- ME 324. **Gas Dynamics.** 3 hours. 2 ① 1 ③  
 Engineering applications of dynamics and thermodynamics to the flow of gases using Mach number as fundamental variable. Prerequisite: ME 318, 322.
- ME 335. **Refrigeration and Cold Storage.** 3 hours. 2 ① 1 ②  
 Principles and practice of refrigeration and cold storage. For students in dairy manufacturing, horticulture, food industries, etc. Prerequisite: algebra and elementary physics.
- ME 337. **Heat Engines.** 3 hours. 2 ① 1 ②  
 Construction, operation, and performance of internal-combustion engines with emphasis on diesel types; fuels, combustion, and lubrication as applied to internal-combustion engines; boilers and auxiliaries. Prerequisite: elementary physics and chemistry. Service course for forest engineering students.

- ME 351. **Mechanical Laboratory.** 3 hours. 1 ① 2 ②  
Selection, calibration, and application of instruments for the testing of machines and processes. Analysis of test results and preparation of engineering reports. Prerequisite: ME 321.
- ME 371. **Mechanical Engineering Analysis.** 3 hours. 2 ① 1 ②  
Application of mathematical analysis to problems in mechanics of solids and fluids, strength of materials, thermodynamics, electricity, and data reduction. Prerequisite: Mth 203, EE 351.
- 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. **Machine Design.** (g) 3 hours each term. 1 ① 2 ②  
Application of the principles of mechanism, mechanics, and strength of materials to design of machine elements. Prerequisite: ME 219, ME 319.
- ME 414. **Cement and Concrete Laboratory.** (g) 3 hours. 1 ① 1 ④  
Design of portland cement concrete and asphaltic concrete. Specifications and test procedures for cements, concretes, and mineral aggregates. Use of entrained air and other admixtures. Prerequisite: ME 312, 315 or 316.
- ME 416, 417, 418. **Elasticity.** (g) 3 hours each term. 2 ① 1 ②  
Introduction to theory of elasticity, stress determination from strain measurement, structural similitude, mechanical and electrical strain gages, photoelasticity, brittle lacquer method; miscellaneous methods in experimental stress analysis. Prerequisite: ME 219.
- ME 419. **Vibrations.** (g) 3 hours. 2 ① 1 ③  
Vibration as applied to mechanical engineering. General theory of systems having one or more degrees of freedom; vibration isolation and absorption; vibration measuring instruments; reciprocating and rotating inertia balance. Prerequisite: ME 319, 371.
- ME 421, 422. **Heating and Air Conditioning.** (g) 3 hours each term. 2 ① 1 ②  
Application of basic principles to heating, ventilating, and air conditioning of buildings for human comfort or industrial processes; design, selection, construction, and operation of air conditioning equipment, including warm air, steam, hot water, and refrigeration systems; testing of air conditioning equipment and controls. Prerequisite: ME 323.
- ME 423. **Refrigeration.** (g) 3 hours. 2 ① 1 ②  
Thermodynamics of refrigeration; systems in use and principal characteristics of each; fundamentals of design; principal applications. Prerequisite: ME 323.
- ME 425. **Fuels and Lubricants.** (g) 3 hours. 2 ① 1 ③  
Heating value and calorimetry; properties of solid, liquid, and gaseous fuels; survey of rocket and nuclear fuels; lubrication theory and properties of lubricants; laboratory tests and specifications. Prerequisite: ME 323, 324, 351.
- ME 428, 429, 430. **Nuclear Reactor Analysis.** (g) 3 hours each term. 2 ① 1 ③  
Survey of engineering analysis of nuclear reactor in steady state and transient operation; elementary reactor theory; shielding; heat transfer and fluid flow problems. Prerequisite: ME 323, 371, or ChE 452.
- ME 431, 432. **Power Plant Engineering.** (g) 3 hours each term. 2 ① 1 ②  
Selection of fuels and combustion equipment, steam generators and auxiliaries, and power generation equipment, including internal combustion engines, gas turbines, hydroelectric and nuclear power plants. Economics of power plant design and operation. Prerequisite: ME 323.

- ME 434. **Gas Turbines and Jet Engines.** (g) 3 hours. 2 ① 1 ②  
Gas turbines as applied to power generation, process industries, and aircraft; study of various cycles and component equipment, including compressors, combustion chambers, gas turbines, heat exchangers; jets and ducts; properties of gases, fuels, and high-temperature materials. Prerequisite: ME 323.
- ME 437, 438. **Mechanical Laboratory.** (g) 3 hours each term. 1 ① 2 ③  
Testing of basic types of mechanical equipment, including development and supervision of test procedures, analysis of test data, calculation of heat balances, and preparation of engineering reports. Prerequisite: ME 323, 351.
- ME 447, 448, 449. **Theory of Structures.** (g) 3 hours each term. 2 ① 1 ②  
Theory and application of principles of mechanics to structural analysis of mechanical and aeronautical components. Prerequisite: ME 219, 371.
- ME 454. **Fluid Flow (Aerodynamics).** (g) 3 hours. 2 ① 1 ②  
Scalar and vector fields, the equations of conservation of mass, Newton's second law and the second law of thermodynamics for a fluid element, vortex filaments, the law of Biot and Sauart, infinite and finite thin wing theory. Prerequisite: ME 324.
- ME 455. **Fluid Flow (Aerodynamics).** (g) 3 hours. 2 ① 1 ②  
The energy equation, thermally and calorically perfect and imperfect gas flows. Prandtl-Meyer expansion waves, normal and oblique shock waves. Linearized subsonic and supersonic flow. Subsonic and hypersonic similarity parameters. Prerequisite: ME 454.
- ME 456. **Fluid Flow (Aerodynamics).** (g) 3 hours. 2 ① 1 ②  
The Navier-Stokes equations and boundary layer equations. Blasius's solution, the integral relations, turbulent flow, Reynolds' stresses and introduction to the compressible boundary layer. Prerequisite: ME 455.
- ME 457, 458. **Aircraft Performance.** (g) 3 hours each term. 2 ① 1 ②  
Theory dealing with problems of aircraft performance, stability, and control; special attention to characteristics of power plants such as reciprocating engine, turboprop, turbojet, ramjet, and rocket. Prerequisite: ME 324.
- ME 460. **Mechanical Engineering Economy.** (g) 3 hours. 3 ①  
Consideration of the time value of money as it affects alternative engineering proposals. Financial aspects of common investments. Prerequisite: senior standing.
- ME 470, 471, 472. **Mechanical Engineering Analysis.** (G) 3 hours each term. 2 ① 1 ②  
Continuation of ME 371 with emphasis on analysis of professional engineering type problems using advanced mathematical methods. Prerequisite: ME 371.
- ME 474. **Analog Computers.** (g) 3 hours. 2 ① 1 ④  
History and development of mechanical and electrical computers and analyzers. Emphasis given to the electronic operational analog and the mathematical equations representing physical systems. Network analyzers, digital computers, membrane and conducting sheet analogies studied in an introductory manner. Laboratory work essentially devoted to solution of problems and analyses of systems using operational analog equipment. Prerequisite: Mth 203, Ph 209.
- ME 476. **Industrial Instrumentation.** (G) 3 hours. 2 ① 1 ③  
Survey and selection of instruments and control devices for machines and industrial processes; calibration methods, static and dynamic testing, and analysis of instrument characteristics, including mechanical, pneumatic, electric and electronic devices. Prerequisite: ME 437.
- ME 480. **Metallurgy.** 3 hours. 2 ① 1 ②  
Survey of metallurgy and properties of ferrous products and nonferrous alloys from utilization standpoint; metallographic and other inspection techniques; principles of 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; preparation of metallographic specimens; use of metallographical microscope; photomicrography. Prerequisite: ME 312, 313.

ME 491, 492, 493. **Automotive Engineering.** (g) 3 hours each term. 2 ① 1 ③

Correlation of fuel and lubricant characteristics with engine performance; fuel induction systems, interpretation of exhaust gas analyses, and power-plant testing; automobile body and chassis engineering; tractive resistance; fleet operation, maintenance, and economics. Prerequisite: ME 323.

#### Graduate Courses

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

ME 501. **Research.** Terms and hours to be arranged.

ME 503. **Thesis.** Terms and hours to be arranged.

ME 505. **Reading and Conference.** Terms and hours to be arranged.

ME 506. **Projects.** Terms and hours to be arranged.

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

ME 511, 512, 513. **Engineering Materials.** 3 hours each term 1 ① 2 ②  
Critical study of materials specifications and testing procedures. Recent developments and applications in the fields of engineering materials. *Fall:* Ferrous metals and alloys. *Winter:* Nonferrous metals and alloys. *Spring:* Nonmetallic materials. Prerequisite: ME 313 or 315.

ME 516, 517, 518. **Elasticity.** 3 hours each term.

ME 516: 3 ①; ME 517, 518: 2 ① 1 ③

Mathematical theory of elasticity; experimental solution of problems in elasticity by means of photoelastic method; use of various types of strain gages, and mathematical analysis.

ME 519. **Vibrations.** 3 hours.

3 ①

General theory of systems having more than one degree of freedom; torsional vibration; geared systems; vibration of elastic structures; harmonic analysis; vibration of frames, plates, casings, turbine disks, rotors; nonlinear systems. Prerequisite: ME 419 or equivalent.

ME 525, 526. **Thermodynamics.** 3 hours each term.

3 ①

Advanced study of classical thermodynamics, properties of imperfect gases, availability functions and equilibrium constants. Prerequisite: ME 322.

ME 527. **Heat Transfer.** 3 hours.

3 ①

Unsteady state and three-dimensional conduction, boundary heat transfer, mass and heat transfer. Prerequisite: ME 323.

ME 532. **Fuel Technology.** 3 hours.

3 ①

Manufactured and natural gas production, transmission, and distribution; industrial application. Synthetic fuels processes; combustion reactions and flame temperatures taking into account dissociation. Prerequisite: ME 425.

ME 534. **Gas Turbine Design.** 3 hours.

2 ① 1 ③

Fields of application for gas turbines; factors affecting design of compressors, combustion chambers, turbines, heat exchangers, ducts, and nozzles; design of gas turbine unit for a specific application, including auxiliary equipment; testing of various components in laboratory. Prerequisite: ME 434.

ME 546, 547, 548. **Aerodynamics.** 3 hours each term.

3 ①

Theories of flow of perfect, viscous, and compressible fluids; theory of wings of finite and infinite spans.

ME 581. **Theoretical Structural Metallurgy.** 3 hours.

3 ①

Structure of the atom; structure of metal crystals; electron theory of metals; rate processes in metal structures; kinetics of phase changes; shear processes in metal crystals. Prerequisite: ME 312, 313.

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 diffractions; effects of plastic deformation on X-ray diffraction patterns; radiographic inspection of metal castings and welds. Prerequisite: ME 581.

# School of Forestry

## Faculty

*As of January 1960*

WALTER FRASER McCULLOCH, Ed.D., Dean of the School of Forestry; Associate Director of Forest Research Division, Agricultural Experiment Station; Professor of Forest Management.

GEORGE HECTOR BARNES, Ph.D., Assistant Director of Forest Research Division, Agricultural Experiment Station; Professor of Forest Management.

CHARLES WESLEY DANE, M.S., Assistant to the Dean of the School of Forestry.

WILLIAM PERRY WHEELER, M.F., Personnel Director; Associate Professor of Forest Management.

Forest Engineering: Professors DAVIES (department head), PATTERSON (emeritus); Associate Professors O'LEARY, WILSON.

Forest Management: Professors DILWORTH (department head), JEFFERS, ROBINSON; Associate Professors FERRELL, KENISTON, NETTLETON, WHEELER, YODER; Assistant Professors BELL, IRGENS-MOLLER, JAENICKE, KRYGIER, RANDALL, SUTHERLAND.

Forest Products: Professor WEST (department head); Associate Professor McKIMMY; Assistant Professor VAN VLIET<sup>1</sup>; Instructor KRAHMER.

Forest Properties: Professor DAVIES, forest supervisor; Associate Professor NETTLETON, assistant forest supervisor.

Forest Extension: Farm Forestry Specialist ROSS; Forest Products Marketing Specialist SANDER.

## General Statement

**T**HE AIM of the School of Forestry at Oregon State College is the best possible development of men, citizens, and foresters—in that order.

The school personnel program provides every student with a personal adviser, but ultimate success is dependent on the student. He must prove himself both on the job and on the campus; seasonal and graduate work performance is carefully appraised by the school. Foresters from Oregon State College must be competent and they must be respected. Forestry is an exacting and competitive profession with high academic and ethical standards. Students are required to abide by the Code of Ethics of the Society of American Foresters, and to conduct themselves in all respects as befits professional foresters. Departure from these requirements may be reason for terminating a student. The School is accredited by the Society of American Foresters, and it maintains the high standards of that Society.

Forestry, the major industry of Oregon, is also of great importance to the states of Washington, Idaho, and California. There is a strong, continuing demand for foresters in this region. Graduates in wood processing and technology are prepared for responsible positions with industrial organizations. Graduates in forest engineering and forest management are prepared to work with private and public organizations in raising, protecting, and harvesting the forest crop. In all areas, the School stresses administrative management, and in consequence graduates have excellent opportunities for advancement to supervisory and executive positions.

The School arranges seasonal employment for students and operates a placement service for graduates. Earlier graduates now in managerial positions

<sup>1</sup> On leave 1959-60.

give special consideration to the career development of present-day Oregon State foresters. Opportunities for good men in forestry are excellent; a forestry career is pleasant work, and it is a growing field with expanding possibilities, particularly on the West Coast.

The most important preparatory subjects for forestry are English, mathematics, and science courses. Deficiencies revealed by the college placement tests in English and mathematics must be corrected. To be admitted to the School of Forestry, a prospective student must have completed the entrance requirements of the college. He must also place in Mathematics 100 or above in the College Mathematics Placement Test. To achieve a satisfactory score in this test, a student should have had algebra, trigonometry, and solid or plane geometry in high school. Those failing to place in Mathematics 100 or above must enroll in the preforestry program in Lower Division. When the preforestry student has completed the necessary remedial mathematics courses, and has achieved a satisfactory grade-point average, he may apply to the Dean of Forestry for admission.

Transfer students will complete graduation requirements more readily if they come to Oregon State not later than the end of the first year. Students transferring two years of college credit to Oregon State will require more than two additional years to complete the 4-year professional forestry program. Those who must remain in junior college for two years should concentrate on general education subjects, leaving professional forestry subjects to the School of Forestry. Vocational forestry courses do not carry college credit.

The School of Forestry offers curricula in three specialized but interrelated fields: Forest Engineering, Forest Management, and Forest Products. In all three fields emphasis is given to West Coast forestry. Each curriculum leads to a degree, either Bachelor of Science or Bachelor of Forestry. There is also a combined Management-Engineering program leading to degrees in both departments. Of special value to forestry students is the Oregon Forest Research Center, located on the campus.

For the bachelor's degree the student is required to complete: (1) a minimum of 204 term hours of college work including institutional requirements (see General Information, General Catalog) plus any additional credit hours required to complete remedial work, (2) a minimum of 80 term hours of professional courses approved by the Dean, (3) 9 hours of approved upper division electives in an area supporting the student's major interest, and (4) at least six months of practical field work satisfactory to the employer and to the school. Through the Graduate School, all departments of the School of Forestry offer graduate work leading to a master's degree, and the Forest Management Department also gives the Ph.D. degree.

No summer camp is required. The school forest is only 20 minutes from the campus, and a fleet of trucks takes forestry classes there daily for field instruction. During each school year, many trips are made to woods and plants in order to give the students first-hand contact with practical phases of engineering, management, and utilization.

School of Forestry properties include the 6,809-acre McDonald Forest, seven miles from the campus, established in 1929 through a gift of the late Mrs. Mary J. L. McDonald of San Francisco; the 181-acre George W. Peavy Arboretum; the 4,000-acre Paul Dunn Forest adjacent to the McDonald Forest; the Spaulding Tract in Benton County; and the Blodgett Tract in Columbia County.

Forest research is carried on in the Forest Research Division of the Agricultural Experiment Station.

## Curricula in Forestry

*B.S., B.F. Degrees*

*Forest Engineering*

*Forest Management*

*Forest Products*

### Forest Engineering

*Accredited Society of American Foresters*

4-Year Curriculum

Freshman Year <sup>1</sup>		Sophomore Year	
	<i>Hours</i>		<i>Hours</i>
Botany (Bot 201).....	3	Mensuration (F 224).....	5
<sup>2</sup> Chemistry (Ch 130).....	3	Forest Engineering (FE 223).....	4
Extempore Speaking (Sp 111).....	3	Wood Technology (FP 210).....	3
Forest Engineering (FE 123).....	3	Forest Protection (F 231).....	3
<sup>2</sup> Forest Orientation (F 40).....	3	General Physics (Ph 201, 202, 203).....	12
General Forestry (F 111).....	3	Calculus (Mth 201).....	4
Tree Identification (F 153).....	3	American Governments (PS 201).....	3
Mathematics (Mth 101, 102).....	8	Outlines of Economics (Ec 212).....	3
Calculus (Mth 200).....	4	Technical Report Writing (Wr 227).....	3
English Composition (Wr 111, 112, 113)	9	Literature.....	3
Engineering Drawing (GE 115).....	3	Air or Military Science.....	3
Air or Military Science.....	3	Physical Education.....	3
Physical Education, General Hygiene.....	3	Principles of Accounting (BA 214, 215)	6
	51		52
Junior Year		Senior Year	
	<i>Hours</i>		<i>Hours</i>
Forest Valuation (F 324).....	3	Logging Plans (FE 461).....	5
Wood Utilization (FP 310).....	3	Logging Transportation (FE 462).....	5
Forest Engineering (FE 323).....	4	Logging Costs (FE 463).....	5
Northwest Logging (FE 360).....	4	Forest Economics (F 412).....	3
Logging Roads (FE 361).....	3	Forest Administration (F 415).....	3
Silviculture: Forest Practices (F 342)....	4	Timber Management (F 425).....	5
Timber Mechanics (FP 321).....	4	Fire Control (F 431).....	4
Aerial Photo-Interpretation in Forestry		Seminar (FE 407).....	1
(F 320).....	3	Business Law (BA 411).....	3
Seminar (F 307).....	1	Geology.....	3
Principles of Accounting (BA 214, 215)	6	Literature.....	3
Heat Engines (ME 337).....	3	Electives.....	10
Literature.....	3		50
Electives.....	16		
	51		

### Forest Engineering

5-Year Curriculum

First Year <sup>1</sup>		Second Year	
	<i>Hours</i>		<i>Hours</i>
Botany (Bot 201).....	3	Engineering Concepts (GE 101, 102, 103)	9
Extempore Speaking (Sp 111).....	3	General Chemistry (Ch 201, 202, 203)....	9
General Forestry (F 111).....	3	Forest Engineering (FE 223).....	4
<sup>2</sup> Forest Orientation (F 40).....	3	Mensuration (F 224).....	5
Tree Identification (F 153).....	3	Wood Technology (FP 210).....	3
Forest Engineering (FE 123).....	3	Forest Protection (F 231).....	3
Mathematics (Mth 101, 102, and 200).....	12	Outlines of Economics (Ec 212).....	3
English Composition (Wr 111, 112, 113)	9	Technical Report Writing (Wr 227).....	3
Engineering Drawing (GE 115).....	3	American Governments (PS 201).....	3
Physical Education.....	3	Physical Education.....	3
Literature.....	3	Air or Military Science.....	3
Air or Military Science.....	3		48
	48		

<sup>1</sup> Remedial courses in English and mathematics preceding the college courses will be required unless the student demonstrates ability to undertake college-level work. All students receiving credit for the English sequence but who fail to pass a comprehensive examination given upon completion of the sequence will be required to take additional English courses.

<sup>2</sup> Not required of students with high school chemistry.

<sup>3</sup> Noncredit course required of all freshmen.

Third Year		Fourth Year	
	Hours		Hours
Calculus (Mth 201, 202, 203).....	12	Fluid Mechanics (CE 312) or (CE 322)...	3
Engineering Physics (Ph 207, 208, 209).....	12	Dynamics (CE 311).....	3
Statics (CE 211).....	3	Structural Analysis (CE 381, 382).....	6
Strength of Materials (CE 212, 213).....	6	Materials Testing Lab (ME 316).....	3
Forest Engineering (FE 323).....	4	Soil Mechanics (CE 372).....	3
Accounting (BA 214, 215).....	6	Northwest Logging (FE 360).....	4
Forest Practices (F 342).....	4	Logging Roads (FE 361).....	3
Literature.....	3	Heat Engines (ME 337).....	3
Seminar (F 307).....	1	Forest Valuation (F 324).....	3
	<u>51</u>	Aerial Photo-Interpretation in Forestry (F 320).....	3
		Business Law (BA 411).....	3
		Literature.....	3
		Electives.....	9
			<u>49</u>

Fifth Year		Hours
Structural Design (CE 482).....		3
Reinforced Concrete (CE 383).....		3
Logging Plans (FE 461).....		5
Logging Costs (FE 463).....		5
Logging Transportation (FE 462).....		5
Seminar (FE 407).....		1
Forest Economics (F 412).....		3
Forest Administration (F 415).....		3
Fire Control (F 431).....		4
Timber Management (F 425).....		5
Geology.....		3
Electives.....		9
		<u>49</u>

### Forest Management

*Accredited Society of American Foresters*

Freshman Year <sup>1</sup>		Sophomore Year	
	Hours		Hours
General Botany (Bot 201, 202).....	6	Dendrology (F 253).....	3
Physical Geology (G 200).....	3	Mensuration (F 224).....	5
Extempore Speaking (Sp 111).....	3	Forest Protection (F 231).....	3
General Forestry (F 111).....	3	Forest Engineering (FE 223).....	4
*Forest Orientation (F 40).....	3	Wood Technology (FP 210).....	3
Tree Identification (F 153).....	3	American Governments (PS 201).....	3
Forest Engineering (FE 123).....	3	Forest Soils (Sls 214).....	4
Mathematics (Mth 101, 102).....	8	Outlines of Economics (Ec 212).....	3
English Composition (Wr 111, 112, 113).....	9	Abridged General Physics (Ph 211, 212).....	6
Engineering Drawing (GE 115).....	3	General Chemistry (Ch 101, 102).....	6
Air or Military Science.....	3	Physical Education.....	3
Physical Education, General Hygiene.....	3	Air or Military Science.....	3
Literature.....	3	Technical Report Writing (Wr 227).....	3
	<u>50</u>		<u>49</u>
Junior Year		Senior Year	
	Hours		Hours
Aerial Photo-Interpretation in Forestry (F 320).....	3	Watershed Management (F 424).....	3
Wood Utilization (FP 310).....	3	Forest Economics (F 412).....	3
Mensuration: Timber Growth (F 327).....	5	Forest Engineering (FE 423).....	4
Logging Methods (FE 392).....	3	Timber Management (F 425).....	5
Silviculture: Forest Ecology (F 341).....	4	Forest Administration (F 415).....	4
Silviculture: Forest Practices (F 342).....	4	Fire Control (F 431).....	3
Silviculture: Forestation (F 343).....	4	Seminar (F 407).....	1
Forest Valuation (F 324).....	4	Range Management (DAH or FC 341).....	3
Forest Engineering (FE 323).....	3	Literature.....	3
Seminar (F 307).....	1	Social science elective.....	6
Literature.....	3	Electives.....	19
Electives.....	14		<u>54</u>
	<u>51</u>		

<sup>1</sup> See footnote<sup>1</sup> page 323.

<sup>2</sup> Noncredit course required of all freshmen.



**Forest Products**

Freshman Year <sup>1</sup>		Sophomore Year	
	Hours		Hours
*General Chemistry (Ch 101, 102, 103).....	9	Mensuration (F 224).....	5
General Botany (Bot 201, 202).....	6	Forest Protection (F 231).....	3
Mathematics (Mth 101, 102).....	8	Forest Engineering (FE 123).....	3
Analytical Geometry and Calculus (Mth 200).....	4	Wood Utilization (FP 310).....	3
*Forest Orientation (F 40).....	3	Wood Identification (FP 311).....	3
General Forestry (F 111).....	3	Principles of Accounting (BA 214, 215).....	6
Tree Identification (F 153).....	3	General Physics (Ph 201, 202, 203).....	12
English Composition (Wr 111, 112, 113).....	9	Extempore Speaking (Sp 111).....	3
Engineering Drawing (GE 115).....	3	Technical Report Writing (Wr 227).....	3
Air or Military Science.....	3	American Governments (PS 201).....	3
Physical Education, General Hygiene.....	3	Air or Military Science.....	3
	51	Physical Education.....	3
			50
Junior Year		Senior Year	
	Hours		Hours
Seminar (F 307).....	1	Forest Economics (F 412).....	3
Logging Methods (FE 392).....	3	Forest Administration (F 415).....	3
Wood Properties (FP 314).....	4	Seminar (FP 407).....	1
Timber Mechanics (FP 321, 322).....	8	Lumber Plant (FP 451).....	3
Wood Preservation (FP 466).....	3	Wood Industry Problems (FP 452).....	3
Outlines of Economics (Ec 212).....	3	Forest Products Merchandising (FP 453).....	3
Literature.....	6	Ply and Laminated Products (FP 464).....	3
*Electives.....	23	Wood Seasoning (FP 465).....	3
	51	Literature.....	3
		*Electives.....	26
			51

**Forest Engineering**

Courses in forest engineering are designed to prepare men to deal with the woods problems peculiar to the forest industry of the Pacific Northwest. Emphasis is placed on the preparation of logging plans and the transportation of timber from the woods to the mills.

**Lower Division Courses**

- FE 123. Forest Engineering. 3 hours. 2 ① 1 ④  
 Measurement of distance, direction, and elevation. Prerequisite: Mth 102.
- FE 223. Forest Engineering. 4 hours. 2 ① 1 ⑥  
 Topographic surveying; direct and indirect leveling; computing and plotting of field data. Prerequisite: FE 123, engineering drawing.

**Upper Division Courses**

- FE 323. Forest Engineering. 4 hours. 2 ① 1 ⑥  
 Public land survey; stadia; plane table; polar and solar observation; triangulation; drafting of field data. Prerequisite: FE 223.
- FE 360. Northwest Logging. 4 hours. 2 ① 1 ⑥  
 A basic course in logging methods and equipment with particular application to the Pacific Northwest. Prerequisite: Mth 200, F 224, FE 223.
- FE 361. Logging Roads. 3 hours. 2 ① 1 ③  
 Problems in design of logging roads. Prerequisite: Ph 203, FE 223.
- 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, F 224.

<sup>1</sup> See footnote<sup>1</sup> page 323.

<sup>2</sup> Ch 201, 202, 203 suggested for those students who have had high school chemistry.

<sup>3</sup> Noncredit course required of all freshmen.

<sup>4</sup> Electives selected under staff guidance to strengthen areas of intended specialization: Production, sales, research and product development, technical services, and utilization.

- 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.** 1 hour. 1 ①
- FE 423. **Forest Engineering.** (g) 4 hours. 3 ① 1 ④  
Basic logging plans and route surveys. Prerequisite: FE 323, 392.
- FE 461. **Logging Plans.** (g) 5 hours. 2 ① 1 ③ 1 ⑥  
Basic logging plans; analysis of timbered areas for development of logging operations; preliminary transportation plans. Prerequisite: FE 323, 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.

#### Graduate Courses

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

- FE 501. **Research.** Terms and hours to be arranged.
- FE 503. **Thesis.** Terms and hours to be arranged.
- FE 505. **Reading and Conference.** Terms and hours to be arranged.
- FE 506. **Projects.** Terms and hours to be arranged.
- FE 507. **Seminar.** Terms and hours to be arranged.  
Subject matter as required by graduate programs.
- FE 525. **Forest Engineering.** 3 hours. 2 ① 1 ④  
Advanced logging plans and route surveys. Not open to forest engineering majors.
- FE 560. **Logging Methods.** 4 hours. 2 ① 1 ⑥  
Studies of current developments in logging methods and equipment.
- FE 561, 562, 563. **Logging Engineering.** 5 hours each term. 2 ① 1 ③ 1 ⑥  
Advanced study of logging plans and timber transportation systems.
- FE 581. **Timber Bridge Design.** 3 hours. 1 ① 1 ⑥  
Problems in location, design, and construction of timber bridges in logging transportation systems.

## Forest Management

The courses in forest management afford a basic training for the practice of forestry, particularly in the Pacific Northwest. Emphasis is placed upon the technical and administrative measures necessary to produce the greatest values from all forest resources.

#### Lower Division Courses

- F 40. **Forest Orientation.** 1 ①  
Personal orientation of the student to the College and to the profession.
- F 111. **General Forestry.** 3 hours. 3 ①  
Preliminary survey of the entire field of forestry including the development of the conservation movement in the United States; fields of specialization; vocational opportunities. Restricted to forestry students.

- F 153. **Tree Identification.** 3 hours. 1 ① 2 ②  
Principal Pacific Coast timber trees; range, occurrence, size, growth, form; climate, soil, moisture requirements, value; wildlife uses.
- F 224. **Mensuration.** 5 hours. 3 ① 1 ⑥  
Measurement of standing and felled timber and timber products. Prerequisite: FE 123, F 153.
- 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.
- F 253. **Dendrology.** 3 hours. 1 ① 2 ②  
Classification and identification of forest trees in the United States; silvical characteristics and distribution; life history and requirements. Prerequisite: F 153.
- F 260. **Conservation of Natural Resources.** 3 hours. 3 ①  
Nature, extent, and importance of natural resources of United States and operation of various forest agencies in conserving them; forest, forage, recreation, wildlife, soil, and water aspects. Not open to forestry majors.

#### Upper Division Courses

- F 307. **Seminar.** 1 hour. 1 ①
- F 320. **Aerial Photo Interpretation.** 3 hours. 2 ① 1 ③  
Techniques and principles of forest photo-interpretation; 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  
Growth of even-aged stands, many-aged stands, and individual trees. Prerequisite: F 224.
- F 341. **Silviculture: Forest Ecology.** 4 hours. 3 ① 1 ③  
Influence of environmental factors on the development, distribution, and succession of forest vegetation. Prerequisite: F 231.
- F 342. **Silviculture: Forest Practices.** 4 hours. 3 ① 1 ③  
Treatment of stands to insure perpetuation of forest resources. Prerequisite: F 341 (for forest management majors).
- F 343. **Silviculture: Forestation.** 4 hours. 3 ① 1 ③  
Forest land examination and classification; reproduction surveys; planting plans; establishment and maintenance of plantations; nursery practices. Prerequisite: F 341, SIs 214.
- 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. Offered 1960-61.
- F 364. **Park Forestry.** 3 hours. 2 ① 1 ③  
Trees and their treatment for park and recreational purposes. Offered alternate years. Not offered 1960-61.
- F 365. **Forest Recreation.** 3 hours. 2 ① 1 ③  
Forest recreation, its importance and nature; planning forest use for recreational purposes in relation to other forest use.
- 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 of Academic Regulations in General Catalog 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.** 1 hour fall. 1 ①
- F 411. **Forest Land Use.** (G) 3 hours. 3 ①  
Application of principles and techniques of economic planning to the problem of coordinating forest land uses with one another and with other forms of land use.
- F 412. **Forest Economics.** (g) 3 hours. 3 ①  
Economics of forest management and utilization; forest credit, taxation, and marketing. Prerequisite: Ec 212, F 324, and F 327, for forest management majors.
- F 415. **Forest Administration.** (g) 3 hours. 3 ①  
Administrative organization and personnel work of public and private forest agencies. Prerequisite: F 307.
- F 424. **Watershed Management.** (g) 3 hours. 2 ① 1 ③  
Principles of forest management applied to integrated use of all forest resources for the production of water. Prerequisite: F 341, 342, 343.
- F 425. **Timber Management.** (g) 5 hours. 4 ① 1 ③  
Principles and practices in the regulation of forest properties for sustained yield; timber inventories and management plans. Prerequisite: F 324, F 327, for management majors.
- F 427. **Industrial Forestry.** (G) 3 hours. 3 ①  
The principles and methods employed in the operation of industrial forest properties in the Northwest. Prerequisite: senior standing.
- F 431. **Fire Control.** (g) 4 hours. 3 ① 1 ③  
Scientific basis for fire control. Fire-control planning and administration. Prerequisite: F 231.
- F 442. **Pine Forest Practices.** (G) 2 hours spring. 2 ①  
Silvicultural problems and treatment of pine forest types in western United States. Prerequisite: F 342, senior standing.

#### Graduate Courses

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

- F 501. **Research.** Terms and hours to be arranged.
- F 503. **Thesis.** Terms and hours to be arranged.
- F 505. **Reading and Conference.** Terms and hours to be arranged.
- F 506. **Projects.** Terms and hours to be arranged.
- F 507. **Seminar.** Terms and hours to be arranged.  
Subject matter as required by graduate programs.
- F 511. **Economics of Private Forestry.** 3 hours. 3 ①  
Economic and financial problems of private forestry, including insurance, forest credit, cost analysis, and practical problems in forest finance.
- F 512. **Economics of the Forest Resource.** 3 hours. 3 ①  
Place of forests in national and regional economy; structure of forest industries; forest ownership, taxation, and public policy.
- F 513. **Economics of Forest Utilization.** 3 hours. 3 ①  
Factors affecting costs and returns in forest industries.
- F 515. **Forest Administration.** 3 hours. 3 ①  
Organization, administration, operating problems of public and private forestry agencies.
- F 519. **Photogrammetry.** 3 hours. 1 ② 2 ③  
Use of multiplex 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  
Advanced methods in use of aerial photographs in forest inventory; photomensurational techniques in preparation of stand and tree volume tables; planning large scale photomensurational projects.

- F 521, 522, 523. **Forest Management.** 3 hours each term. 2 ① 1 ③  
 Managing even-aged and many-aged stands for timber production.
- F 531. **Fire Control.** 3 hours. 2 ① 1 ③  
 Forest-fire plans, their preparation and execution.
- F 541, 542, 543. **Silviculture.** 3 hours each term. 2 ① 1 ③  
 Advanced approach in treatment of stands; research methods.
- F 544. **Forest Genetics.** 3 hours winter. 2 ① 1 ③  
 Application of principles of plant genetics to silvicultural practices. Prerequisite: SIs 214, F 341 or Bot 341, Z 341 or equivalent.

## Forest Products

The curriculum is intended to prepare men for careers in forest products and allied industries: lumber, plywood, pulp and paper, composition boards, timber laminating and structure fabrication, millwork, furniture and other finished products, packaging, construction, wood preservation, equipment, paints, chemicals, research organizations, and trade associations.

The curriculum in forest products 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 given through electives to arrange course programs, under staff guidance, in cooperation with courses offered in architecture, social sciences, business, sciences, industrial arts, engineering, forest management, and forest engineering.

### 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 153, F 111 or F 260.

### Upper Division Courses

- FP 310. **Wood Utilization.** 3 hours. 3 ①  
 Survey of the principal wood-using industries; economics, species used, manufacturing processes, and products; special emphasis on Pacific Coast industries. Prerequisite: FP 210 or FP 311.
- FP 311. **Wood Identification.** 3 hours. 1 ① 2 ③  
 Identification of commercial woods with a hand lens; brief introduction to 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 as related to behavior and uses; modified woods. Prerequisite: FP 311.
- FP 321. **Timber Mechanics.** 4 hours. 2 ① 2 ③  
 Graphic and analytic statics applied to simple structures and structural elements of wood; stress, strain, strength, and elastic characteristics of wood; design and selection of structural elements. Prerequisite: Mth 200, FP 210 or 314, Ph 201.
- FP 322. **Timber Mechanics.** 4 hours. 2 ① 2 ③  
 Development, scope, and procedures of timber testing; factors affecting the strength of wood; gathering and analysis of 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.** 1 hour. 1 ①
- FP 451. **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; FP 451, for forest products majors.
- 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; recommended building practices; preservatives, processes, and treating equipment; properties of treated materials; economic aspects; plant visits. Prerequisite: FP 314.

#### Graduate Courses

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

- FP 501. **Research.** Terms and hours to be arranged.
- FP 503. **Thesis.** Terms and hours to be arranged.
- FP 505. **Reading and Conference.** Terms and hours to be arranged.
- FP 506. **Projects.** Terms and hours to be arranged.
- FP 507. **Seminar.** Terms and hours to be arranged.  
Subject matter as required by graduate program.
- FP 516. **Wood Microtechnique.** 3 hours. 3 ③  
Preparation, sectioning or maceration, staining, and mounting of slides of wood and wood-base materials for microscopic study. Prerequisite: FP 314.
- FP 517. **Wood Anatomy.** 3 hours. 1 ① 2 ③  
Intensive anatomical studies; techniques; literature survey. Prerequisite: FP 314, FP 516.
- 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 of physical properties to specific uses. Prerequisite: FP 317.
- FP 551, 552, 553. **Wood Industry Problems.** 3 hours each term.  
Plant layout planning; production studies; production control; residue utilization; management; merchandising.
- FP 564. **Ply and Laminated Products.** 3 hours. 2 ① 1 ③  
Special gluing problems; testing adhesives used in ply and laminated construction; relation of physical properties of wood to bonding problems; extensive study of technical literature.
- FP 565. **Wood Seasoning.** 3 hours. 2 ① 1 ③  
Special problems relating to the drying of wood; procedures and equipment; design of schedules.
- FP 566. **Wood Preservation.** 3 hours. 2 ① 1 ③  
Advanced work in wood preservation designed to meet needs of individual students, with special attention to theoretical consideration and factors that control efficiency of treating processes.

# School of Home Economics

## Faculty

*As of January 1960*

MIRIAM G. SCHOLL, Ed.D., Dean of the School of Home Economics.

WINNIFRED KEIL FULMER, M.S., Head Counselor.

AVA MILAM CLARK, M.A., Professor Emeritus of Home Economics. (Dean and Director School of Home Economics 1917-1950.)

VERA BRANDON, Ph.D., Professor Emeritus of Home Economics. (Acting Dean School of Home Economics 1950-1954, Associate Dean 1954-1955.)

**Clothing, Textiles, and Related Arts:** Professors PETZEL (department head), FRITCHOFF (emeritus), GATTON (emeritus), PATTERSON, STRICKLAND (emeritus); Associate Professors DIEDESCH, EDABURN, INGALLS, LEDBETTER, MOSER; Assistant Professors CARLSON, GRANT,<sup>1</sup> SMITH, WELLS; Instructors FESSLER, LEMMAN<sup>2</sup>; Graduate Assistants HUNTER, LOKKEN, ORME.

**Family Life and Home Administration:** Professors READ (department head), KIRKENDALL, BRANDON (emeritus), PRENTISS (emeritus); Associate Professors KANE<sup>2</sup>, VAN HORN, WIGGENHORN<sup>3</sup>; Assistant Professors AIKIN, PLONK, SCHALOCK, STATION<sup>3</sup>; Instructors BUEHNER, MCKAY, FERNICE, WALSH; Graduate Assistants ANDERSON, FERNANDES, MANN, O'NEILL, WELDON.

**Foods and Nutrition:** Professors FINCKE (department head), MACKAY, STORVICK, WILLIAMS (emeritus); Associate Professors CHARLEY, HAWTHORNE, MCLEAN, TANK; Assistant Professors BARTE, GARRISON (emeritus), WARE; Instructors HARRIS, PAASCHE, PETERS, VAISEY, WALLACE.

**Home Economics Education:** Professor DUBois (department head); State Supervisor and Teacher-Trainer KOHLHAGEN; Associate Professor McQUESTEN; Instructor WOHLGENANT.

**Home Economics Research:** Professors STORVICK (chairman), MACKAY, PETZEL, WILSON (emeritus); Associate Professors CHARLEY, HAWTHORNE, TANK; Junior Nutritionists (Instructors) BENSON, EDWARDS, FISHER; Junior Home Economists (Instructors) JOINER, LYMAN; Research Assistants HUNTER, POHL, SMITH.

**Institution Management:** Associate Professor MULHERN (chairman, manager women's food service, dormitories); Assistant Professor CLEVELAND (manager cafeterias).

**Home Economics Extension:** Professors MACK (assistant director, Federal Cooperative Extension Service), TASKERUD (coordinator, home economics extension programs), SCALES (State agent); Associate Professors ABBOTT (State agent), FRASIER (family life specialist), FUNK (State agent), KLIPPSTEIN (nutrition specialist), MALLALEU (recreation specialist), ROUTH (clothing specialist), SHERRILL (home management specialist), STRAWN (home management and equipment specialist), STREUFERT (clothing specialist); Assistant Professors BRASHER (State agent, 4-H Clubs), McCANDLESS (consumer marketing specialist), REDMAN (State agent, 4-H Clubs), REIGLE (consumer marketing specialist); Instructor MILLER (information specialist).

## General Statement

OREGON STATE COLLEGE has provided education for women in home economics since 1889, when home economics was in its early beginnings and first organized as a body of knowledge having to do with the science and art of homemaking. Since then tremendous changes in living have taken place, and a vast amount of knowledge is now available to enhance home and family life. Each year the home economics profession makes increasing contributions to community and society and to the well-being of individuals and families around the world. For these and other reasons the demand for women with college training in home economics continues to increase. They are sought after in commerce and industry, by government, and by educational,

<sup>1</sup> On leave of absence to January 1962.

<sup>2</sup> Spring term only.

<sup>3</sup> Winter, spring terms only.

<sup>4</sup> On leave of absence.

<sup>5</sup> Winter term only.

philanthropic, and international agencies for positions in teaching, extension, business, and research.

The School of Home Economics has three major objectives: (1) to provide the best possible educational opportunities for women, (2) to assist students in fitting themselves for their varied and dual roles as individuals and homemakers, and (3) to provide training for professional careers.

All home economics students take some work in each of the basic areas: clothing, textiles, and related arts; foods and nutrition; and family life and home administration. They also take work in arts and letters, social science, and science.

Excellent facilities for all phases of home economics work are provided in the Home Economics Building, the home management houses, the nursery schools, and the dormitory housing and dining services.

**Curriculum.** Beginning with fall quarter 1960, all students will fulfill requirements of one core curriculum for graduation from the School of Home Economics.

The new core includes the following requirements:

Home Economics:

- 12 hours in clothing, textiles, and home furnishings
- 12 hours in foods and nutrition
- 9 hours in child development and family life
- 12 hours in household equipment, home management, and finance
- 1 hour in home economics orientation
- 9 hours upper division electives in home economics subjects.

Science and Social Science:

- 15 hours in science, of which 8-12 is a laboratory sequence (not a survey)
- 24 hours in social science to include:
  - 6 hours in general psychology
  - 9 hours in a history sequence
  - 3 hours each in economics, political science, and sociology.
  - 6 hours of electives in science or social science.

Other combinations of social science courses for students with special needs, may be taken with specific approval of the Dean.

Humanities:

- 9 hours of English composition
- 9 hours of literature (or literature in a foreign language) or 6 hours of literature and 3 hours of speech
- 3 hours of art: Color and Composition
- 3 hours of art or music
- 3 hours of architecture: Home Planning and Architectural Drawing.

Other requirements:

- Mathematics 10 or exempt
- Physical Education: 5 terms in activity courses and one term in general hygiene. Also required for senior standing.

Students majoring in home economics choose additional hours of work from the Areas of Concentration on pages 334-338 in order to provide breadth and depth in their programs, to develop special interests, and to meet course requirements of specific professional fields.

*Students who enrolled in Curricula A, B, and C in 1959-60 or earlier may continue their programs and receive their degrees as the curricula are outlined on pages 327-329 of the 1959-60 Catalog.*



**One- and two-year students** who are interested in home economics but who are not candidates for degrees may plan, with the help of their advisers, special programs to meet individual needs, capabilities, and interests. In such special programs students may elect a variety of courses in other schools and departments of the college.

**Graduate Study and Research.** Through the Graduate School, all departments of the School of Home Economics offer work leading to the master's degree (M.A., M.S., M.H.Ec.). The Master of Home Economics degree may also be completed with a major in general home economics. The Doctor of Philosophy degree is offered in foods and nutrition and in family life and home administration.

Through research and extension, effort is constantly directed toward the solution of problems of home and family life. The School of Home Economics cooperates with the Agricultural Experiment Station in research programs and undertakes studies supported by State and General Research Funds.

## Curriculum in Home Economics

*B.A., B.S. Degrees<sup>1</sup>*

Freshman Year		Sophomore Year	
	<i>Hours</i>		<i>Hours</i>
Color and Composition (AA 160).....	3	Foods (FN 211, 212) or (220, 221).....	6
Art or music.....	3	Science .....	3-7
Science sequence with laboratory (not a survey) .....	8-12	Child Development (FL 225).....	3
<sup>2</sup> Mathematics 10 or exempt.....(0-4)		Management in Family Living (HAD 240) .....	2
English Composition (Wr 111, 112, 113)	9	House Planning and Architectural Drawing (AA 178).....	3
Introduction to Home Economics (HAD 101) .....	1	General Psychology (Psy 201, 202).....	6
Nutrition (FN 225).....	3	History of Western Civilization (Hst 101, 102, 103).....	9
Clothing Construction (CT 210).....	3	Literature or literature in a foreign language .....	6
Clothing (Selection) (CT 211).....	3	Physical Education.....	3-4
Textiles (CT 250).....	3	Electives or courses in Area of Concentration .....	2-7
Speech or literature.....	3		
Physical Education.....	3-4		
Electives or courses in Area of Concentration .....	0-6		
Junior Year		Senior Year	
	<i>Hours</i>		<i>Hours</i>
Family Finance Management (HAD 341) .....	2	Family Relationships (FL 422).....	3
Child Development (FL 311).....	3	Home Management House (HAD 450).....	5
Household Equipment (HAD 330).....	3	Upper division electives in home economics .....	9
Meal Planning and Service (FN 313)....	3	Electives or courses in Area of Concentration .....	3-4
<sup>3</sup> Outlines of Economics (Ec 212).....	3		
<sup>3</sup> General Sociology (Soc 212).....	3		
<sup>3</sup> Political science.....	3		
Home Furnishing (CT 331).....	3		
Electives or courses in Area of Concentration .....	19		
<sup>1</sup> Electives in science or social science....	6		

<sup>1</sup> See DEGREES AND CERTIFICATES, page 99.

<sup>2</sup> Does not count in hours for graduation.

<sup>3</sup> Course may also be first term of a sequence if the sequence is to be completed.

## AREAS OF CONCENTRATION AND MINORS

The following areas of concentration and minors have been set up to help direct students in their professional interests in home economics. Students need to consult staff members as early as possible in their college careers to plan their total programs for personal and professional preparation as well as to meet graduation requirements. The areas of concentration and minors list recommended courses and are not requirements for graduation.

Students interested in areas other than those listed may plan special programs with their advisers.

### Clothing, Textiles, and Related Arts

#### Clothing and Textiles in Business

Students in this area may prepare for merchandising, promotional, and fashion careers in textiles and clothing.

*Recommended courses:*

Consumer Buying in Clothing and Textiles (CT 350)  
The Clothing Buyer (CT 470)  
Retail Merchandising (BA 463)  
Speech  
Business English (Wr 214)

Marketing (BA 313)  
Advertising (BA 464)  
Salesmanship (BA 465)  
Human Relations in Business and Industry (BA 497)  
Principles of Economics (Ec 201, 202, 203 or Ec 213, 214)  
Elementary Journalism (J 111)  
French  
Radio Speaking (Sp 361)  
Basic Television (Sp 367)  
Survey of Visual Arts (AA 201, 202, 203)  
Drawing (AA 291)  
Display Design (AA 296)

*Other Electives:*

Upper division courses in clothing, textiles, and related arts  
Principles of Accounting (BA 211) or Basic Accounting and Financial Analysis (BA 217)

#### Clothing Construction and Design

Students may enter this area because of general interest or as additional preparation for teaching, including college teaching, in this field.

*Recommended Courses:*

Historic Costume (CT 309)  
Flat Pattern and Draping (CT 310)  
Costume Design (CT 311)  
Tailoring (CT 312)  
Clothing for Children (CT 320)  
Textile Design (CT 335)  
Consumer Buying in Clothing and Textiles (CT 350)  
Flat Pattern and Draping (CT 410)  
Additional courses from: art, economics, education, French, history, journalism, psychology, speech.

*Other Electives:*

Quantity Textile Purchasing (CT 351) or Textiles (CT 450)  
Costume Design (CT 411)  
Textile Design (CT 435)  
Historic Textiles (CT 460)  
The Clothing Buyer (CT 470)  
Home Furnishing Laboratory (CT 332)

#### Home Furnishing

Students in this area may prepare for the fields of interior decoration, merchandising of home furnishings, college teaching, or communications related to home furnishing.

*Recommended Courses:*

House Planning (AA 179, 180)  
Design Studio I (AA 187)  
Basic Design (AA 295)  
Survey of Visual Arts (AA 201, 202, 203)  
Elements of Interiors (AA 223)  
Design Studio II—Interior Architecture (AA 288)  
Display Design (AA 296)  
Home Furnishing Laboratory (CT 332)  
Textile Design (CT 335, 435)  
Consumer Buying in Clothing and Textiles (CT 350)  
Home Furnishing (CT 431)  
Historic Textiles (CT 460)  
Organization and Use of House Space (HAd 335)  
Functional Design (HAd 436)  
Family Housing (HAd 439)

*Other Electives:*

Introduction to Music Literature (Mus 221)  
History of American Civilization (Hst 224, 225, 226)  
American Thought and Culture (Hst 460, 461, 462)  
Creative Epochs in Western Thought (Hum 311, 312, 313)  
Quantity Textile Purchasing (CT 351)  
House Planning in Relation to Function (HAd 435)  
Courses in business administration, French, journalism, speech

**Textiles**

Students in this area may prepare for graduate work leading to research and/or college teaching of textiles.

*Recommended Courses:*

Consumer Buying in Clothing and Textiles (CT 350)  
 General Bacteriology (Bac 204)  
 General Chemistry (Ch 101, 102, 103)  
 Organic Chemistry (Ch 221 or Ch 226, 227)  
 Abridged General Physics (Ph 211, 212) or  
 General Physics (Ph 201, 202, 203)  
 Technical Report Writing (Wr 227) or  
 Technical Writing (J 319)

*Other Electives:*

Clothing (Construction) (CT 212)  
 Quantity Textile Purchasing (CT 351)  
 Textiles (CT 450)  
 Qualitative Analysis (Ch 206)  
 Quantitative Analysis (Ch 234)  
 Elements of Biochemistry (Ch 250)  
 Elementary Physical Chemistry (Ch 340) or  
 Physical Chemistry (Ch 440, 441, 442)  
 and Physical Chemistry Laboratory (Ch  
 443, 444, 445)  
 Intermediate Algebra (Mth 100)  
 College Algebra (Mth 101)  
 Trigonometry (Mth 102)  
 Calculus (Mth 200, 201, 202, 203)  
 French or German

**Family Life and Home Administration****Child Development and Nursery School Teaching**

Students in this area prepare to teach nursery school or pursue further study in child development.

*Recommended Courses:*

The Nursery School Child (FL 425)  
 Child Development (FL 413)  
 Parent Education (FL 423)  
 Nursery School Procedure (FL 427)  
 Supervised Nursery School Experience (FL  
 429, 430)  
 Curriculum Enrichment for Young Children  
 (FL 428)  
 Creative Arts and Crafts for Classroom  
 Teacher (AA 311, 312, 313)  
 Music for Elementary Teachers (Mus 381,  
 382, 383)  
 Children's Literature and Library (Eng 388)  
 Family Nutrition (FN 325)

*Other Electives:*

Selected Topics in Child Development (FL  
 481)  
 Economics of the Family (HAd 441)  
 Clothing for Children (CT 320)  
 Food Management (FN 412) or Quantity  
 Cookery (IM 311)  
 Group Dynamics (Psy 361)  
 Mental Hygiene (Psy 411)  
 Quantitative Methods (Psy 371)  
 First Aid (PE 358)  
 Speech Science (Sp 480)

**Family Relationships**

For students preparing for research, teaching, and graduate work in the area of marriage and family relationships special programs are arranged.

**Family Economics and Home Management**

Students in these areas may prepare for college teaching, or family counseling in social work and personnel departments

*Recommended Courses:*

MANAGEMENT IN FAMILY LIVING:  
 Food Management (FN 412)  
 Organization and Use of House Space (HAd  
 335)  
 Management Problems in Home-Community  
 Relations (HAd 445)  
 Seminar—Decision Making:  
 Case Study Analysis (HAd 407)  
 Seminar—Work Simplification (HAd 407)  
 Seminar—Home Management House Super-  
 vision (HAd 407)  
 Seminar—Time Problems in Management  
 (HAd 407)  
 Seminar—Philosophy of Homemaking (HAd  
 407)

**FAMILY ECONOMICS:**

Family Food Buying (FN 411)  
 Consumer Buying in Clothing and Textiles  
 (CT 350)  
 Family Housing (HAd 439)  
 Economics of the Family (HAd 441)  
 Management Problems in Home-Community  
 Relations (HAd 445)  
 Seminar—The American Family and Eco-  
 nomic Change (HAd 407)  
 Use and Interpretation of Statistical Data  
 (Seminar) (HAd 407)  
 Seminar—Survey of Income, Expenditure,  
 and Cost of Living Studies (HAd 407)  
 Upper division economics, sociology, psy-  
 chology, and political science

### Housing and Equipment

For students preparing for commercial work with utility and equipment companies, in house planning institutes, and consultant services.

#### Recommended Courses:

Organization and Use of House Space (HAD 335)	Basic Television (Sp 367)
Economics of the Family (HAD 441)	Television Programming (Sp 368)
House Planning in Relation to Function (HAD 435)	Functional Design of Dwellings (HAD 436)
Family Housing (HAD 439)	Rural House Planning (AE 451)
Abridged General Physics (Ph 211, 212)	House Planning and Architectural Drawing (AA 179, 180)
	Food Demonstrations (FN 410)
	Experimental Cookery (FN 435)
	Technical Writing (J 319)
	Seminars in Home Administration

### Foods and Nutrition

#### Foods and Nutrition in Business

Students in this area may prepare for positions in test kitchens and in consumer service work with food, equipment, and utility companies. See also Home Economics Communications and Food Research areas.

#### Recommended Courses:

General Chemistry (Ch 101, 102, 103)	Family Nutrition (FN 325)
Organic Chemistry (Ch 226, 227)	Abridged General Physics (Ph 211, 212)
Foods (FN 220, 221)	Economics of the Family (HAD 441)
Biochemistry (Ch 350)	Extempore Speaking (Sp 111)
General Bacteriology (Bac 204)	Voice and Diction (Sp 120)
Food Demonstrations (FN 410)	Radio Speaking (Sp 361, 362, 363)
Family Food Buying (FN 411)	Basic Television (Sp 367)
Food Management (FN 412)	Television Programming (Sp 368)
Home Food Preservation (FN 414)	Journalism (J 111)
Recent Advances in Foods (FN 425)	Public Information Methods (J 318)
Experimental Cookery (FN 435)	Technical Writing (J 319)
Food and Agriculture (AEc 331)	Business English (Wr 214)
	Educational Psychology: Learning (Ed 312)
	Salesmanship (BA 465)

#### Public Health Nutrition

Graduate work in Public Health Nutrition is required for positions as nutritionist in public health or other community agency. The following courses will help to meet the entrance requirements for graduate schools of public health.

#### Recommended Courses:

General Chemistry (Ch 101, 102, 103)	Nutrition in Disease (FN 420)
Organic Chemistry (Ch 226, 227)	Child Nutrition (FN 421)
Foods (FN 220, 221)	Readings in Nutrition (FN 481)
General Bacteriology (Bac 204, 205)	Group Discussion (Sp 232)
Nutrition (FN 321)	Educational Psychology: Learning (Ed 312)
Food Bacteriology (Bac 460)	Public Information Methods (J 318)
Family Food Buying (FN 411)	Mental Hygiene (Psy 411)
Recent Advances in Foods (FN 425)	History of Great Religions (R 462)
Physiology (Z 331, 332)	Principles of Accounting (BA 211)
Biochemistry (Ch 350)	Economics of the Family (HAD 441)

#### Research and College Teaching

Students in this area may prepare for graduate study leading to college teaching and to research positions in Foods or Nutrition in colleges, government, or industry. A sound basis in chemistry is essential.

#### Recommended Courses:

General Chemistry (Ch 101, 102, 103)	<i>Selected Nutrition Courses:</i>
Foods (FN 220, 221)	Nutrition (FN 321)
Organic Chemistry (Ch 226, 227)	Readings in Nutrition (FN 481)
Quantitative Analysis (Ch 234)	Child Nutrition (FN 421)
Biochemistry (Ch 350)	Nutrition in Disease (FN 420)
Intermediate Algebra (Mth 100) or exempt	<i>Other Electives:</i>
Mathematics (Mth 101, 102)	Modern language, 1 to 2 years
General Bacteriology (Bac 204, 205)	Qualitative Analysis (Ch 206)
Physiology (Z 331, 332)	Calculus (Mth 200, 201, 202, 203)

#### Selected Food Courses:

Family Food Buying (FN 411)	General Physics (Ph 201, 202, 203) or
Home Food Preservation (FN 414)	Abridged General Physics (Ph 211, 212)
Recent Advances in Foods (FN 425)	Elementary Physical Chemistry (Ch 340)
Experimental Cookery (FN 435)	

## Institution Management and Dietetics

Students in this area may prepare for positions as dietitians in hospitals, school and college food service, and industry. The following courses will meet the requirements of the American Dietetic Association.

### *Recommended Courses:*

General Chemistry (Ch 101, 102, 103)  
 Organic Chemistry (Ch 221 or 226, 227)  
 Elements of Biochemistry (Ch 230)  
 Bacteriology (Bac 204)  
 Foods (FN 220, 221)  
 Physiology (Z 331, 332)  
 Institution Organization and Administration (IM 430)  
 Quantity Cookery (IM 311)  
 Purchasing for Institutions (IM 440)  
 Institution Experience (IM 450)  
 Biochemistry (Ch 350)  
 Nutrition (FN 321)  
 Personnel Management (BA 451) or Industrial Psychology (Psy 431) or Human Relations in Business and Industry (BA 497)  
 Educational Psychology: Learning (Ed 312)

### *15 hours to be selected from the following:*

Nutrition in Disease (FN 420)  
 Accounting (BA 211)  
 Experimental Cookery (FN 435)  
 Recent Advances in Foods (FN 425)  
 Readings in Nutrition (FN 481)  
 Child Nutrition (FN 421)  
 Food Management (FN 412)  
 Food Demonstrations (FN 410)  
 Home Food Preservation (FN 414)

*Students in college or industrial internships may take the above 15 hours from the following courses and fields:*

Advanced Accounting (BA 212, 213)  
 Food Management (FN 412) or other advanced food production  
 Business Law (BA 412)  
 Human Relations in Business and Industry (BA 497)  
 Communications  
 Institutional equipment  
 Labor economics

## Home Economics Communications

### Home Economics and Journalism

Students interested in the fields of journalism, radio, and television may combine their home economics preparation with elective courses in one or more types of communications.

### *Recommended Courses:*

Journalism (J 111, 112)  
 Copyediting (J 214)  
 Editorial Writing (J 223)  
 Public Information Methods (J 318)  
 Special Feature Articles (J 317)  
 Technical Writing (J 319)  
 Journalism Projects (J 351, 352, 353)

### *Other Electives:*

Food Demonstration (FN 410)  
 Family Food Buying (FN 411)  
 Food Management (FN 412)  
 Historic Costume (CT 309)  
 Consumer Buying in Clothing and Textiles (CT 350)  
 Home Furnishing Laboratory (CT 332)  
 Organization and Use of House Space (HAD 335)  
 Economics of the Family (HAD 441)

### Home Economics, Radio, and Television

### *Recommended Courses:*

Extempore Speech (Sp 111)  
 Voice and Diction (Sp 120)  
 Interpretation (Sp 121)  
 Radio Speaking (Sp 361, 362, 363)  
 Basic Television (Sp 367)  
 Television Programming (Sp 368)  
 Electives in Speech

### *Other Electives:*

Food Demonstration (FN 410)  
 Family Food Buying (FN 411)  
 Food Management (FN 412)  
 Historic Costume (CT 309)  
 Consumer Buying in Clothing and Textiles (CT 350)  
 Home Furnishing Laboratory (CT 332)  
 Organization and Use of House Space (HAD 335)  
 Economics of the Family (HAD 441)

### Home Economics Education

Students interested in preparing to teach Home Economics in junior or senior high school are expected to have strong Home Economics preparation, certification requirements for Oregon, and a teaching minor in a second high school subject. Certification requirements for other states may also be met.

*Courses to be included in Home Economics Education not listed specifically in the Core Curriculum:*

Clothing (Construction) (CT 212)  
Nutrition (FN 321) or Family Nutrition (FN 325), or Family Food Buying (FN 411), or Food Management (FN 412)  
Child Development (FL 413), or Human Development (Psy 311)  
The Nursery School Child (FL 425)  
Physiology (Z 331, 332)

*Courses in a Teaching Minor*

(See SCHOOL OF EDUCATION Teaching Majors and Minors, page 271.)

*Courses in Education:*

Field Experience (Home Economics) (Ed 200)  
School in American Life (Ed 310)  
Educational Psychology (Ed 312)  
Methods in Reading (Ed 350)  
Special Secondary Methods (Home Economics) (Ed 408d)  
Student Teaching: Secondary (Ed 416)  
Seminar: Student Teaching (Ed 407)  
Organization and Administration of Home-making Education (HEd 422)  
Homemaking Education in the Community High School (HEd 440)

### Home Economics Extension

Students interested in the field of extension as county agents, 4-H Club agents, or similar types of workers may combine their home economics preparation with electives in the following courses:

*Recommended Courses:*

Extension Methods (EM 411)  
Field Work in Home Economics Extension (EM 453)  
Chemistry (Ch 101, 102, 103) to fulfill the science requirement  
Personality and Development (Psy 111) or Methods of Study (Ed 101)  
Journalism (J 111)  
Extempore Speech (Sp 111)  
Bacteriology (Bac 204)  
Consumer Buying in Clothing and Textiles (CT 350)

*Other Electives:*

Flat Pattern and Draping (CT 310)  
Tailoring (CT 312)  
Leadership Training (Ed 296)  
Child Development (FL 413)

Parent Education (FL 423)  
Community Organization (Soc 475)  
Family Food Buying (FN 411)  
Food Demonstrations (FN 410)  
Home Food Preservation (FN 414)  
Group Dynamics (Psy 361)  
Family Nutrition (FN 325)  
Youth Agencies (Ed 425)  
Radio Speaking (Sp 361)  
Educational Psychology: Learning (Ed 312)  
Mental Hygiene (Psy 411)  
Business English (Wr 217)  
Psychology of Adolescence (Ed 461)  
Basic Television (Sp 367)

Recreation Leadership (PE 240) or Recreational Use of Music (Mus 241)  
Human Development (Psy 311)  
Home Ground Planning (LA 279)

### Home Economics Work in Social Agencies

Students may prepare for positions as beginning caseworkers in public welfare and other social agencies, or for graduate work in schools of social work. (Graduate work is required for positions in specialized fields such as child welfare, family economics, management, and nutrition.) Programs are planned individually with students depending on their interests.

*Recommended Courses:*

Three-term sequence in Human Biology  
Three-term sequence in Sociology  
Three-term sequence in Economics

*Suggested Electives:*

Courses in Family Life and Home Administration  
Elementary Statistics  
Additional courses in Sociology, Psychology, Economics, Government, History, Philosophy

### Minor in Business and Technology

	<i>Hours</i>		<i>Hours</i>
Principles of Accounting (BA 211).....	3	Human Relations in Business and Industry (BA 497).....	3
Retail Merchandising (BA 463).....	3	Personnel Management (BA 451).....	3
Advertising (BA 464).....	3	Income Tax Procedure (BA 434).....	3
Salesmanship (BA 465).....	3		
Sales Management (BA 466).....	3		

See also SCHOOL OF BUSINESS AND TECHNOLOGY for Technical Minors in Clothing and Textiles and Institution Management.

### Minors in Other Areas

Students in home economics may take minors in:

*Humanities*  
*Biological science*  
*Physical education, recreation, or camping*  
*education*

*Physical science*  
*Secretarial science*  
*Social science*

A minor ordinarily totals at least 27 term hours, and in most cases includes at least 9 hours of upper division course work. Descriptions of courses available will be found in the departmental 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 training in the basic principles of clothing construction, fabric analysis and identification, and selection of clothing. Advanced courses are offered in clothing construction, textiles, consumer education, home furnishing, and applied arts. Business and Technology students may minor in the area of clothing, textiles, and related arts. Service courses are open to students not enrolled in home economics.

Students planning to register for clothing construction courses should keep in mind, when planning their wardrobes for the college year, that these courses require construction of garments.

### Lower Division Courses

- CT 210. **Clothing Construction.** 3 hours any term. 3 ②  
 Fundamental principles of clothing construction; selection, construction, and management problems applied to a cotton dress and a wool garment.
- CT 211. **Clothing (Selection).** 3 hours any term. 3 ①  
 Artistic and economic factors in the selection of adult clothing; wardrobe needs of college students. Prerequisite: AA 160.
- CT 212. **Clothing (Construction).** 3 hours any term. 3 ②  
 Commercial patterns and their adaptation; organization and management problem applied to a cotton garment; fitting and construction principles applied to a wool dress. Prerequisite: CT 210 or 218, CT 211.
- CT 216. **Clothing Construction (Men).** 3 hours. 3 ②  
 Garment construction with emphasis on correct procedures and terminology; various types and styles of men's, women's, and children's garments.
- CT 217. **Clothing Selection.** 3 hours. 3 ①  
 Personal wardrobe selection from standpoint of beauty, health, and economy. Elective for students not in home economics degree curriculum.
- CT 218, 219. **Clothing Construction.** 3 hours each term. 3 ②  
 CT 218: Principles of selection, construction, and management applied in making a cotton dress and a wool skirt. Elective for students not in home economics degree curricula. CT 219: Planning and construction of two dresses (an afternoon dress and a sleep project) and a child's garment. Prerequisite for CT 219: CT 210 or 218.
- CT 231. **Home Furnishing.** 3 hours. 2 ① 1 ②  
 Aims to develop appreciation of beauty and suitability in the home and its furnishings.
- CT 235. **Textile Design and Weaving.** 3 hours. 3 ②  
 Decorative art involving consideration of line, texture, and color as applied to problems in weaving.
- CT 250. **Textiles.** 3 hours any term. 2 ① 1 ②  
 Properties, identification, selection, use, and care of textile fibers and fabrics.

## Upper Division Courses

- CT 309. **Historic Costume.** 2 hours. 2 ①  
Historic costume and its relation to modern dress. Prerequisite: CT 250, history recommended. DIEDESCH.
- CT 310. **Flat Pattern and Draping.** 3 hours any term. 3 ②  
Principles of flat pattern and draping on half-size dress forms with practical application of principles to the construction of afternoon and evening garments. Prerequisite: CT 212, 250. EDABURN.
- CT 311. **Costume Design.** 1 hour. 1 ②  
Emphasis on designing of fashionable and appropriate ensembles for various occasions and figure types. Prerequisite: AA 161 or 291; CT 212, 250. DIEDESCH.
- CT 312. **Tailoring.** 4 hours any term. 2 ④  
Principles of tailoring; planning and constructing coat and skirt or suit. Prerequisite: CT 310. LEDBETTER.
- CT 320. **Clothing for Children.** 3 hours any term. 3 ②  
Selection and construction of garments for children with emphasis on child development, good design, and the saving of time, money, and energy. Prerequisite: CT 212, 250. INGALLS.
- CT 331. **Home Furnishing.** 3 hours any term. 1 ① 2 ②  
Furnishing a small home from standpoint of comfort, beauty, convenience, and economy; influence of historic design. Prerequisite: CT 250, AA 160, 178. PATTERSON.
- CT 332. **Home Furnishing Laboratory.** 3 hours. 2 ③  
Principles of drapery and slipcover construction; finishing furniture and interior woodwork; estimating yardage and costs of fabrics; simple upholstery techniques. Student furnishes own furniture and fabrics. Prerequisite: CT 212, 216, or 219; CT 231 or 331 recommended. PATTERSON, MOSER.
- CT 333. **Applied Home Furnishing.** 3 hours. 1 ① 2 ②  
Home furnishing and decoration. Students work with actual home interiors and with dealers. Prerequisite: CT 331, 332. PATTERSON.
- CT 335. **Textile Design.** 3 hours. 3 ②  
Line, texture, and color as applied to design of woven textiles; contemporary weaving techniques. Prerequisite: AA 160, CT 250 and 210 or 218. PATTERSON.
- CT 350. **Consumer Buying in Clothing and Textiles.** 3 hours any term. 3 ①  
Problems and aids in purchasing clothing and textiles from consumer's point of view. Prerequisite: CT 211, 250, Ec 212. DIEDESCH.
- CT 351. **Quantity Textile Purchasing.** 3 hours. 3 ①  
Problems in selection, purchase, and care of textiles by manufacturers, wholesalers, retailers, and institutions; use of specifications. Prerequisite or parallel: CT 350. GRANT.
- CT 401. **Research.** Terms and hours to be arranged.
- CT 403. **Thesis.** Terms and hours to be arranged.
- CT 405. **Reading and Conference.** Terms and hours to be arranged.
- CT 407. **Seminar.** Terms and hours to be arranged.
- CT 408. **Workshop.** Terms and hours to be arranged.
- CT 410. **Flat Pattern and Draping.** (G) 3 hours. 2 ③  
Principles of flat pattern designing and of draping in varied textures; practical application to afternoon and evening garments. Each student may make a dress form. Prerequisite: CT 310 (CT 309 and 311 recommended). EDABURN.
- CT 411. **Costume Design.** (G) 3 hours. 3 ②  
Creative designing of clothing and accessories for women. Prerequisite: CT 212, 309, 311. DIEDESCH.



- CT 431. **Home Furnishing.** (G) 3 hours. 3 ②  
Consumer study of home furnishing, fabrics, furniture, rugs, china, silver, and ceramics. Particular attention paid to contemporary designers, materials, prices, and manufacturers. Prerequisite: CT 331. PATTERSON.
- CT 435. **Textile Design.** (G) 3 hours. 2 ③  
Advanced work in textile design for students who have had CT 335. PATTERSON.
- CT 450. **Textiles.** (G) 3 hours. 1 ① 2 ②  
Planning and conducting investigations of physical properties of yarns and fabrics; evaluation of data in relation to serviceability; survey of textile research laboratories and standard procedures for physical analysis of textiles. Prerequisite or parallel: CT 350.
- CT 460. **Historic Textiles.** (G) 3 hours. 3 ①  
Study of textiles from ancient times to present, from an appreciative and historical point of view. Prerequisite: CT 250 and senior standing. PETZEL.
- CT 470. **The Clothing Buyer.** 3 hours. 1 ① 1 ②  
Buying ready-to-wear clothing for retail markets. Merchandise selection and fashion trends. Management and personnel responsibilities of the buyer. Prerequisite: CT 350. LEMMAN.

#### Graduate Courses

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

- CT 501. **Research.** Terms and hours to be arranged.
- CT 503. **Thesis.** Terms and hours to be arranged.
- CT 505. **Reading and Conference.** Terms and hours to be arranged.
- CT 507. **Seminar.** Terms and hours to be arranged.
- CT 508. **Workshop.** Terms and hours to be arranged.
- CT 551. **Textile Fibers.** 3 hours. 2 ① 1 ②  
Composition and chemical properties of textile fibers; relation to certain structural and physical characteristics. Prerequisite: 12 term hours in clothing and textiles including CT 250; 1 year of chemistry. PETZEL.
- CT 552. **Textile Analysis.** 4 hours. 1 ① 2 ③  
Principles and practice in identification of textile fibers by chemical methods and quantitative analysis for moisture content, total nonfibrous materials, and fiber content. Prerequisite or parallel: CT 551. PETZEL.

## Family Life and Home Administration

The Department of Family Life and Home Administration offers instruction in general areas of family living—marriage and family relationships, child development, home management, family economics, household equipment, and housing. Advanced courses prepare students for nursery school teaching and work in housing, equipment, and family economics. Laboratories for instruction include two home management houses and two nursery schools on campus, and housing and equipment laboratories in the Home Economics Building.

Courses in marriage, family living, child care, and home management are offered for students in other schools who wish some preparation for homemaking. Men, as well as women, are welcomed in most of the courses in Family Life and Home Administration.

## Courses in Family Life

### Lower Division Courses

- FL 222. **Marriage.** 2 hours any term. 2 ①  
Open to men and women. Courtship period, factors in a successful marriage, husband-wife relationships. KIRKENDALL, SCHALOCK.
- FL 223. **Family Living.** 2 hours. 2 ①  
Open to men and women. Marriage and relationships in the beginning family; management of family resources. KIRKENDALL, SCHALOCK.
- FL 225. **Child Development.** 3 hours any term. 3 ①  
Growth and development of the infant and young child; observations in nursery school. AIKIN.

### Upper Division Courses

- FL 311. **Child Development.** 3 hours. 3 ① 1 ①  
Behavior and development of preschool children. Observation and participation in nursery school. Prerequisite: Psy 202, FL 225. AIKIN.
- FL 312. **Child Development.** 3 hours. 3 ①  
Theory and basic research in the area of child development. Prerequisite: FL 311. AIKIN.
- FL 401. **Research.** Terms and hours to be arranged.
- FL 403. **Thesis.** Terms and hours to be arranged.
- FL 405. **Reading and Conference.** Terms and hours to be arranged.
- FL 407. **Seminar.** Terms and hours to be arranged.
- FL 408. **Workshop.** Terms and hours to be arranged.
- FL 413. **Child Development.** (G) 3 hours. 3 ①  
Growth and development in middle and late childhood and early adolescence. Prerequisite: FL 311. AIKIN.
- FL 421. **Behavior of Young Children.** 2 hours. 2 ①  
For men. Understanding development problems of young children; observation in nursery school. Prerequisite: senior standing or consent of instructor. READ.
- FL 422. **Family Relationships.** (g) 3 hours. 3 ①  
Stages and adjustments in the family cycle; the family and the community. Prerequisite: FL 311, or consent of instructor. KIRKENDALL.
- FL 423. **Parent Education.** (G) 3 hours. 1 ① 1 ②  
Relationships of parents and children; resources for meeting problems with emphasis on discussion as a method. Prerequisite: FL 425. READ.
- FL 425. **The Nursery School Child.** (g) 3 hours any term. 2 ① 1 ④  
Developing insight into child behavior and child-adult relations through participation in the nursery school program. Prerequisite: FL 312. BUEHNER, MCKAY.
- FL 426. **The Nursery School Child Laboratory.** (G) 1 hour. 1 ③  
Must accompany FL 425 or FL 427.
- FL 427. **Nursery School Procedure.** (G) 3 hours. 2 ① 1 ④  
Program planning and administration in a nursery school; home-school relations. Prerequisite: FL 425.
- FL 428. **Curriculum Enrichment for Young Children.** (G) 2 hours spring. 2 ①  
Methods of relating literature, art, music, and science activities to child interests; projects for nursery school. Prerequisite or parallel: FL 425.

FL 429, 430. **Supervised Nursery School Experience.** (G) 5 hours, 3 hours respectively, winter and spring.

Full participation in the program of the nursery school. Field experiences arranged. Prerequisite: FL 425 and consent of instructor. Laboratory and seminar periods to be arranged.

FL 481. **Selected Topics in Child Development.** (G) 3 hours. 3 ①

Reading and interpretation of current literature on child development. Prerequisite: FL 312. SCHALOCK.

#### Graduate Courses

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

FL 501. **Research.** Terms and hours to be arranged.

FL 503. **Thesis.** Terms and hours to be arranged.

FL 505. **Reading and Conference.** Terms and hours to be arranged.

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

BASIC CONCEPTS IN HUMAN DEVELOPMENT. SCHALOCK.

INTERPERSONAL RELATIONS IN FAMILY LIVING. KIRKENDALL.

PHILOSOPHY AND METHODS OF BEHAVIOR RESEARCH. SCHALOCK.

UNDERSTANDING BEHAVIOR. AIKIN, READ.

PSYCHO-SEXUAL ADJUSTMENTS AND THE FAMILY CYCLE. KIRKENDALL.

DIRECTIONS IN THEORY AND RESEARCH IN HUMAN DEVELOPMENT. SCHALOCK.

FL 508. **Workshop.** Terms and hours to be arranged.

FL 520. **Nursery School Philosophy.** 3 hours fall. 3 ①

Philosophy underlying procedures in nursery education; role of nursery school teacher. Prerequisite: FL 425 or equivalent and consent of instructor. READ.

### Courses in Home Administration

#### Lower Division Courses

HAd 101. **Introduction to Home Economics.** 1 hour fall. 2 ①

Orientation of beginning students in home economics. FULMER.

HAd 240. **Management in Family Living.** 2 hours. 2 ①

Managing time and energy in relation to goals of family living. VAN HORN.

#### Upper Division Courses

HAd 330. **Household Equipment.** 3 hours. 2 ① 1 ②

Selection, operation, care, and arrangement of household equipment. PLONK.

HAd 335. **Organization and Use of House Space.** 3 hours. 2 ① 1 ②

Analysis of housing needs of families; optimum dimensions of activity areas; patterns for space units of family dwelling; evaluation of house plans in terms of family needs.

Prerequisite: AA 178. PLONK.

HAd 341. **Family Finance Management.** 2 hours any term. 2 ①

Open to men and women. Management of income, expenditures, credit, savings, insurance, Social Security, and taxes. VAN HORN.

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

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

HAd 405. **Reading and Conference.** Terms and hours to be arranged.

HAd 407. **Seminar.** Terms and hours to be arranged.

HAd 408. **Workshop.** Terms and hours to be arranged.

- HAd 435. **House Planning in Relation to Function.** (G) 3 hours. 2 ① 1 ②  
 An advanced course concerned with the application of principles of functional design to various types of family dwellings and their surroundings. Prerequisite: HAd 335.
- HAd 436. **Functional Design of Dwellings.** (G) Terms and hours to be arranged.  
 Problems in use of storage space; arrangement of equipment; floor plans for small dwellings; illustrative material for use in house planning classes. Prerequisite: HAd 435.
- HAd 439. **Family Housing.** (G) 3 hours. 3 ①  
 Social and economic aspects of housing in relation to family living. Prerequisite: Ec 212, Soc 212, senior or graduate standing. VAN HORN.
- HAd 440. **Home Management.** 3 hours. 3 ①  
 Analysis of decision making throughout the family life cycle; case studies. Individual project. Prerequisite: HAd 240, Psy 202.
- HAd 441. **Economics of the Family.** (G) 3 hours. 3 ①  
 Function of family and roles of its members in American economy; problems of setting, improving, and maintaining standards of living. Prerequisite: senior or graduate standing. VAN HORN.
- HAd 445. **Management Problems in Home-Community Relations.** (G) 3 hours. 3 ①  
 Relation of family to society in civic, business, and other formal and informal associations. Prerequisite: HAd 240, Soc 212. VAN HORN.
- HAd 450. **Home Management House.** 5 hours any term.  
 Experience in applying homemaking courses in a family size group and in a family type house. One-half term residence. Prerequisite: FN 313, FL 311, HAd 240. PLONK, WALSH, PERNICE.
- HAd 460. **Management in the Home.** 3 hours winter. 1 ① 1 ②  
 Supervised experience in applying management principles in home. Student's home used as laboratory. Open to married students only. Students who are married and living at home may substitute HAd 460 and an FL or HAd course beyond the core for HAd 430. Prerequisite: FN 313, FL 311, HAd 240. STATON.

#### Graduate Courses

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

- HAd 501. **Research.** Terms and hours to be arranged.
- HAd 503. **Thesis.** Terms and hours to be arranged.
- HAd 505. **Reading and Conference.** Terms and hours to be arranged.
- HAd 507. **Seminar.** Terms and hours to be arranged.  
 THE FAMILY AND ECONOMIC CHANGE. VAN HORN.  
 HOME MANAGEMENT HOUSE SUPERVISION. Fall—PLONK.  
 WORK SIMPLIFICATION. PLONK.  
 CASE STUDIES IN FAMILY DECISION MAKING. VAN HORN.  
 CONSUMER BUYING DECISIONS. VAN HORN.
- HAd 508. **Workshop.** Terms and hours to be arranged.

## Foods and Nutrition

The Foods and Nutrition Department in its first nutrition course aims to teach the student the relation of nutrition to health and ways of meeting the nutritive allowances by good food selection. In courses in food preparation, applications of scientific principles are taught. The student is then able to plan and

prepare meals which will be adequate nutritionally, attractive in taste and appearance, and economical of both money and time. Advanced courses prepare the student for the professional fields of high school teaching, hospital dietetics, school lunch administration, public health nutrition, foods and nutrition in business, and graduate work leading to research and college teaching. Service courses are offered for the nonmajor in home economics or for home economics students not working for a degree.

Laboratories are provided for instruction in food preparation and meal service, for dietetic and animal nutrition work, and for chemical studies related to foods and nutrition.

#### Lower Division Courses

- FN 211, 212. **Foods.** 3 hours each term. 1 ① 1 ② 1 ③  
Principles involved in the preparation of food; standards for judging food products. Prerequisite or parallel: one year of biological or physical science and FN 225.
- FN 218, 219. **Food Preparation.** 3 hours each term. 1 ① 2 ②  
For students not majoring in home economics. Basic principles of food preparation, menu making, and meal service.
- FN 220, 221. **Foods.** 3 hours each term. 1 ① 1 ② 1 ③  
The application of chemical and physical principles in food preparation. Prerequisite: Ch 101, 102, 103. Prerequisite or parallel: FN 225, Ch 221.
- FN 225. **Nutrition.** 3 hours any term. 3 ①  
Principles of nutrition from the standpoint of newer scientific investigations; selection of an optimal diet for health; present day problems in nutrition.
- FN 240. **Food Selection and Preparation (For Men).** 2 hours winter and spring. 1 ① 1 ③  
Open to men in all schools interested in food preparation, meal planning, and serving. Aids men who are managers of living groups or are preparing their own meals.
- FN 250. **Camp Cookery (For Men).** 2 hours. 1 ① 1 ③  
Planning and preparing palatable and nutritious products from foods available in camps; use of reflectors and other camping utensils.

#### Upper Division Courses

- FN 313. **Meal Planning and Service.** 3 hours. 1 ① 1 ② 1 ③  
Planning, preparing, and serving meals. Prerequisite: FN 212 or 221.
- FN 321. **Nutrition.** 4 hours fall and winter. 2 ① 2 ②  
Fundamentals of nutrition; application of biochemistry and physiology to nutrition of individual and family; animal experimentation. Prerequisite: FN 225, Ch 250, Z 331. Prerequisite or parallel: Z 332. HAWTHORNE.
- FN 325. **Family Nutrition.** 2 hours. 2 ①  
Principles of nutrition applied to family; maternal nutrition, nutrition of the infant and child through growth period; geriatric nutrition. Prerequisite: FN 212, 225.
- 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.

<sup>1</sup> Home practice in food preparation is recommended for students who have completed FN 313. This practice should be completed before an advanced course in foods is taken.

- <sup>1</sup>FN 410. **Food Demonstrations.** 3 hours winter and 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. McLEAN.
- <sup>1</sup>FN 411. **Family Food Buying.** (g) 3 hours winter and spring. 1 ① 1 ② 1 ③  
Practical and intelligent food buying for family; cost factors, food laws, quality standards; home adaptation of new trends in food manufacturing and packaging. Prerequisite: FN 313, Ec 212. McLEAN, HARRIS.
- <sup>1</sup>FN 412. **Food Management.** 3 hours fall and winter. 1 ① 1 ② 1 ③  
Advanced food preparation with emphasis on time, energy, and money management. Prerequisite: FN 313. BARTE.
- <sup>1</sup>FN 414. **Home Food Preservation.** (g) 3 hours fall. 1 ① 1 ② 1 ③  
Common home methods of preserving foods with emphasis on freezing, canning, curing, pickling and preserving with sugar. Prerequisite: FN 313, Bac 204. Offered alternate years. Not offered 1960-61. 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 321. STORVICK.
- FN 421. **Child Nutrition.** (G) 3 hours winter. 3 ①  
Nutritional needs from prenatal life through childhood; maternal dietary requirements. Prerequisite: FN 321. FINCKE.
- <sup>1</sup>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, 313. CHARLEY.
- <sup>1</sup>FN 435. **Experimental Cookery.** (G) 3 hours winter. 1 ① 1 ② 1 ③  
Experimental method applied to problems in food preparation; literature in field. Prerequisite: FN 221, 313. CHARLEY.
- FN 481. **Readings in Nutrition.** (G) 3 hours fall. 3 ①  
Research studies in nutrition reviewed; interpretations and significance. Prerequisite: FN 321. FINCKE.

#### Graduate Courses

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

- FN 501. **Research.** Terms and hours to be arranged.
- FN 503. **Thesis.** Terms and hours to be arranged.
- FN 505. **Reading and Conference.** Terms and hours to be arranged.
- FN 507. **Seminar.** Terms and hours to be arranged. FINCKE, staff.
- FN 508. **Workshop.** Terms and hours to be arranged.
- FN 522, 523. **Methods in Nutrition Research.** 3 hours each term. Students may register for one or two terms. 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 321, Ch 233 or 234. STORVICK, HAWTHORNE.
- FN 531, 532. **Food Preparation Investigation.** 3 or 5 hours each term. 2 ③  
Independent investigations. Prerequisite: FN 435. Offered alternate years. MACKEY.

<sup>1</sup>Home practice in food preparation is recommended for all students who have completed FN 313 before taking advanced courses in foods.

FN 551. Selected Topics in Nutrition. 3 hours.

3 ①

Prerequisite: FN 481. FINCKE.

## Home Economics Education

Professional preparation for teachers of home economics is provided jointly by the School of Home Economics and the School of Education. A student in either school 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 Department. Home economics students who have taken FL 225, FL 311 may substitute FL 413 for Psy 311. (For requirements for the State Teacher's Certificate and listing of courses see SCHOOL OF EDUCATION.)

## Home Economics Extension

Professional preparation for positions as Home Economics Extension Agents or 4-H Club Agents is offered by the School of Home Economics. Course work provided by the extension staff includes information in Extension Methods, as well as practical experience in the field. Students are advised to combine their home economics and extension preparation with course work in journalism, speech, sociology, and psychology. A graduate program provides advanced courses for further preparation for supervisory and specialist positions. See also p. 229.

### Upper Division Courses

EM 405. Reading and Conference. Terms and hours to be arranged.

EM 411, 412. Extension Methods. (G) 3 hours winter. 3 ①  
For course description see page 229.

EM 453. Field Work in Home Economics Extension. (G) Terms and hours to be arranged.

Field practice in county extension work under supervision of professor of extension methods and county extension agents. Prerequisite: EM 411.

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, industrial, and other types of food services. Students entering this field may wish to take a hospital, restaurant, or college administrative internship following graduation. The department has laboratories and facilities in large group housing and food service adequate for undergraduate and graduate work.

### Upper Division Courses

IM 311. Quantity Cookery. 4 hours fall. 2 ① 2 ②

Use of standardized formulae and procedure; use of equipment; menu planning; preparation and service of foods in quantity. Prerequisite: FN 313 or consent of instructor. MULHERN.

- IM 320. **Cafeteria Management.** 3 hours. 3 ①  
For prospective teachers who will manage a school cafeteria. Menu study; cafeteria plans; accounting. At present offered alternate summer sessions only.
- IM 401. **Research.** Terms and hours to be arranged. MULHERN.
- IM 403. **Thesis.** Terms and hours to be arranged. MULHERN.
- IM 405. **Reading and Conference.** Terms and hours to be arranged. MULHERN.
- IM 407. **Seminar.** Terms and hours to be arranged. MULHERN.
- IM 408. **Workshop.** Terms and hours to be arranged.
- IM 430. **Institution Organization and Administration.** (g) 3 hours fall. 3 ①  
Principles of organization and administration as applied to various types of institutions; discussion of employment problems and training, labor laws, office records. Prerequisite: IM 311 or permission of instructor. MULHERN.
- IM 440. **Purchasing for Institutions.** (g) 3 hours. 3 ①  
Selection, design and materials, cost and arrangement of equipment; sources, standards of quality, grades, methods of purchase, care and storage of food. Prerequisite: IM 311 and IM 430 or consent of instructor. CLEVELAND.
- IM 450. **Institution Experience.** (G) 4 hours spring. 1 ① 3 ②  
Practice work in residence halls including daily food production and service, business office procedure, catering, and banquet service. Prerequisite: IM 311, 430, 440. MULHERN.

#### Graduate Courses

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

- IM 501. **Research.** Terms and hours to be arranged.
- IM 503. **Thesis.** Terms and hours to be arranged.
- IM 505. **Reading and Conference.** Terms and hours to be arranged.
- IM 507. **Seminar.** Terms and hours to be arranged.
- IM 508. **Workshop.** Terms and hours to be arranged.

## Home Economics (General)

Following courses are available normally only in Summer Session.

- HEc 408. **Workshop.** Terms and hours to be arranged.
- HEc 508. **Workshop.** Terms and hours to be arranged.



# School of Pharmacy

## Faculty

*As of January 1960*

CHARLES O. WILSON, Ph.D., Dean of the School of Pharmacy and Professor of Pharmaceutical Chemistry.

Pharmacy: Professors FORSLUND, ZIEFLE (emeritus); Associate Professor COOPER; Assistant Professor SISSON; Instructor KNOTT.

Pharmaceutical Chemistry: Assistant Professors SCHULTZ, STUART.

Pharmacology: Professor McCUTCHEON.

Pharmacognosy: Professor SCIUCCHETTI; Assistant Professor LEARY.

## General Statement

**U**NDER the provisions of public health laws, it is required that the pharmacist be licensed before he is permitted to compound and supply drugs and medicines on the prescriptions of doctors, dentists, and veterinarians. One of the principal prerequisites to such license is that of graduation from an accredited school of pharmacy.

The School of Pharmacy at Oregon State College is fully accredited and is rated as a class A college by the American Council on Pharmaceutical Education. This is a national recognition, hence graduates of this school are privileged to become licensed either by examination or reciprocity in all states except New York.

The curriculum of the School of Pharmacy is designed to give the student a sound general education as well as to train him for all positions in the profession of Pharmacy; it aims to provide a background for both pharmaceutical competency and cultured, responsible citizenship. The first two years of the curriculum are devoted to studies in the arts and sciences, in preparation for the period of intensive professional training which follows. During this latter time, the student is provided opportunity for selection of electives which will best fit him for practice in that portion of the field in which he intends to function after graduation.

The program is set up to lead to the *Bachelor of Science degree*, but the *Bachelor of Arts* may also be taken by those who meet the college requirements in humanities and social sciences.

Applicants for admission as undergraduate students must meet the general admission requirements. Appropriate advanced standing is granted to those transferring with acceptable records from other accredited institutions of collegiate rank. However, any applicant permitted to enter with advanced standing but having no previous training in an accredited school of pharmacy is required to be in residence in this school for a minimum of nine academic terms before becoming eligible for graduation, regardless of his previous academic status.

In order to be eligible for final examination for credit, students in Pharmacy must attend at least seven-eighths of the classes of each course for which they have registered. Excessive absences incurred because of illness or other unavoidable circumstances may be canceled by special arrangement with the instructor concerned and completion of all work missed during such absence. Completion of the prescribed curriculum and satisfaction of all College requirements are prerequisite to the granting of the baccalaureate degree.

Graduate work leading to the degrees of Master of Science and Doctor of Philosophy is offered in each of the areas of Pharmacy, Pharmacology, Pharmaceutical Analysis, and Pharmacognosy. The Master of Science degree is offered in Pharmacy Administration. Candidates for admission to study at the graduate level must hold a bachelor's degree in Pharmacy from Oregon State College or its equivalent from another accredited institution. In addition, they must have attained a creditable scholastic average in their undergraduate work and have determined a definite objective to be attained through the advanced study. All advanced degrees are granted through and in accordance with the regulations of the Graduate School.

## Curriculum in Pharmacy

### *B.A., B.S. Degrees*

To enter the professional portion of the Pharmacy curriculum a student must present a transcript of collegiate record showing satisfactory completion of not less than 48 term hours which include:

#### First Year

One year of English composition  
 One year of general biology or zoology  
 Mathematics through college algebra  
 General chemistry and qualitative analysis

#### Second Year

	Term hours		
	F	W	S
Introduction to Pharmacy (Phr 201, 202).....	3	3	.....
Outlines of Economics (Ec 212).....	3	.....	.....
Quantitative Analysis (Ch 234).....	5	.....	.....
Organic Chemistry (Ch 226, 227).....	.....	5	5
Extempore Speaking (Sp 111).....	.....	.....	3
Abridged General Physics (Ph 211, 212).....	.....	3	3
General Psychology (Psy 201, 202).....	3	3	.....
Applied Psychology (Psy 205).....	.....	.....	3
Air or Military Science.....	1	1	1
<sup>1</sup> Physical Education.....	1	1	1
	16	16	16

#### Third Year

Pharmaceutical Calculations (Phr 212).....	3	.....	.....
Fundamentals of Pharmacy (Phr 213, 214).....	.....	3	3
Pharmacognosy (Phc 231, 232, 233).....	3	3	3
Inorganic Pharmaceuticals (Phr 311).....	4	.....	.....
Organic Medicinal Products (Phr 312, 313).....	.....	4	4
General Bacteriology (Bac 204).....	3	.....	.....
Physiology (Z 331, 332).....	.....	3	3
Electives.....	3	3	3
	16	16	16

#### Fourth Year

Pharmaceutical Preparations (Phr 319, 320, 321).....	3	3	3
Pharmaceutical Analysis (PhA 321).....	4	.....	.....
Pharmacology (Phc 391, 392, 393).....	3	3	3
Elementary Physical Chemistry (Ch 340).....	3	.....	.....
Biochemistry (Ch 451, 452).....	.....	3	3
Electives.....	3	7	7
	16	16	16

<sup>1</sup> 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.

	Term hours		
	F	W	S
Fifth Year			
Prescription Compounding (Phr 454, 455, 456).....	3	3	3
Pharmacy Seminar (Phr 407).....	1	1	1
First Aid (PE 358).....	3		
Proprietary Specialty Products (Phr 451, 452).....		3	3
Biological Products (Pcg 495).....	3		
Pharmacy Law (Phr 450).....		3	
Pharmacy Administration (Phr 447).....	3		
Electives .....	3	6	9
	16	16	16

## Pharmacy

In the Department of Pharmacy are offered basic and advanced courses in theoretical pharmacy, pharmaceutical processes, and commercial pharmacy.

### Lower Division Courses

- Phr 201, 202. **Introduction to Pharmacy.** 3 hours fall and winter. 3 ①  
 Evolution and development of profession from remote times to present; opportunities in pharmacy; relation of curriculum to practice.
- Phr 212. **Pharmaceutical Calculations.** 3 hours fall. 3 ①  
 System of weight and measures; dilution and concentration of solutions; calculation of dosages; thermometry. Prerequisite: Mth 101.
- Phr 213, 214. **Fundamentals of Pharmacy.** 3 hours winter and spring. 2 ① 1 ③  
 Fundamental concepts, principles, and practices. Prerequisite: Phr 212, Ph 212, Ch 227.

### Upper Division Courses

- Phr 311. **Inorganic Pharmaceuticals.** 4 hours fall. 3 ① 1 ③  
 Inorganic chemicals and their preparations used in medicine. Students make samples of chemicals; test for impurities. Prerequisite: Ch 206, Phr 214.
- Phr 312, 313. **Organic Medicinal Products.** 4 hours winter and spring. 3 ① 1 ③  
 Organic chemicals and their preparations used in medicine; correlation between chemical constitution and physiological action. Prerequisite: Phr 311, Ch 227.
- Phr 319, 320, 321. **Pharmaceutical Preparations.** 3 hours each term. 2 ① 1 ③  
 Preparation of U. S. Pharmacopeia and National Formulary. Prerequisite: Phr 214, Pcg 233.
- Phr 350, 351. **Manufacturing Pharmacy.** 3 hours winter and spring. 1 ① 2 ③  
 Problems involved in manufacturing drugs and related products on industrial scale. Prerequisite: Phr 313, 321, PhA 321.
- Phr 401. **Research.** Terms and hours to be arranged.
- Phr 403. **Thesis.** Terms and hours to be arranged.
- Phr 405. **Reading and Conference.** Terms and hours to be arranged.
- Phr 407. **Seminar.** One hour each term. 1 ①
- Phr 447, 448, 449. **Pharmacy Administration.** 3 hours each term. 2 ① 1 ③  
 Establishing a store, arrangements, salesmanship, showcase and window trimming, inventory, narcotic and poison records, taking prescriptions over telephone, etc. Prerequisite: Ec 212.

- Phr 450. **Pharmacy Law.** 3 hours winter. 3 ①  
Oregon Pharmacy Law; promulgations of Oregon Board of Pharmacy; Federal Food, Drug, and Cosmetic Act; Harrison Narcotic Act; other laws.
- Phr 451, 452. **Proprietary Specialty Products.** 3 hours winter and spring. 3 ①  
Preparations of pharmaceutical manufacturers; composition and therapeutic use. Prerequisite: Phr 313, 321.
- Phr 454, 455, 456. **Prescription Compounding.** 3 hours each term. 1 ① 2 ③  
Supervised compounding of a wide variety of prescriptions selected from current files of practicing pharmacists. Prerequisite: Phr 313, 321.
- Phr 460. **Hospital Pharmacy.** 3 hours spring. 3 ①  
Concepts and principles of Hospital Pharmacy.

#### Graduate Courses

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

- Phr 501. **Research.** Terms and hours to be arranged.
- Phr 503. **Thesis.** Terms and hours to be arranged.
- Phr 505. **Reading and Conference.** Terms and hours to be arranged.
- Phr 507. **Seminar.** Terms and hours to be arranged.

## Pharmaceutical Analysis

Courses in drug analysis, qualitative and quantitative, are offered through the Department of Pharmaceutical Analysis. All the work is of upper division or graduate character.

#### Upper Division Courses

- PhA 321. **Pharmaceutical Analysis.** 4 hours fall. 3 ① 1 ③  
Determination of identity and purity of common drugs. Prerequisite: Phr 313, Pcg 233, Ch 234.
- PhA 441. **Toxicology.** 3 hours winter. 2 ① 1 ③  
Detection of common inorganic and organic poisons; emphasis on alkaloids and synthetics. Prerequisite: Pcg 233, Phc 393, PhA 321, Ch 227.
- PhA 461, 462, 463. **Advanced Drug Analysis.** (G) 3 hours each term. 1 ① 2 ③  
Advanced quantitative methods, both chemical and physical. Students showing proficiency in this course may do special work in State Drug Laboratory. Prerequisite: PhA 321.

#### Graduate Courses

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

- PhA 501. **Research.** Terms and hours to be arranged.
- PhA 503. **Thesis.** Terms and hours to be arranged.
- PhA 505. **Reading and Conference.** Terms and hours to be arranged.
- PhA 507. **Seminar.** Terms and hours to be arranged.  
Conducted jointly with Phr 507, Pcg 507, and Phc 507.

## Pharmacology

Courses in pharmacology deal with all drugs in common use in America today. Emphasis is on therapeutic use, physiological response, and mode of action. Attention is given to the relation of chemical structure to function, to the standardization of drugs, and to poisonings produced chemically and their appropriate treatments.

### Upper Division Courses

- Phc 391, 392, 393. **Pharmacology.** 3 hours each term. 2 ① 1 ③  
Pharmacological action of drugs on human organisms; toxicological aspects of poisonous drugs. Prerequisite: Ch 227, Phr 214, Pcg 233, Z 332.
- Phc 454. **Commercial Poisons.** (G) 3 hours fall. 3 ①  
Substances and materials used as commercial poisons; their composition, characteristics, and toxicities. Prerequisite: Phc 393.
- Phc 494. **Pharmacological Standardization.** 3 hours. 2 ① 1 ③  
Biological assaying; methods of U.S.P.; certain unofficial but well-recognized procedures. Prerequisite: Phc 393, Bac 204.

### Graduate Courses

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

- Phc 501. **Research.** Terms and hours to be arranged.
- Phc 503. **Thesis.** Terms and hours to be arranged.
- Phc 505. **Reading and Conference.** Terms and hours to be arranged.
- Phc 507. **Seminar.** Terms and hours to be arranged.  
Conducted jointly with Phr 507 and PhA 507.
- Phc 520, 521, 522. **Advanced Pharmacology.** 3 hours each term. 2 ① 1 ③  
Methods of pharmacological screening in development of new drugs; determination of dose levels, tolerance, and safety by animal experimentation. Phc 520: Anesthetics, general and local. Phc 521: Sedatives, analgesics, hypnotics, convulsants, anticonvulsants. Phc 522: Drugs affecting autonomic nervous system. Prerequisite: Phc 393, Ch 452, or equivalent. McCUTCHEON.
- Phc 525. **Advanced Pharmacological Standardization.** 4 hours. 2 ① 2 ③  
Biological standardization of drugs by methods representative of latest techniques; application of statistical methods to evaluation of experimental results. Prerequisite: Phc 393, 494, Mth 423, or equivalents. McCUTCHEON.
- Phc 530, 531. **Advanced Toxicology.** 3 hours each term, fall and winter. 1 ① 2 ③  
Classification of poisons; symptoms of poisoning; organs most commonly involved in poisonings and separation of poisons from organs; chemical and pharmacological methods of testing for poisons. Prerequisite: PhA 441, Phc 393, or equivalents. McCUTCHEON.

## Pharmacognosy

Courses in pharmacognosy deal with drugs of biological origin. Both basic and advanced courses are offered.

### Lower Division Courses

- Pcg 231, 232, 233. **Pharmacognosy.** 3 hours each term. 3 ①  
Official and nonofficial botanical and animal drugs; macroscopic identification. Prerequisite: Ch 227, general biology.

**Upper Division Courses**

- Pcg 354, 355. **Advanced Pharmacognosy.** 3 hours winter and spring. 1 ① 2 ③  
 Microscopy of vegetable and animal drugs; cultivation of drug plants. Prerequisite: Pcg 233.
- Pcg 495. **Biological Products.** 3 hours fall. 3 ①  
 Official vaccines, serums, antitoxins, hormones, endocrine products, and other materials of biological origin. Prerequisite: Bac 204, Phc 393.

**Graduate Courses**

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

- Pcg 501. **Research.** Terms and hours to be arranged.
- Pcg 503. **Thesis.** Terms and hours to be arranged.
- Pcg 505. **Reading and Conference.** Terms and hours to be arranged.
- Pcg 507. **Seminar.** Terms and hours to be arranged.  
 Conducted jointly with Phr 507 and PhA 507.
- Pcg 550, 551, 552. **Selected Topics in Pharmacognosy.** 3 hours each term. 3 ①  
 Nonsequence courses intended to acquaint student with recent advances in pharmacognosy and their applications to specialized fields of study. Pcg 550: Carbohydrates, glycosides, saponins. Pcg 551: Alkaloids. Pcg 552: Lipids, resins, and related compounds. Prerequisite: Phr 313, Pcg 355, Phc 393. **СІУСНЕРТІ.**

# Defense Education

## Reserve Officers Training Corps

*Air Science*

*Military Science and Tactics*

*Naval Science*

### General Statement

**I**NSTRUCTION in military tactics began at Oregon State College about 1872 in conformity with a requirement of the Federal Morrill Act of 1862 establishing the land-grant universities. Cadets trained in the early years saw service in the Spanish-American War. Another Act of Congress passed on June 3, 1916, brought about the reorganization, in 1917, of the Cadet Regiment into a Reserve Officers Training Corps unit. In World War I, World War II, and the Korean conflict, the number of former students who served with distinction in our armed forces has given proof of the high quality of their preparation for public service and the value to the Nation of such military instruction.

Oregon State College is one of the 233 colleges and universities offering ROTC (Army), one of 53 offering NROTC (Navy and Marine Corps), and one of 175 offering AFROTC (Air Force). It is one of the 33 which offer all three. The Department of Military Science and Tactics trains officers for four branches of the Army: Infantry, Field Artillery, Corps of Engineers, and Signal Corps. The Department of Naval Science, which was commissioned on September 17, 1945, includes a program of training for Marine Corps as well as Naval officers. The Department of Air Science activated on July 1, 1949, was one of the first Air Force ROTC units established; its program of study leads to flight training in a commissioned status or to a commission as a nonrated officer in the Air Force.

**Mission and Objectives.** The ROTC seeks to select and prepare young men, through a permanent program of instruction in civilian institutions, to serve as officers in the Regular and Reserve components of the Army, Navy, Air Force, and Marine Corps. Each of the units on this campus strives to develop in the student a capacity for leadership, to develop him morally, mentally, and physically, and to provide him with a basic knowledge of the military professions.

**Requirements.** Military instruction is required of all physically qualified freshman and sophomore men between the ages of 14 and 22 inclusive at the time of enrollment in the ROTC, who are citizens of the United States and who successfully complete such general survey or training tests as may be prescribed. Men who transfer from other institutions with advanced standing are required to pursue military instruction until they have completed 93 term hours of college work, except that those who are credited with 80 term hours or more of advanced standing at the time of enrollment are exempt.

Men who have served one year or more in the regular Army, Navy, Marine Corps, Air Force, or Coast Guard, and who wish to continue with advanced ROTC, may be excused from an appropriate portion of the basic course according to their length of service. This excused portion of the basic course

counts toward completion of the basic course and eligibility for the advanced course.

Enrollment in ROTC does not preclude registering under the Universal Military Training and Service Act of 1951. All students enrolled and of age must register.

**Uniforms, Allowances, and Summer Camps.** Students in all three of the units receive uniforms to be worn at certain drill periods and on special occasions. In the third and fourth years, cadets in the Army and Air Force units and those in Naval Science called "contract students" receive in addition an allowance of approximately 90¢ a day for a period not to exceed 595 days. Between the third and fourth years, these students attend a summer camp or take a summer cruise of approximately six weeks duration. During this period they are messed and quartered at government expense and are paid at the rate of approximately \$78 per month. They also receive a travel allowance of 5¢ a mile to and from camp. "Regular students" in Naval Science receive additional allowances described on a later page.

Basic students who are members of the band drill with the band rather than with the squadrons or companies.

## Air Science

(Personnel detailed from United States Air Force)  
*As of January 1960*

Professor OLIVER (Colonel, United States Air Force) Commander.

Associate Professors: Lieutenant Colonel BRAZIER; Majors ANDERSON, CARREL; Captains DENNIS, HAYES, LEAHY, RICHARDS.

Instructors: Master Sergeant BUCKEM, SIMMONS; Technical Sergeants FEARON, POST; Staff Sergeants DONAHUE, LAMANSKY.

Students in Air Science pursue the Basic Course the first two years and receive 1 term hour of credit each term. Those who go on into the Advanced Course (the third and fourth years) receive 3 term hours of credit each term and 6 term hours for attending summer training at an Air Force base. In all, the student on graduation will have a total of 30 term hours of credit in Air Science, 24 hours of which will be upper division. He may include SSc 441, 442, 443 to provide a comajor in Air Science with whatever other major he submits for a baccalaureate degree.

**Enrollment in Advanced Course.** Each student enrolled in the Advanced Course of the Senior Air Force ROTC must:

1. Be selected by the professor of air science and the President of Oregon State College.
2. Be eligible for commissioning prior to his 28th birthday.
3. Successfully complete such survey and general screening tests as may be prescribed.
4. Have completed the Basic Course or received credit in lieu thereof for having had previous honorable active service in the Army, Navy, Marine Corps, Coast Guard, or Air Force.
5. Be a citizen of the United States.
6. Be physically qualified under standards prescribed by the Department of the Air Force. Due allowance will be made for those defects that are correctible before the student becomes eligible for appointment as a commissioned officer.
7. Be accepted by Oregon State College as a regularly enrolled student.
8. Execute a written agreement with the Government to complete the Advanced Course, contingent upon remaining in college, and to attend the summer training unit at the time specified.
9. If physically qualified, agree to apply for flying training unless otherwise specifically exempt. Quotas for those applying are quite limited.



**Commissions.** A student must be 21 through 27 years of age, complete the advanced course Air Force ROTC, and receive a baccalaureate degree to be recommended for a commission as an officer in the Air Force.

Outstanding advanced course cadets are designated Distinguished Air Force ROTC Cadets, Distinguished Air Force ROTC Graduates are selected from these Distinguished Cadets. Distinguished Air Force ROTC Graduates are given the opportunity to apply for commission as a Regular Officer of the Air Force.

**Flight Training.** Eligible seniors are given flight training. Qualified cadets who complete this flight training, the advanced course in Air Force, and are awarded a commission in the Air Force are eligible to participate in the Air Force Pilot Flight Training Program as commissioned officers. Students determined eligible for other than pilot training will receive navigation or other training in the Air Force as commissioned officers.

#### Lower Division Courses

- AS 111, 112, 113. **Air Science 1.** 1 hour each term. 1 ①; 1 ①; 3 ①  
*Foundations of Air Power—1.* A survey of air power designed to provide the student with an understanding of the elements of air power and basic aeronautical science.
- AS 211, 212, 213. **Air Science 2.** 1 hour each term. 3 ①; 3 ①; 1 ①  
*Foundations of Air Power—2.* A survey of the development of aerial warfare, with emphasis on principles of war, concepts of employment of forces, and changing weapon systems. Treatment of aerial warfare covers targets, weapon systems, delivery vehicles, bases, and operations.

#### Upper Division Courses

- AS 311, 312, 313. **Air Science 3.** 3 hours each term. 5 ①  
*Air Force Officer Development.* An inquiry into the knowledge and skills required of a junior officer in the Air Force. Includes Air Force leadership doctrine, staff organization and functions, communicating, instructing, problem solving techniques, leadership principles and practices, and the military justice system.
- AS 314. **Summer Training Unit.** 6 hours summer.  
 Junior Officer Training with emphasis on military discipline, air crew and aircraft indoctrination, a career in the Air Force, organization and functions of an Air Force base, physical training, and weapons familiarization.
- AS 311, 312, 313. **Air Science.** 3 hours each term. 5 ①  
*Global Relations.* A study of global relations of special concern to the Air Force officer with attention to such aspects as weather, navigation, geography, and international relations.

## Military Science and Tactics

(Personnel detailed from United States Army)  
 As of January 1960

Professor LEARNARD (Colonel, Infantry) Commandant.

Associate Professors: Lieutenant Colonel LAHM (Chief, Artillery Branch); Majors DOYAL (Chief, Infantry Branch), HERON (Chief, Signal Corps Branch), IRVINE (Chief, Corps of Engineers Branch).

Assistant Professors: Captains DOUTHIT (Armor), GRANICHER (Corps of Engineers), GRIFFITHS (Signal Corps), PITTS (Artillery), TAKASUMI (Infantry), VOLMER (Infantry), WILLIFORD (Infantry).

Instructors: Master Sergeants BARR, BARTCHER, HAMILL, HUNNINGS, MOREHEAD, RANKINS, WILLIAMS; Sergeant First Class MACDOUGALL, McDERMOTT; Sergeant LOWE.

The first two years of military instruction requiring three hours a week (1 term hour credit) constitute the Basic Course. Students in the Advanced Course (third and fourth years) receive 3 term hours of credit per term and 6 term hours for summer camp. In all, advanced course students on graduation will

have a total of 30 term hours of credit in Military Science, 24 hours of which will be upper division. He may include SSc 441, 442, 443 to provide a comajor in Military Science with whatever other major he submits for a baccalaureate degree.

**Enrollment in the Advanced Course.** Each student enrolled in the Advanced Course of the Senior ROTC must:

1. Be selected by the professor of military science and tactics and the President of Oregon State College.
2. Not have reached 27 years of age.
3. Have successfully completed such survey and general screening tests as may be prescribed.
4. Have completed the Basic Course or received credit in lieu thereof for having had twelve months or more previous honorable active service in the Army, Navy, Marine Corps, Coast Guard, or Air Force.
5. Be a citizen of the United States.
6. Be physically qualified under standards prescribed by the Department of the Army. Due allowance will be made for those defects that are correctible before the student becomes eligible for appointment as a commissioned officer.
7. Be accepted by the College as a regularly enrolled student.
8. Execute a written agreement with the United States to complete the Advanced Course, contingent upon remaining in college, and to attend the summer camp at the time specified unless deferred for cogent reasons.

**Commissions.** For a reserve commission a student must meet the following minimum requirements:

1. He must have received a baccalaureate degree.
2. In addition to his major in military science, he must have a comajor as follows:
  - (a) For commission in the Corps of Engineers, he must have a comajor in any academic course of instruction leading to an engineering, technical, or scientific degree.
  - (b) For commission in the Field Artillery or Infantry, he must have a comajor in any school or department at Oregon State College granting an academic degree.
  - (c) For commission in the Signal Corps, he must have any academic course leading to a degree in engineering, electronics, or physics. Students enrolled in courses other than these, however, may be admitted if marked ability, aptitude, or interest in technical fields of endeavor is demonstrated.

Students in scientific and technical courses who wish to be commissioned in branches of the Army not represented by units on this campus may, under certain circumstances, attend an ROTC summer camp of the appropriate branch and on graduation be recommended for commission in that other branch.

Distinguished Military Students have an opportunity to apply for appointment as commissioned officers in the Regular Army. In addition to possessing outstanding qualities of military leadership, high moral character, and definite aptitude for the military services, these men must be between the ages of 21 and 27 years and must meet certain physical standards.

**Flight Training.** A limited number of seniors in the advanced course will have an opportunity to take flight training leading to a private pilot's license and to an opportunity to attend the U. S. Army flight training program after graduation.

## **Courses for Freshman and Sophomore Years**

### **Lower Division Courses**

- MS 111, 112, 113. First-Year Basic Course.** 1 hour each term.  
Leadership, drill and command; organization of the Army and ROTC; individual weapons and marksmanship; American military history.
- MS 211, 212, 213. Second-Year Basic Course.** 1 hour each term.  
Leadership, drill and command; map and aerial photo reading; crew-served weapons and gunnery; basic tactics; elementary communications.

**Courses for Junior and Senior Years****Courses in Infantry**

- MS 311, 312, 313. **First-Year Advanced Course.** 3 hours each term.  
Leadership, drill and command; maps and aerial photos; crew-served weapons and gunnery; mine warfare; field fortifications; patrolling; tactics of the rifle squad; platoon tactics; new developments in Infantry; leadership; military teaching principles; pre-camp orientation.
- MS 314. **Advanced Summer Camp.** 6 hours.  
Practical and theoretical instruction for six weeks at Fort Lewis, Washington. Prerequisite: MS 313.
- MS 411, 412, 413. **Second-Year Advanced Course.** 3 hours each term.  
Leadership, drill and command; command and staff; estimate of the situation and combat orders; military intelligence; training management; supply and evacuation; troop movements; motor transportation; the military team; military administration; military justice; service orientation.

**Courses in Field Artillery**

- MS 321, 322, 323. **First-Year Advanced Course.** 3 hours each term.  
Leadership, drill and command; leadership; military teaching principles; organization and capabilities; instruments; materiel; communications, gun section drill; survey; firing battery; observed fires; fire direction; introduction to artillery tactics; operation of the field artillery battery; precamp orientation.
- MS 324. **Advanced Summer Camp.** 6 hours.  
Practical and theoretical instruction for six weeks at Fort Sill, Oklahoma. Prerequisite: MS 323.
- MS 421, 422, 423. **Second-Year Advanced Course.** 3 hours each term.  
Leadership, drill and command; command and staff; military intelligence; employment of artillery in the combined arms team; gunnery; supply and evacuation; troop movements; motor transportation; new developments; military administration; military justice; service orientation; role of air defense artillery; organization and tactical employment of missiles.

**Corps of Engineers Courses**

- MS 331, 332, 333. **First-Year Advanced Course.** 3 hours each term.  
Leadership, drill and command; basic engineer organization; use of explosives; construction materials; military structures; engineer computations and layout; fortifications and camouflage construction; leadership; military teaching principles; precamp orientation.
- MS 334. **Advanced Summer Camp.** 6 hours.  
Practical and theoretical instruction for six weeks at Fort Leonard Wood, Missouri. Prerequisite: MS 333.
- MS 431, 432, 433. **Second-Year Advanced Course.** 3 hours each term.  
Leadership, drill and command; engineer logistics; construction management; engineer operations; military administration; military justice; service orientation.

**Courses in Signal Corps**

- MS 351, 352, 353. **First-Year Advanced Course.** 3 hours each term.  
Leadership, drill and command; leadership, signal organization; signal orders; field wire communications fundamentals; field radio communications fundamentals; applied signal communications (division); communications center procedure and operation; military teaching principles; precamp orientation.
- MS 354. **Advanced Summer Camp.** 6 hours.  
Practical and theoretical instruction for six weeks at Fort Gordon, Georgia. Prerequisite: MS 353.
- MS 451, 452, 453. **Second-Year Advanced Course.** 3 hours each term.  
Leadership, drill and command; signal corps logistics; wire communications materiel; radio communications materiel; higher echelon signal communications systems and equipment; signal corps pictorial and television activities; military intelligence; command and staff; military administration; military justice; service orientation.

## Naval Science

(Personnel detailed from United States Navy and Marine Corps)  
As of January 1960

Professor NUTTING (Captain USN) Commanding Officer.

Associate Professor DONNALLY (Commander USN) Executive Officer.

Assistant Professors: STEPHENSON (Major USMC); FOX (Lieutenant Commander USN); ANDREWS (Lieutenant USN); HUNTER (Lieutenant USNR); LOCKEMAN (Lieutenant, JG, USNR).

Instructors: CARMICKLE (Senior Chief Gunners Mate); COCHRAN (Fire Control Technician First Class); FINCHER (Chief Quartermaster, USN); KIRKMAN (Acting Master Sergeant, USMC).

The NROTC Unit is composed of two types of students: *regular students* and *contract students*. The contract students receive the same type of allowances as do the cadets in the other ROTC units. They are selected by the Department of Naval Science at Oregon State College. The regular students fall under a different category, being provided for by a separate Act of Congress.

Regular students are appointed Midshipman, USNR. They have their tuition, fees, and textbooks paid for by the Navy for a period not exceeding four years, are uniformed at Government expense, and receive retainer pay at the rate of \$600 per year. They obligate themselves to complete the prescribed Naval Science curriculum, to attend three summer cruises of from six to eight weeks, to accept a commission as Ensign, U.S.N., or Second Lieutenant, U.S.M.C., on graduation, and to serve on active duty for four years after receiving commission, unless earlier released by the Navy Department. At the beginning of the fourth year after receiving commissions, they have the opportunity to apply for retention in the regular Navy or Marine Corps, and will be so retained if selected under the quotas then in force.

Students in this group are selected by means of a nationwide examination, which is administered by state or regional selection boards. This examination is given each year, generally in December, for entry the following fall term. Information relative to later examinations may be obtained from the Commanding Officer of the NROTC Unit.

**Requirements:** *Every acceptable candidate*, whether applying as a regular or contract student, must:

1. Be a male citizen of the United States.
2. Be a regularly enrolled student in good standing at a college of which the NROTC Unit is a part.
3. Have attained his 17th birthday on or before July 1 of the year in which enrolled, but must not attain his 25th birthday before July 1 of the year in which he would normally receive his first baccalaureate degree and be commissioned.
4. Be unmarried and agree to remain unmarried until commissioned or otherwise separated from the NROTC program.
5. Agree, with the consent of his parent or legal guardian, to undergo whatever period of training may be necessary to complete all requirements of the NROTC curriculum.
6. Agree to participate in required summer training courses and cruises.
7. Agree to accept the appropriate commission in the Navy, Marine Corps, Naval Reserve, or Marine Corps Reserve, when offered.
8. Meet general physical requirements as follows: *Height*, minimum 5 feet 6 inches, maximum 6 feet 4 inches. *Vision*, 20/20 each eye; color perception normal. Contract applicants may request waiver of the vision requirement if vision is not less than 20/40 each eye and can be corrected to 20/20 with glasses. *Weight*, in proportion to height. *Teeth*, a minimum of 16 vital, of which 8 must be in each arch. Other physical requirements as prescribed by the Manual of Medical Department for candidates for commissions.
9. Be morally qualified and possess potential officer qualities, as evidenced, for example, by appearance, scholarship, and extracurricular activities.
10. Agree, with consent of parents or guardian, to serve on active duty in the Navy or Marine Corps, after receiving his commission for a period of four years (for regular student) or two years (for contract student).

**Status and Curriculum.** Students enrolled in the program are not on active duty. They wear the uniform only for drills, on special occasions, and during the summer training cruises.

The program of study covers four years and fits into curricula leading to first baccalaureate degrees. It includes the following requirements:

1. 33 term hours of Naval Science.
2. One year of college physics to be completed by the end of the sophomore year for regular students only. This course is a necessary background for the courses in naval engineering (NS 311, 312).
3. One year of college mathematics to be completed by end of sophomore year—required as background for navigation courses (NS 312, 313).
4. One term of general psychology (Psy 201 or 212) ordinarily taken in spring term of sophomore year.
5. Proficiency in written and oral expression. (One year of English is considered adequate.)
6. Two years of physical education. Each student must qualify as a swimmer and should be instructed in lifesaving and resuscitation.

Naval science (including summer cruise) pursued for four years in one of the undergraduate curricula constitutes a comajor with many of the majors offered in degree-granting divisions of schools. In addition, the Department of Naval Science offers a 4-year curriculum with a major in naval science; in this curriculum the student may take considerable amounts of work in any of the schools but needs to complete a major only in naval science. The curriculum leading to a B.A. or B.S. degree in Naval Science is open only to those students enrolled in either the regular or contract programs. Interested students should confer with the Department of Naval Science.

### Description of Courses

NS 111, 112, 113. **Naval Orientation and Sea Power.** 3 hours each term. ⑤ 1

Organization; customs and traditions of the Navy; highlights of Naval history from Salamis to Jutland; Naval history of World War II; leadership; discipline; introduction to Marine Corps; naval aviation, amphibious warfare, submarines, etc.; seamanship; maneuvers and tactics; rules of the nautical road.

NS 211, 212. **Naval Weapons.** 3 hours each term fall and winter. 5 ①

Introduction to weapons and control equipment; principles of radar; fire control; anti-submarine warfare; new weapons; CIC; rockets and guided missiles; amphibious operations.

NS 311, 312, 313. **Naval Machinery and Navigation.** 3 hours each term. 5 ①

Elements of a typical marine engineering plant: boilers, turbines, condensate system, feed water system, auxiliary equipment, diesel engines; ship stability; introduction to navigation: piloting, nautical astronomy, celestial navigation, nuclear propulsion.

NS 321, 322, 323. **Evolution of Art of War and Modern Basic Strategy and Tactics.** 3 hours each term. 5 ①

Evolution of the art of war from Alexander to the present time; basic strategy and tactics; small unit tactics; world strategy in World War II. For candidates for U. S. Marine Corps or U. S. Marine Corps Reserve.

NS 411, 412, 413. **Naval Operations and Naval Administration.** 3 hours each term. 5 ①

Study of relative movement problems, rules of the nautical road; fleet tactics and maneuvers; fleet communications; administration; military justice; weather; and naval leadership.

NS 421, 422. **Amphibious Warfare.** 3 hours fall and winter. 5 ①

Theory of amphibious warfare; analysis of amphibious operations in World War II and Korean conflict. For candidates for U. S. Marine Corps or U. S. Marine Corps Reserve.

# Division of Physical Education

## Faculty

*As of January 1960*

CLAIR VAN NORMAN LANGTON, Dr.P.H., Ed.D., Director of the Division of Physical Education.

Physical Education for Women: Professor SEEN (department head); Associate Professors P. GILL, HUPPRICH, MILLIKEN, THOMPSON, WEIR; Assistant Professors J. A. DIXON, McALLESTER (emeritus), OCKER, SEYMOUR; Instructors POLING, STARKS, WEBER, J. WINKLER.

Physical Education for Men: Professors ADRION, ALLMAN, ANDERSON (chairman of hygiene and environmental sanitation), BERGSTROM (chairman of professional physical education), COLEMAN (chairman of service programs for men), J. V. DIXON, A. T. GILL, KEENE, PROTHRO; Associate Professors COX, DAILEY, DRLICA, FLOOD, FOSTER, MCKALIF, MOE, SWAN; Assistant Professors BEEGLE, KOSKI, MARTINSON, MAYSHARK, MEGALE, THOMAS, W. WINKLER; Instructor CRAMER.

Intercollegiate Athletics: Director R. S. KEENE, Athletic Business Manager BARRATT. COACHES: BELL (track), COLEMAN (baseball), GIBBS (assistant football), GILL (basketball), HARRIS (tennis), MARTIN (golf), PROTHRO (football), ROBERTSON (trainer), SIEGRIST (assistant football), THOMAS (wrestling), TWENGE (assistant football), VALENTI (assistant basketball), WATSON (assistant football), ZELINKA (assistant football).

## General Statement

**A**LL 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 of Oregon State College.

In addition to its service courses, the Division of Physical Education offers professional courses for students enrolled in certain curricula in the Schools of Education and Science. The major in physical education offered through the School of Education provides preparation for teaching and coaching and leads to the baccalaureate degree in education. Major work in hygiene and sanitation in the School of Science and health education in the School of Education provides professional training for specialists in these fields. The student's basic program may be varied with options in recreation, youth agency leadership, pre-physical therapy, and preoccupational therapy which prepare graduates for these rapidly developing fields. Many opportunities exist for combining professional courses in physical education with courses in the Schools of Science, Agriculture, Business and Technology, Engineering, Forestry, and Home Economics.

Students majoring in other teaching fields or schools may take a minor in physical education, health education, recreation, camp education, or the dance by completing at least 27 term hours of professional courses in the respective fields. See curricula under SCHOOL OF EDUCATION.

Requirements for the Oregon teachers' certificates are listed under SCHOOL OF EDUCATION. Students who complete either the health education major or the physical education major include courses in these fields during their fifth year of preparation along with other courses according to their special objectives. Students who devote their fifth year to graduate work for a master's degree may major in education, science education, health education, hygiene, or other fields and include a graduate minor in physical education. Requirements

for the master's degree can be completed with or without thesis. Advanced degrees are granted through the School of Education or the School of Science.

A comprehensive intramural sports program offers sports for all students of Oregon State College. Living organizations, clubs, individuals, classes, and institutional departments compete with friendly rivalry in many sports activities. The intramural sports program is separate and apart from intercollegiate athletics.

Clubs and societies for women include Parthenia, an honor society sponsored by the Women's Physical Education Department; Women's Recreation Association, which offers competitive and noncompetitive physical activities for women; and Orange "O," the honorary club for the Women's Recreation Association. Athletic organizations for men include the Minor "O" and Varsity "O" associations and the honor society, Sigma Delta Psi. The Varsity "O" Managers Association includes varsity team managers and the senior intramural sports manager.

A medical examination is required of all entering students. The Student Health Service advises with the Division of Physical Education in the assignment of students to activities in accord with their physical needs. The following activity classification is made, based upon the medical examinations: (a) unlimited activity, (b) unlimited activity with observation, (c) restricted activity, (d) corrective gymnastics, (e) no activity.

The regular registration fee entitles every student to the 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 the 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 (except in Nursing Education—1 hour each for three terms); and PE 160, General Hygiene, 2 term hours for women; PE 150 or PE 160, 1 or 2 term hours for men.

*Sophomore year:* PE 180 or 190, Physical Education, 1 term hour each term for three terms.

Only one of the courses listed above may be taken in any one term.

The professional activities courses for students taking a major or minor in physical education may be considered as fulfilling the physical education requirement for any term.

Required activity courses are regularly scheduled classes planned as instructional hours leading to a knowledge and appreciation of the technique involved and not merely to give opportunity for recreation or exercise. Ample opportunity for exercise and recreation is provided.

Courses PE 380 or 390 may be taken to the amount of one hour per term for juniors and seniors. A total of six 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.

### Student's Basic Program

Freshman Year		Sophomore Year	
	Hours		Hours
Human Biology (Z 114, 115, 116).....	9	Elementary Human Anatomy (Z 321, 322).....	6
English Composition (Wr 111, 112, 113).....	9	Applied Human Anatomy (Z 323).....	3
General Chemistry (Ch 101, 102, 103).....	9	Professional Activities (PE 294).....	6
Introduction to Physical Education (PE 131).....	3	Social Science (Ec 212, PS 201, Soc 212).....	9
General Hygiene (PE 170).....	3	Literature.....	9
Introduction to Health Education (SEd 123).....	3	General Psychology (Psy 201, 202).....	6
Professional Activities (PE 194).....	6	Field Experience (Ed 200).....	2
Air, Military, or Naval Science (men).....	3-9	Speech.....	3
		Organization and Administration of Intramural Sports (PE 340).....	2
		Air, Military, or Naval Science (men).....	3-9
Junior Year		Senior Year	
	Hours		Hours
Physiology (Z 331, 332).....	6	School Health Education (SEd 321).....	3
Applied Human Physiology (Z 336).....	3	School Health Services (SEd 322).....	3
School in American Life (Ed 310).....	3	First Aid (PE 358).....	3
Educational Psychology: Learning (Ed 312).....	3	School Programs and Organization (PE 442).....	5
Special Secondary Methods (Ed 408h).....	3	Evaluation of Physical Education (PE 443).....	3
Human Development (Psy 311).....	3	Conditioning and Care of Injuries (PE 361) (men).....	2
Methods in Reading (Ed 350).....	3	Adaptive and Corrective Physical Education (PE 444).....	3
Physical-Education Technique (PE 333, 334, 335).....	6	Supervised teaching (Ed 416).....	9-12
Football Coaching (PE 365) (men).....	2	Seminar (Ed 407).....	1-3
Basketball Coaching (PE 366) (men).....	2	Community Health (Bac 424 or 425 or 426) or Nutrition (FN 225).....	3
Track and Field Coaching (PE 368) (men) or Baseball Coaching (PE 367) (men).....	2		
Professional Activities (PE 394).....	6		
Sports Officiating (PE 362) (women).....	3		
Courses in recreation (women) (PE 240, Ed 263 or Ed 426).....	3		

### Options

For options in recreation, youth agency, leadership, prephysical therapy, and preoccupational therapy consult with advisers in the Division.

### Service Courses

#### Lower Division Courses

- PE 150. **General Hygiene.** 1 hour any term. 2 ①  
Principles and practices of 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  
Principles and practices of 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. A more extensive general hygiene course. Satisfies hygiene requirement; may be elected by both men and women.
- PE 180. **Physical Education (Women).** 1 hour each term, five terms.



- PE 190. **Physical Education (Men).** 1 hour each term, five terms.  
Physical activities taught for acquisition of skill and for adaptation in social life of the 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  
Concept of community recreation; growth and development of public recreation movement; types of recreation; role of organized recreation in present social order.
- SEd 123. **Introduction to Health Education.** 3 hours. 3 ①  
Historical background and underlying philosophy of health education; statistical facts that indicate need for health education; survey of modern practice in and organization for health education; opportunity for professional work in field.
- PE 131. **Introduction to Physical Education.** 3 hours. 3 ①  
Personal and professional qualifications for teaching and coaching; place of physical education and athletics in education; values of physical education to development of children and youth; general purposes of physical education program.
- PE 132. **Introduction to Therapy.** 2 hours. 2 ①  
Personal and professional qualification to become registered physical therapist or occupational therapist. Relationship of physical therapy and occupational therapy to field of medicine; values of physical therapy and occupational therapy.
- PE 194. **Professional Activities.** 2 hours each term, three terms. 2 ②  
Methods, techniques, and basic skills in activities commonly found in physical education programs. *Fall:* gymnastics (men); basketball, volleyball, field sports (women). *Winter:* aquatics (men); basic rhythms (women). *Spring:* team sports (men); softball, track and field, badminton, tennis (women).
- PE 240. **Social Recreation Leadership.** 3 hours. 3 ①  
Study and practice of games for family recreation, parties, picnics, clubs, and community centers. Lecture and laboratory.
- PE 253. **Introduction to Dance Education.** 3 hours. 3 ①  
Modern developments of dance in relation to general education; aims and objectives; history of dance in education; survey of modern practices; opportunities in field.
- Ed 263. **Camp Counseling.** 3 hours. 3 ①  
Counselor training, responsibility in camp, camper problems, camp relationships. Three-day practical camping field trip.
- PE 294. **Professional Activities.** 2 hours each term, three terms. 2 ②  
Methods, techniques, and basic skills in activities commonly found in physical education programs. *Fall:* body mechanics, track and field (men); archery, bowling, golf (women). *Winter:* boxing, wrestling (men); modern dance, folk, square, and social dance (women). *Spring:* individual and dual sports (men); aquatics, advanced modern dance (women).

#### Upper Division Courses

- Bac 321. **Sanitation.** 3 hours. 1 ② 1 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 bacteriology or equivalent.
- PE 321. **Games and Relays for the Elementary School.** 1 hour. 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  
Procedures, processes, and techniques in development ability of public school student to understand and guide own health and to contribute to health of community. Prerequisite: SEd 123.
- PE 322. Rhythms for the Elementary School.** 1 hour. 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.
- PE 323. Posture and Conditioning for the Elementary School.** 1 hour. 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  
Technique of teaching physical activities; problems of directed teaching. Prerequisite: PE 194, 294.
- PE 340. Organization and Administration of Intramural Sports.** 2 hours. 2 ①  
Intramural 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  
Observation and participation in planning, operation, and administration of variety of recreation, youth-organization, and therapy programs under direction and supervision of trained leaders. Prerequisite: Ed 121 or PE 132.
- PE 358. First Aid.** 3 hours. 2 ① 1 ②  
Emergency treatment for various types of injuries; control of bleeding, artificial respiration, transportation, splinting, and bandaging. Students are required to teach first-aid projects. Course leads to Red Cross Standard, Advanced, and Instructor's Certificates. Open as a service course to all departments.
- PE 359. Conditioning and Care of Injuries (Men).** 2 hours. 1 ① 1 ②  
Prevention and treatment of 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  
Background and knowledge of all phases of safety; home, fire, industrial, water, rural, school, and traffic safety; elementary, secondary, and adult levels. Prerequisite: Ed 310, 312.
- PE 360. Sports Officiating (Men).** 3 hours. 3 ①  
Rules, mechanics, and procedures of officiating in competitive sports; enforcement of rules, use of signals; personal appearance and conduct, public relations, duties of officials; suggestions for coaches and administrators, code of ethics, and qualifications for national official's rating.
- PE 362. Sports Officiating (Women).** 1 hour each term, three terms. 1 ①  
Rules, mechanics, and procedures of officiating in competitive sports; enforcement of rules, use of signals; personal appearance and conduct, public relations, duties of officials; suggestions for coaches and administrators, code of ethics, and qualifications for national official's rating. Prerequisite: PE 194.
- Ed 364. Laboratory Practice in Camping Skills.** 3 hours. 3 ①  
Practical experience and development of skills in a variety of camping activities. Prerequisite: Ed 263.
- Ed 365. Camp Management.** 3 hours. 3 ①  
Directed toward preparation for camp administration. Prerequisite: Ed 263, 364, or camp counseling experience.

- PE 365. **Football Coaching (Men).** 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 American intercollegiate 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 (Men).** 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 (Men).** 2 hours. 2 ① 1 ②  
Technique of 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 (Men).** 2 hours. 2 ① 1 ②  
How to train for track and field 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 394. **Professional Activities.** 2 hours each term, three terms. 2 ②  
Methods, techniques, and basic skills in activities in physical education programs. *Fall:* rhythms (men); recreation games, tumbling and apparatus (women). *Winter:* fundamentals of body movement (women). *Spring:* games, stunts, and relays; marching and drill (women). Prerequisite: PE 294.
- PE 405. **Reading and Conference.** (g) Terms and hours to be arranged.<sup>1</sup>
- PE 407. **Seminar.** (g) Terms and hours to be arranged.<sup>1</sup>  
EQUIPMENT AND SUPPLIES.  
FACILITIES.  
CURRICULUM.  
PROBLEMS IN INTRAMURAL SPORTS.  
SUPERVISION.  
CURRENT STUDIES IN ATHLETICS.  
RESEARCH SURVEY.
- PE 420. **Physical Education in the Elementary School.** 3 hours. 3 ①  
Purposes in elementary school physical education; planning progressive programs for grades 1-8; methods of obtaining objectives; evaluation.
- Bac 424, 425, 426. **Community Health Problems.** (g) 3 hours each term. 2 ① 2 ②  
Application of the principles of hygiene to sanitary, statistical, governmental, epidemiological, sociological problems. Prerequisite: one year of upper division biological science.
- Ed 423. **Organization and Administration of Recreation.** (g) 3 hours. 3 ①  
Organizing, administering, and conducting recreation programs; study of problems in recreation. Prerequisite: Ed 347, 348, 349.
- Ed 425. **Youth Agencies.** (G) 3 hours. 3 ①  
Survey of youth-serving organizations; organization and leadership. Prerequisite: senior or graduate standing.
- Ed 426. **Community Recreation.** (G) 3 hours. 3 ①  
Developing philosophy of recreation, trends; organization and administration of recreation program in large, small, and rural communities. Prerequisite: senior standing.
- SEd 431, 432, 433. **School Health Problems.** (G) 3 hours each term. 3 ①  
Maintenance of health of school children; communicable diseases; school sanitation; planning of school buildings; health of school child; hygiene of instruction. Prerequisite: one year of upper division biological science.
- 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 of health education; organization and administration; health education curriculum; coordination of school health activities with other health resources. Prerequisite: one year of upper division biological science and SED 321 and 322 or equivalent.
- PE 442. **School Programs and Organization.** 5 hours. 5 ①  
Aims and objectives; selecting activities; typical programs and variations; athletics; standards; State and local requirements; administrative organization; policies and procedures; history and philosophy. Prerequisite: Ed 408.
- PE 443. **Evaluation of Physical Education.** 3 hours. 3 ①  
Techniques for evaluating knowledge, skill, attitudes, appreciations, and organic vigor through physical education instruction. Prerequisite: PE 335.
- PE 444. **Adaptive and Corrective Physical Education.** 3 hours. 3 ①  
Reconstructive health and physical education, including scoliosis, kyphosis, lordosis; methods of posture screen, orthopedic conditioning affecting posture, preventive measures, evaluation of visual aid materials in posture. Prerequisite: Z 323.
- PE 446. **Tests and Measurements in Physical Education.** (g) 3 hours. 3 ①  
Survey of field: special study of typical tests, methods of scoring, principles of test construction. Prerequisite: PE 442.
- PE 447. **Principles of Physical Education.** (g) 3 hours. 3 ①  
General philosophy and principles of physical education and their relation to general education. Prerequisite: PE 442.
- PE 448. **Administration of Physical Education.** (g) 3 hours. 3 ①  
Administrative problems; organization of departments and of instructional and recreational programs; supervision of both teaching and 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.
- Bac 453. **Epidemiology.** 3 hours spring. 1 ② 1 ①  
Causes and behavior of communicable diseases in general population; factors influencing occurrences of epidemics; basic principles underlying control. Prerequisite: Bac 205.
- PE 480. **Driver Education and Training.** (G) 3 hours. 2 ① 1 ②  
Preparation of teachers for driver-training classes in high schools; behind-the-wheel instruction in dual-control training cars sponsored by American Automobile Association and the Department of Motor Vehicles. Limited number of drivers-learners (non-drivers) will be admitted with whom driver-teachers will work. Prerequisite: Ed 310, 312.

#### Graduate Service Courses

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

- SEd 501. **Research.** Terms and hours to be arranged.
- SEd 503. **Thesis.** Terms and hours to be arranged.
- SEd 505. **Reading and Conference.** Terms and hours to be arranged.
- SEd 507. **Seminar.** Terms and hours to be arranged.
- \*Ed 523. **School Activities.** 3 hours. 3 ①

\* For course description see SCHOOL OF EDUCATION.

<sup>1</sup> Credit for PE 405 plus 407 must not exceed 9 term hours.

# Graduate School

HENRY P. HANSEN, Ph.D., Dean of the Graduate School.

## Graduate Council

H. P. HANSEN (chairman), RALPH COLBY, W. T. COONEY, J. R. DILWORTH, MARGARET FINCKE, E. C. GILBERT, J. G. KNUDSEN, R. S. MCCUTCHEON, J. W. SHERBURNE, E. A. YUNKER, F. R. ZERAN.

## Graduate Committees

Science: E. C. GILBERT (chairman), W. B. BOLLEN, E. J. DORNFELD, J. G. JENSEN, A. T. LONSETH, P. O. RITCHER, W. D. WILKINSON, S. E. WILLIAMSON, R. A. YOUNG, E. A. YUNKER.

Agriculture: W. T. COONEY (chairman), R. BOGART, E. N. CASTLE, J. R. COWAN.

Education: F. R. ZERAN (chairman), R. B. D. BARON, G. B. COX, MAY DUBOIS, H. A. TEN PAS, S. E. WILLIAMSON.

Engineering: G. W. GLEESON (chairman), G. B. COX, G. W. HOLCOMB, L. SLEGEL, L. N. STONE, J. S. WALTON.

Forestry: J. R. DILWORTH (chairman), G. H. BARNES, W. A. DAVIES, W. I. WEST.

Home Economics: MARGARET FINCKE (chairman), MAY DUBOIS, BETTY HAWTHORNE, HELEN MULHERN, FLORENCE PETZEL, KATHERINE READ, CLARA A. STORVICK.

Pharmacy: R. S. MCCUTCHEON (chairman), H. C. FORSLUND, L. A. SCIUCHETTI.

General Studies: E. A. YUNKER (chairman), R. F. FUQUAY, H. H. PLAMBECK, W. D. WILKINSON.

Graduate Minors in Nonmajor Fields: RALPH COLBY (chairman), G. A. BAKKUM, J. L. LEMASTER, M. N. NELSON, J. A. PFANNER, K. R. SWYGARD.

## Graduate Faculty

*As of January 1960*

### Departments Offering Majors for Master's and Doctoral Degrees

Agricultural Economics: Professors WOOD (head), BLANCH, CASTLE, DAVIS, HOLLANDS, KORZAN, MUMFORD; Associate Professors BECKER, BROWN, CHRISTENSEN, PLATH, SITTON; Assistant Professor LANGMO.

Bacteriology and Hygiene: Professors ELLIKER (chairman), C. L. ANDERSON, BOLLEN, GILMOUR, LANGTON, PILCHER; Associate Professor A. W. ANDERSON; Assistant Professor PARKS.

Botany: Professors YOUNG (chairman), DIETZ (emeritus), McWHORTER, MILBRATH, ROTH, SMITH, VAUGHAN; Associate Professors BELKENGREN, CHILCOTE, HARDISON, HORNER, JENSEN, JONES, PHINNEY; Assistant Professors BRANDT, CORDEN, DEEP, LEACH.

Chemical Engineering: Professors WALTON (head), GLEESON, KNUDSEN; Associate Professor WICKS; Assistant Professors MEREDITH, MOEN.

Chemistry: Professors CHRISTENSEN (chairman), BUTTS, CALDWELL, CHELDELIN, DECIUS, GILBERT, HAAG, KING, KURTH, LOGAN, MEHLIG (emeritus), PEASE, REMMERT, RICHARDSON, SCOTT, SLABAUGH, WANG, WESWIG, WILLIAMS; Associate Professors BUBL, FANG, FREED, FREUND, HEDBERG, MARVELL, NEWBURGH, NORRIS, TERRIERE; Assistant Professors HEISLER, LOOMIS, PARSONS, REESE.

Civil Engineering: Professors HOLCOMB (head), COOPEY, McCLELLAN, MERRYFIELD, PAN, WANLESS; Associate Professors BEHLKE, BURGESS, KOPFOID, SHOEMAKER; Assistant Professors BELL, BEECROFT, NORTHCRAFT\*.

Dairy and Animal Husbandry: Professors MILLER (head), BOGART, HAAG, JONES, KRUEGER, LANDERS, MCKENZIE, POULTON, WESWIG; Associate Professors FOX, HEDRICK, OLDFIELD, OLIVER, WOLBERG; Assistant Professors CHURCH, ENGLAND, WU; Instructor DRISCOLL\*.

Education: Professors ZERAN (head), CLINTON, GOODE, MUNFORD, REICHAFT, REID, TEN PAS, WILLIAMSON; Associate Professors BARON, GILL, HALL, MARKSHEFFEL, MILLIKEN, PARKS; Assistant Professors CANNON, FOX, LEELEND, REED, REES, SABAROFF, SEVERIDE\*.

Electrical Engineering: Professors STONE (head) ALBERT, COCKERLINE, FEIKERT, MAGNUSON; Associate Professors ENGLE, MICHAEL, OORTHUYNS, WEBER; Assistant Professors JENSEN, STONE.

- Entomology: Professors RITCHER (chairman), CHAMBERLIN (emeritus), MARTIN; Associate Professors CROWELL, ROSENSTIEL, RUDINSKY, STEPHEN, SWENSON, TERRIERE; Assistant Professors BROOKES, DICKASON, GOULDING, KRANTZ; Instructors: HASBROUCK, LATTIN.
- Family Life and Home Administration: Professors READ (head), KIRKENDALL; Associate Professors VAN HORN, WIGGENHORN; Assistant Professors AIKIN, PLONK, SCHALOCK.
- Farm Crops: Professors COWAN (head), FOOTE, FORE, HILL, POULTON; Associate Professors FURTICK, HEDRICK, MCGUIRE; Assistant Professors CHING, METZGER; Instructor DRISCOLL\*.
- Fish and Game Management: Professors DIMICK (head), DOUDOROFF, EINARSEN; Associate Professors BOND, KATZ, KUHN, LONG; Assistant Professor WARREN.
- Food and Dairy Technology: Professors SCHULTZ (head), LITWILLER, RICHARDSON; Associate Professors CAIN, HARVEY, ONSDORFF, SAMUELS, SINNHUBER, STEIN, WILDER, WORTHINGTON, YANG; Assistant Professors DAY, DIETZ.
- Foods and Nutrition: Professors FINCKE (head), MACKEY, STORVICK; Associate Professors CHARLEY, HAWTHORNE, MCLEAN; Assistant Professor WARE; Instructor HARRIS\*.
- Forest Management: Professors DILWORTH (head), BARNES, JEFFERS, MCCULLOCH, ROBINSON; Associate Professors FERRELL, KENISTON, NETTLETON, WHEELER, YODER; Assistant Professors BELL, JAENICKE\*, KRYGIER\*, RANDALL, SUTHERLAND.
- General Science: Professors HANSEN (chairman), GILFILLAN, WILLIAMSON; Associate Professor BEER; Assistant Professors ANTON\*, HUMPHREY.
- Geology: Professors ALLISON (chairman), HANSEN, WILKINSON; Associate Professor TAUBENBECK; Assistant Professors BOSTWICK\*, CUMMINGS, KOCH; Instructors COCHRAN, SNOOK\*.
- Horticulture: Professors APPLE (head), FRAZIER, HANSEN, HARTMAN, ROBERTS; Associate Professors BLANEY, COMPTON, ZIELINSKI; Assistant Professors BAGGETT, MACK.
- Mathematics: Professors LONSETH (chairman), ARNOLD, GASKELL, GOEHN, HOSTETTER, OBERHETTINGER, POOLE, WILLIAMS; Associate Professors KIRKHAM, REIFENBERG, SAUNDERS, STONE; Assistant Professors MCLEOD, STALLEY.
- Mechanical Engineering: Professors SLEGEL (head), HEATH, HUGHES, PAASCHE, PAUL, POPOVICH; Associate Professors LARSON, OLLEMAN, SMITH, THORNBURGH; Assistant Professors BOUBEL, CROENI\*, DALY, GELLER.
- Pharmacy, Pharmaceutical Chemistry, Pharmacology, and Pharmacognosy: Professors WILSON (dean), FORSLUND, MCCUTCHEON, SCIUCCHETTI; Associate Professor COOPER; Assistant Professors SCHULTZ, STUART.
- Physics: Professors YUNKER (chairman), BRADY, DEMPSTER, VARNER; Associate Professors DECKER, GARMAN, NICODEMUS, SCHECTER, VINYARD; Assistant Professors CHURCH\*, TRIGG.
- Poultry Husbandry: Professors PARKER (head), BERNIER, HARPER; Associate Professor ARSCOTT.
- Soils: Professors CHENEY (head), YOUNGBERG; Associate Professors DAWSON, EVANS, HARWARD, JACKSON, KNOX, YOUNG; Assistant Professor ALBAN.
- Zoology: Professors DORNFIELD (chairman), ALLMAN, GORDON, HILLEMANN, KRUEGER, PRATT; Associate Professors PRITCHARD, STORM; Assistant Professors HISAW, MOHLER, OWCZARZAK.

### Departments Offering Majors for Master's Degrees Only

- Agricultural Education: Professor TEN PAS (head); Assistant Professor DAVIS.
- Agricultural Engineering: Professors RODGERS (head), CROPSEY, LUNDE, SINNARD; Associate Professors KIRK, WOLFE\*; Assistant Professors BONNICKSEN\*, BOOSTER\*, CHRISTENSEN\*.
- Business Education: Professors YERIAN (head), LARSE, WINGER; Assistant Professor BARBER\*.
- Clothing, Textiles, and Related Arts: Professors PETZEL (head), PATTERSON; Associate Professors DIEDESCH, EDABURN, INGALLS, LEDBETTER, MOSER; Assistant Professors GRANT, WASSON.
- Forest Engineering: Professor DAVIES (head), Associate Professors O'LEARY, WILSON.
- Forest Products: Professor WEST (head), Associate Professor MCKIMMY; Assistant Professor VAN VLIET.
- Home Economics Education: Professor DuBois (head); Associate Professor MCQUESTEN.
- Industrial Education, Industrial Engineering, and Industrial Arts: Professors COX (head), ENGESSER, SHEELY; Associate Professors AINSWORTH, FRAZIER\*, ROBLEY, WILLIAMSON; Assistant Professors CANNON, JOHNSON, SMITH\*, WILSON\*; Instructor MOE\*.
- Institution Management: Associate Professor MULHERN (chairman); Assistant Professor CLEVELAND\*.
- Natural Resources: Professors JENSEN (chairman), HIGHSMITH; Associate Professors HEINTZELMAN, MYATT; Assistant Professor RUDD.

\* Member of graduate faculty on a limited basis.

Oceanography: Professor BURT; Associate Professor FROLANDER.

Science Education: Professors WILLIAMSON (chairman), ANDERSON; Associate Professor FOSTER; Assistant Professor FOX.

Statistics: Professors LI (chairman), CALVIN; Associate Professors LINK, PETERSEN.

Veterinary Medicine: Professors DICKINSON (head), MUTH, SHAW, VAWTER; Associate Professor BONE; Assistant Professor KNAPP.

### Departments Offering Courses Applicable Toward Graduate Minors Only

Business Administration: Professors LEMASTER (chairman), CAMPBELL, CRAIG, MASER, NEWTON, PFANNER, SEATON; Associate Professors EASTON, GODDARD, MENGLER, STRICKLER; Assistant Professor ALLAN\*.

Economics: Professors FRIDAY (chairman), NELSON; Associate Professor DOWNS; Assistant Professors DARCY, SMITH; Instructors ORZECI\*, PATTERSON.

English: Professor NELSON (head).

Extension Methods: Professors MACK, SMITH.

History: Professors ELLISON (head), CARLIN, SMITH; Assistant Professor SHAW.

Physical Education: Professors LANGTON (head), ALLMAN, ANDERSON, BERGSTROM, COLEMAN, SEEN; Associate Professors GILL, MILLIKEN, WEIR\*.

Political Science: Professors WALTER (chairman), SWYGARD; Associate Professors FUQUAY, MADDOX; Assistant Professor CARNEY.

Psychology: Professor CROOKS (chairman); Associate Professors MILLS, ROHDE; Assistant Professor SIMPSON; Instructor VAN LOAN.

Sociology: Professors PLAMBECK (chairman), BAKKUM; Associate Professor PARKS; Assistant Professor CANTRELL.

Speech: Professor WELLS (chairman); Associate Professor HARRIS; Assistant Professor HILDEBRANDT.

## General Statement

**A**LL STUDY beyond the bachelor's degree at Oregon State College is conducted through the Graduate School. The formulation of departmental graduate programs and the working out and direction of the programs of individual students are responsibilities of the departments, under the general rules or requirements of the Graduate School.

The Graduate School also administers the institutional program for the encouragement of research by members of the faculty through the provision of necessary facilities and through grants-in-aid.

**Organization and Administration.** The Graduate Faculty consists of the President of the College, the academic deans, the chairmen of the several departments in which advanced degrees are offered, and other members of the faculty who have been elected to the Graduate Faculty. Formulation and administration of graduate school policies are carried out by the Graduate Council, which is composed of the chairmen of the several School Graduate Committees. Members of the Graduate Faculty are represented through their respective School Graduate Committees, which are made up of representatives from each of the several departments in the school. Members of the Graduate Faculty offer graduate courses, conduct seminars, serve on graduate committees, advise with students on their theses, and serve on preliminary and final examination committees. The Graduate Council meets on the first and third Thursdays of each month. The Dean of the Graduate School is chairman of the Graduate Council and ex-officio member of all graduate committees.

\* Member of graduate faculty on a limited basis.

Oregon State College granted its first advanced degree (A.M.) in 1876. In 1897 definite residence requirements for the master's degree were announced. In 1910 graduate study was placed under a standing committee of the faculty. In 1933 all graduate work in the State System of Higher Education was placed in an interinstitutional Graduate Division; graduate work at Oregon State College 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 College in 1935. In October 1946, the State Board of Higher Education returned to the institutions direct responsibility for their programs of graduate study, and assigned graduate work at Oregon State College to the Graduate School.

The Doctor of Philosophy degree is offered in about 70 fields of study, distributed through 30 departments of instruction. The Doctor of Education degree is offered in General Education and Guidance. Various types of Master's degrees are offered in the same fields as the doctoral and in 18 additional fields in 13 departments of instruction. Minors only on graduate degrees are offered in 7 departments. The departments of instruction are in 8 schools: Science, Agriculture, Business and Technology, Education, Engineering and Industrial Arts, Forestry, Home Economics, and Pharmacy, and the School of Humanities and Social Sciences.

## Advanced Degrees

Degrees granted, and fields in which programs of study leading to respective degrees are offered, are listed below:

**Doctor of Philosophy:** SCIENCE—bacteriology and hygiene, botany, chemistry, entomology, general science, genetics, geology, mathematics, physics, zoology. AGRICULTURE—agricultural economics, dairy and animal husbandry, farm crops, fisheries, food and dairy technology, genetics, horticulture, poultry husbandry, soils, wildlife management. ENGINEERING—chemical engineering, civil engineering, electrical engineering, mechanical engineering. FORESTRY—forest management. HOME ECONOMICS—family life and home administration, foods and nutrition. PHARMACY—pharmacy, pharmaceutical chemistry, pharmacology, and pharmacognosy.

**Doctor of Education:** EDUCATION—education, guidance.

**Master of Arts (departmental):** SCIENCE—bacteriology and hygiene, botany, chemistry, entomology, general science, genetics, geology, mathematics, natural resources, oceanography, physics, statistics, zoology. EDUCATION—education, guidance, agricultural education, business education, health education, home economics education, industrial arts education, science education. ENGINEERING—agricultural engineering, chemical engineering, civil engineering, electrical engineering, industrial engineering, mechanical engineering, nuclear engineering. HOME ECONOMICS—clothing, textiles, and related arts, family life and home administration, foods and nutrition, institution management. PHARMACY—pharmacy, pharmaceutical chemistry, pharmacology, and pharmacognosy.

**Master of Agriculture:** AGRICULTURE.

**Master of Arts in General Studies:** see page 371.



**Master of Science:** SCIENCE—bacteriology and hygiene, botany, chemistry, entomology, general science, genetics, geology, mathematics, natural resources, oceanography, physics, statistics, zoology. AGRICULTURE—agricultural economics, agricultural engineering, dairy and animal husbandry, farm crops, fisheries, food and dairy technology, genetics, horticulture, poultry husbandry, range management, soils, veterinary medicine, wildlife management. EDUCATION—agricultural education, business education, education, guidance, health education, home economics education, industrial arts education, science education. ENGINEERING—agricultural engineering, chemical engineering, civil engineering, electrical engineering, industrial engineering, mechanical engineering, nuclear engineering. FORESTRY—forest engineering, forest management, forest products. HOME ECONOMICS—clothing, textiles, and related arts, family life and home administration, foods and nutrition, institution management. PHARMACY—pharmacy, pharmaceutical chemistry, pharmacology, and pharmacognosy.

**Master of Education:** education, guidance, agricultural education, business education, health education, home economics education, industrial arts education.

**Master of Forestry:** forest engineering, forest management, forest products.

**Master of Home Economics:** clothing, textiles, and related arts, family life and home administration, foods and nutrition, general home economics, home economics education, institution management. A major may be selected from among several fields within a department or may involve two or more related departments.

#### Engineer:

<i>Degree</i>	<i>Department</i>
Agricultural Engineer (A.E.).....	Agricultural Engineering
Chemical Engineer (Ch.E.).....	Chemical Engineering
Civil Engineer (C.E.).....	Civil Engineering
Electrical Engineer (E.E.).....	Electrical Engineering
Industrial Engineer (I.E.).....	Industrial Engineering
Mechanical Engineer (M.E.).....	Mechanical Engineering
Metallurgical Engineer (Met.E.).....	Mechanical Engineering
Mining Engineer (Min.E.).....	Chemical Engineering

## General Regulations

Four classes of graduate students are recognized: (1) those wishing to become candidates for a master's degree; (2) those wishing to become candidates for a doctor's degree; (3) those desiring an engineer degree; and (4) those wishing merely to take work beyond the requirements for the bachelor's degree. Students of the first three classes follow programs organized in conformity with the rules stated below.

Students with baccalaureate degrees who are not working toward an advanced degree may register for courses in the Graduate School as unclassified. They may take courses, graduate or undergraduate, for which they have sufficient background, but credit for these courses may not necessarily be applied toward a degree. If later an unclassified student decides to work toward a degree, however, such courses may be used provided they are pertinent to his graduate study program. Before he is accepted he must pass the qualifying examinations for his major and minor or minors.

**Admission to the Graduate School.** A student desiring to enter the Graduate School will send (or arrange to have sent) to the office of the

Registrar: (1) two admission blanks completely filled out; (2) a transcript of all his previous college or university work; (3) a letter indicating the special fields in which he is particularly interested or a statement that he does not wish to become a candidate for a degree; and (4) a small, fairly recent photograph. A grade-point average of 2.50 is required for entrance to the Graduate School. The Office of the Registrar will determine whether the general conditions for admission have been met. The major and minor departments indicated by the student will examine the material submitted to determine adequacy of scholastic background and to decide whether departmental facilities are adequate for the expressed aims of the student. The recommendations of the departments are reviewed by the graduate office. The student is then notified by the Registrar as to the action taken.

A graduate of a nonaccredited institution may be admitted provisionally as an unclassified student. He must take such standard diagnostic tests as may be required by the Graduate Council and additional qualifying examinations when demanded; he must complete at least one term of satisfactory work at Oregon State College, after which he may petition for full standing in the Graduate School and for graduate credit for courses that he has completed acceptably while registered as an unclassified student.

*Provisional Status.* In some cases a student may be admitted to the Graduate School with a GPA below the requirements, provided he has shown improvement during his junior and senior years and has a sufficiently high GPA in his major. Such students are admitted under Provisional status and their work is closely scrutinized during their first two quarters. If they fail to show promise as graduate students they are asked to terminate their work at OSC.

**Reserving Credits.** Graduate credit is not granted for undergraduate courses taken in excess of the requirements for a baccalaureate degree, but undergraduate students, taking graduate courses in excess of baccalaureate requirements may have such credits reserved for possible future use under the following conditions: (a) Only credits with A or B grades, earned within 45 hours of graduation, may be reserved for graduate credit. (b) Request for reservation must be made early in the term in which the student completes baccalaureate requirements. (c) A maximum of 18 hours may be reserved for graduate credit. (d) Before more than 15 term hours of credit are earned, the student must select a graduate major and minor, pass qualifying examinations, be assigned a major professor, and formulate an approved graduate program. (e) A minimum of two terms of residence in the Graduate School is required regardless of the number of credits reserved.

**Qualifying Examinations.** Graduate students working for advanced degrees are required to take an examination in their major and minor fields designed to determine their weaknesses, deficiencies, and overall preparation and background. This examination is in effect a guidance examination, the results of which are used in setting up the graduate study program. Poor showing in any of the areas tested may result in the student's taking undergraduate courses without graduate credit in order to give him the necessary background to go on with his graduate program. The examination may be oral or written, or both, and must be taken during the first term of his graduate enrollment, preferably during New Student Week, 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 OSC 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 College not more than three years before beginning doctoral work is not required to take the qualifying examinations unless his major has been changed. He is required, however, to take examinations in additional minors.

**Preparation Required.** Preparation for a graduate major must be an undergraduate major in the same subject, or a fair equivalent. Preparation for a graduate minor must be at least a one-year sequence of upper division work in addition to foundational courses in the subject. Graduate credit may not be earned in courses for which the student does not show proper preparation by previous record or special examination.

**Term Credit Load.** The normal load for a graduate student devoting all of his time to graduate study is 15 term hours (including course work and thesis). The maximum load is 16 term hours (17 term hours on petition). For assistants and fellows the maximum load is 12 term hours; for part-time assistants and fellows the maximum load is 15 term hours.

Each graduate program should include a substantial amount of work with at least three faculty members offering graduate instruction.

**Grade Requirement.** A 3.00 (B) grade-point average is required in both major and minor(s). Grades below C are not acceptable.

**Graduate Courses.** All courses numbered in the 500s carry graduate credit, as do those in the 400s which have been approved by the Graduate Council. Approved courses in the 400s are designated in the catalog by (G) or (g) following the course title. Courses designated (G) may form a part of either a major or minor; courses designated (g) may be taken toward a minor only. Blanket numbers 501, 503, 505, and 507 may be used repeatedly. Number 503 covers the thesis, both the research and the writing. Although thesis credit may be registered each term, the thesis grade is not given until the dissertation is presented at the final oral examination. 501 is for research which is not part of the thesis, and data obtained from such research should not be incorporated in the thesis. Reading and Conference 505 is used for special work not given under a formal course number. It may include specified reading, laboratory work, field work, or compilation of information essential in the student's program. The work done under this number may be reported either in writing or orally to the instructor concerned. Seminar 507 is used both for departmental seminars and for special work not given in a formal course where several students are concerned.

**Petitions.** A student who wishes to deviate from the normal graduate school regulations and procedures may present his problem in a letter addressed to the Graduate Council signed by himself and his major professor. The Graduate Council will consider the petition at the meeting following receipt of the petition. 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 Registrar's Office during

the Winter Term or early in the Spring Term preceding Commencement. Students in residence during the Spring Term are required to attend Commencement, while those wishing to be excused must petition.

**Graduate Fees.** Graduate students registered for 7 term hours of work or more pay tuition and fees of \$90 a term. Graduate students do not pay the nonresident fee. Students holding graduate or research assistantships or fellowships pay fees totaling \$34 per term. Graduate students registering for 6 hours of work or less pay the regular part-time fee. Payment of the fee entitles the student to all services maintained by OSC for the benefit of students.

**Deposits.** Persons who enroll for academic credit (except staff members) must make a deposit of \$10 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 College holding rank above that of instructor cannot receive advanced degrees from Oregon State College. 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.

## Degree Programs

### Master of Arts and Master of Science

**Credit Requirement.** For the departmental Master of Arts or Master of Science degree, the student must complete a program of study totaling not less than 45 term hours in courses approved for graduate credit. Approximately two-thirds of the work (30 term hours) must be in the major and one-third (15 term hours) in the minor. No correspondence credits may be included. 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.

**Residence Requirements.** The residence requirement for the M.A. and M.S. degrees is one academic year or fair equivalent. A maximum of 15 term hours earned in graduate courses in the General Extension Division of the Oregon State System of Higher Education or at the University of Oregon may be counted as credit earned in residence toward the departmental master's degree. If adequate course offerings are available, all the work toward the Master of Arts (General Studies) degree may be earned at the Portland Center.

**Transferred Credit.** A maximum of 15 term hours of graduate work done at another accredited institution, or in the General Extension Division of the Oregon State System of Higher Education, may be transferred, provided that: (1) the work fits into a logical program for the degree; (2) the transfer is approved by the department and by the Graduate Council; (3) grades of A or B have been earned. Credit granted for work done at another institution is tentative until validated by work in residence.

**Language Requirements.** For the Master of Arts degree, the student must show by examination or by adequate undergraduate courses (not less than two years), a reading knowledge of one foreign language, preferably French or German. By petition to the Graduate Council, *before* any language examination is taken, a student may be permitted to substitute another language, if it is equally relevant to his program of graduate studies. A candidate for a master's degree who passes the regular reading-knowledge examination need not repeat such examination if he proceeds toward his doctorate within a reasonable time. For a Master of Science degree there is no foreign-language requirement, unless a language is needed in the individual student's program.

**Graduate Study Program.** As soon as feasible a study program for the master's degree should be filed in the Graduate Office. The program is worked out under the guidance of the major and minor professors, entered on the card for that purpose and signed by the major and minor professors and the chairman of the school graduate committee before filing in the Graduate Office. The master's degree program should be filed during first term of student's residence.

**Time Limit.** All work counted toward the master's degree (including work for which credit is transferred from another institution, the thesis, and the final examination) should be completed within a period of seven years, but work taken between seven and ten years before the program is completed may be validated under the supervision of the department, usually by assigned readings or examination, or both.

**Thesis.** A copy of the thesis in final form must be presented to the Graduate Office for collating at least one week prior to the final 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 major professor, head of major department, chairman of school graduate committee, and dean of Graduate School. Information on prescribed style for theses may be obtained at the Graduate School office.

The credit allowed for the thesis, including the research and the preparation of the manuscript, varies from 6 to 12 term hours. A Master of Science degree with a major in General Science is offered either with or without thesis.

**Final Examination.** A final oral examination of not less than two hours is required of every candidate for the master's degree; when deemed desirable a written examination may also be required. (For the master's degree, the examining committee consists of at least four members of the faculty, two in the student's major field, one in the minor field, and one in a field not directly connected with the candidate's studies.)

The examining committee is nominated by the student's adviser, subject to the approval of the dean of the Graduate School, who is *ex officio* a member of all examining committees.

### **Other Master 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 agri-

cultural workers who do not desire the specialized training of the departmental degree and the thesis based on research. Forty-five hours are required with a minimum of 9 hours in each of at least three agricultural fields. An advisory committee is selected from these departments, which will select the major professor from the department of the student's major interest. The program must be approved by the committee within three weeks after registration under this program. No thesis is required, but a paper of 3 to 5 term hours must be submitted. The general requirements, except for those relating to the thesis and written report, are the same as for the degree of Master of Science.

**Master of Arts (General Studies).** In addition to the regular Master of Arts (departmental) degree, Oregon State College offers the degree of Master of Arts (General Studies) in the fields in which graduate work is allocated to the institution. This degree is granted for achievement in cultural scholarship, not for specialized work in one of the traditional fields of learning. The student pursues a program of study selected from the offerings of several departments. The requirements are flexible, but the work must be integrated and organic. The student's thesis provides the focus which determines the selection of courses.

The credit requirement for this degree is 45 term hours, including credit for thesis. The thesis shall be the equivalent, in point of performance, of 9 term hours of course work. A committee may, on recommendation of the student's adviser, waive the foreign-language requirement.

**Master of Education.** The Master of Education is a professional degree, and satisfactory teaching experience is required. For the degree a minimum of 45 term hours in graduate courses must be completed; additional hours may be required depending on the needs and the undergraduate preparation of the candidate. Liberal provision is made for the earning of credits through the General Extension Division, but a minimum of 12 term hours of academic work (not thesis or field studies) must be earned on the Corvallis campus; this can be done in one summer session.

The candidate must qualify under one of the following plans: (a) He submits a thesis, which meets all standards for a master's thesis, on some applied or professional aspect of education. For the thesis he receives 6 term hours of credit. (b) He majors in guidance and completes 30 hours in this area, including 15 hours in prescribed courses. The other 15 hours are set up with a choice between two or three subjects. A minor of 15 hours in psychology is required with at least 6 hours in the field of psychological tests and testing. (c) He completes 45 term hours with 24 term hours in specific courses. No thesis or field studies are required. The remaining 21 hours are elective under the direction of the adviser. In addition to the final oral examination, a written comprehensive examination is required in the candidate's major field.

Under Plan C are offered Industrial Arts, Business Education and Health Education, and Trade and Industrial Education majors which deviate from the requirements above in that they consist of a minimum of 30 hours in the respective fields with a minor of 15 hours in general education integrated around Research Procedures in Education and a sequence of not less than 9 hours in administration, guidance and counseling or curriculum construction. In each case a minimum of 45 hours is required.

**Master of Forestry.** The professional Master of Forestry degree is intended for potential administrators and technologists in public and private organizations where men of broad ability are demanded. A minimum of 45 hours is required. Two optional plans of study are as follows: (a) Thirty hours, in-

cluding 6 to 12 for a thesis, are to be within a chosen field in the School of Forestry. The remaining 15 hours may be a minor in forestry or in other related departments. The thesis may be based on findings of a research investigation, or on the application of technical knowledge for solution of a practical problem. (b) This is intended to provide a broader technical training. At least 21 hours are to be selected within a major field of forestry, and as many as 24 hours may be elected from other departments in the School of Forestry or from other related fields outside of forestry. The electives must contribute to a unified program which will meet the specific objective of the student. A thesis is not required under this plan, but at least two technical reports correlated with courses in the major fields or assigned or approved topics must be submitted.

**Master of Home Economics.** The Master of Home Economics is a professional degree which may be of interest primarily to high school teachers and extension personnel. A major is offered in general home economics and also in each of the departments of the School of Home Economics. A minor is required, to be selected from offerings in the School of Home Economics or from other schools and departments according to the student's needs.

A thesis is not required but at least one written report requiring reading, analysis, criticism, and organization of material shall be prepared and submitted to the Graduate Council and then filed with the department concerned.

The general requirements, except for those relating to the thesis and written report, are the same as for the Master of Science degree.

## Engineer

For the degrees of Agricultural Engineer, Chemical Engineer, Civil Engineer, Electrical Engineer, Industrial Engineer, Mechanical Engineer, Metallurgical Engineer, and Mining Engineer, the candidate must meet one of the following sets of requirements:

(1) Those who hold a baccalaureate or master's degree from Oregon State College must have at least five years of successful professional practice following graduation. Graduate study, by Extension or otherwise, may be substituted for professional practice to a maximum of three years, and at the approximate rate of 12 term hours of graduate credit in lieu of each year of professional practice. No thesis credit will be permitted in such substitution, but the candidate must present a satisfactory thesis upon a subject of his professional experience and compatible with the designation of the degree.

(2) Those who do not hold baccalaureate or master's degrees from Oregon State College are subject to the same requirements as (1) with the additional stipulation that at least 12 term hours of graduate work must be completed in residence upon the Oregon State campus.

In both cases, on or before January 1 of the academic year in which the degree is desired, the candidate submits to the chairman of the appropriate department a complete statement of his professional experience and graduate academic credit since receipt of his last degree. Accompanying the statement should be a thesis title and sufficient description or outline of thesis content to provide a basis of evaluation. After the statement has been approved by the chairman of the department, the School Graduate Committee, and the Graduate Council, the candidate is instructed to prepare and submit his thesis. The thesis must be of high order and is subject to the same scrutiny and regulations as other graduate theses. Upon acceptance of the thesis, the candidate is recom-

mended for the degree in the usual manner. The candidate registers for the degree with the Registrar, either in person or by mail, not later than March 1.

### **Doctor of Philosophy**

**General Requirements.** The degree of Doctor of Philosophy is granted primarily for attainments and proved ability. There is no rigid credit requirement. It is the policy of the institution not to accept as a candidate for the Ph.D. degree any student whose academic training, both undergraduate and graduate, has been exclusively at Oregon State College.

**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 College, or during the second term if he enters from another school with a master's degree. A minimum of 45 hours of course work must be completed after approval of the Ph.D. program. The doctoral program consists of a major and two minors. If the major department offers several distinct areas of study, one minor may be in that department, subject to approval of the graduate dean. The study program is formulated under the guidance of the student's doctoral committee, composed of two advisers from the major, one from each of the minors, and the graduate dean or his representative. The committee is approved by the graduate dean. Approximately sixty percent of the program is devoted to the major including the thesis and forty percent to the minors. After the program has been accepted by the committee it is submitted to the Graduate Council, and if approved it becomes the obligation of the student to complete the requirements as set up. In order to change the program in any way, approval of such changes must be obtained from the major and minor departments, the chairman of the School Graduate Committee, and the graduate dean. For college teaching minor see page 376.

**Residence.** For the doctor's degree, at least three years of full-time work beyond the bachelor's degree or two beyond the master's degree are required, of which at least one year (usually the last) must be spent in residence at OSC.

**Language Requirements.** For the Doctor of Philosophy degree, a reading knowledge of French and German must be demonstrated by a formal examination in each language. These examinations should be taken as early as possible after the beginning of graduate work, and must be passed before the preliminary examinations may be taken. By petition to the Graduate Council, *before* any language examination is taken, a student may be permitted to substitute another language if it is equally relevant to his program of graduate studies. If a foreign student is permitted to use his native language, he must take a written examination to demonstrate his ability in translating it into English.

**Preliminary Examinations.** The student working toward the doctor's degree must pass a group of comprehensive preliminary examinations (at least partly oral) in his major and minor subjects not less than two terms before he takes the final examination. Advancement to candidacy is contingent on passing these preliminary examinations.

**Thesis.** Every candidate for the degree of Doctor of Philosophy must submit a thesis embodying the results of research, and giving evidence of originality and ability in independent investigation. The thesis must be a real contribution to knowledge, based on the candidate's own investigation. It must show a mastery of the literature of the subject, and be written in creditable literary form.



It is expected that the preparation of an acceptable thesis will require at least the greater part of an academic year.

An abstract of the doctoral thesis of not more than 600 words will be published by University Microfilms in *Dissertation Abstracts*.

Regulations concerning the doctoral dissertation are same as those for the master's degree, as outlined on a previous page, except that final draft must be presented to Graduate Office at least two weeks prior to final examination.

**Microfilming Fee.** Candidates for the Doctor of Philosophy and Doctor of Education degrees pay a fee of \$20 for microfilming of the thesis in its entirety by University Microfilms. This includes publication of the doctoral abstract in *Dissertation Abstracts* by the same agency.

**Final Examination.** The final examination for the degree of Doctor of Philosophy may be written in part, but must include an oral examination of at least two hours' duration. The oral examination is open to all members of the faculty and to advanced graduate students. Date of the oral examination is publicly announced at least one week before it is held. The examining committee consists of the candidate's advisory committee, including at least one 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, or the candidate will be required to take another preliminary examination.

### Doctor of Education

For the degree of Doctor of Education, procedures and requirements in respect to residence, preliminary and final examinations, and thesis are similar to those for the Doctor of Philosophy degree. Successful teaching experience is essential. A minimum of two years of teaching at either the elementary or secondary level is a requirement. The credit requirement is flexible, but the total number of term hours of graduate credit including thesis must approximate 135.

Along with the educational major, one minor in 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.

### Genetics

A program for a major or minor in genetics is offered for the master's and doctor's degrees. Opportunity for specialization in pure and applied genetics is offered in the Schools of Science and Agriculture. The course work is drawn from the biological departments of these schools. The genetics program is designed to acquaint the student in all the principal phases of genetics, and at the same time permit him to emphasize his research interests in this field. All graduate study in genetics is coordinated through a special committee nominated

by the deans of Science and Agriculture and approved by the dean of the Graduate School. The seminar listed below helps unify all genetic studies.

#### Graduate Courses

Gen 503. **Thesis.** Terms and hours to be arranged.

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

## General Studies

The general-studies program at Oregon State College is supervised by a special committee of which Dr. E. A. Yunker is chairman. In addition to courses chosen from the offerings of the several schools and departments, the following courses are available for the general-studies student.

GSt 501. **Research.** Terms and hours to be arranged.

GSt 503. **Thesis.** Terms and hours to be arranged.

GSt 505. **Reading and Conference.** Terms and hours to be arranged.

## Studies in College and University Teaching and Curriculum

Most persons who qualify for master's and doctor's degrees engage in college and university teaching as part of their professional work. The Graduate School prepares students for college and university teaching as well as for research. It offers a group of courses dealing with the philosophy, functions, and structure of higher education and problems of teaching, curriculum development, and student-faculty relationships. In all these courses, students have opportunity to delve into topics of special interest.

Maturity, background, and sincerity of purpose are the principal requisites. There are no course prerequisites in professional education. The program is not planned to fulfill requirements for a teaching credential in any state, although it may be supplemented with additional work to serve this purpose. The coordinator for studies in College and University Teaching and Curriculum is Professor Delmer M. Goode, Curriculum Consultant.

**Graduate Minor in College Teaching.** A minor in college and university teaching (15-18 term hours for a master's degree, 21-24 term hours for a doctor's degree) may be taken in conjunction with a subject-matter major. The core program, all of which is required for the teaching minor for a master's degree, consists of the following courses:

Ed 556. **The College Student.** 3 hours.

Ed 557. **College and University Teaching.** 3 hours.

Ed 558. **American Higher Education.** 3 hours.

..... 507. **Seminar (Teaching Procedures).** 3 hours.

(Registration in major departments. By special arrangement, registration may be in CC 507. Ed 557 and either Ed 556 or Ed 558 are prerequisite.)

CC 506. **College Teaching Studies.** 3 hours.

For doctoral candidates, additional electives are chosen in appropriate areas to form an integrated program in college teaching.

**Studies in Teaching and Curriculum.** Studies or projects in curriculum development and improvement of teaching may be engaged in by individuals or faculty groups. Graduate students are encouraged to join these studies since the association of college teachers with students interested in curriculum and teaching is of mutual advantage.

Credit may be earned in the courses listed below. Whenever the nature of the work warrants, credit so earned may be applied toward a graduate major or minor in a department.

#### Graduate Courses

CC 505. **Reading and Conference.** Terms and hours to be arranged.

CC 506. **College Teaching Studies.** 3 hours any term.

Reading, conference, and preparation of written reports related to, but distinct from, a teaching assignment at college level. Ordinarily no credit is given for the teaching itself. Open to graduate students who have teaching assignments concurrent with the course. Special arrangements may be made for those who have already taught in college or university. Prerequisite: Ed 556, 557, 558.

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

CC 508. **Workshop.** Terms and hours to be arranged.

CC 509. **College Curriculum Studies.** Terms and hours to be arranged.

Joint study with staff assistance in any aspect of college curriculum, including problems of teaching, guidance, and coordination. Seminar or workshop procedures are used according to aims of group.

## Graduate Appointments and Fellowships

A varying number of graduate and research assistantships and fellowships are awarded annually to graduates of accredited universities and colleges who have superior records in their undergraduate work. All persons holding these appointments are expected to register in the Graduate School and to become candidates for advanced degrees. Assistants and fellows who render service to the institution through teaching duties or research pay fees amounting to \$34 per term, which admit them to all services maintained by the college for the benefit of the students. Assistants and fellows in this category may carry a maximum of 12 hours per term. Other types of fellows who render no service to the institution pay the full fee of \$90 and are permitted to carry a full graduate load of 16 hours.

**Graduate Assistantships.** A graduate 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 term hours of course work. A graduate assistant commonly completes the work for a master's degree in four terms. The stipend varies from \$1,400 to \$1,800.

**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 graduate assistant.

**Teaching and Research Fellowships.** A fellow is normally a person proceeding toward the doctorate, with at least one year of markedly superior work toward that degree completed. The teaching fellow gives instructional assistance in his department. The duties of a research fellow are similar to

the duties of a research assistant; a fellow is, however, expected to assume greater responsibility in connection with the research project to which he is assigned. Fellows are allowed to enroll for a maximum of 12 term hours of course work. The stipend varies from \$1,800 to \$2,000.

**Agricultural Experiment Station Graduate Research Assistantships and Fellowships.** 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. The stipend, based on training, ability, and experience, varies from \$1,800 to \$3,240 for 12 months.

**State Scholarships.** A limited number of scholarships covering tuition and laboratory and course fees are available to graduate students. All applicants, to be eligible, must be in need of financial assistance, and must show evidence of superior scholarship. Applications should be made to the Registrar of Oregon State College, on official blanks furnished by his office, and must be filed before April 1.

**Other Fellowships.** The following fellowships are open to Oregon State College graduate students:

- CROWN ZELLERBACH FOUNDATION FELLOWSHIP:** \$2,000 for a student in chemistry, with \$500 to department to cover research expenses.
- DOW CHEMICAL COMPANY FELLOWSHIP:** \$1,800 to \$2,500 provided by the Dow Chemical Company for graduate fellowships in chemical engineering; a senior may be selected.
- DU PONT POSTGRADUATE TEACHING ASSISTANTSHIP IN CHEMISTRY:** \$2,400 to a single student or \$3,000 to a married student, plus fees, provided by the E. I. du Pont de Nemours Company for a graduate student in chemistry.
- GREELEY FELLOWSHIP:** \$1,000 a year provided by the Industrial Forestry Association for a fellowship or lectureship in forestry in memory of the late Colonel W. B. Greeley.
- HYSLOP AGRICULTURAL RESEARCH FELLOWSHIP:** \$1,000 a year for research in farm crops in memory of Professor George R. Hyslop.
- JOHNSON RESEARCH FELLOWSHIP:** Income from a trust fund left by the late Robert Johnson, placed with First National Bank of Portland, to graduate student for study, research, and investigation in agricultural economics and allied fields. Current income about \$3,000 annually.
- MARY J. L. McDONALD FELLOWSHIPS IN FORESTRY:** Annual grants of \$700 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 student in mechanical engineering.
- SOUTH SANTIAM EDUCATIONAL AND RESEARCH PROJECT FELLOWSHIPS:** \$1,400 for a student in forest management provided by the Lewis W. and Maud Hill Foundation.
- STANDARD OIL COMPANY OF CALIFORNIA GRADUATE FELLOWSHIP:** \$1,500 plus fees provided by the Standard Oil Company of California, for a graduate student in mechanical engineering.
- STAUFFER FELLOWSHIP:** \$1,800 for the recipient plus laboratory fees of \$200 provided by the Stauffer Chemical Company in support of research in chemistry.
- THE TEXACO INC. FELLOWSHIP IN CHEMICAL ENGINEERING:** \$2,700 to \$3,000 provided by Texaco Inc. for a graduate research fellowship, established during the 1959-60 school year.
- 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.
- UNITED STATES PLYWOOD CORPORATION:** \$1,000 for a fellowship in forestry.
- WEYERHAEUSER FELLOWSHIPS IN FOREST MANAGEMENT:** Two \$2,000 fellowships provided by The Weyerhaeuser Timber Foundation, for graduate study and research in forest management.
- WILDLIFE FELLOWSHIPS:** Grants of \$1,500 per year plus quarters and travel expenses for two-year periods provided by Oregon Cooperative Wildlife Research Unit and other wildlife agencies for graduate students who show aptitude for careers in wildlife conservation and management.
- RESEARCH GRANTS:** Various departments of the School of Science and other research organizations on the campus, including the Engineering Experiment Station and Agricultural Experiment Station, annually receive grants from Federal and State agencies, foundations, and private companies for research projects. Many of these grants include stipends for graduate students. Application should be made through the department concerned.

THE SCIENCE RESEARCH INSTITUTE has available a number of fellowships and grants ranging in value from \$1,800 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, Oregon Agricultural Experiment Station, U. S. Department of Agriculture, American Heart Association, Oregon Heart Association, Nutrition Foundation, and Life Insurance Medical Research Fund.

## Graduate Work at the Portland Extension Center

If adequate course offerings are available for an integrated program in the fields in which the student wishes to work, he may complete all the requirements for the Master of Arts (General Studies) degree at Portland Extension Center. Of the 45 term hours of work required for the Master of Education degree, 33 hours may be earned in Portland. In a number of fields, one-third of the work for the Master of Arts (departmental) or the Master of Science degree may be earned in Portland. Graduate work beyond the master's degree is not offered at the Portland Center. Graduate degrees, earned at the Portland Center are awarded by Oregon State College or the University of Oregon according to major subject, in harmony with the allocation of curricula and degrees.

## 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 College is one of four northwestern universities cooperating with the University of Washington Center for Graduate Study at Hanford, which is located in Richland, Washington. Employees of the General Electric Company at the Hanford Atomic Products Operation, who are qualified, may earn graduate credits toward advanced degrees at Richland.

In addition to the departmental majors, a major in nuclear engineering will be offered. The minimum residence requirement at Corvallis is one term for a master's degree and two terms for a doctor's degree.

The studies pursued at Richland vary for different students and fields but are subject to approval in each case by the Graduate Council. A plan is followed whereby the course number 509 is used, preceded by the appropriate departmental designation, followed by the name "Richland Studies" with the title of the particular study placed in parentheses.

### Graduate Courses

Ch	509.	Richland Studies.	Terms and hours to be arranged.
ChE	509.	Richland Studies.	Terms and hours to be arranged.
EE	509.	Richland Studies.	Terms and hours to be arranged.
ME	509.	Richland Studies.	Terms and hours to be arranged.
Mth	509.	Richland Studies.	Terms and hours to be arranged.
Ph	509.	Richland Studies.	Terms and hours to be arranged.

# Research

**A**DVANCEMENT 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 College is encouraged and assisted by several institutional agencies, including the General Research Fund, the Science Research Institute, the Engineering Experiment Station, and the Agricultural Experiment Station, which encompasses research in forestry, home economics, and agriculture.

## General Research

General Research includes faculty research, especially of a fundamental nature, that does not fall into the organized and directed programs of other research agencies of Oregon State College. 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 the 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. The grants will supply some apparatus, 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 January 1 each year. Projects may be renewed for several years.

## Agricultural Experiment Station

FREDERICK EARL PRICE, B.S., Director of the Agricultural Experiment Station.  
WALTER F. McCULLOCH, Ed.D., Associate Director in Charge, Forest Research Division.  
GEORGE H. BARNES, Ph.D., Assistant Director, Forest Research Division.  
ROBERT W. HENDERSON, Ph.D., Assistant Director in Charge, Agricultural Research Division.  
ROBERT M. ALEXANDER, M. A., Assistant Director.  
RALPH A. SOLUM, Fiscal Officer.

The Oregon Agricultural Experiment Station was organized July 1, 1888, in accordance with the Hatch Act of 1887. It now includes a central station at Corvallis and twelve branch stations and one experimental area so located as to cover the varying agricultural conditions of Oregon. It investigates problems in agriculture, home economics, and forestry; its general objectives follow:

1. Conservation and efficient use of the State's natural resources including soil, water, fish, wildlife, forest, and ranges and their integrated management to provide the greatest public good.
2. Increasing efficiency of agricultural and forest production.
3. Improving the processing, distribution, and marketing of products of agriculture and forestry.
4. Testing and developing new crops and new uses for old crops as a means of reducing crop surpluses.

5. Collecting and analyzing basic information needed in development of comprehensive agricultural and forestry programs and policies.

6. Advancement of human well-being through research in the selection, preparation, and preservation of food, the determination of human nutrition requirements, and the role of food in maintaining optimal health and the selection, construction, and care of clothing and household fabrics.

**Central Station:** The Agricultural Research Division of the Station includes the following research departments: Agricultural Chemistry; Agricultural Economics; Agricultural Engineering; Agricultural Information; Bacteriology; Botany and Plant Pathology; Dairy and Animal Husbandry; Entomology; Farm Crops; Fish and Game Management; Food and Dairy Technology; Home Economics; Horticulture; Poultry Husbandry; Soils; Statistics; and Veterinary Medicine. In the Forest Research Division work is underway in various phases of forest production and management.

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 John Jacob Astor Branch Experiment Station* at Astoria has as its major problems of investigation: dairy and beef cattle production in the Coastal Area; the improvement of forage crops through variety testing; pasture management; soil fertility and management for Coast conditions; testing of small fruits and specialty horticultural crops.

*The Central Oregon Experimental Area* located at Redmond conducts research on general farming problems in Crook, Deschutes, and Jefferson Counties. Current emphasis is on problems related to production of potatoes, alsike and Ladino clover seeds, cereals, and hay. All research is conducted on privately owned land under cooperative agreements with the owners.

*The Eastern Oregon Branch Experiment Station* at Union has research projects with both farm flock sheep and commercial beef cattle production, conservation and improvement of timbered and open ranges in the higher rainfall areas in eastern Oregon, and soil fertility and crop varietal testing in northeastern Oregon. The Station has a section of valley floor land and a 2,000-acre tract of summer range.

*The Klamath Branch Experiment Station* consists of two experimental tracts, one located southeast of Klamath Falls on mineral soil and the other located south of Klamath Falls on muck soil. In addition to research in reclamation of problem soils in this irrigated district this experimental area is engaged in research on production problems with potatoes, cereals, and forage crops in the Klamath Basin.

*The Malheur Branch Experiment Station* research program near Ontario is aimed at finding the best methods of crop production and the crops and crop varieties best suited to the areas of the Vale-Owyhee irrigation project. Major emphasis is given to studies of production and utilization of forage crops for livestock. The U. S. Department of Agriculture cooperates actively with the State in certain phases of the program.

*The Mid-Columbia Branch Experiment Station*, with facilities at Hood River and The Dalles, deals with orchard pests, diseases, irrigation, soil management, plant nutrition, post-harvest investigations, and other problems relating to commercial fruit production in the important orchard section of Hood River and Wasco Counties.

*The North Willamette Branch Experiment Station* near Aurora in Clackamas County was established in 1958 for research on horticultural problems in Clackamas, Multnomah, Columbia, and Washington Counties. Problems of vegetable, small fruit, bulb, florist, and nursery crop production receive major emphasis.

*The Pendleton Branch Experiment Station* is situated in the heart of an important wheat and pea production area. In cooperation with the U. S. Department of Agriculture it has concentrated on the development of improved wheat varieties and crop practices, including crop rotation, weed eradication, and control of soil erosion. Recently an intensive project on erosion control has been initiated in cooperation with the U. S. Department of Agriculture.

*The Red Soils Branch Experiment Station* near Oregon City is centering attention on rebuilding depleted red hill soils, of which there are approximately 800,000 acres in the Willamette Valley. Utilization of grasses and legumes for seed production and forage has been emphasized in the station's soil-building program.

*The Sherman Branch Experiment Station* at Moro, operated cooperatively with the United States Department of Agriculture, is conducting investigations on the major problems of cereal production under eastern Oregon dryland conditions with special reference to the development of new and improved varieties, rates and dates of seeding, summer fallow, fertility, and soil conservation.

*The Southern Oregon Branch Station* at Medford is centering attention on problems of fruit and crop production for the southern Oregon area. Research is underway on nutrition and fertilizer responses, irrigation, weed control, disease and insect control for the important

field and horticultural crops of the area. Breeding and varietal testing of new pear and stone fruits selections and varieties are in progress.

*The Squaw Butte-Harney Branch Experiment Station* near Burns consists of 16,000 acres of sagebrush-bunchgrass and semiarid rangeland and 661 acres of native flood meadowland. Research is under way in range improvement and management, increasing yield and quality of native meadows for winter feed, and improving livestock production through better nutrition, breeding, and management. The station's combination of range and meadowland makes a typical southeastern Oregon livestock unit and provides feed resources for the station-owned herd for the entire year. The research program is conducted jointly with the United States Department of Agriculture.

*The Umatilla Branch Experiment Station* at Hermiston is studying production problems of crops under irrigation on the Umatilla Reclamation Project and similar lands of the Columbia River Basin.

## Engineering Experiment Station

### Administrative Officers

JOHN REESE RICHARDS, Ph.D., Chancellor, Oregon State System of Higher Education.

AUGUST LEROY STRAND, Ph.D., President, Oregon State College.

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

ARTHUR LEMUEL ALBERT, M.S., E.E., Communication Engineering.

MARTIN PORTMAN COOPEY, B.S., Highway Engineering.

WILLIAM FREDERIC ENGESSER, M.S., Industrial Engineering.

GRANT STEPHEN FELKERT, M.S., E.E., Radio Engineering.

CHARLES OSWALD HEATH, M.S., Engineering Materials.

GLENN WILLIS HOLCOMB, M.S., Structural Engineering.

ARTHUR DOUGLAS HUGHES, M.S., Heat, Power, and Air Conditioning.

JOHN GRANVILLE JENSEN, Ph.D., Industrial Resources.

JAMES GEORGE KNUDSEN, Ph.D., Chemical Engineering.

PHILIP COOPER MAGNUSSON, Ph.D., Electrical Engineering Analysis.

FRED MERRYFIELD, M.S., Sanitary Engineering.

ROBERT RAY MICHAEL, M.S., Electrical Materials.

OLAF GUSTAV PAASCHE, M.S., Metallurgical Engineering.

WILLIAM HOWARD PAUL, M.S., Automotive Engineering.

JEFFERSON BELTON RODGERS, A.E., Agricultural Engineering.

MILTON CONWELL SHEELY, B.S., Manufacturing Processes.

LOUIS SLEGEL, Ph.D., Mechanical Engineering.

LOUIS NELSON STONE, B.S., Servomechanisms and Controls.

JESSE SEBURN WALTON, B.S., Chemical and Metallurgical Engineering.

ROBERT ELLIOT WILSON, M.S., Aeronautical Engineering.

By act of the Board of Regents of Oregon State College on May 4, 1927, the Engineering Experiment Station was established at Corvallis to serve the State in a manner broadly outlined by the following policy:

- To serve the industries, utilities, professional engineers, public departments, and engineering teachers by making investigations of significance and interest to them.

- To stimulate and elevate engineering education by developing the research spirit in faculty and students.

- To publish and distribute through bulletins, circulars, and technical articles in periodicals the results of such studies, surveys, tests, investigations, and research as will be of greatest benefit to the people of Oregon, and particularly to the State's industries, utilities, and professional engineers.

The Engineering Experiment Station is an integral part of the School of Engineering. All staff members and laboratory facilities of the Engineering School are available for the investigative work of the station to the extent of



funds allocated or contributed for this purpose. Much of the work of the station has been made possible by the assistance of industries and state and national associations. Inquiries concerning cooperative projects are welcomed.

The dean of engineering is the director of the Engineering Experiment Station and guides the operation of the station to conform with state and institutional policies. The assistant dean of engineering acts as the administrator in charge, technical editor of publications, and as chairman of the station executive council composed of senior station staff representing the various departments of the School of Engineering. The active staff is composed of members of the instructional staff who may be interested in various specific research projects, or of research fellows who are pursuing graduate study and are assigned to part-time work in the station. Experts who are especially qualified by training and experience to advise on the investigations in certain fields have been appointed to the staff as special technical counselors. Among these are executives and engineers representing major industries of Oregon and the Northwest, prominent consulting engineers, and leading engineers of Federal agencies and State departments. Some technical assistants have been supported by manufacturers and industrial associations interested in working out specific problems.

## Science Research Institute

VERNON H. CHELDELIN, Ph.D., Director.

Professors: T. E. KING, Ph.D.; E. F. KURTH, Ph.D.; C. H. WANG, Ph.D.

Associate Professors: F. W. DECKER, Ph.D.; R. W. NEWBURGH<sup>1</sup>, Ph.D.

Assistant Professors: V. J. BROOKES, Ph.D.; W. D. LOOMIS, Ph.D.; C. E. REED, M.D. (Research Associate); E. J. TRIONE, Ph.D.

Research Associates (Instructors): A. C. LIETZE, Ph.D.; P. NICHOLLS, Ph.D.; C. A. RYAN, Ph.D.

Research Associates (Acting Instructors): ANNETTE S. BAICH, Ph.D.; L. F. HARRIS, B.S.; R. L. HOWARD, B.S.; W. G. JENSBY, B.S.; H. KERSHAW, B.S.; L. N. POTTER, B.A.

Research Fellows: R. R. ALLEN, M.S.; J. A. ANDERSON, M.S.; W. W. BAKER, B.S.; A. L. BIEBER, M.S.; L. L. BIEBER, M.S.; S. S. BYERRE, J.S.; G. L. CARLBERG, B.S.; K. HADLEY, B.S.; G. HOLMES, M.S.; D. E. JONES, M.S.; S. S. KERWAR, M.S.; C. P. LEE, B.S.; J. K. McDONALD, M.S.; R. B. MELVIN, M.S.; R. L. SEEFELD, M.S.; E. VAISEY, M.S.

Research Assistants: R. G. COFFEY, B.S.; A. MALLEY, B.S.; E. A. POSSEHL, B.A.; J. C. RAMSEY, B.S.; G. G. STILL, B.S.; D. F. WILSON, B.S.

The growth of scientific research on this campus during the past twenty-five 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 College in obtaining support for research projects; second, to aid in expediting their research programs and to promote interdepartmental research; and third, to pursue an active research program fitted to the interest and competence of the Institute staff.

The Institute is housed in the new Physics-Chemistry Building. Current studies by the Institute staff include fundamental projects in biochemistry, organic chemistry, microbiology, entomology, plant pathology, forest products, and atmospheric science, which derive their support from Oregon State College, 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 and Research Fellows employed by the Institute also receive appointments in the departments in which their advanced degrees are sought.

<sup>1</sup> On leave of absence 1960-61.

## Oregon Forest Research Center

R. M. Kallander, B.S., M.F., Administrator (Professor).

The Oregon Forest Research Center, located on Philomath Road and the Mall, was established in 1957 to bring together the Oregon Forest Products Laboratory and the former Forest Lands Research Division of the State Forestry Department under the supervision of the Forest Protection and Conservation Committee. The aim of Forest Products Research is to obtain maximum employment and product value in utilizing the State's forest resources. The objective of Forest Lands Research is to provide the information necessary to maintain maximum productivity of our forest lands within the State. Research activities are financed by a Forest Products Harvest Tax.

### FOREST PRODUCTS RESEARCH

#### Staff

- LEIF DEDRICK ESPENAS, M.S., Director (Professor).  
B.S. (1938), New York College of Forestry, M.S. (1940), California. At Oregon State since 1947.
- DOUGLAS WILLIAM GLENNIE, Ph.D., Chief, Chemical Research (Associate Professor).  
B.A. (1949), M.A. (1951), University of British Columbia; Ph.D. (1955), Washington. At Oregon State since 1956.
- JAMES DODD SNODGRASS, M.W.T., Chief, Physical Research (Professor).  
B.S. (W.T.) (1943), M.W.T. (1951), Michigan. At Oregon State since 1946.
- HARVEY APT, M.S., Research Chemist (Assistant Professor).  
A.B. (1950), Southern California; M.S. (1952), Puget Sound. At Oregon State since 1957.
- GEORGE H. ATHERTON, B.S., In Charge, Milling and Engineering (Assistant Professor).  
B.S. (1950), Oregon State. At Oregon State since 1950.
- CHARLES HENRY BURROWS, JR., B.S. Wood Technologist (Instructor).  
B.S. (1954), Oregon State. At Oregon State since 1956.
- STANLEY EUGENE CORDER, B.S., Research Engineer (Assistant Professor).  
B.S. (1950), Oregon State. At Oregon State since 1951.
- RAYMOND ALAN CURRIER, M.S., In Charge, Manufactured Products (Assistant Professor).  
B.S. (1950), Massachusetts; M.S. (1952), New York State College of Forestry. At Oregon State since 1952.
- ROBERT DOUGLAS GRAHAM, M.S., In Charge, Wood Preservation (Associate Professor).  
B.S. (1941), Pennsylvania State; M.S. (1947), Oregon State. At Oregon State since 1947.
- CHARLES JAMES KOZLIK, M.F., In charge, Seasoning (Instructor).  
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- JAMES WENDELL JOHNSON, M.S., In Charge, Timber Mechanics (Assistant Professor).  
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- DONALD JAMES MILLER, M.F., Wood Technologist (Assistant Professor).  
B.S. (1951), Connecticut; M.F. (1954), Yale. At Oregon State since 1955.
- JOHN STANLEY MOTHERSHEAD, B.S., Research Chemist (Instructor).  
B.S. (1959), Oregon State. At Oregon State since 1959.
- JAMES LAFAYETTE OVERHOLSER, B.S., Editor (Associate Professor).  
B.S. (1950), Oregon State. At Oregon State since 1952.
- ROBERT MARTIN SAMUELS, B.S., In Charge, Pulp and Paper (Associate Professor).  
B.S., Ch.E. (1951), Washington. At Oregon State since 1955.

#### Cooperating Departments and Divisions

Agricultural Engineering Department	Engineering Experiment Station
Agricultural Experiment Station	Forest Engineering Department
Botany Department	Forest Management Department
Chemical Engineering Department	Forest Products Department
Chemistry Department	Mechanical Engineering Department

Oregon's program of forest products research, initially authorized by the 1941 State Legislature, gained impetus in 1947, with Legislative enactment of a Forest Products Harvest Tax to finance research. The year 1957 marked another step forward when permanent, enlarged quarters were provided in the new Forest Research Center. These improved facilities, together with the valued co-

operation of Oregon State College, other research agencies, and industry enable the staff to contribute even more to Oregon's economic growth.

The Forest Products Research program benefits from advice and counsel of an advisory committee composed of representatives of the following agencies: Douglas Fir Plywood Association, Oregon Pulp and Paper Industry, Pacific Northwest Forest and Range Experiment Station, School of Forestry, Southern Oregon Conservation and Tree Farm Association, West Coast Lumbermen's Association, Western Forest Industries Association, Western Pine Association, and Willamette Valley Lumbermen's Association. The Governor is chairman, State Forester, a member, and Director of Forest Products Research, secretary.

## FOREST LANDS RESEARCH

### Staff

- DALE NESTRUD BEVER, M.F., Director (Professor).  
B.S. (1942), M.F. (1954), Oregon State. At Oregon State since 1957.
- DONALD G. ALLEN, M.S., Research Entomologist (Assistant Professor).  
B.S. (1940), M.S. (1950), Wisconsin. At Oregon State since 1957.
- ALAN BEN BERG, M.S., Associate Director (Associate Professor).  
B.S. (1941), Oregon State; M.S. (1955), Washington. At Oregon State since 1957.
- KIM K. CHING, Ph.D., Forest Geneticist (Associate Professor).  
B.S. (1942), Central University, China; M.F. (1948), Ph.D. (1954), Michigan State. At Oregon State since 1957.
- MAX HALBER, B.S., Research Assistant (Instructor).  
B.S. (1953), North Carolina State. At Oregon State since 1957.
- RICHARD K. HERMANN, M.F., Forest Ecologist (Assistant Professor).  
B.S. (1951), University of Munich; M.F. (1956), Yale University. At Oregon State since 1959.
- EDWARD F. HOOVEN, B.S., Forest Mammalogist (Assistant Professor).  
B.S. (1948), Washington; M.S. (1958), Oregon State. At Oregon State since 1957.
- RUDOLPH KANGUR, M.F., Research Silviculturist (Assistant Professor).  
B.S. (1931), M.F. (1932), Estonia State University of Tartu. At Oregon State since 1958.
- FEDOR KUDRJVACEV, M.S., Research Assistant (Instructor).  
M.S. (1928), University of Prague. At Oregon State since 1958.
- DENIS PETER LAVENDER, B.S., Forest Physiologist (Assistant Professor).  
B.S. (1949), Washington; M.S. (1958), Oregon State. At Oregon State since 1957.
- WILLIAM PRESCOTT LOWRY, M.S., Research Meteorologist (Assistant Professor).  
A.B. (1950), Cincinnati; M.S. (1955), Wisconsin. At Oregon State since 1957.
- ERNEST WRIGHT, Ph.D., Research Pathologist (Associate Professor).  
B.S.A. (1923), Oregon State; M.S. (1928), California; Ph.D. (1941), Nebraska. At Oregon State since 1957.

### Cooperating Departments and Divisions

Agricultural Experiment Station	Entomology Department
Botany Department	Department of Farm Crops
Chemistry Department	Soils Department
School of Forestry	Fish and Game Management Department
Bacteriology Department	Cooperative Seed Testing Laboratory

The Forest Lands Research program was initiated in 1947 by the State Forestry Department after the passage of the Forest Products Harvest Tax Act. The program remained under the direction of the State Forester until September 1, 1957, when it was transferred to Corvallis. Close relationship to the College, expanded facilities, a well integrated staff, and the fine support of industry and public agencies enable the organization to be of great service to all forest land owners and to the public in general.

The Forest Lands Research program benefits from an advisory committee representing Western Forest Industries Association, Pacific Northwest Forest and Range Experiment Station, Willamette Valley Lumbermen's Association, Southern Oregon Conservation and Tree Farm Association, Western Pine Association, School of Forestry, Bureau of Land Management, and State Forestry Department.

# Extension

**T**HROUGH extension services the benefits of all the Oregon state institutions of higher education are brought to the people of the State in their own communities. All divisions of the Oregon State System of Higher Education seek through every means possible, so far as resources and facilities permit, to serve the entire State. All extension activities are administered through the General Extension Division and the Federal Cooperative Extension Service. The latter includes all extension activities carried on jointly with the Federal Government.

## General Extension Division

- JAMES W. SHERBURNE, Ph.D., Dean, General Extension Division.  
VIRON A. MOORE, Ed.D., Assistant Dean, General Extension Division; Director, Department of State-Wide Services.  
JAMES C. CAUGHLAN, Ph.D., Assistant Dean, General Extension Division; Director, Portland Extension Center and Portland Summer Session.  
DONALD R. LARSON, B.A., Assistant to the Dean, General Extension Division; Director, Information Services.  
CLARK P. SPURLOCK, D.Ed., Associate Director, Portland Extension Center and Portland Summer Session.  
JAMES M. MORRIS, Ed.D., Director, Department of Educational Radio and Television; Program Manager.  
W. CURTIS REID, Ph.D., Director, Department of Visual Instruction.  
HOWARD IMPECOVEN, Ed.D., Registrar, General Extension Division.  
W. T. LEMMAN, JR., B.S., Business Manager, General Extension Division.  
JEAN P. BLACK, Ph.D., Librarian, General Extension Division.

The General Extension Division is interinstitutional in character, the extension arm of all state-supported campuses within the State System of Higher Education. This state-wide form of extension is unusual among the various states. The full effectiveness of Oregon's General Extension Division can be seen as dependent on the resources of not only one institution, but on many. Financially, however, the Division is considerably self-sufficient, earning much of its own way through collection of authorized fees for the services it provides.

The Dean's office is at 1633 S.W. Park Avenue, Portland 1, Oregon.

**State-Wide Services.** These services consist of state-wide evening classes, correspondence study, conferences, workshops, and consultant service to business, industry, education, and other activities including the Institute of International Affairs. Any community in Oregon may become a meeting place for state-wide evening classes if a satisfactory facility is provided and sufficient enrollment is guaranteed to cover actual operating costs. Offices are maintained on campuses in Eugene, Corvallis, Monmouth, Ashland, and La Grande and in Salem.

**Educational Radio and Television.** Radio station KOAC and television station KOAC-TV are educational stations owned by the State of Oregon and operated by the State Department of Higher Education with General Extension Division in charge of program and other administration. KOAC-TV broadcasts on channel 7 with its transmitter located on Vineyard Hill near Corvallis. Programs originating in both Corvallis and Eugene reach the transmitter by microwave relay. Now a relatively low-power transmission which began as a campus television teaching experiment with present programming until 9 p.m. Monday through Friday, KOAC-TV will increase its power sometime in the

future. KOAC radio transmission on 550 kc is received throughout the State Monday through Saturday from 10 a.m. until 10 p.m. Oregon State College is the licensee and operator of the physical plant. Studios are located in Eugene, Corvallis, Salem, and Portland. The department also is responsible for development of the Tapes for Teaching library, which assists teachers in classrooms throughout the State.

**Portland Extension Center.** An evening class activity, Portland Extension Center, uses facilities of Portland State College for both undergraduate and graduate study and enrolls about 6,000 students annually. Courses taken for college credit originate at one or another of the state system campus institutions and instructors are in most instances members of a campus faculty. No degrees are granted by the Center.

**Portland Summer Session.** Under the same administration as the evening center, Portland Summer Session is a daytime program operating from June through August. Enrollments in recent sessions exceed 3,700 and statistics show it is the State's best-attended Summer Session. Both undergraduate and graduate courses are offered and special workshops for teachers and education administrators are provided.

**Department of Visual Instruction.** The Department of Visual Instruction provides 16 mm. motion picture films, glass and film slides, and microscopic slides suitable for use by schools, community groups, and other organizations. A catalog is published which lists materials available and procedures for ordering. Located on the campus of Oregon State College at Corvallis, the department is maintained jointly by General Extension Division and Federal Cooperative Extension Service.

## Federal Cooperative Extension Service

### Administration

FREDERICK EARL PRICE, B.S., Director.  
FRANK LLEWELLYN BALLARD, B.S., Associate Director.  
CHARLES WESLEY SMITH, B.S., Assistant Director.  
JEAN WILLARD SCHEEL, M.A., Assistant Director.  
MABEL CLAIR MACK, M.S., Assistant Director.  
JAMES RALPH BECK, B.S., Assistant Director.

### State Leaders and Agents

ESTHER ADELIA TASKERUD, M.A., Coordinator, Home Economics Extension Programs.  
BURTON SEYMOUR HUTTON, B.S., State 4-H Club Leader.  
RUTH ELIZABETH BRASHER, M.A., State Extension Agent (4-H Club).  
CAL GRAHAM MONROE, M.S., State Extension Agent (4-H Club).  
ALICE LOIS REDMAN, M.S., State Extension Agent (4-H Club).  
MARY EUNICE ABBOTT, M.A., State Extension Agent.  
EVELYN AMANDA FUNK, M.Ed., State Extension Agent.  
JOHN GORDON HOOD, M.S., State Extension Agent.  
GENE M. LEAR, M.P.A., State Extension Agent.  
WILLIAM GERALD NIBLER, B.S., State Extension Agent.  
\*JACKSON ROSS, B.S., State Extension Agent.  
MURLE SCALES, M.S., State Extension Agent.  
CLIFFORD LOVEJOY SMITH, Ph.D., State Extension Agent.

\* On sabbatical leave 1959-60.

Federal Cooperative Extension performs one of the three major functions of Oregon State College, which are: resident teaching, research, and extension teaching. It extends the available information of Oregon State College, 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 College, 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 is directed toward improvement of rural life. Its first objective is the rural home. Its program 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. Active cooperation with all other organized forces of betterment toward enrichment of the agricultural and home interests of Oregon characterizes the extension program. All counties of the State cooperate in the program, which is available in every community.

**Extension Projects.** In order to assure the maximum of efficiency, extension work is conducted on the basis of definitely planned projects. These require approval by the proper Oregon State College authority and the U. S. Secretary of Agriculture before Federal and State funds appropriated for the work may be expended. The several distinct lines of work now covered by written projects, from which citizens of the State are receiving benefit, include:

*General*—general administration and organization of the Extension Service; county agent work; home demonstration work; 4-H Club work; preparation, printing, and distribution of bulletins; information; radio; and visual instruction supported jointly with General Extension Division.

*Agriculture*—soils, irrigation and drainage; soil conservation; horticulture; animal husbandry; dairying; poultry husbandry; farm crops; agricultural economics, including marketing and the collection and dissemination of statistical and outlook information; agricultural engineering; wildlife; land use planning; entomology; farm forestry; seed certification; plant pathology; and farm management.

*Home Economics*—nutrition; home management; clothing and textiles; home furnishings; community social organization; consumer education; family life.

*4-H Club Work*—for boys and girls between 9 and 21 years of age; instruction in subject matter in agriculture and home economics; special attention to group skills, human relations, and good citizenship generally.

These projects are not assumed to cover all problems of importance within the State. It is the purpose to put into operation and to emphasize those lines of extension service that are fundamental to large and important interests of farm and home welfare, or to material rural development.

# Summary of Enrollment—1958-59

## ENROLLMENT BY CURRICULUM AND CLASS, REGULAR SESSION, 1958-59

Curriculum	Freshman year	Sophomore year	Junior year	Senior year	Graduate	Special	Sub-total	Total
<i>Liberal Arts and Sciences</i>								
Lower Division .....	593	312	-----	-----	-----	1	906	-----
School of Science								
General Science .....	68	88	79	84	74	-----	-----	-----
Bacteriology .....	4	6	3	11	19	-----	-----	-----
Botany .....	1	2	3	3	37	-----	-----	-----
Chemistry .....	45	16	20	31	95	-----	-----	-----
Entomology .....	-----	-----	2	4	20	-----	-----	-----
Geology .....	18	35	10	21	13	-----	-----	-----
Mathematics .....	25	20	8	38	34	-----	-----	-----
Medical Technicians .....	9	15	5	3	-----	-----	-----	-----
Natural Resources .....	4	10	7	23	11	-----	-----	-----
Nursing Education .....	42	29	2	1	-----	-----	-----	-----
Physics .....	53	21	13	23	24	-----	-----	-----
Pre-Dental .....	29	17	11	8	-----	-----	-----	-----
Pre-Medicine .....	19	12	8	11	-----	-----	-----	-----
Pre-Veterinary .....	9	8	1	1	1	-----	-----	-----
Science Education .....	13	15	8	32	2	-----	-----	-----
Zoology .....	7	6	4	3	33	-----	-----	-----
Total, School of Science ..	346	300	184	297	363	-----	1,490	-----
Total, Liberal Arts and Sciences (excluding duplicates) .....	939	612	184	297	363	1	-----	2,396
<i>Professional Curricula</i>								
School of Agriculture .....	185	221	97	258	169	1	931	-----
School of Business and Technology .....	316	361	212	357	-----	1	1,247	-----
School of Education .....	222	331	210	305	62	-----	1,130	-----
School of Engineering .....	352	351	324	479	75	-----	1,581	-----
School of Forestry .....	60	89	77	118	25	-----	369	-----
School of Home Economics ..	144	144	93	115	36	-----	532	-----
School of Pharmacy .....	45	55	47	91	4	-----	242	-----
Unclassified .....	-----	-----	-----	-----	91	-----	91	-----
Total, Professional Schools	1,324	1,552	1,060	1,723	462	2	6,123	6,123
Totals (excluding duplicates) .....	2,263	2,164	1,244	2,020	825	3	-----	8,519
Total Students, Regular Session.....								8,519

## ENROLLMENT BY SEX, ALL SESSIONS, 1958-59

Session	Men	Women	Total
Summer Session 1958 .....	1,133	610	1,743
Fall Term 1958-59 .....	5,836	2,145	7,981
Winter Term 1958-59 .....	5,547	2,030	7,577
Spring Term 1958-59 .....	5,040	1,924	6,964
Net total, regular sessions .....	6,229	2,290	8,519
Net total, all sessions, Oregon State College .....	7,362	2,900	10,262

## ENROLLMENT IN SUMMER SESSION, 1958

Session	Men	Women	Total
Eight-Week Summer Session .....	1,133	610	1,743
Second Session .....	1,265	583	1,848
4-H Club Short Course .....	-----	-----	-----
Totals .....	2,398	1,193	3,591

**ENROLLMENT IN GENERAL EXTENSION DIVISION**  
(July 1, 1958-June 30, 1959)

Classes	Under-graduate	Graduate	Total
<i>Extension Classes:</i>			
Portland Extension Center .....	5,344	2,455	7,799
State-Wide Classes (75 centers) .....	3,735	2,856	6,591
Total, Extension Classes .....	9,079	5,311	14,390
<i>Correspondence Study:</i>			
New Registrations .....	3,049		
Old Registrations .....	2,383		
Total, Correspondence Study .....	5,432		
Total, General Extension Division .....	14,511	5,311	19,822

**SUMMARY OF DEGREES CONFERRED 1958-59**

<i>Advanced Degrees:</i>		
Honorary .....	2	.....
Doctors of Philosophy .....	30	.....
Doctors of Education .....	3	.....
Masters of Arts .....	4	.....
Masters of Science .....	162	.....
Masters of Agriculture .....	4	.....
Masters of Education .....	94	.....
Masters of Forestry .....	4	.....
Masters of Home Economics .....	2	.....
Total Advanced Degrees .....	.....	305
<i>Bachelors' Degrees:</i>		
Bachelors of Arts:		
Science .....	10	.....
Business and Technology .....	12	.....
Education .....	6	.....
Engineering .....	3	.....
Home Economics .....	2	.....
Pharmacy .....	1	.....
Bachelors of Science:		
Science .....	182	.....
Agriculture .....	177	.....
Business and Technology .....	244	.....
Education .....	189	.....
Engineering .....	305	.....
Forestry .....	73	.....
Home Economics .....	87	.....
Nursing Education .....	8	.....
Pharmacy .....	32	.....
Total Bachelors' Degrees .....	.....	1,331
Total Degrees Conferred 1958-59 .....	.....	1,636



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