

Oregon State College

CATALOG

1948-49



Corvallis, Oregon

Oregon State System of Higher Education B U L L E T I N

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	Term expires
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PHIL METSCHAN, Portland.....	1953
HENRY F. CABELL, Portland.....	1954
EDGAR W. SMITH, Portland.....	1955
A. S. GRANT, Baker.....	1956
CHERYL S. MACNAUGHTON, Portland.....	1957

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R. E. KLEINSORGE.....	Vice President

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R. E. KLEINSORGE

LEIF S. FINSETH

PAUL C PACKER, *Chancellor*

CHARLES D. BYRNE, *Secretary*

Office of the State Board of Higher Education
Eugene, Oregon

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 Federal survey of higher education in Oregon, includes all the state-supported institutions of higher learning. The several institutions are now elements in 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 the University of Oregon at Eugene, Oregon State College at Corvallis, the Oregon College of Education at Monmouth, the Southern Oregon College of Education at Ashland, and the Eastern Oregon College of Education at La Grande. The University of Oregon Medical School and the University of Oregon Dental School are located in Portland.

Each of the five institutions provides the general studies fundamental to a well-rounded education. At the three colleges of education general and professional studies are combined in the teacher-training curriculum; students who do not plan to become elementary-school teachers may devote their time exclusively to lower-division studies in the liberal arts and sciences or (at Southern Oregon and Eastern Oregon Colleges of Education) to approved lower-division programs in semiprofessional fields.

At the University and the State College two years of unspecialized work in liberal arts and sciences are provided on a parallel basis in the Lower Division. Major curricula, both liberal and professional, are grouped on either campus in accordance with the distinctive functions of the respective institutions in the unified State System of Higher Education.

Oregon State System of Higher Education

PAUL C PACKER, Ph.D., LL.D., Chancellor

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President, University of Oregon

DAVID W. E. BAIRD, M.D.
Dean, University of Oregon Medical School

ELMO NALL STEVENSON, Ed.D.
President, Southern Oregon College of Education

AUGUST LEROY STRAND, Ph.D.
President, Oregon State College

HENRY MARTIN GUNN, Ed.D.
President, Oregon College of Education

ROBEN JOHN MAASKE, Ph.D.
President, Eastern Oregon College of Education

OFFICE OF THE CHANCELLOR

CHARLES DAVID BYRNE, Ed.D. Assistant to the Chancellor
RICHARD LYLE COLLINS, M.A., C.P.A. Statistician and Budget Officer
LYLE MORGAN NELSON, B.A. Director of Information
ISABEL DAVIS, B.A. Administrative Assistant

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JOHN L. WATSON, B.B.A., C.P.A. Assistant Comptroller
HAROLD ROWLEY, B.S. Chief Accountant
WILLIAM RALPH STOVALL Assistant Accountant and Property Custodian
THOMAS FRANCIS ADAMS, B.S. Cost Accountant

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JOHN FRANCIS CRAMER, D.Ed. Dean and Director of General Extension
HENRY EUGENE STEVENS, D.Ed. Assistant Director of General Extension
ALFRED POWERS, A.B. Dean and Director of Creative Writing and Publishing

TEACHER EDUCATION

PAUL B. JACOBSON, Ph.D. Director of High-School Teacher Training
HENRY MARTIN GUNN, Ed.D. Director of Elementary Teacher Training

LIBRARIES

WILLIAM HUGH CARLSON, M.A. Director of Libraries
ELZIE VANCE HERBERT Head of Orders Department
MARIE HULL JACKSON, B.A., B.S. in L.S. Cataloger for Union Catalog
ANITA BROWN HUBBARD, A.B., A.B.L.S. Assistant Union Cataloger
MYRTLE ANN BOSWORTH Bookkeeper and Accountant

HIGH-SCHOOL RELATIONS

High-School Visitor

1948

June 1948

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August 1948

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September 1948

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October 1948

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November 1948

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December 1948

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ACADEMIC CALENDAR

Summer Quarter 1948

June 14, *Monday*.....Registration, First Session

June 15, *Tuesday*.....Classes begin

July 23, *Friday*.....First Session ends

July 24, *Saturday*.....Registration, Second Session

July 26, *Monday*.....Classes begin, Second Session

August 27, *Friday*.....Classes end, Second Session

Fall Term, 1948-49

September 10, *Friday*.....First faculty meeting, 4:00 p.m.

September 13-18, *Monday to Saturday*.....Freshman Week and registration

September 20, *Monday*.....Classes begin

October 2, *Saturday*.....Last day for addition of new courses or new registrations

October 2, *Saturday*.....Last day for dropping a course without being responsible for grade

October 27, *Wednesday*.....Charter Day

November 11, *Thursday*.....Armistice Day, special observance program at 11:00 a.m.

November 22, *Monday*.....Last day for withdrawing from college without responsibility for grades

November 25-27, *Thursday to Saturday*.....Thanksgiving vacation

December 11, *Saturday*.....Classes end

December 13-18, *Monday to Saturday*.....Final examinations

December 18, *Saturday*.....Fall term ends

EIGHTIETH YEAR

Winter Term 1948-49

- January 3, *Monday*.....Registration
 January 4, *Tuesday*.....Classes begin
 January 15, *Saturday*.....Last day for addition of new courses or new registrations
 January 15, *Saturday*.....Last day for dropping a course without being responsible for grade
 February 21, *Monday*.....Last day for withdrawing from college without being responsible for grades
 March 14-19, *Monday to Saturday*.....Classes end; final examinations
 March 19, *Saturday*.....Winter term ends

Spring Term 1948-49

- March 28, *Monday*.....Registration
 March 29, *Tuesday*.....Classes begin
 April 9, *Saturday*.....Last day for addition of new courses or new registrations
 April 9, *Saturday*.....Last day for dropping a course without being responsible for grade
 May 16, *Monday*.....Last day for withdrawing from college without being responsible for grades
 May 30, *Monday*.....Memorial Day, holiday
 June 4, *Saturday*.....Classes end
 June 5, *Sunday*.....Baccalaureate Service
 June 6, *Monday*.....80th Annual Commencement
 June 6-11, *Monday to Saturday*.....Final examinations
 June 11, *Saturday*.....End of spring term

1949

January 1949

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March 1949

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April 1949

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May 1949

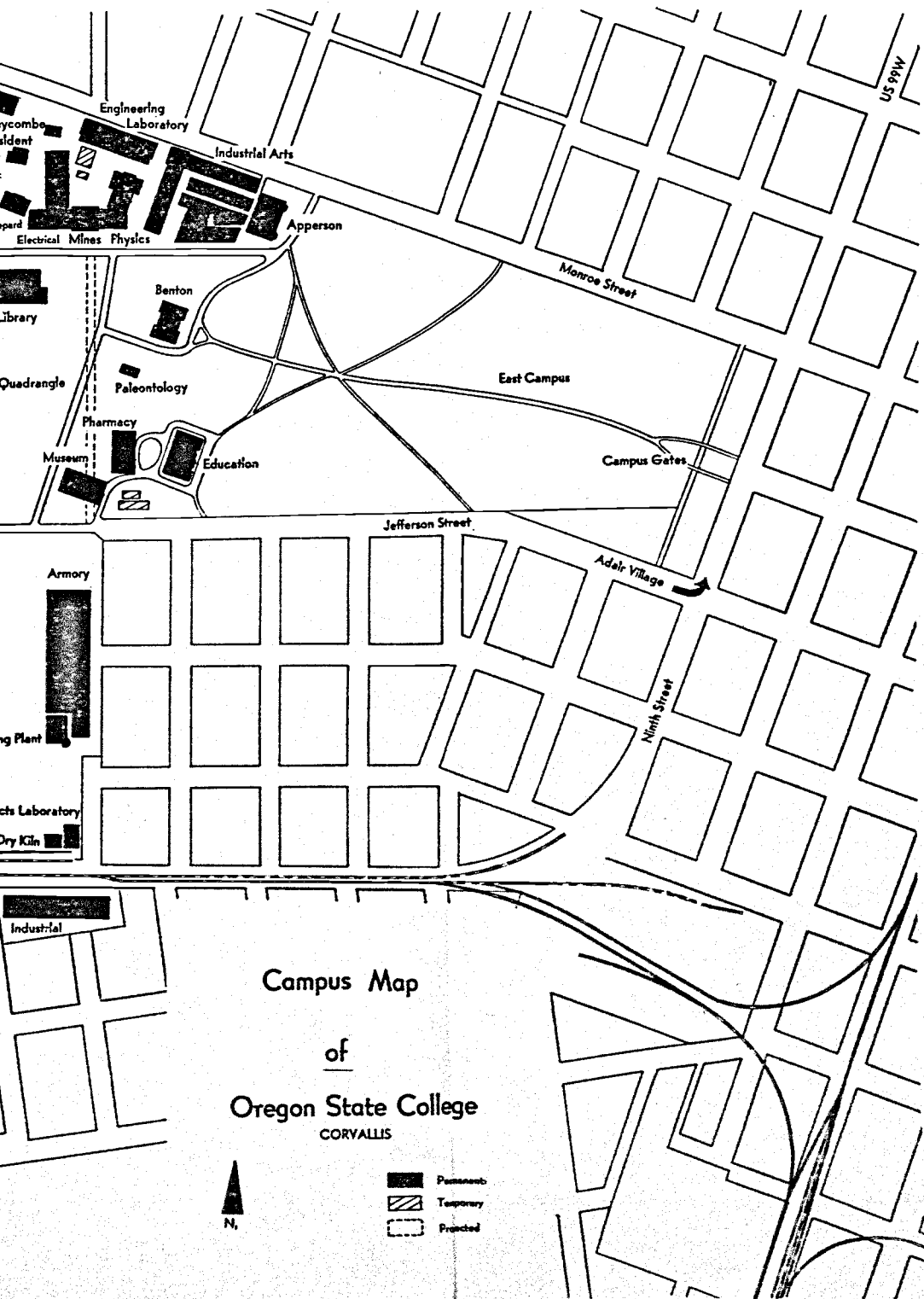
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June 1949

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July 1949

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Oregon State College

Administrative Council

AUGUST LEROY STRAND, Ph.D. President
ERWIN BERTRAN LEMON, B.S. Dean of Administration
DELMER MORRISON GOODE, M.A. Secretary

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WILLIAM HUGH CARLSON, M.A. Librarian
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DANIEL THOMAS ORDEMAN, Ph.D. Registrar
DAN WILLIAMS POLING, M.S. Dean of Men
WILLIAM ALFRED SCHOENFELD, M.B.A. Dean and Director of Agriculture
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FRANKLIN ROYALTON ZERAN, Ph.D. Associate Dean of Education

Service Divisions

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RUTH LANO. Secretary

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PAUL A WALGREN, B.B.A.	Business Manager
GEORGE MORRIS ROBERTSON, B.S.	Assistant Business Manager
FRANK EUREN	Purchasing Agent
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MARTHA MOORE MARTILLA, B.S.	Assistant in the Dormitories

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HARRY RUTHERFORD.....	Supervisor of Building Repairs
HENRY BRANDT.....	Superintendent of Light and Power
DONALD WHITE.....	Supervisor Janitorial
CECILE SMITH.....	Secretary to General Superintendent of Physical Plant

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FRED MERLE SHIDELER, M.S.....	Assistant in News Bureau
ETHEL E ALLEN, B.S.....	Assistant Editor of Publications
DONALD THOMAS CARLSON, B.A.....	Assistant to the Editor of Publications

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EVA BLACKWELL, B.S.....	Assistant Registrar
DALLAS W NORTON, M.Ed.....	Assistant Registrar
BESS JACKSON MCCOY.....	Chief Clerk
BELVA DIXON, B.S.....	Schedule Clerk
FAY WELLS LIEN.....	Recorder

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DANIEL CLYDE REYNOLDS, B.S., M.D.....	Director of Health Service
CHARLES EDWARD SKINNER, B.A., M.D.....	Assistant Physician
PETER HENRY ROZENDAL, B.S., M.D.....	Assistant Physician
ERNA PLAGEMAN, R.N.....	General Supervisor
MARGARET McLAUGHLIN, R.N.....	Nurse
HELEN LANDES, R.N.....	Nurse
CRYSTAL FOSTER, R.N.....	Nurse
ELIZABETH GREENFELL, R.N.....	Nurse
BERNICE SUTHERLAND, R.N.....	Nurse

STUDENT WELFARE, PERSONNEL, AND PLACEMENT

DAN WILLIAMS POLING, M.S. Dean of Men
 BUENA MARIS MOCKMORE, M.S. Dean of Women
 ERNEST WILLIAM WARRINGTON, M.A., D.D. Director of Religious Education
 DALLAS W NORTON, M.Ed. Personnel Coordinator
 EDWARD CHRISTOPHER ALLWORTH, B.S., LL.D. Manager and Secretary,
 Memorial Union
 ROY SERVAIS KEENE, B.S. Director of Intercollegiate Athletics
 IRWIN CECIL HARRIS, M.S.J. Manager, Student Educational Activities
 MARY IDA BASH, A.B. Assistant Dean of Women
 KENNETH HAROLD BAKER, B.S. Chief, Counseling and Testing Bureau
 ROBERT RAY REICHART, Ed.D. Director, Counseling and Testing Bureau
 ALVIN ALLEN, M.A. Vocational Adviser, Counseling and Testing Bureau
 EDGAR C BALDOCK, M.A. Vocational Adviser, Counseling and Testing Bureau
 J C BRANAMAN, M.S. Vocational Adviser, Counseling and Testing Bureau
 LAWRENCE W CARRILLO, B.S. Psychometrist, Counseling and Testing Bureau
 LORIS ROY BAKER, B.S. Assistant to Director of Intercollegiate Athletics
 LEONE JOHNSON, B.S. Executive Secretary of Round Table
 CLYTIE MAY WORKINGER Placement Secretary
 EMMA SEVERSON COE, B.A. Secretary, Employment and Housing for Men
 EDITH MAE WILKINSON, B.S. Secretary to the Dean of Men
 ELEANOR JO HUDSON. Secretary to the Dean of Women

ALUMNI OFFICE

JOHN BENJAMIN FENNER, B.S.S. Manager, Alumni Association

State College Staff*

PAUL C PACKER, Ph.D., LL.D., Chancellor, Oregon State System of Higher Education.

B.A., (1918), Iowa; M.A. (1921), Michigan; Ph.D. (1923), Columbia; LL.D. (1938), Cornell College. Chancellor, State System, since 1946.

AUGUST LEROY STRAND, Ph.D., President.

B.S. (1917), Montana State; M.S. (1925), Ph.D. (1928), Minnesota. At Oregon State since 1942.

GEORGE WILCOX PEAVY, M.S.F., Sc.D., LL.D., President Emeritus; Dean Emeritus of the School of Forestry; Professor Emeritus of Forestry.

B.L. (1895), M.S.F. (1905), Sc.D. (1936), Michigan; LL.D. (1937), Willamette. At Oregon State since 1910.

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

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

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.

ROBERT M ALEXANDER, B.S., Assistant to the Director, Agricultural Experiment Station.

B.S. (1942), Oregon State. At Oregon State since 1946.

ETHEL E ALLEN, B.S., Assistant Editor of Publications.

B.S. (1916), Oregon State. At Oregon State since 1917.

FRANCIS STEPHEN ALLEN, Litt.B., B.L.S., Circulation Assistant (Instructor), Library.

Litt.B. (1933), Xavier; B.L.S. (1941), Illinois. At Oregon State since 1946.

LEONARD JOHN ALLEN, M.S., State 4-H Club Leader.

B.S. (1914), M.S. (1915), Oregon State. At Oregon State since 1915.

FLORENCE SNOWBERGER ALLER, M.S., Instructor in Household Administration.

A.B. (1930), Oklahoma; M.S. (1947), Oregon State. At Oregon State since 1947.

LOUIS ALLER, Ph.B., Instructor in Psychology.

Ph.B. (1935), Chicago. At Oregon State since 1946.

IRA SHIMMIN ALLISON, Ph.D., Professor of Geology.

A.B. (1917), Hanover College; Ph.D. (1924), Minnesota. At Oregon State since 1928.

DELMAR ISAAC ALLMAN, Dr.P.H., Associate Professor of Hygiene.

B.S. (1923), 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 of Memorial Union.

B.S. (1916), LL.D. (1929), Oregon State. At Oregon State since 1925.

* State College officers of administration, instruction, research and extension at Corvallis having the rank of instructor or above. The FACULTIES are listed under the school or divisional sections of this Catalog. The FACULTY COUNCIL, composed of administrative officers and elected representatives of the faculties, is the faculty legislative body of the State College. The ADMINISTRATIVE COUNCIL (page 11), the CURRICULUM COUNCIL (page 402), the GRADUATE COUNCIL (page 390), and the STUDENT PERSONNEL COUNCIL coordinate activities in their respective fields.

An INDEX of NAMES of members of the State College staff, of the United States Department of Agriculture scientists at the State College, and of interinstitutional officers is printed on pages 427-431.

- DONALD EVANS ANDERSON, B.S.**, Instructor in Mechanical Engineering.
B.S. (Math.) (1945), B.S. (M.E.) (1947), Washington. At Oregon State since 1947.
- LESLIE IRA ANDERSON**, Master Sergeant, Instructor in Military Science and Tactics.
At Oregon State since 1947.
- WILLIAM BALLANTYNE ANDERSON, Ph.D.**, Professor Emeritus of Physics.
B.S. (1901), M.S. (1903), Ph.D. (1906), Wisconsin. At Oregon State since 1914.
- ROBERT JOSEPH ANTONACCI, M.A.**, Instructor in Physical Education.
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B.S. (1941), M.S. (1945), Washington. At Oregon State since 1947.
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- ELMER HANSEN, Ph.D., Associate Horticulturist (Pomology), Agricultural Experiment Station.
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B.S. (1910), B.S. (1928), Oregon State; B.L.S. (1924), New York State Library School. At Oregon State 1910-12, 1916-22, and since 1924.

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- MELVIN JULIUS KOFOID, Ph.D.**, Associate Professor of Electrical Engineering.
B.S. (1933), M.S. (1935), Oregon State; Ph.D. (1942), Stanford. At Oregon State since 1946.
- ORVILLE KOFOID, M.S.**, Associate Professor of Civil Engineering.
B.S. (1932), Oregon State; M.S. (1940), Iowa. At Oregon State since 1947.
- BERTHA KOHLHAGEN, M.S.**, State Supervisor and Teacher Trainer in Home Economics Education.
B.S. (1929), M.S. (1941), Oregon State. At Oregon State since 1935.
- AGNES KOLSHORN, M.A.**, Associate Professor of Foods and Nutrition.
B.S. (1913), Oklahoma State; B.S. (1918), Columbia; M.A. (1919), Denver. At Oregon State since 1929.
- GUSTAV WESLEY KUHLMAN, Ph.D.**, Associate Professor of Farm Management; Associate Economist, Agricultural Experiment Station.
B.S. (1925), South Dakota State; M.S. (1926), Ph.D. (1938), Illinois. At Oregon State since 1927.
- LEE WALLACE KUHN, M.S.**, Instructor in Fish and Game Management.
B.S. (1940), Iowa State; M.S. (1942), Oregon State. At Oregon State since 1946.
- EDITH CARTER KUNEY, A.M.**, Associate Professor of Modern Languages.
A.B. (1909), Willamette; A.M. (1925), Stanford. At Oregon State 1910-15 and since 1925.
- ERVIN FREDRICK KURTH, Ph.D.**, Professor of Wood Chemistry.
B.S. (1927), M.S. (1929), Ph.D. (1933), Wisconsin. At Oregon State since 1945.
- ADELAIDE VALETA LAKE, M.A.**, Assistant Professor of Journalism.
B.A. (1920), Oregon; M.A. (1942), Oregon State. At Oregon State since 1939.
- LUCY ROCENA LANE, M.A.**, Extension Specialist in Clothing and Textiles.
A.B. (1921), Baker (Kansas); M.A. (1938), Iowa. At Oregon State since 1938.
- WILLIAM MARTIN LANGAN, B.S.**, Agricultural Student Personnel Adviser.
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B.S. (1923), M.S. (1925), Dr.P.H. (1928), Michigan; Ed.D. (1938), Oregon. At Oregon State since 1928.

JOSEPH GUIDO LAPALOMBERA, A.B., Instructor in Political Science.

A.B. (1946), Illinois. At Oregon State since 1947.

LYDA MAE LAPALOMBERA, A.B., Instructor in English.

A.B. (1945), Illinois. At Oregon State since 1946.

LYDD O LARSE, Ed.M., Associate Professor of Secretarial Science.

B.S. (1928), Oklahoma A. and M.; Ed.M. (1935), Oklahoma. At Oregon State since 1940.

HERBERT REYNOLDS LASLETT, Ph.D., Professor of Educational Psychology.

A.B. (1918), Kansas; A.M. (1923), Ph.D. (1926), Stanford; Certificat (1919), Université Montpellier. At Oregon State since 1928.

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MARGARET LUCILLE LAWRENCE, B.A., Instructor in English.

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NEDRA LUCILLE LEBLOND, B.S. in L.S., Reference Assistant, (Instructor), Library.

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MARIE LEDBETTER, B.A., Instructor in Clothing, Textiles, and Related Arts. Textiles, and Related Arts.

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LUCY MAY LEWIS, A.B., B.L.S., D.L.S., Librarian Emeritus, (Professor).

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MARY EUNICE LEWIS, Ph.D., Associate Professor of Modern Languages.

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- DAVID ROBERT LONG, B.S.**, Instructor in Agricultural Engineering.
B.S. (1947), Oregon State. At Oregon State since 1947.
- JAY B LONG, B.S.**, Assistant Professor of Fish and Game Management.
B.S. (1939), Oregon State. At Oregon State since 1940.
- STANLEY HOWARD LOWY, M.S.**, Instructor in Aeronautical Engineering.
B.S. (1943), Purdue; M.S. (1947), Minnesota. At Oregon State since 1947.
- WALTER THOMAS LUND, M.S.**, Instructor-Technician in Botany.
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- RALPH NICHOLAS LUNDE, B.S.**, Associate Professor of Agricultural Engineering; Associate Agricultural Engineer, Agricultural Experiment Station.
B.S. (1926), Oregon State. At Oregon State since 1930.
- WILLIAM DAVID LUTZ, B.S.**, Captain, Field Artillery, Assistant Professor of Military Science and Tactics, Artillery Unit.
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- ALMON P LYMAN, B.S.**, Instructor in Civil Engineering.
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- LAURA CORNELIA McALLESTER, B.S.**, Assistant Professor of Physical Education for Women.
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B.S. (1917), Vanderbilt; M.S. (1920), Chicago; Ph.D. (1928), Cornell. At Oregon State since 1930.
- MABEL CLAIR MACK, M.S.**, Assistant State Home Demonstration Leader.
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- GAYLE TIMMONS MERKLIN, B.S., Instructor in Foods.
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- FRED MERRYFIELD, M.S., Professor of Sanitary Engineering.
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- AVA BERTHA MILAM, M.A., Dean of the School of Home Economics.
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- LOUISE MARGUERITE MILLIGAN, A.B., B.L.S., Circulation Librarian, (Assistant Professor).
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- HORACE HANNA MILLSAP, Research Assistant, Plant Pathology, Agricultural Experiment Station.
At Oregon State since 1945.
- WILLIAM EDMUND MILNE, Ph.D., D.Sc., Professor of Mathematics; Head of Department.
A.B. (1912), Whitman College; A.M. (1913), Ph.D. (1915), Harvard; D.Sc. (1942), Whitman College. At Oregon State since 1932.
- MARY BETH MINDEN, M.A., Assistant Professor of Home Economics Extension; Home Management Specialist.
B.S. (1940), Oregon State; M.A. (1947), Columbia. At Oregon State since 1947.
- CHARLES BUREN MITCHELL, M.A., Professor of Speech; Head of Department.
B.A. (1911), DePauw; M.A. (1912), Michigan. At Oregon State since 1920.
- BUENA MARIS MOCKMORE, M.S., Dean of Women.
B.A. (1936), College of Puget Sound; M.S. (1939), Oregon State. At Oregon State since 1937.
- CHARLES ARTHUR MOCKMORE, C.E., Ph.D., Professor of Civil Engineering, Head of Department.
B.E. (1920), C.E. (1926), M.S. (1932), Ph.D. (1935), Iowa. At Oregon State since 1921.

- JOHN PAUL MONCUR, M.A.**, Instructor in Speech.
B.A. (1946), California, Los Angeles; M.A. (1947), Washington. At Oregon State since 1947.
- CAL GRAHAM MONROE, B.S.**, Assistant State 4-H Club Leader.
B.S. (1939), Oregon State. At Oregon State since 1942.
- DELBERT WARREN MOORE, B.A.**, Professor of Music (Violin and Cello); Conductor of Bands and Orchestra.
B.A. (1933), Oregon. At Oregon State since 1935.
- JAMES CECIL MOORE, M.S.**, Assistant Extension Agricultural Economist (Marketing).
B.S. (1926), Oregon State; M.S. (1927), Iowa State. At Oregon State 1932-35 and since 1945.
- ETHEL POPE MORGAN, B.S.**, Instructor in Foods and Nutrition.
B.S. (1923), Oregon State. At Oregon State since 1945.
- FRED BUCKNER MORGAN, M.S.**, Assistant Professor of Physics.
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- HENRIETTA MORRIS, Sc.D.**, Associate Professor of Hygiene.
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- HUGH ENGLE MORRISON, M.S.**, Associate Entomologist, Agricultural Experiment Station.
B.S. (1927), Franklin and Marshall; M.S. (1936), Ohio State. At Oregon State since 1937.
- ROGER WILLIAM MORSE, B.S.**, Extension Dairyman.
B.S. (1916), Washington State. At Oregon State since 1923.
- RUTH ANNETTA MOSER, B.S.**, Instructor in Clothing, Textiles, and Related Arts.
B.S. (1931), North Dakota Agricultural. At Oregon State since 1946.
- DON CARLOS MOTE, Ph.D.**, Professor of Entomology; Head of Department; Entomologist in Charge, Agricultural Experiment Station.
B.S. (1911), M.S. (1912), Ph.D. (1928), Ohio State. At Oregon State since 1923.
- HELEN MULHERN, M.S.**, Assistant Professor of Institution Economics and Supervisor of the Memorial Union Dining Service.
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- DWIGHT CURTIS MUMFORD, M.S.**, Professor of Farm Management; Head of Department; Economist (Farm Management), Agricultural Experiment Station.
B.S. (1923), Illinois; M.S. (1925), Cornell. At Oregon State since 1938.
- DOUGLAS BROOKS MURRAY, Lieutenant Colonel, Coast Artillery Corps, Associate Professor of Military Science and Tactics, Director of Artillery Unit.**
At Oregon State since 1947.
- RUTH ANN MUSSELMAN, M.A.**, Instructor in English.
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- OTTO HERBERT MUTH, D.V.M., M.S.**, Veterinarian, Agricultural Experiment Station.
D.V.M. (1929), M.S. (1935), Michigan State. At Oregon State since 1929.
- WILFRED GERVAIS MYATT, B.A.**, Assistant Professor of Geography.
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- MILTON NELS NELSON, Ph.D.**, Professor of Economics; Head of Department.
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- ORAN MILTON NELSON, M.S.**, Professor of Animal Husbandry; Animal Husbandman, Agricultural Experiment Station.
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- HARRY IRA NETTLETON, M.S.F.**, Associate Professor of Forestry.
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- OLAF GUSTAV PAASCHE, B.S.**, Assistant Professor of Mechanical Engineering.
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- RUTH WOOSTER PARKINSON, M.A.**, Instructor in Chemistry.
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- MELVIN A PARSONS**, Chief Gunner's Mate, U. S. Navy, Instructor in Naval Science.
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B.S. (in C.E.) (1909), Oregon. At Oregon State since 1920.
- JOAN PATTERSON, B.Arch.**, Associate Professor of Clothing, Textiles, and Related Arts.
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- OSCAR INGAL PAULSON, B.S.**, Associate Professor of Vocational Education.
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- MAYNARD DEAN PEARSON, A.B.**, Instructor in Physics.
A.B. (1943), Whitman College. At Oregon State since 1947.
- CHARLES S PEASE, Ph.D.**, Professor of Chemistry.
B.S. (1918), Denison; Ph.D. (1928), Ohio State. At Oregon State since 1925.
- ARTHUR LEE PECK, B.S., B.A.**, Professor of Landscape Architecture; Head of Department.
B.S. (1904), Massachusetts State; B.A. (1904), Boston. At Oregon State 1908-10 and since 1912.
- SIGURD HARLAN PETERSON, Ph.D.**, Professor of English; Head of Department.
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- LILLIAN JEFFREYS PETRI**, Professor Emeritus of Music.
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PAUL PETRI, Professor Emeritus of Music.
At Oregon State since 1924.

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At Oregon State since 1948.

ERNA PLAGEMAN, R.N., General Supervisor, Student Health Service.
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HANS HEINRICH PLAMBECK, Ph.D., Assistant Professor of Sociology.
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ERMINE LAWRENCE POTTER, M.S., Professor of Agricultural Economics; In Charge, Division of Agricultural Economics; Agricultural Economist, Agricultural Experiment Station.
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- HAZEL GUSTINE QUASDORF, B.A., B.S. in L.S.**, Assistant Science Librarian, (Instructor), Library.
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- HOWARD WILLIAM RAABE, M.S.**, Assistant Professor of Physical Education; Director of Intramural Sports.
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- WARREN ROBERT RANDALL, M.S.**, Instructor in Forestry.
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- ROBERT RAY REICHAERT, Ed.D.**, Associate Professor of Educational Psychology; Director, College Counseling Bureau.
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- WILLIAM CURTIS REID, Ph.D.**, Associate Professor of Visual Instruction; Head of Department; Extension Specialist in Visual Instruction.
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B.S. (1916), M.D. (1918), Michigan. At Oregon State since 1929.
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At Oregon State since 1947.
- ANTONINA FEDOROVNA RIASANOVSKY**, Assistant Professor of Russian.
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- ELBERT FLOYD RICE, B.S.**, Instructor in General Engineering.
B.S. (1947), Idaho. At Oregon State since 1947.
- HILDRED ATKINSON RICE, B.S.**, Instructor in English.
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- GEORGE ARTHUR RICHARDSON, Ph.D., Associate Professor of Dairy Husbandry; Associate Dairy Husbandman, Agricultural Experiment Station.
B.Sc. (Agr.) (1920), Toronto; M.S. (1925), Ph.D. (1927), Minnesota. At Oregon State since 1947.
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- ELIZABETH PROPHET RITCHIE, A.B., B.L.S., Catalog Librarian Emeritus, (Assistant Professor).
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- ARTHUR LOREN ROBERTS, B.S., Assistant Professor of Industrial Engineering and Industrial Arts.
B.S. (1944), Oregon State. At Oregon State since 1946.
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- SIDNEY RUBIN**, M.A., Associate Professor of Economics.
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- ROBERT WAYNE SMITH, Ph.D.**, Associate Professor of History.
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- THEODORE HENRY SPRING, Master Sergeant, Air Force**, Assistant to Professor of Military Science and Tactics, Assistant Sergeant Major.
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- MEAD STAPLES, Master Sergeant, Instructor in Military Science and Tactics, Air Force Unit.**
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- JOSEPHINE WASSON, M.A.**, Assistant Professor of Art.
B.A. (1925), Washington State; M.A. (1933), Columbia. At Oregon State since 1943.
- IVAN FREDERIC WATERMAN, C.E.**, Associate Professor of Civil Engineering.
B.S. (1910), John B. Stetson University; C.E. (1912), Wisconsin. At Oregon State since 1919.
- ERMA MARION WEIR, M.S.**, Instructor in Physical Education for Women.
B.E. (1936), Minnesota State Teachers College (Bemidji); M.S. (1941), Washington. At Oregon State since 1945.
- WILLIAM CARL WEIR, Ph.D.**, Associate Professor of Animal Husbandry; Associate Animal Husbandman, Agricultural Experiment Station.
B.S. (1940), Oregon State; M.S. (1941), Ph.D. (1947), Wisconsin. At Oregon State since 1948.
- DONALD ARTHUR WELLS, Ph.D.**, Assistant Professor of Philosophy and Religion.
A.B. (1940), Hamline; S.T.B. (1943), Boston University School of Theology; Ph.D. (1946), Boston University. At Oregon State since 1946.
- EARL WILLIAM WELLS, M.A., J.D.**, Professor of Speech.
A.B. (1921), Iowa; M.A. (1927), Wisconsin; J.D. (1928), Iowa. At Oregon State since 1921.
- WILLIBALD WENIGER, Ph.D.**, Dean of the Graduate School; Professor of Physics; Head of Department.
B.A. (1905), M.A. (1906), Ph.D. (1908), Wisconsin. At Oregon State 1908-14 and since 1920.

- WILLIAM IRVIN WEST, M.F.**, Assistant Professor of Forest Products.
B.S.F. (1939), M.F. (1941), Washington. At Oregon State since 1946.
- HAZEL KELSEY WESTCOTT, B.S.**, Administrative Assistant, President's Office.
B.S. (1920), Oregon State. At Oregon State 1919-21 and since 1926.
- PAUL HENRY WESWIG, Ph.D.**, Associate Biochemist (Agricultural Chemistry)
Agricultural Experiment Station.
B.A. (1935), St. Olaf College; M.S. (1939), Ph.D. (1941), Minnesota. At Oregon State since 1941.
- WILBUR JOHN WHITSELL, B.S.**, Instructor in Civil Engineering.
B.S. (1944), Oregon State. At Oregon State since 1946.
- ERNEST HERMAN WIEGAND, B.S.A.**, Professor of Food Technology; Head of Department; Food Technologist in Charge, Agricultural Experiment Station.
B.S.A. (1914), Missouri. At Oregon State since 1919.
- MIRIAM AUGUSTA WIGGENHORN, M.A.**, Assistant Professor of Household Administration.
B.A. (1931), Nebraska; M.A. (1936), Columbia. At Oregon State since 1946.
- CURTIS WILDER, M.S.**, Assistant 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.
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B.S. (1921), M.S. (1941), Oregon State. At Oregon State since 1922.
- 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.**, Assistant Professor of Chemistry.
B.S. (1936), M.S. (1938), Utah; Ph.D. (1941), Cornell. At Oregon State since 1941.
- RUSSELL WILLARD WILLIAMSON, M.A.**, Assistant Professor of Industrial Arts.
B.S. (1935), Oregon State; M.A. (1948), Minnesota. At Oregon State since 1946.
- STANLEY E WILLIAMSON, M.A.**, Associate Professor of Science Education, Head of Department.
B.A. (1931), Nebraska Wesleyan; M.A. (1936), Columbia. At Oregon State since 1946.
- MAUD MATHES WILSON, A.M.**, Head of Department of Home Economics Research, Agricultural Experiment Station; Professor of Home Economics Research.
B.S. (1913), Nebraska; A.M. (1931), Chicago. At Oregon State since 1925.
- NORMAN WILLIAM WILSON, M.A.**, Instructor in English.
A.B. (1930), Linfield; M.A. (1940), Oregon. At Oregon State since 1947.
- RAY WILSON**, Master Sergeant, Instructor in Military Science and Tactics; Rifle Team Coach.
At Oregon State since 1947.
- GUSTAV HANS WILSTER, Ph.D.**, Professor of Dairy Manufacturing; Dairy Husbandman, Agricultural Experiment Station.
B.S. (1920), M.S. (1921), Ph.D. (1928), Iowa State. At Oregon State since 1929.

- CARLYN REO WINGER, M.A.**, Associate Professor of Speech.
B.A. (1928), Washington State; M.A. (1932), Wisconsin. At Oregon State since 1938.
- FRED EVERETT WINGER, M.A.**, Assistant Professor of Secretarial Science.
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- ROBERT JAMES WISE, B.S.**, Instructor in Mathematics.
B.S. (1940), California. At Oregon State since 1946.
- JOHN JOSEPH WITTKOFF, B.S.**, Assistant Professor of Electrical Engineering.
B.S. (1943), Oregon State. At Oregon State 1943-44, and since 1945.
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- JOHN WILLIAM WOLFE, M.S.**, Assistant Professor of Agricultural Engineering; Assistant Agricultural Engineer, Agricultural Experiment Station.
B.S. (1939), South Dakota State; M.S. (1940), Idaho. At Oregon State since 1947.
- MURIEL JOSEPHA WOODRING, B.S.**, Instructor in English.
B.S. (1930), William Jewell College. At Oregon State since 1946.
- LAWRENCE FISHER WOOSTER, M.S.**, Professor of Electrical Engineering.
B.S. (in E.E.) (1906), Illinois; M.S. (1931), Oregon State. At Oregon State since 1910.
- CLYTIE MAY WORKINGER**, Placement Secretary.
At Oregon State since 1910.
- OLIVER JACKSON WORTHINGTON, Ph.D.**, Assistant Professor of Food Technology; Assistant Food Technologist, Agricultural Experiment Station.
B.S. (1924), Rhode Island State; M.S. (1926), Ph.D. (1936), Wisconsin. At Oregon State since 1946.
- WILLIAM R WRIGHT**, First Sergeant, Instructor in Military Science and Tactics.
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- HO-YA YANG, Ph.D.**, Associate Food Technologist, Agricultural Experiment Station.
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- HARVEY HAROLD YEAGER**, Staff Sergeant, Instructor in Military Science and Tactics.
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B.S. (1941), New Mexico State; M.S. (1942), Ph.D. (1948), Iowa State. At Oregon State since 1948.
- EDWIN ARTHUR YUNKER, Ph.D., Professor of Physics.
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B.S. (1909), Greenville College; A.B. (1912), A.M. (1913), Washington; Ph.D. (1917), Washington University (St. Louis). At Oregon State since 1919.
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Ph.C. (1904), B.S. (1907), M.S. (1919), Michigan; Ph.D. (1928), Pittsburgh. At Oregon State since 1914.
- QUENTIN BLISS ZIELINSKI, M.S., Associate Professor of Horticulture; Associate Horticulturist, Agricultural Experiment Station..
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Fellows and Assistants

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- HERBERT GERALD ADAMS, B.S., Graduate Assistant in Zoology.
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- WILLIAM HUDSON BAKER, M.S., Graduate Assistant in Botany.
- RAYMOND LEE BARNETT, B.S., Graduate Assistant in General Engineering.
- MYRTLE DEE BEATTY, B.A., Graduate Assistant in Zoology.
- WALTER MICHAEL BOLLEN, B.S., Graduate Assistant in Chemical and Metallurgical Engineering.
- CARL ELDON BOND, B.S., Graduate Assistant in Fish and Game Management.
- JOHN HOWARD BROOKE, B.S., Graduate Assistant in Zoology.
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- CHARLES HAROLD CEHRS, B.M.E. Teaching Fellow in Mechanical Engineering.
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- WILLIAM EUGENE COOPER, B.S., Graduate Assistant in General Engineering.
- LLOYD BERNARD CRAINE, B.S., Graduate Assistant in Electrical Engineering.

- ROBERT WAYNE CREWS, B.S., Graduate Assistant in Physics.
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- JACK RUSSELL DAVIS, B.S., Teaching Fellow in Chemistry.
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- KENNETH IVORY EVANS, B.A., Graduate Assistant in Chemistry.
- SHENG CHUNG FANG, M.S., Research Fellow in Agricultural Chemistry.
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- IRVING GORDON FELS, M.A., Research Fellow in Chemistry, Swift and Company Grant.
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- HOMER SUMNER GALLAHER, B.S., Teaching Fellow in Chemistry.
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- HENRY JOHN HROSTOWSKI, B.A., Graduate Assistant in Chemistry.
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- JOHN WALTER HULL, B.S., Graduate Assistant in Chemistry.
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- DENIS JOHN ILLIGE, B.S., Graduate Assistant in Science Surveys.
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- JOEL FREDERICK KAHN, B.S., Graduate Assistant in Chemistry.
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- JEAN MATER, M.A., Teaching Fellow in Chemistry.
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- ROBERT HENRY PASCHALL, B.A., Graduate Assistant in Geology.
- WILLIS BAGLEY PERSON, B.S., Graduate Assistant in Chemistry.
- ROY STANLEY PETERSON, B.S., Graduate Assistant in Mechanical Engineering.
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- ROBERT PLANKINTON, B.S., Graduate Assistant in Chemistry.
- DONALD JAMES REISH, B.S., Graduate Assistant in Zoology.
- ERNEST WALTER RETZLOFF, B.S., Graduate Assistant in Zoology.
- LAVERNE EDWIN RICKARD, A.B., Graduate Assistant in Mathematics.
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- JACK CARTER RILEY, B.S., Graduate Assistant in Electrical Engineering.
- MYRON LEE ROBINSON, Graduate Assistant in Chemistry.
- EVA ANN RYDALCH, B.A., Teaching Fellow in Chemistry.
- JAMES MARLIN SCHREYER, B.A., Teaching Fellow in Chemistry.
- RAY ALVIN SCHWALM, B.S., Graduate Assistant in Industrial Engineering and Industrial Arts.
- JOHN CARL SIEGLE, A.B., Graduate Assistant in Chemistry.
- ROBERT HASKELL SIMON, M.S., Teaching Fellow in Mechanical Engineering.

- CHARLES HOBART SKINNER, M.S., Graduate Assistant in Botany.
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NEWTON BIRRELL SMITH, B.A., Graduate Assistant in Mathematics.
LAWRENCE PAUL SNIPPER, B.A., Graduate Assistant in Chemistry.
ROBERT ROWLAND SOWELL, B.S., Graduate Assistant in Zoology.
ROBERT DELMER STALLEY, B.S., Graduate Assistant in Mathematics.
ROBERT LYLE STEARMAN, B.S., Graduate Assistant in Chemistry.
CHESTER RANDOLPH STIFE, JR., B.S., Graduate Assistant in Chemical Engineering, Engineering Experiment Station.
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KEITH HOLCOMB SWEENEY, B.S., Teaching Fellow in Chemistry.
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LEON C TERRIERE, B.S., Research Fellow in Agricultural Chemistry, Agricultural Experiment Station.
HARRY L THURMAN, B.S., Graduate Assistant in Electrical Engineering.
EDWARD BRUCE TILLEY, B.S., Graduate Assistant in Mathematics.
JOSEPHINE DAY TOWNES, B.S., Graduate Assistant in Household Administration.
ANITA TETER VAN ARSDEL, B.S., Graduate Assistant in Bacteriology.
WALTER S VINCENT, JR., B.S., Graduate Assistant in Zoology.
ROBERT CARSTEN VON BORSTEL, B.A., Graduate Assistant in Zoology.
KENNETH MERRIMAN WALKER, B.S., Teaching Fellow in Zoology.
TAO-FANG WANG, B.S., Graduate Assistant in Physics.
HORST LOWIEN WEBER, B.A., Graduate Assistant in Chemistry.
HORACE FREDERICK WHITE, B.A., Graduate Assistant in Chemistry.
SZU HSIAO WU, B.S., Research Fellow, Agricultural Experiment Station.
ROBERT GEORGE ZIEGLER, B.A., Graduate Assistant in Chemistry.

Organization and Facilities

History

OREGON State College, the oldest state-supported institution of higher learning in Oregon, is now in its fourth quarter century and will celebrate its eightieth Charter Day October 27, 1948. The following paragraphs sketch briefly the beginnings and some significant events in the history of Oregon State College to date.

The Oregon territorial legislature in 1851 located and established the territorial university at Corvallis (then called Marysville). After bricks and other materials had been assembled on the selected site (where Margaret Snell Hall now stands), the legislature in 1855 relocated the university and ordered the materials sold. The next year Corvallis established a community academy that in 1858 was incorporated as Corvallis College. Rev. William A. Finley, A.M., in 1865 became the first president. On July 2, 1862, President Lincoln signed the measure known as the First Morrill Act establishing the "land-grant institutions" in the several states. Accepting the provisions of the federal act, the Oregon legislature on October 27, 1868, designated Corvallis College as "the agricultural college of the State of Oregon" and 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 requirements of the Act of Congress."

The federal act defined the purpose of the land-grant institutions as follows: "The leading objects 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."

From 1865 to 1885, when the state assumed full control of the institution, the College was conducted under the sponsorship of the Methodist Episcopal Church South with annual appropriations (after 1868) from the state legislature.

Corvallis College originally occupied ^{the corner of Benton} ~~corner of~~ Fifth and Madison streets. The first experimental farm of thirty-five acres, containing a dwelling, barn, and orchard, was purchased in 1870. The present campus was occupied in 1889 when Benton Hall (long known as the Administration Building) gift of the citizens of Benton County, was completed. 15070

The curriculum of Corvallis College was originally that of a liberal-arts college of the period—a classical course leading to the bachelor of arts degree, a scientific course leading to the bachelor of science degree. A curriculum in agriculture, largely conducted in the Department of Chemistry, was added in 1869. In succeeding years four professorships were established: commerce, 1880, agriculture, 1883, household economy, 1889, and engineering, 1889. These chairs expanded into departments that rose steadily to dominant positions in the program of the institution and resulted in the establishment in 1908 of four major professional schools: Agriculture, Commerce, Engineering, and Home Economics. By a similar development later schools were established—Forestry, 1913; Mines, 1913; Pharmacy, 1917; and Vocational Education, 1918.

In professional education Oregon State College has been a pioneer. Its departments of agriculture, engineering, and home economics were the first of their kind in the Pacific Northwest. Business training represented in economics and accounting was a part of the curriculum from the time of the founding of the institution. A degree curriculum in landscape architecture (1910) was the first to be offered west of the Mississippi River.

As professional schools were developed, related nonprofessional departments in some cases became part of the school organization. The social sciences were in the School of Commerce, geology was in the School of Mines, psychology in the School of Vocational Education. Other similar departments were included in the nonmajor School of Basic Arts and Sciences.

In the organization of the State System of Higher Education in 1932, the Lower Division, offering freshman and sophomore work in liberal arts and sciences, was established 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. The School of Commerce was consolidated with the School of Business Administration at the University and the School of Science of the State System was allocated at State College. The School of Mines was discontinued and its work incorporated in the School of Engineering. The work of the School of Vocational Education was merged with that of a new School of Education operating on a parallel basis at both State College and University. In 1941 major work in science was reestablished at the University, and by action in 1942, 1943, and 1948 the Board established the School of Business and Technology at State College.

The first advanced degree (A.M.) was awarded in 1876 under the standards of the time. By 1910 the standards for graduate study that are accepted today were beginning to take shape; in that year was established a committee on advanced degrees, precursor of the Graduate School (designated Graduate Division 1933, Graduate School 1946). The first Ph.D. degrees were conferred in 1935. The first summer school was held in 1908. Extension work had its beginnings in the first farmers' institutes held at four places in the state in 1889.

For a generation, in keeping with the small population and undeveloped resources of the state, the growth of the institution was slow. As late as 1900 Oregon still had only four high schools; until 1908 Oregon State College maintained a preparatory department and not until 1915 did it demand full high-school preparation for admission to its degree curricula. Enrollment reached one hundred by 1889; by 1906-07 it was 833, and since then growth in attendance has been rapid. Degrees conferred at the annual Commencement have grown from 3 in 1870 to 19 in 1893, 180 in 1918, 807 in 1947. The Library, which had its beginning in a gift of books from the Adelpian Society in 1890, numbered 1,950 volumes in 1893, 36,478 volumes in 1918, 193,479 in 1943, and now exceeds 228,000 volumes.

Oregon State College is a member of the Northwest Association of Secondary and Higher Schools. It is accredited by the Association of American Universities, the American Association of University Women, and other authoritative rating institutions.

Presidents of Oregon State College since its founding are: W. A. Finley, 1865-1871; B. L. Arnold, 1871-1892; John M. Bloss, 1892-1896; H. B. Miller, 1896-1897; Thomas M. Gatch, 1897-1907; William Jasper Kerr, 1907-1932; George Wilcox Peavy, 1934-1940; Frank Llewellyn Ballard, 1940-1941; Francois Archibald Gilfillan (acting), 1941-1942; August Leroy Strand, from 1942.

Income

THE state law creating the Board of Higher Education specified that this body was to "have and exercise control of 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 all 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: a millage appropriation equal to 2.04 mills on all taxable property; certain continuing appropriations from the State for definite purposes; specified sums from the National Government assigned for definite purposes by Congressional acts; income from student tuition and fees; and other sources such as sales, service charges, gifts, etc.

Campus

CORVALLIS (population 13,500), situated in the heart of the Willamette Valley between the Cascade Mountains and the Coast Range, is 85 miles south of Portland and 60 miles from the Pacific Ocean. The climate is remarkably equable, the average annual temperature being about 52 degrees Fahrenheit; rainfall, mostly during the winter months, averages about 42 inches annually. Corvallis has pure mountain water, modern sanitation, good schools, numerous churches, and strong civic and social organizations.

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 campus proper, exclusive of farm and forest lands, includes about 199 acres. It extends from near Ninth Street westward between Monroe and Jefferson streets in a wedge-shaped area to Sixteenth Street, thence in a rectangular form to the Mall (Thirtieth Street). The area from Ninth to Fourteenth Street, known as the East Campus, is a spacious, attractively planted, parklike recreation area and parade ground; it serves also as an outdoor laboratory for engineering students.

The campus buildings are arranged first as colleges or schools, and further are grouped in quadrangles, so planned that expansion can take place without injury to the established buildings and campus areas. Pending erection of new buildings, many of which have already been authorized in the permanent building program, immediate postwar needs have been supplied by temporary structures, moved to the campus from military posts of the Northwest. The location of buildings is shown on the map following page 10.

The East Quadrangle is partly developed, with the Library (built 1918, west wing added 1941) on the north, Agriculture (1909, 1913) and Dairy (1912) on the west, Pharmacy (1924) on the east, and the site for the auditorium on the south. The Museum Building (1899) at present stands at an angle at the southeast corner; along the east side, just outside the quadrangle, are Benton Hall (1889), the Paleontology Laboratory (1889), and Education Hall (1902, 1940). The area south of the East Quadrangle contains the Armory (1910, 1911), the Heating Plant (1923), and the Industrial Building (1947) along the east border, and Waldo Hall (1907) along the west, with a large area in the center devoted to drives, walks, and plantings.

North of the Library are Shepard Hall (1908), the President's House, East Hall, and West Hall. Adjacent to these buildings is an area devoted to large science and engineering groups, of which Chemistry Hall (1939) was the first to be erected. North and east of the Library is the engineering group, including Electrical Engineering (1948), Mines (1913), Physics (1928), Apperson (1883, 1920), Industrial Arts (1908), the Foundry (1899), and the Engineering Laboratory (1920), with space for later buildings. Commerce Hall (1922), the Student Health Service Building (1936), and Margaret Snell Hall (1921), west of Chemistry and north of the West Quadrangle, are each located so as to afford suitable sites for related buildings.

The West Quadrangle is the heart of the present campus, with Agriculture Hall at its east border, Home Economics (1914, 1920) with its neighboring nursery schools at the north, Agricultural Engineering (1912, 1939), the Women's Building (1926), and Kidder (1892) at the west, and the Memorial Union (1928) at the south. South of the Memorial Union are Forestry (1917) and the Men's Gymnasium (1915, 1921), with adjacent Stadium, Bell Field, and other sports facilities.

Between the West Quadrangle and the Mall are the men's and women's quadrangles. The Men's Dormitory Building (1928), Central Dormitory, and Hudson Dormitory, the two latter being temporary dormitories moved to the campus from military posts, occupy the north side of the Men's Quadrangle. Directly across the driveway to the north is the new Women's Dormitory. All these dormitories contain a number of separate halls.

On the north road to the Mall are located, to the north the Greenhouses (1927, 1930) and gardens, and to the south Food Industries (1919, 1923), Agricultural Utilities, and the Veterinary Clinic Building (1918). Across the Mall, facing east, are the Poultry-Veterinary Building (1927) and a number of agricultural buildings, each having limited land areas required for the teaching of the particular subject housed. Between this row of buildings and the farms, the barns and stables, some of which are now east of the Mall, will ultimately be located.

Within the quadrangles at present are located a large number of temporary buildings, many of them being quonset huts, which have been provided for use during the period until permanent buildings can be erected. These buildings provide classrooms, instructional and research laboratories, offices, and space for many other needs.

Each quadrangle is provided with walks convenient to general student circulation and is planted with ornamental trees and shrubs. The plantings serve as living laboratory material for students engaged in landscape and horticultural studies.

Farm and Forest Lands

FOR research and instruction in agriculture the State owns and leases a number of tracts of land in addition to the land on which branch experiment stations are located. Land used jointly for instruction and research includes the main campus and adjoining areas consisting of approximately 1,700 acres. The Agricultural Experiment Station, including the nine branch stations and the five experimental areas, in conducting research with crop and livestock problems, utilizes 21,711 acres, most of which is owned by the counties or the federal government.

The School of Forestry owns and administers a total of 8,602 acres of forest land included in the Peavy Arboretum, the McDonald Forest, and the

Blodgett, Spaulding, and Prospect tracts. The Peavy Arboretum and the McDonald Forest are located seven miles north of the campus and provide very accessible areas for instruction and research. Laboratory classes in many of the forest management and forest engineering courses are held on these adjacent forest lands. Field research studies have been in progress on these areas since 1928.

Library

CONSTRUCTED of brick and gray terra cotta, the Library (1918, 1941) includes the original central unit and the new west wing. It provides at present seating accommodations for 925 readers at one time. Public and service elevators facilitate use of the building. The fireproof stack room includes five decks. The central unit contains the circulation lobby, public catalog lobby, microfilm reader room, reference room, engineering and technology reference room, and periodical room. The west wing contains a well-equipped reserved book room seating 132 readers; a science reference room seating 136 readers; quarters for the Library administrative offices, catalog, order, and serials divisions, and the union catalog of the libraries of the Oregon State System of Higher Education.

Collections. The main working collection of the Library includes the scientific and technical books provided for the instructional and research activities of the different schools and of the experiment stations. The State College is a designated depository for the publications of the United States government and the Carnegie Institution of Washington, and for official publications of the State of Oregon. It was also designated, August 1, 1942, a depository for the current cards of the Library of Congress Catalog. The Library contains a practically complete file of the publications of the United States Department of Agriculture and of the agricultural experiment stations of the various states, as well as agricultural literature from foreign governmental and educational institutions.

The book collection numbered 228,558 volumes on April 1, 1948. Exclusive of the United States government documents, 1,850 periodicals are currently received, including the best scientific and technical magazines. Earlier files of these journals and science proceedings form the background for research and advanced study. Newspapers received by subscription, gift, or exchange total 106. In addition, through unified library administration, all the books (totaling 734,230 on April 1, 1948) in the libraries of the several state institutions of higher education are made available to the students and faculties of all the institutions.

The Library's notable collection of books on the history of horticulture includes rare books on the sixteenth, seventeenth, eighteenth, and nineteenth centuries. There is an excellent file of herd books. The home-economics collection is good, especially in the field of textiles, costume design, and nutrition. A good foundation has been laid for research work in agriculture, biology, food technology, chemistry, pharmacy, and other scientific fields. There are excellent collections on plant pathology, mycology, and entomology. Approximately 34,002 volumes are devoted to science and are located in the science room.

The engineering and technology collection of approximately 22,250 volumes is housed in a special reading room. Progress has been made in the development of source material for graduate study, especially in science and engineering.

Over a period of years the Library has built up a map collection of 7,303 items, which is particularly well adapted to the needs of work in geology, soils, and engineering. A collection of 48,673 pictures has been especially selected to meet the needs of classes in art, household arts, and advertising. Departmental libraries are limited to books needed for laboratory purposes.

The Mary J. L. McDonald Collection of fine books, separately shelved in a room of Jacobean design, numbers 3,113 volumes in fine bindings and special editions. Some of the items are rare and of unusual interest. The present collection is largely the gift or bequest of the late Mrs. McDonald, but notable gifts from other sources have been added from time to time.

Service. The Library is open Monday through Friday from 7:45 a.m. to 10:00 p.m., on Saturdays from 7:45 a.m. to 5:00 p.m., and on Sundays from 2:00 to 5:00 p.m. It is closed on legal holidays.

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 if their work requires it. Graduate students and seniors are admitted to the stacks by permission of the Librarian.

Books are freely borrowed from and loaned to all the libraries in the Oregon State System of Higher Education. In addition, chiefly through the facilities of the Pacific Northwest Bibliographic Center, books are borrowed from and loaned to other libraries in the Pacific Northwest and throughout the nation.

Library Fines and Charges. The following regulations govern Library fines and charges:

(1) A fine of 5 cents per day is charged for all overdue books borrowed from the Circulation Department.

(2) All books especially needed for use at the Library are subject to recall at any time and should be returned promptly when requested. A maximum fine of \$1.00 per day may be imposed for failure to comply with this request.

(3) The following fines are charged for violation of the rules of the Reserve Department: (a) for overdue books, a regular fine of 25 cents for the first hour and 5 cents for each succeeding hour, or fraction thereof, until the book is returned or reported lost (a maximum charge of \$1.00 per hour may be made in cases of flagrant violation of the rules); (b) for failure to recheck books at stated times, a fine of 25 cents; (c) for failure to return books to proper department desk, a fine of 25 cents.

(4) A service charge of 10 cents is added to all accounts reported to the Business Office for collection.

(5) If a book, which has been reported lost and has been paid for, is returned within one year, refund will be made after deduction of the accumulated fines, plus 5 per cent of the list price of the book for each month it was missing from the Library.

Unified Facilities. The library facilities of the state institutions of higher education in Oregon are organized into a single unit under the supervision of a director, with a local librarian on each campus. The director is also librarian of the State College at Corvallis, where the 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 published material. It has also proved most valuable as a checking source for bibliographical resources of the system. An author list of books in the State College Library is maintained at the University Library.

Museums and Collections

MUSEUMS and collections maintained by Oregon State College include scientific, industrial, historical, and art material classified and arranged for effective study and enjoyment. Special exhibitions, including occasional loan collections, are shown from time to time in the Horner Museum, the Home Economics Building, the Memorial Union, Kidder Hall, and elsewhere on the campus.

The Horner Museum of the Oregon Country

LULA MARY STEPHENSON.....Curator

The Horner Museum of the Oregon Country is the repository of notable collections of historic, scientific, industrial, and artistic interest. The Museum was formally opened February 20, 1925. In 1933 it was moved to its present quarters, and in 1934 was named for the late Dr. J. B. Horner, for many years Professor of History and Director of Oregon Historical Research. Dr. Horner was active in the early development of the Museum, and served as its first director.

Among the largest collections are mounted animals and birds; historical and other relics; zoological specimens; geological specimens; fluorescent minerals displayed under ultra-violet light; articles from prehistoric burial grounds; baskets and other Indian relics; bones of prehistoric animals, including one of the three largest mastodon tusks ever found; historic guns and weapons and World War I trophies; trophies from the South Pacific war district, World War II; war implements of savage tribes of South America, Africa, the Philippine Islands; animal skins from Portuguese East Africa and objects made by the natives; marine shells; paintings and sculptures; antiques; oriental fabrics, embroideries, old china, old brasses and bronzes, etc., including the valuable collection in the name of Mr. and Mrs. Louis J. Clarke; three old square pianos, one of which came around Cape Horn in a sailing vessel and up the Valley by ox team, another made in the eighteenth century; old-style organs; the famous Hank Monk stagecoach; and a great many other types of exhibits, all representing approximately twelve thousand articles from more than four hundred donors.

Valuable material is added from time to time through loans and gifts of particular interest to the College and to the public. Information concerning desirable collections that might be available either as gifts or as loans is solicited.

The Museum is administered by the Curator. A Museum Committee composed of five faculty members serves in an advisory capacity as needed.

The William Henry Price Memorial Collection of Paintings

The William Henry Price Memorial Collection of Paintings, formally opened in the Memorial Union on Charter Day, October 27, 1943, includes fifty pictures, chiefly western landscapes and marines, by the late William Henry Price of Pasadena, California. The collection came to the campus through the generosity of Mrs. William Henry Price (Sarah B. Price), and Mr. Mark B. Price, son of W. H. Price, who have presented twenty-four of the paintings as a permanent gift to Oregon State College. Mrs. Price and Mr. Mark B. Price have authorized the placing of one of the paintings in the President's Office; one is a gift to the Horner Museum; the others remain in the Memorial Union. All of the paintings are characterized by individuality, vigor, and dis-

tinctive technique; several have won prizes at exhibitions in Los Angeles, Pasadena, and San Francisco. Custody of the collection on behalf of the College has been entrusted to a committee composed of E. C. Allworth, Mrs. J. M. Clifford, and Dorothy Bourke Fox.

The Herbarium

HELEN MARGARET GILKEY, Ph.D. Curator
 Herbarium Technician

THE Herbarium contains more than 109,000 named specimens of flowering plants, ferns, mosses, algae, and fungi. The mycological section houses 40,000 packets of fungi of pathological importance; also the Henry Gilbert gift collection of 2,318 specimens of myxomycetes. Two hundred and forty-two photographs of types of northwestern plants and a seed collection of 2,300 numbers add to the usefulness of the Herbarium. Oregon leads in number of specimens, but other parts of the United States, and foreign countries, also are represented. The largest foreign collection is from Australia.

The Braly Ornithological Collection

KATHERINE PATRICIA BRALY Technical Adviser

The Braly ornithological collection consists of more than a thousand mounts, several thousand skins, and the largest and most complete assemblage of bird eggs in the Northwest. This collection, together with other collections of bird skins and mounts at Oregon State College, forms a complete ornithological unit suited to both research and exhibition. Research students in zoology, fish and game management, and certain phases of agriculture will find the collection indispensable. The exhibit is housed in the Natural History Building.

The Zoological Collections

The zoological collections, housed in and adjacent to the zoological laboratories, include minor collections of marine invertebrates, fishes, reptiles and amphibians, and small mammals. An ornithological collection quite representative of the local bird life supplements the Braly collection described above.

The Entomological Collection

The entomological collection contains nearly 200,000 specimens of insects; of these 96,500 are named. About 90 per cent are from Oregon, the remainder being from various regions of the country and about 3,000 from foreign lands. Orders represented are: Coleoptera 19,000, Hymenoptera 30,000, Diptera 9,000, Lepidoptera 3,000. Other orders constitute the remainder. The collection now contains more than 285 types, paratypes, and cotypes; *types* are the specimens in the hands of the authorities when the species are first described. A microscope slide collection contains 2,100 minute and fragile forms. During recent years several thousand specimens of considerable value have been donated to the insect collection of Oregon State College. Notable among these donations is a collection of several thousand exotic insects, mostly Lepidoptera, by Mrs. C. W. Herr as a memorial to her husband.

Special attention is being paid to Oregon aquatic insects, of which are included 4,800 vials of preserved specimens. A collection of 820 authentically determined specimens is housed in a special rack system. Arthropods of medical and veterinary importance are receiving attention.

A special student reference collection containing 8,000 forms has been prepared. Specimens are mounted in permanent transparent-topped tin boxes and so arranged that the important taxonomic characters are visible. Illustrated keys to the orders of insects, accompanied by the actual specimens, have been arranged in glass-topped display boxes. Life histories of the most important insects are contained in 450 glass-topped Riker mounts. A catalog of Oregon insects is in the process of preparation.

The Geological Collections

The geological collections include minerals, ores, rocks, invertebrate fossils, some vertebrate fossils, and a large collection of fossil plants. The mineral collection includes more than 700 species arranged according to the Dana classification and at least one specimen, and in some cases several, of nearly all of the minerals listed by Dana. The ore-deposit collection includes one or more samples for each mineral arranged according to the Lindgren classification of ores. In addition, there are 300 hand specimens of rocks representing a wide variety of types taken from the classical localities of the world. This collection is supplemented by 150 samples arranged according to Harker's book on igneous rocks. There are also on file thin sections of each of these rocks. The geological collections are housed in Education Hall; the paleontological collections are in the Paleontology Laboratory.

Official Publications

OFFICIAL publications include those issued directly by the State Board of Higher Education and various institutional publications issued by Oregon State College. The legislative act placing all the state institutions of higher education under the control of one Board provided that all public announcements pertaining to the several institutions "shall emanate from and bear the name of the Department of Higher Education and shall be conducted in such a way as to present to the citizens of the state and prospective students a fair and impartial view of the higher educational facilities provided by the state and the prospects for useful employment in the various fields for which those facilities afford preparation." All publications of the State System are issued under the editorial supervision of the Division of Information of the System, through the central offices of the division or through institutional offices.

System Publications

Announcements emanating directly from the Board are published in a **BULLETIN** and in a **LEAFLET SERIES**.

The **Bulletin** of the Oregon State System of Higher Education, issued monthly, includes announcements of curricula, the annual catalogs, information for students, and official reports.

The **Leaflet Series** of the State System of Higher Education, issued semimonthly, includes special announcements to prospective students and to the general public.

State College Publications

All Oregon State College scholarly and research publications, except those issued through the Agricultural Experiment Station and the Engineering Experiment Station, are under the general administration of the State College

Publications Committee. The committee also has control over any subject-matter periodicals that may be issued by the institution. Members of the committee are: E. C. Gilbert, chairman; D. M. Goode, secretary; R. S. Besse, S. H. Graf, E. L. Packard.

Oregon State Monographs. Research studies by staff members are selected and published on behalf of Oregon State College by the Publications Committee in a series known as OREGON STATE MONOGRAPHS. The monographs are sold at cost. A list of the monographs will be supplied on request to the Office of Publications.

Biology Colloquium Proceedings. The proceedings of the annual Biology Colloquium are published by the Oregon State Chapter of Phi Kappa Phi in collaboration with the honor society of Sigma Xi and the School of Science. Copies are sold at cost.

Agricultural Experiment Station Publications. The Station BULLETINS include reports and monographs on research and experimental investigations conducted at the central station or at the several branch stations. The Station also issues series of HOME ECONOMICS BULLETINS, TECHNICAL BULLETINS, CIRCULARS, a mimeograph series of CIRCULARS OF INFORMATION, and occasional pamphlets and reports. Single copies of experiment station publications are supplied free to residents of Oregon who request them.

Extension Publications. The Federal Cooperative Extension Service publishes a series of BULLETINS meeting the demand for scientific knowledge in popular form, especially with reference to its application to everyday life. The subjects covered by these publications include the various phases of agriculture, agricultural economics, home economics, agricultural engineering, and applied science. A series of OUTLOOK CIRCULARS deals with the outlook in respect to major lines of agricultural production. Twenty-one different series of 4-H Club Bulletins are issued. The Extension Service also publishes occasional miscellaneous circulars, posters, and reports. Single copies of extension bulletins are supplied free to residents of Oregon who request them.

Engineering Experiment Station Publications. These include series of BULLETINS, CIRCULARS, and REPRINTS, reporting progress in engineering research. The engineering publications are distributed at cost on request.

Academic Regulations

Admission

IN ORDER to be admitted to Oregon State College a student must be of good moral character and must present evidence of acceptable preparation for work at the college level. The development of character is regarded as a primary aim in education and is emphasized at all the state institutions of higher education.

Every person applying for admission to the regular sessions of the State College must submit complete records of all his high-school and his college work, if any. (These records become the property of Oregon State College. For failure to have submitted complete records the State College may cancel the student's registration.) Every applicant must also submit a completed "Application for Admission," Form A. The application form may be obtained from the Office of the Registrar, Oregon State College. All materials should be filed with the Registrar of the State College at least two weeks before the applicant expects to enter the institution. If materials are filed later, the student's registration may be unavoidably delayed. The Registrar will evaluate the records submitted and will notify the applicant of his entrance standing. When the institution is physically unable to accommodate all qualified students who apply, preference will be given to Oregon residents.

A person applying for admission to freshman standing must submit a record of his high-school work on an official application form. Copies of this form may be obtained from high-school principals or from the Registrar of Oregon State College. The record must be certified by the principal or superintendent of the applicant's school. A person applying for admission with advanced or graduate standing must submit a certified transcript of previous college work (and a record of high-school work if this is not included on the college transcript) indicating honorable dismissal.

Admission to Freshman Standing

The requirements for admission to first-year or freshman standing conform to the following uniform entrance requirements adopted by all the institutions of higher education in Oregon:

Graduation from a standard high school, which in Oregon involves the completion of 16 units, 8 of which are required as follows: 3 units in English; 2 units in social science, comprising the state-adopted courses in United States history-civics and socio-economic problems; 1 unit in health and physical education; and 2 units selected from the fields of natural science and mathematics or the field of foreign language. Two units in either natural science or mathematics or 1 unit in each of these subjects will be acceptable; but a minimum of 2 units in a single language will be required if a foreign language is selected. In order to be admitted to any of the four-year curricula in engineering, except industrial arts, a student must present one unit in elementary algebra, one-half unit in higher algebra, and one unit in plane geometry. A student deficient in mathematics for engineering may be admitted to the Lower Division, where he will be registered until he is fully prepared to change.

Graduates from standard out-of-state high schools are required to present substantially the same distribution of subject-matter units, but are required to show higher scholastic records.

Admission with Advanced Standing

Advanced standing is granted to students transferring with acceptable records from accredited institutions of collegiate rank. The amount of credit granted depends upon the nature and quality of the applicant's previous work, evaluated according to the academic requirements of Oregon State College.

No advanced standing is granted at entrance for work done in nonaccredited collegiate institutions. After three terms of satisfactory work at Oregon State College a student may petition for credit for courses taken in such institutions. Credit is granted only for courses that have been equated with work regularly offered by Oregon State College. Examinations may be required by the department concerned before credit is granted.

Admission as Special Student

Two classes of special students are recognized: (1) those not qualified for admission as regular students but qualified by maturity and experience to work along special lines; and (2) those qualified for admission as regular students who are not working toward a degree.

An applicant for admission as a special student should be not less than 21 years of age and must file with the Registrar documentary evidence sufficient to prove his special fitness to pursue the subjects desired.

A special student may petition for regular standing when he has made up entrance deficiencies or has completed at least 45 term hours in the State College with a grade-point average of 2.50 or better. Credits earned by a special student will not subsequently be counted toward a degree until the student has completed at least two years of work (93 term hours) as a regular student. In case a regular student changes to special status, work done while classified as a special student will not count toward a degree.

Admission with Graduate Standing

Graduates of accredited colleges and universities are admitted to graduate classification by the dean of the Graduate School and the State College Registrar on presentation of an official transcript of their undergraduate work. But admission to candidacy for an advanced degree is determined only after a qualifying examination, given when a student has completed not more than one-third of the work for the degree.

A graduate of a nonaccredited institution may be admitted provisionally as an unclassified student. 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 Division and for graduate credit for courses that he has completed acceptably while registered as an unclassified student.

Placement Examinations

TO PROVIDE the faculty with a basis for reliable advice and assistance to students planning their college programs, Oregon State College requires entering undergraduates to take placement and physical examinations.

The psychological examination is considered to some extent a measure of ability to do college work, and the results are used as a basis for planning the student's educational and vocational program. Students who have taken the American Council on Education psychological examination at another institution may be exempt from taking the State College examination on submitting a certified copy of the scores obtained.

The examination in English covers the fundamental principles of grammar and tests the student's ability to apply these principles in writing. Students who make the best scores in this examination may be exempt from the first term of English Composition (Eng 111). Students failing to obtain a satisfactory rating in this examination are required to take and pass English K before registering for work in English Composition.

The physical examination is a safeguard both to the institution and to the student. For the student, it may result in the discovery and correction of defects which, if allowed to continue, might seriously impair his health; for the institution it may result in the prevention of epidemics which might develop from undiagnosed cases of contagious disease. The examination also provides a scientific basis for the adjustment of the student's physical-education program to his individual needs.

All entering students intending to take mathematics during their freshman year are required to take a placement examination on the basis of which their college work in mathematics is determined.

Degrees and Certificates

OREGON State College offers curricula leading to certificates on the completion of two years' work, and to baccalaureate and graduate degrees. If changes are made in the requirements for degrees or certificates, special arrangements may be made for students who have taken work under the old requirements. In general, however, a student will be expected to meet the requirements in force at the time he plans to receive a degree or certificate. Oregon State College grants the following academic degrees:

- Science, *B.A., B.S., M.A., M.S., Ph.D.*
- Agriculture, *B.S., B.Agr., M.S., Ph.D.*
- Business and Technology, *B.A., B.S., B.S.S.*
- Education, *B.A., B.S., Ed.B., M.A., M.S., Ed.M., Ed.D.*
- Engineering and Industrial Arts, *B.A., B.S., B.I.A., M.A., M.S., Ch.E., C.E., E.E., M.E., Met.E., Min.E., Ph.D.*
- Forestry, *B.S., B.F., M.S., M.F., F.E.*
- Home Economics, *B.A., B.S., M.A., M.S., Ph.D.*
- Naval Science, *B.A., B.S.*
- *Nursing Education, *B.A., B.S.*
- Pharmacy, *B.A., B.S., M.A., M.S.*

Either Military Science or Naval Science may be taken by men as a co-major in any school.

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

Lower-division work leading to certificates (*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, music, and physical education. Approved preparation is also offered for the degree curricula in medicine, dentistry, and nursing education at the University of Oregon Medical and Dental schools in Portland.

* Conferred on students who take the Preparatory Nursing Curriculum at Oregon State College and complete their curriculum at University of Oregon Medical School.

Requirements for Certificates

The Junior Certificate admits to upper-division standing and the opportunity to pursue a major curriculum leading to a degree.* A student is expected to fulfill the requirements for the Junior Certificate during his first two years at Oregon State College. The requirements are as follows:

- (1) Term Hours: Minimum, 93.†
- (2) Grade-Point Average: Minimum, 2.00.
- (3) English:
 - (a) Freshmen who do not obtain a satisfactory rating in the English placement examination required upon entrance must take and pass the course designated English K.
 - (b) English Composition: 9 term hours unless excused. A student whose work meets the standards aimed at may, at the end of any term, with the consent of the head of the Department of English, be excused from further required written English.
- (4) Physical Education: 5 terms in activity courses unless excused.
- (5) Military Science: 6 terms for men unless excused.‡. See MILITARY SCIENCE AND TACTICS.
- (6) General Hygiene.
- (7) Group requirements: A prescribed amount of work selected from three "groups" representing comprehensive fields of knowledge. The three groups are: literature, science, social science. (For a classified list of courses satisfying the group requirements, see pages 135-137.) The group requirements are as follows:
 - (a) For students in liberal arts and sciences—At least 9 approved term hours in each of the three groups and at least 9 additional approved term hours in courses numbered 200-210 in any one of the three groups.
 - (b) For students in the professional and technical schools—At least 9 term hours in each of two of the following groups: (1) English literature or upper-division foreign language; (2) science; (3) social science. If a student cannot meet this requirement by the end of the sophomore year, fulfillment may be deferred by agreement between the dean of the school concerned and the Academic Requirements Committee, such agreement to be filed in the Registrar's Office.

The Junior Certificate with Honors Privileges admits to upper-division standing and permits the student to work for a bachelor's degree with honors in those colleges and schools providing an honors program. For this certificate the student must have a grade-point average of at least 2.75, in addition to fulfilling all the requirements for the Junior Certificate.

The Lower-Division Certificate recognizes the successful completion of two years of lower-division work. This certificate is granted upon request to

* A student who transfers to Oregon State College after completing the equivalent of the requirements for the Junior Certificate at another institution may be admitted to upper-division standing without the formal granting of the Junior Certificate.

† In schools having a graduation requirement of 204 term hours, students should present 96 hours for the Junior Certificate.

‡ Advanced-standing credit in military science and tactics is granted veterans on a basis of rank held in Army or Navy, less the credit already earned in college. Commissioned and warrant officers are allowed 24 term hours of credit; the various pay grades are allowed credit as follows: first pay grade, 21 hours; second, 18; third, 15; fourth, 12; fifth, 9; sixth and seventh, 6.

students whose desire has been only to round out their general education. It does not require the scholastic average specified for the Junior Certificate, and does not admit to upper-division standing.

The Certificate in Agriculture recognizes the completion of the Two-Year Curriculum offered by the School of Agriculture. For this certificate students must meet requirements (3), (4), (5), and (6) specified for THE JUNIOR CERTIFICATE, must complete 9 term hours of science and 9 term hours of either language and literature or of social science, must complete a minimum of 85 term hours including 43 term hours in agriculture, and must have the dean's recommendation certifying fulfillment of all requirements of the School of Agriculture.

Requirements for Degrees

The Bachelor's Degree. When a student has fulfilled all the requirements for a Junior Certificate, he is classified as an upper-division student and may become a candidate for a bachelor's degree in the college or school of his choice. The requirements for a bachelor's degree (including both lower- and upper-division work) are as follows:

- (1) Term Hours: Minimum, 192 (in Engineering and Forestry, 204), including—
 - (a) Hours in upper-division courses: Minimum, 45.
 - (b) Hours in the major: Minimum, 36, including at least 24 in upper-division courses.*
 - (c) Hours after receipt of Junior Certificate: Minimum, 45.
- (2) Required distribution of hours for different bachelor's degrees:
 - (a) Bachelor of Arts: 36 hours in arts and letters†, including two years (normally 24 term hours) of college work in a foreign language.
 - (b) Bachelor of Science: 36 hours in science or 36 hours in social science or 45 hours in science and social science.
 - (c) Professional bachelor's degree: Fulfillment of all major requirements.
- (3) Grade-Point Average:
 - (a) Minimum 2.00 on all college work, and on all work taken in residence at this institution.
 - (b) Minimum 2.00 on last 45 hours for which registered.
- (4) Residence: Minimum, 45 term hours (normally the last 45).
- (5) Dean's recommendation, certifying fulfillment of all requirements of major department or school.
- (6) Restrictions:
 - (a) Correspondence Study: Maximum, 60 term hours.
 - (b) Law: Maximum, 48 term hours.
 - (c) Medicine: Maximum, 48 term hours.
 - (d) Applied Music: Maximum, 12 term hours.

Advanced Degrees. The requirements for advanced degrees are listed on another page under GRADUATE SCHOOL.

* Students majoring in Business and Technology are required to take not less than 36 term hours in a technical minor to be chosen from the following fields: Agriculture, Engineering, Forestry, Home Economics, Industrial Chemistry, Mining or Petroleum Geology, and Applied Physics. No more than 9 of the 36 hours may be taken in basic prerequisite or necessary related courses. The technical minors are printed on pages 248-252.

† English, Modern Languages, Speech.

Academic Procedure

THE regular academic year throughout the State System of Higher Education is divided into three terms of approximately twelve weeks each. The summer sessions supplement the work of the regular year (see special announcements). Students may enter at the beginning of any term. It is important that freshmen and transferring students entering in the fall term be present for Freshman Week (see page 77). A detailed calendar for the current year will be found on pages 8-9.

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

Definitions

A **COURSE** is a subject, or an instructional subdivision of a subject, offered through a single term.

A **YEAR SEQUENCE** consists of three closely articulated courses extending through the three terms of the academic year.

A **CURRICULUM** is an organized program of study arranged to provide integrated cultural or professional education.

A **TERM HOUR** is 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 lecture, recitation, laboratory, or other periods per week for any course may be found in the course descriptions in this Catalog, or in the separately published **SCHEDULE OF CLASSES**.

Course Numbering System

Courses throughout the State System of Higher Education are numbered as follows:

- 1-99. Courses in the first two years of foreign language, or other courses of similar grade.
- 100-110, 200-210. Survey or foundation courses that satisfy the lower-division group requirements in the language and literature, science, and social science groups.
- 111-199, 211-299. Other courses offered at first-year and second-year level.
- 300-399. Upper-division courses not applicable for graduate credit.
- 400-499. Upper-division courses primarily for seniors. If approved by the Graduate Council, these courses may be taken for graduate credit. In this catalog, courses numbered 400-499 if approved for graduate *major* credit are designated (G) following the title. Courses approved for graduate *minor* credit only are designated (g).
- 500-599. Courses primarily for graduate students but to which seniors of superior scholastic achievement may be admitted on approval of instructor and department head concerned.

600-699. Courses that are highly professional or technical in nature and may count toward a professional degree only and cannot apply toward an advanced academic degree such as M.A., M.S., or Ph.D.

Certain numbers are reserved for courses that may be taken through successive terms under the same course number, credit being granted according to the amount of acceptable work done. These course numbers are as follows:

301, 401, 501. Research or other supervised original work.

303, 403, 503. Thesis (reading or research reported in writing).

305, 405, 505. Reading and Conference (individual reading reported orally to instructor).

307, 407, 507. Seminar.

The following plan is followed in numbering summer-session courses:

- (1) A summer-session course that is essentially identical with a course offered during the regular year is given the same number.
- (2) A summer-session course that is similar to a course offered during the regular year, but differs in some significant respect, is given the same number followed by "s."
- (3) A course offered during the summer session which does not parallel any course offered during the regular year is given a distinctive number followed by "s."

Grading System

The quality of student work is measured by a system of grades and grade points.

Grades. The grading system consists of four passing grades, A, B, C, D. The grade of A denotes exceptional accomplishment; 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. The grade-point average that is used as a standard of acceptable scholarship and as a requirement for graduation is computed on all work for which the student receives credit—including work for which credit is transferred, correspondence study, and work validated by special examination.

Scholarship Regulations

The administration of the regulations governing scholarship requirements is vested in a faculty committee. This committee has discretionary authority to study the record of every student receiving a grade-point average below 2.00 (C). Any student with a term or cumulative grade-point average below 2.00 may be given a warning, be placed on probation, or even suspended.

(1) A freshman student is automatically placed on probation if his grade-point average for any term is below 1.50. A freshman or sophomore will not be released from probation until such time as he is doing profitable and creditable work. In general, profitable and creditable work means maintaining a grade-point average of 2.00 or better. A sophomore student is automatically placed on probation if his grade-point average for any term is below 1.75.

(2) An upper-division student is automatically placed on probation if his grade-point average for any term falls below 1.75, or his cumulative grade-point average below 2.00. He is not released from probation until his grade-point average for a subsequent term is at least 2.00 and his cumulative grade-point average is at least 2.00.

The scholarship requirements for participation in student extracurricular activities are printed on page 100.

Fees and Deposits

STUDENTS at Oregon State College and at the University of Oregon pay the same fees. In the fee schedule printed below, *regular fees* are those fees paid by all students under the usual conditions of undergraduate or graduate study. Regular fees are payable in full at the time of registration. *Special fees* are fees paid under the special conditions indicated.

The institution reserves the right to change the schedule of tuition and fees without notice.

Payment of the stipulated fees entitles all students registered for academic credit (undergraduate and graduate, full-time and part-time) to all services maintained by the State College for the benefit of students. These services include: use of the State College Library; use of laboratory and course equipment and materials in connection with courses for which the student is registered; medical attention and advice at the Student Health Service; use of gymnasium equipment (including gymnasium suits and laundry service); a subscription to the student daily newspaper; admission to athletic events; admission to concert and lecture series sponsored by the State College. No reduction in fees is made to students who may not desire to use some of these privileges.

Regular Fees

Undergraduate Students. Undergraduate students enrolled in the State College at Corvallis who are residents of Oregon pay regular fees each term of the regular academic year, as follows: tuition, \$10.00; laboratory and course fee, \$12.00; incidental fee, \$15.50; building fee, \$5.00. The total in regular fees, which includes all laboratory and other charges in connection with instruction, is \$42.50 per term.*

Undergraduate students who are not residents of Oregon pay the same fees as Oregon residents, and, in addition, a nonresident fee of \$50 per term, making a total of \$92.50 per term.*

* See footnote on next page.

The regular fees for undergraduate students for a term and for a year may be summarized as follows:

Fees	Per term	Per year
Tuition	10.00	30.00
Laboratory and course fee	12.00	36.00
Incidental fee	15.50	46.50
Building fee	5.00	15.00
*Total for Oregon residents	\$ 42.50	\$127.50
*Total for nonresidents (who pay an additional nonresident fees of \$50.00 per term)	\$ 92.50	\$277.50

Graduate Students. All graduate students registered for seven term hours of work or more pay a fee of \$39.00 a term. Graduate students do not pay the nonresident fee. Students holding graduate or research assistantships or fellowships pay fees totaling \$17.50 per term. Graduate students registered for 6 hours of work or less pay the regular part-time fee. Payment of the graduate fee entitles the student to all services maintained by the State College for the benefit of students.

Deposits

Persons who enroll for academic credit (except staff members) must make a deposit of \$5.00, 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.

Special Fees

The following special fees are paid by students under the conditions indicated:

Matriculation Fee\$5.00

Students registering in Oregon State College for the first time pay a matriculation fee of \$5.00. This fee is not refundable.

Part-Time Fee per term, \$12.50 to \$28.50

Students (undergraduate or graduate) who register for 6 term hours or less pay, instead of the regular registration fees, a part-time fee in accordance with the following scale: 1 term hour, \$12.50; 2 term hours, \$12.50; 3 term hours, \$16.50; 4 term hours, \$20.50; 5 term hours, \$24.50; 6 term hours, \$28.50. Students registered for 6 term hours or less do not pay the nonresident fee. Payment of the part-time fee entitles the student to all services maintained by the State College for the benefit of students. See also REGISTRATION-IN-ABSENTIA fee below.

Staff Feeper term hour, \$3.00

On approval of the President's Office, full-time staff members registering for College courses pay a special staff fee of \$3.00 per term hour. Payment of this fee entitles staff members to instructional and library privileges only.

Auditor's Feeper term hour, \$3.00

An auditor is a person who has obtained permission to attend classes without receiving academic credit. The auditor's fee is payable at the time of registration and entitles the student to attend classes, but to no other institutional privileges. Students regularly enrolled in the State College may be granted the privileges of an auditor without paying the auditor's fee.

* Except special fees for instruction in applied music (see MUSIC) and in pilot training (see GENERAL ENGINEERING). Undergraduate students registering in Oregon State College for the first time pay a matriculation fee. See SPECIAL FEES.

Late-Registration Fee.....	\$1.00 to \$5.00
Students registering after the scheduled registration dates of any term pay a late-registration fee of \$1.00 for the first day and \$1.00 for each additional day until a maximum charge of \$5.00 is reached. Part-time students (see above) and auditors are not required to pay the late-registration fee.	
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 canceled during a term for failure to comply with the regulations of the institution, but is later allowed to continue his work, he must pay the reinstatement fee.	
Special-Examination Fees.....	\$1.00 to \$10.00
A student pays a fee of \$1.00 per term hour for the privilege of taking an examination for advanced credit, or other special examinations. A graduate student taking his preliminary or final examination at a time when he is not registered for academic work pays an examination fee of \$10.00.	
Registration-in-Absentia Fee.....	\$10.00 to \$24.00
This fee is paid at the rate of \$4.00 per term hour for work taken in absentia up to 6 term hours; minimum fee \$10.00.	
Transcript Fee	\$1.00
This fee is charged for each transcript of credits issued after the first, which is issued free of charge. This fee is not charged persons entering military service.	
Degree Fee	\$6.50
The degree fee is paid for each degree taken. No person may be recommended for a degree until he has paid all fees and charges due the institution, including the degree fee. When a student receives a certificate at the same time that he receives his degree, an additional fee of \$2.50 is charged for the certificate.	
Counseling and Testing Service Fee.....	\$5.00
Pilot Training Fee.....	See GENERAL ENGINEERING
Placement-Service Fees	See SCHOOL OF EDUCATION
Special Music-Course Fees	See MUSIC
Library Fines and Charges	See LIBRARY

Refunds

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

(1) Any claim for refund must be made in writing before the close of the term in which the claim originated.

(2) Refunds in all cases are calculated from the date of application for refund and not from the 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.

Deposit Refunds. The \$5.00 deposit, less any deductions which may have been made, is refunded about three weeks after the close of the academic year. Students who discontinue their work at the State College before the end of the year may receive refunds upon petition to the Business Office, about three weeks after the close of the fall or winter term.

Regulations Governing Nonresident Fee

The Oregon State Board of Higher Education has defined a nonresident student as a person who comes into Oregon from another state for the purpose of attending one of the institutions under the control of the Board.

In order to draw a clear line between resident and nonresident students the Board has ordered that all students in the institutions under its control who have not been domiciled in Oregon for more than one year immediately preceding the day of their first enrollment in the institution shall be termed nonresident students, with the following exceptions:

- (1) Students whose father (or mother, if the father is not living) is domiciled in the state of Oregon.
- (2) Children of regular employees of the Federal Government stationed in the state of Oregon.
- (3) Students holding bachelor's or higher degrees from higher educational institutions whose work is acceptable as preparation for graduate work.
- (4) Students in summer sessions.

Student Life and Welfare

Coordination of Student Interests

THE total experience of a student while attending Oregon State College should result in satisfactory growth socially, emotionally, and educationally.

Primary responsibility for student welfare is shared by the Offices of the Dean of Women, the Dean of Men, and the Personnel Coordinator. Student welfare includes personnel services, student living, social and activity programs, loan funds, scholarships and fellowships, and honors and awards. The three offices cooperate with the Office of the Registrar in maintaining complete permanent personnel records for each student attending Oregon State College, and the offices are vitally concerned with student orientation, employment, loans, placement, and follow-up.

Deans of Students. The Dean of Women and the Dean of Men have specific responsibilities for standards of student living and for coordinating the social and activity programs of the campus. They work with individuals in counseling and guidance as part of the personnel program. They work closely with groups through student organizations and councils in developing sound student leadership and participation.

Personnel Coordinator. The Personnel Coordinator is primarily responsible for coordination of the various student personnel agencies of the institution and for assisting in the promotion of an efficient student personnel service in each school or division of registration. The following personnel groups work in cooperation with and under the direction of the Personnel Coordinator: Head Counselors, Testing and Counseling Bureau, Clinical Services, and Academic Deficiencies Committee.

Head Counselors. Head Counselors are the appointees of the deans of the respective schools and are responsible for the personnel program in their several school organizations. Head counselors are: Lower Division, Donald A. Wells; Science, W. M. Atwood; Agriculture, W. M. Langan; Business and Technology, R. K. Campbell; Education, H. R. Laslett; Engineering, G. W. Holcomb; Forestry, W. F. McCulloch; Home Economics, Ava B. Milam; Pharmacy, H. C. Forslund.

Guidance. The department of student personnel makes available to all students the advisory and guidance services of the entire institution. Individual students are invited to use the services as they desire. Individual records are scrutinized and particular attention is given to any student not measuring up to his possibilities. When causes of poor accomplishment can be ascertained, suggestions for improvement are offered.

Testing and Counseling Bureau. The College maintains a testing and counseling service under the direction of Dr. R. R. Reichart that is available to assist the student in determining his or her aptitude and ability to do college work, in determining interest and aptitude for work in a particular academic or vocational field, and in determining causes of difficulties.

Clinical Services. Personnel workers are expected to make full use of departments qualified to render clinical services. The clinical services are able to provide advice concerning student welfare and academic programs. Services

available are: psychological, O. R. Chambers; health, D. C. Reynolds; religious education, E. W. Warrington; speech, E. W. Wells; remedial reading, English Department; methods of study, R. R. Reichart.

Academic Deficiencies Committee. The Academic Deficiencies Committee is responsible for the administration of the regulations of the State College governing student scholarship. The committee is in close cooperation with the head counselors, attempts to learn causes for poor student accomplishment, and promotes policies and procedures deemed advisable for improvement of scholastic status of students in general.

Faculty-Student Committees. Other committees concerned with student personnel and welfare are: the Committee on Student Interests, including student as well as faculty members, which assists students with social and living problems; the Committee on Student Housing, which assists students in making proper adjustments relative to housing and boarding; the Committee on Health and Sanitation, which takes initiative in the development and maintenance of high standards of health and sanitation in the various places of student residence; the Committee on Religious Education, which concerns itself with coordinating the various campus religious agencies, and serves as a connecting link between the religious work on the campus and the various local churches; the Committee on Educational Activities, including both student and faculty members, which promotes and supervises the various student educational activities. The Student Employment Bureau, the Student Health Service, the Student Loan Fund administration, and other agencies of student welfare, are described on later pages.

Freshman Week. Freshman week, a program of orientation for entering undergraduate students, is held annually the first week of the fall term. By means of general assemblies, group lectures and discussions, individual conferences, and examinations and tests (see pages 68-69), an effort is made to assist every new student in getting the best possible start in his new work. During Freshman Week new students become acquainted with the aims of higher education, the principles governing the wise use of time and money, methods of study, and the ideals and traditions of Oregon State College. Directions concerning Freshman Week and registration are sent three weeks before the opening of the term to each new student who is accepted for admission.

The tests given entering students during Freshman Week are not entrance examinations but placement tests. They provide the State College faculty with reliable information as a basis for advising and assisting students in planning their college programs. Each entering student will receive from the Registrar a detailed program of the Freshman Week activities. The student should follow this schedule faithfully, in order to avoid delay in registration and to gain as much as possible from his first week in college.

The 1948-49 session of Oregon State College officially opens for new undergraduate students on Monday, September 13, 1948; the first freshman assembly and the first events of Freshman Week are scheduled for 8:00 a.m. that day. New students should arrive on the campus by Sunday, September 12, in order to be ready for the opening of Freshman Week Monday morning. Rooms in the dormitories will be available Sunday, September 12. Meals will be served beginning Sunday evening.

Placement. In all of the schools the placement of graduates is recognized as an important concern of the faculty generally, and especially of the dean's office. Each school maintains vital contacts with the professional fields for

which its curricula give preparation, and is thus enabled to be of greater service both to the profession and to graduates. The demands of the professions and the industries are taken into account in the revision of courses of study. Assistance is regularly given to students in finding work for which they are qualified by personality and training. In the counseling of students special assistance is given to the selection of a program of studies for each student that will develop his particular abilities and at the same time prepare him for some type of service for which there is demand.

The aid given students in obtaining part-time and vacation jobs is described under SELF-SUPPORT (pages 84-85). The Teacher Placement Service is described under SCHOOL OF EDUCATION.

Student Living

COMFORTABLE, healthful, and congenial living conditions contribute much to the success of college life and work. Living conditions of the right kind not only provide opportunity for students to do their best in their studies but also through the experiences of group life contribute to the student's total education as a person. Democratic house organization and activities are a valid part of the educational experience of the college student.

All living arrangements for men are under the supervision of the Dean of Men. All living arrangements for women are under the supervision of the Dean of Women. All unmarried undergraduate men and women students, except those living with relatives, live in residence halls, fraternity, sorority, or cooperative houses, and approved private homes. Most undergraduate women live on campus in organized groups; any undergraduate woman must first obtain the approval of the Dean of Women before making plans to live elsewhere or to change address. Most graduate women live in private homes; those who live in college residence halls, sororities, or cooperative houses must accept the house rules for seniors.

College Dormitories

Women's Halls. With the completion of the new women's dormitory Oregon State College will have six residence halls for women. One of these—Waldo—is reserved as a freshman hall. Women students bring their own bedding (for a single bed), including a mattress pad, three sheets, a pillow, two pillow slips, and blankets. (Women students bring bedding whether they reside in residence hall, sorority, or cooperative house.) A small spread or quilt for daytime covering is desirable. A study lamp will be needed. Room curtains or draperies are best left for later purchase after roommates can decide preferences. As rooms are crowded and closet space limited, a minimum of other equipment is recommended.

Men's Halls. The permanent dormitory for men contains five halls: Buxton, Cauthorn, Hawley, Poling, and Weatherford. These halls have accommodations for two men to a room; in addition to the study rooms each floor contains a common sleeping room. The other two dormitories—Central and Hudson—contain both single and double rooms; the beds are in the student rooms. All the men's dormitories provide single beds (double-deck in the permanent dormitory), mattresses, mattress covers, study tables, chairs, dressers or wardrobes, sheets, two single blankets for each bed, pillowcases, hand towels and bath towels. Meals in all the dormitories are served in cafeteria style.

Cost. Board and room charges in college residence halls are approximately \$60.00 to \$65.00 a month. Board and room charges in college halls are subject to change by the State Board of Higher Education as circumstances demand.

Reserving a Room. To reserve a room in a college residence hall or dormitory the student (a) completes a room application blank, obtained from the Registrar; (b) sends a check or money order for \$15.00 (payable to Oregon State College) for a room reservation; and (c) forwards the application and check or money order to the Business Office, Oregon State College, Corvallis, Oregon.

For a room for Spring or Fall Term, the student may apply after January 1; for Winter Term, after October 1.

Assignment. Assignment to a hall is not made until the student has received official admission to the College. As official admission is often unavoidably delayed, however, room reservation request should be made early, as preference is given in the order in which the deposits are received. Room assignment is made after the student arrives on campus.

Dormitories are open for students and for receiving baggage the day before the opening of the term.

Deposit Insures Room. Although the College does not guarantee housing to all, a student who has requested a dormitory reservation is assured of a room unless his deposit is returned.

The \$15.00 room deposit is retained until the last month of the student's residence in the dormitory, at which time it will be refunded. The deposit serves as a deposit for each succeeding term of his residence in the dormitory.

If a student is found ineligible for admission, the \$15 deposit is returned to him immediately. If it is necessary for him to postpone entrance to Oregon State College, he may request, instead of a refund, the transfer of his room deposit to any later term. If he changes his plans about entering the College and notifies the proper office (the Director of Dormitories in the case of men, the Dean of Women in the case of women) at least 14 days in advance, the \$15.00 deposit will be refunded. This advance notice means 14 days before the opening of the term for which the deposit has been made.

Responsibility in Reserving a room. When a student reserves a room in a dormitory and makes his \$15 deposit, he is holding a room for a term and is responsible for the cost of the room unless he has cancelled his reservation before the opening of the term.

Sororities and Fraternities

Sororities. Sororities provide supervised living accommodations for women in chapter houses. Most freshman women complete a full year's residence in the college dormitories even though pledged to sororities. A period of time set aside for selection of members, commonly known as rushing, takes place once each term. Board and room costs in the sororities approximate those of the dormitories. Additional fees are required for social fees and club dues.

Further information concerning sororities may be obtained from the Panhellenic Council by addressing the Office of the Dean of Women.

Fraternities. Fraternities provide for men comfortable living accommodations under college supervision. In the fall, prospective members are selected following a rushing period which is held the latter part of Freshman Week.

Each summer a pamphlet, *Is It Greek to You?* is published by the Interfraternity Council, a copy of which is mailed to all men students entering Oregon State College for the first time. The booklet aims to acquaint incoming students with fraternities in general.

Board and room charges in fraternities approximate \$60 per month. In some cases this figure includes building and social fees while in other instances these fees are in addition to board and room costs.

Further information concerning fraternities may be obtained by addressing the Office of the Dean of Men.

Cooperative Houses

In cooperative houses students are able to achieve desirable group and social life at a cost about \$15.00 a month less than in other types of group life. Students perform from one-half to one hour of work a day, sharing all the housework responsibilities except meal preparation.

For Women. Six cooperative houses for women have been developed on the Oregon State campus. There is a cook and a hostess in each house. The cooperative values in this type of group living are of great satisfaction to the girls themselves and to the College. A descriptive booklet and application blank may be obtained by writing to the Office of the Dean of Women.

For Men. There are two men's cooperatives at the College. Any man interested in cooperative housing should write the Office of the Dean of Men.

Private Homes

For Women. A card file of private homes with available rooms is maintained in the Office of the Dean of Women. It is best to engage a room personally. If it is not possible to do this, the student should write to the Dean of Women for assistance.

For Men. Many men students engage board and room in private homes which have been approved by the Office of the Dean of Men. Costs are comparable to those in the dormitories. Students interested should arrange personally for this type of housing through the office of Mrs. Emma Coe, Housing and Employment Secretary, Shepard Hall. It is mutually beneficial if both householder and student meet each other before commitments are made. The student should not plan to engage housing for Fall term in a private home before June 15.

Housing for Married Students

Oregon State College has two housing projects for married students: Adair Village, located eight miles north of the campus on Highway 99-W, and the Mall Apartments, located on the campus.

Adair Village. Adair Village contains 370 one- and two-bedroom apartments. The one-bedroom apartments rent for \$44.00 per month while the two-bedroom units rent for \$48.00 per month. All apartments are furnished, and the rental price includes water, light, steam heat, and garbage disposal. Public transportation to and from the campus is available. Adair Village has its own Mayor and Councilmen elected by the residents of the Village. The Village has post office, recreation center, grocery store, butcher shop, self-service laundry, library, and restaurant.

Mall Apartments. The Mall Apartments consist of 40 double and 10 single units. The apartments are furnished, and water and disposal of garbage are provided within the rental costs of \$25.00 per month for the single and \$31.50 per month for the double units.

A married student wishing to make application either for Adair Village or the Mall Apartments should contact the Office of the Dean of Men.

Off-campus Apartments. A married student wishing to find living accommodations off campus should consult Mrs. Emma Coe, Housing and Employment Secretary, Shepard Hall.

Housing Regulations

The Committee on Student Housing has the responsibility of aiding students in making adjustments relative to board and lodging while they are in college. The committee attempts to uphold the traditions of the institution, to fulfill the regulations of the State Board of Higher Education, and to render each student every service possible. The committee regulations governing student housing are as follows:

a. All unmarried undergraduate students, except those living with relatives, live in residence halls, fraternity houses, cooperative houses, and approved private homes.

b. Undergraduate women students who have not been assigned to one of the halls of residence and whose parents do not reside in Corvallis must obtain the approval of the Dean of Women before arranging a place of residence.

c. Women of freshman rank shall not reside in sorority houses under other than exceptional circumstances, the validity of which is to be determined by the Dean of Women.

d. Upperclass women at the State College may move to the sorority houses at the beginning and end of any term. Men living in dormitories may move to fraternity houses at the end of any term. Students are expected to make no changes in residence within the term period.

e. All women students living in residence halls must take their meals at their residences. All women students are expected to have a regular boarding arrangement. All men living in the dormitories must take their meals in the dormitory dining room.

Student Automobiles Restricted

Because of the large number of cars brought to the community annually by students, traffic on the College campus is seriously congested. In the interests of safety, the adoption of rather drastic and rigid regulations have become necessary. The administration of these regulations is in the hands of a joint student-faculty committee which has authority to deal with traffic violations. All parking of motor vehicles is limited to defined areas, and restricted parking has been established in certain of these areas.

All cars operated by students must be registered and are supplied with campus registration stickers. Students are not permitted to operate cars on the campus during certain hours. For students living in the dormitories, some parking areas are available, but these are not sufficient to accommodate all of the cars controlled by dormitory students. Students expecting to live in the dormitories are advised that the reservation of a dormitory room does not necessarily guarantee the student parking privileges. Corvallis is a relatively small city, and most all of the living accommodations are in close proximity to the campus and within walking distance.

For these reasons, students are urged to leave their cars at home.

Student Expenses

Statements of expenses are confusing. Though the average per month may vary from \$80.00 to \$100.00, the student meets large financial demands during his first two weeks of college. Registration fees are paid for the full term, room rent is paid in two installments during the term, board is paid a month in advance, and books are purchased. For this reason an Oregon student should be prepared for an initial expense of \$150.00 or more.

It is suggested that the most convenient and safest method of payment will be by check made at the correct time for the exact amount.

Fees	Fall term	Per year
Institutional fees	\$ 42.50	\$127.50
Books, supplies, etc.	20.00	45.00
Board and room	186.00	503.00
Incidentals	25.00	75.00
Totals	\$273.50	\$750.50

Note: This table does not include the matriculation fee of \$5.00 paid by students registering for the first time nor the \$5.00 breakage deposit, which must be maintained during the year and is refunded at the end of the year. Room deposit of \$15.00 must be paid at time of application for dormitory room. Books and supplies run higher for engineering students who must obtain equipment during their freshman year which they use throughout their undergraduate years. Out-of-state students pay \$50.00 a term additional tuition.

It should be remembered that, in thinking of the cost of a year at college, a student usually has in mind the amount he will spend from the time he leaves home until he returns at the close of the year. Such an estimate would include clothing, travel, and amusements—items, not included in the table, that vary according to the thrift, discrimination, and habits of the individual.

A veteran must pay his own fees unless he has received his certificate of eligibility by registration date.

Self Support

Organized effort is made to assist students desiring to find work. The Employment Bureau for Men is conducted in Shepard Hall under the direction of the Office of the Dean of Men. The Employment Bureau for Women is conducted by the Office of the Dean of Women in Commerce Hall.

Some men and women students who live in the dormitories are employed in the cafeteria or dining rooms where it is possible for them to earn most of the cost of their board and room. Information concerning work in the dormitories can be obtained from the Office of the Director of Dormitories.

Some women students earn a large part of their expenses while attending college by working for their board and room in private homes. This plan requires that the student give approximately three hours work per day to the employer. Arrangements for working for board and room are made through the Office of the Dean of Women. In general, a girl who plans to earn such a large part of her expenses while attending college should register for less than a full academic schedule.

Some men students on campus find employment working as house boys or furnace boys in private homes, in sororities or boarding groups. Arrangements for such jobs are made through the Employment Bureau for Men in Shepard Hall.

Remunerative employment cannot be guaranteed to all who may desire it, and the new student should have sufficient funds to cover the expenses of at least the first term. It is difficult to earn one's way while carrying a full program of studies and only capable students of good health should attempt it. The attention of new students who intend to earn all or part of their living is called to the following facts:

(1) Work of any kind is much more readily obtained after the student has had opportunity to familiarize himself with the local conditions.

(2) No student should expect to obtain employment by correspondence. It is helpful to write to the employment office early stating the kind of work desired, experience, and the amount of work actually needed. Positions for part-time employment are not listed, as a rule, until about the time the term opens.

(3) There is a constant oversupply of those wishing to do teaching and clerical work. None but those having superior qualifications and experience are likely to obtain employment of this type during the first term.

(4) There is a considerable demand for efficient stenographers, but generally there is not sufficient work of this kind to meet the needs of all applicants. There is a considerable demand for radio repair men, printers, licensed electricians, motion-picture operators, high-school and city bus operators, clerks, and barbers.

(5) Opportunities exist for students who have good health, and who can perform domestic or manual labor well, to earn the equivalent of board and room by working three hours a day.

Student Health Service

THROUGH the Student Health Service Oregon State College does all in its power to safeguard the health of its students. This is accomplished through health education, detection of incipient diseases, medical treatment of acute diseases, and the maintenance of hygienic student 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 infirmaries in-patients. Limited hospital facilities are maintained for emergency cases which require hospitalization for general medical care. Such patients are admitted only upon the advice of the Health Service physicians. Fifteen days is the maximum period of hospitalization available to a student during any one academic year.

All expenses of or 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.

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

All activities pertaining to the medical care of students are centered in the Student Health Service building. On the ground floor are the dining room, kitchen, heating plant, and refrigeration unit. The clinic occupies the entire second floor and includes physicians' offices, examining rooms, X-ray and clinical laboratories, pharmacy, and minor surgery. On the third floor are 30 beds in two-bed and four-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.

Vaccination. Under ruling of the State Board of Higher Education, students are required, as a condition of entrance to any of the institutions in the State System, to satisfy the institutional physician of immunity to smallpox (by evidence of having had the disease or of 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.

Loan Funds

AS AN aid to students in financing a part of their study at the State College a number of loan funds have been established. In addition to the general "Student Loan Fund," to which there are many donors, a number of special loan funds have been established.

Dr. W. M. Atwood, chairman of the Student Loan Fund, and a special faculty committee, with offices in the Memorial Union, are charged with the responsibility of administering the Student Loan Fund and cooperate in the administration of the other loan funds available for students at the State College. The fundamental principles upon which the Student Loan Fund is administered and upon which the success of the fund has been built are:

- (1) Care in the selection of student character as a credit basis.
- (2) Detailed budgeting of expenses and receipts to assure that the sums borrowed are not disproportionate with the student's capacity to pay.
- (3) Insurance against loss by a "Contract of Guaranty" signed by the parent or guardian.
- (4) Effective follow-up system on delinquent loans.

Applications for loans should be made at the Student Loan Fund office in the Memorial Union, where information is freely given on the different loan funds available and procedure in obtaining a loan. Students may also consult the dean of women, the dean of men, or their advisers.

The Student Loan Fund

The Student Loan Fund, a perpetual revolving trust fund established for the purpose of lending money to worthy students attending or who wish to attend Oregon State College, is administered by the Student Loan Fund of the State College, a membership organization, incorporated under the laws of the State of Oregon. Members are known and designated as trustees and are appointed by the President of the State College. This fund has arisen through the liberality 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 easily obtained, but rather to aid those who have determined to secure an education and are paying the cost wholly or in part from their own earnings." Students are eligible to loan aid after they have been in attendance at the State College *at least one term*.

Among the many donors to the Student Loan Fund may be mentioned the following: Hon. R. A. Booth, Dr. Clara Humason Waldo, Mr. Ashby Pierce, Mr. R. M. Johnston, Mr. L. J. Simpson, Mr. Ben Selling, Dr. U. M. Dickey, the College Folk Club, the Agricultural Club, the Oregon Countryman, miscellaneous contributions by Faculty, Professors Paul Petri and Lillian Jeffreys

Petri, Winter Short Course Students, the A. Grace Johnson Memorial Fund, the Forestry Fund, the Piano Practice Fund, various Class Donations, the Phi Pi Phi fraternity, Y.M.C.A., Rifle Club, Marguerite MacManus String Quartet, Salem Oregon State Club, Portland Oregon State Club, Oregon State Barometer, Domestic Science Dining Room (Panama-Pacific International Exposition, San Francisco), Waldo Hall Club, Cauthorn Hall Club, Miners' Club, Silverton Rotary Club, Grand Army of the Republic and Women's Relief Corps, Oregon Technical Council Engineers Fund, student chapter of the American Society of Civil Engineers, Oregon State College Chamber of Commerce, Isaac Walton League (Salem chapter).

Other Loan Funds

The Crawford Loan Fund. By the wills of the late Edward G. Crawford and his wife Ida M. Crawford a fund has been left in trust with the United States National Bank of Portland to assist worthy young men desiring to educate themselves. Applications for assistance are made through the local loan office. Applicant must be a native-born citizen of the United States, have attended primary school, either public or private, and have shown a desire and ability to help to educate himself. He must be regularly enrolled as a student in the school or college at which the proceeds of the loan will be used. According to the terms of the will, this fund can be used to assist young men who require financial aid in obtaining an education in any of the mechanical arts, trades, or in practical business, or along any particular line of study except the professions of medicine, law, theology, pedagogy, and music.

The Federation of Women's Clubs Educational Fund provides loans to women students who are well recommended.

Eastern Star Educational Fund. Loans are available to students who are members or daughters of members of the Order of the Eastern Star. Loans are made upon honor, no security being asked, and will be made by the Trustees of the Grand Chapter on the recommendation of the president of the institution which the student is attending and the approval of the Worthy Matron and Worthy Patron of the chapter of the Order of the Eastern Star located in the same place as the institution of learning.

The J. T. Apperson Educational Fund. By the will of the late Hon. J. T. Apperson, who had been a Regent of the State College from its foundation, a fund amounting to between \$55,000 and \$75,000 is to be a perpetual endowment, administered by the State Land Board of Oregon, for the assistance of worthy young men and women who are actual bona fide residents of the State of Oregon and who would otherwise be unable to bear the expense of a college course at Oregon State College. The income from this estate is loaned to students. Applicants for loans must be recommended to the State Land Board by the President of the State College and the State Superintendent of Public Instruction. Application is made through the Student Loan Committee.

The Adelaide Knapp Educational Fund. By bequest of the late Adelaide Knapp of Portland a sum of \$5,000 was given to Oregon State College to be known as the Adelaide Knapp Educational Fund and to be used to assist worthy, ambitious young women, residents of Oregon, to attend Oregon State College. Preference is to be given to applicants who are in need of financial aid to continue their education and the money received by each student is subject to repayment to become a part of the principal sum though no formal promise of repayment is required.

The Ben Selling Scholarship Loan Fund. By the will of the Honorable Ben Selling of Portland, \$100,000 is set aside, from a part of the income of which loans may be made to men and women of the State College. Applicants must be approved by the State College Student Loan Committee.

The Joseph N. Teal Loan Fund. By bequest the late Joseph N. Teal of Portland gave to the State College the sum of \$5,000 "to be administered as a perpetual revolving fund to be loaned . . . to worthy students pursuing courses of instruction in said College."

The Arthur Palmer Tift Memorial Loan Fund. By the will of the late Mrs. Joan C. Palmer Tift, practically her entire estate is left as a permanent loan fund for deserving young men needing financial assistance while attending Oregon State College. This fund is left as a memorial to her son, Arthur Palmer Tift, Portland attorney, who died on January 14, 1919. The fund is irreducible and all interest accruing therefrom is added to the fund.

A. W. S. Emergency Loan Fund for Women Students. The Associated Women Students have set aside a sum of money which is available to women students who are in need of small amounts of money for short periods of time. The fund is administered by the Dean of Women.

O.S.P.A. Educational Fund. A fund of \$10,000 has been established by the members of the Oregon State Pharmaceutical Association to assist worthy students in the School of Pharmacy to complete their course. Applicants for loans submit information on forms obtained from the School of Pharmacy; the forms should be returned to the school when completed. Administration of the fund is vested in a Board of Trustees elected from the membership of the State Pharmaceutical Association.

Scholarships and Fellowships

A NUMBER of scholarships and fellowships have been established largely through the generosity of private donors, providing funds in varying amounts for the encouragement of students of ability and promise. Some of these are general scholarships. Others are limited to special fields. Scholarships are classified in three groups: Oregon State College scholarships, Oregon State College scholarships for foreign students, other scholarships.

Oregon State College Scholarships

Scholarships especially for foreign students are described on page 93. Many of the following scholarships are open to foreign students.

State Scholarships. A limited number of scholarships are awarded annually to students in the institutions of the Oregon State System of Higher Education. These scholarships cover tuition and laboratory and course fees (a total of \$22.00 a term or \$66.00 a year for a student attending Oregon State College). Recipients of scholarships must, however, pay the matriculation fee, incidental fee, the building fee, and special fees. At least fifty per cent of the scholarships are awarded to entering freshmen. To be eligible, an entering student must rank in the upper third of his high-school graduating class. Students who have previously attended an institution of higher learning must have a grade-point average of 2.5 (computed according to the grade-point system in

use at the Oregon state institutions of higher education). All applicants, to be eligible, must be in need of financial assistance. Application should be made on official blanks to the State College Registrar. All applications must be filed by April 1.

State College Assistantships, Scholarships, and Fellowships. A number of graduate and research assistantships, scholarships, and fellowships are awarded annually by the State College to qualified graduate students in various fields. For stipends and application procedure, see GRADUATE SCHOOL.

The Amalgamated Sugar Company Home Economics Scholarships. The Amalgamated Sugar Company contributes a total of \$400 annually for awards in varying amounts to worthy students in need of financial assistance in pursuing their education.

American Foundation for Pharmaceutical Education Scholarships. An annual grant of \$400 by the American Foundation for Pharmaceutical Education is divided into four scholarships for award to freshmen in pharmacy.

Borden Home Economics Scholarship Award. Through the generosity of the Borden Company Foundation, Inc., a scholarship of \$300 is awarded each year to a senior in home economics who has completed two or more courses in foods and nutrition and who, among all similarly eligible students, has made the highest grade-point average in her college work prior to the senior year.

M. C. Buchanan Scholarship. The M. C. Buchanan Scholarship of the Lincoln Foundation provides two scholarships of \$250 awarded to agricultural engineering students on the basis of scholastic attainment, imagination, and promise without regard to financial need.

Consolidated Vultee Aircraft Corporation Fellowship. A fellowship carrying a stipend of \$750 is granted by the Consolidated Vultee Aircraft Corporation open to graduates of accredited engineering, metallurgy, physics, and mathematics curricula who are highly recommended by their faculty scholarship committees for graduate study and research in fields of aeronautical engineering. The student is employed by the company during the first summer after the award; when he returns to his studies he is placed on leave of absence from the company pending graduation or completion of his work for a higher degree.

Consolidated Vultee Aircraft Corporation Scholarship. A scholarship carrying a stipend of \$250 is granted by the Consolidated Vultee Aircraft Corporation open to highly recommended students in engineering (civil, electrical, mechanical, or aeronautical) who have completed the junior year. Oregon State College proposes nominations from which the corporation makes its selections. The student is sent to one of the divisions for indoctrination for a period of three months to a year, then returned to college for his senior year.

Dietrich Pharmacy Scholarship. A scholarship of \$100 from a fund established by Mrs. H. D. Dietrich of San Francisco is awarded to an outstanding student in pharmacy.

Martin Dennis Research Fellowship. The Martin Dennis research fellowship is awarded to a graduate student and provides a grant of \$750.

Martin Dennis Fellowship. The Martin Dennis fellowship of \$750 is provided for research in electrochemistry in the Department of Chemistry by the Martin Dennis Company of Newark, N. J., by Mr. C. D. Marlatt.

The Corvallis Elks Senior Award, provided by Corvallis Lodge No. 1413, Benevolent and Protective Order of Elks, includes registration fees for one year and \$10 a month for eight months and is given annually to the junior man who during his three years in college has contributed most to the welfare of Oregon State College.

A. E. Engbretson Memorial Fellowships. Two graduate fellowships of \$750 each have been made available through a grant by the Dairy Cooperative Association of Portland, Oregon. Applications for these fellowships are considered from qualified candidates who are residents of the Pacific Coast, having high scholarship records and demonstrated aptitudes in the fields of dairy manufacturing and dairy-products marketing. The fellowships are awarded through the office of the dean of agriculture.

J. A. Hanson Scholarship. The J. A. Hanson Scholarship of \$75 is awarded annually to the outstanding junior majoring in poultry husbandry.

The Professor George R. Hyslop Agricultural Research Memorial Fellowship. Friends of the late Professor George R. Hyslop throughout the state and the nation have contributed funds to establish the Professor George R. Hyslop Agricultural Research Memorial Fellowship in recognition of his many years of outstanding service to the state as head of the Department of Farm Crops. Income from the fund is used to support the fellowship for research in farm crops. Selection of recipients of the fellowship is made by a committee composed of the President of Oregon State College, the dean of the School of Agriculture, and the head of the Department of Farm Crops.

The Home Economics Freshman Scholarship. Through the generosity of an anonymous donor, the Home Economics Freshman Scholarship of \$100 is awarded each year to a worthy home economics freshman in need of financial assistance in her college course.

The A. Grace Johnson Memorial Scholarship is awarded in units of \$25 or less to a worthy, needy home economics student who is registered as an upperclassman and whose scholastic average is equal to or above that of the student body. The scholarship fund, started in the spring of 1935, is a continually growing one contributed to by former fellow workers, students, friends, and relatives of Miss Johnson, professor of household administration at the State College from 1915 to the time of her death in 1933.

The Leonora Hamilton Kerr Scholarship is an award of \$150 made annually to an outstanding woman student entering the freshman class. The recipient is chosen by the scholarship committee of the College Folk Club with the approval of the college committee on scholarships. The scholarship was established in 1932 by the College Folk Club as a tribute to its founder and first president, Mrs. W. J. Kerr, and in 1944 was permanently endowed by generous gifts from Dr. and Mrs. W. J. Kerr and the College Folk Club.

The Lee Scholarship is awarded each year to a woman student in home economics registered as a junior, who during her career in college has shown improvement in her work, stability and meritorious record in all her activities, and general all-round worthiness. This scholarship provides a sum of money

derived from the annual income of a fund of \$1,000 bequeathed by Minnie E. Lee as a memorial to her husband J. B. Lee and herself, to be paid to the recipient at the time of her registration in the senior year. The award is not open to any student who has received any other monetary prize.

The William Clark Leedy Aeronautical Scholarship. As an aid in the development of aeronautical engineering, Jay Clark Leedy, '12, and Mildred Wilson Leedy, '14, of Brooks, Oregon, have established the William Clark Leedy Aeronautical Scholarship in memory of their son, Lieutenant William Clark Leedy, who was killed in line of duty in the service of his country as an aviator in the United States Navy May 18, 1943; Meredith Ann Leedy has joined in sponsoring the award in memory of her husband. The scholarship provides \$200 applicable toward tuition and other expenses while a student in aeronautical engineering at Oregon State College and is awarded annually by the Committee on Scholarships to a student recommended by the faculty of the School of Engineering on the basis of scholarship, aptitude, and character, as deserving of encouragement in the study of aeronautical engineering. The scholarship is paid in two installments of \$100 each at the time the student registers for the second term of his junior year and senior year.

The Mary J. L. McDonald Fellowships in Forestry. Through the generosity of the late Mrs. Mary J. L. McDonald of San Francisco, funds are available for several fellowships which provide opportunity for advanced studies in the field of forestry. These fellowships are awarded each year by a committee of the faculty of the School of Forestry to graduates of recognized schools of forestry on the basis of proficiency in forestry studies, personality, and an indicated ability to do independent work.

The Multnomah Hunters and Anglers Club Scholarship is an annual scholarship of \$150 to a male student, junior or senior, in the Department of Fish and Game Management to encourage students to continue their studies in the field of wildlife conservation and management. The recipient must have a sincere interest in this field and a desire to continue in it after graduation.

Oregon Home Economics Extension Council Scholarship. An award of \$25 is made annually at the Oregon Conference for the Study of Home Interests to a junior or senior who shows sincere interest and promise of leadership in extension work, who stands high in scholarship, and is active in campus affairs.

Oregon Milk Distributors Association Memorial Scholarship. As a memorial to employees of Portland milk distributors who lost their lives in World War II, the Oregon Milk Distributors Association awards annually to a junior in dairy production or dairy manufacturing a scholarship of \$350, \$175 to be paid in the junior year and \$175 in the senior year. The recipient is selected on the basis of scholastic achievement and industry on recommendation of the faculty in dairy husbandry and with the approval of the dean of the School of Agriculture.

The Sears-Roebuck Agricultural Scholarships. A grant of \$2,000 is made by Sears-Roebuck and Company for scholarships in the School of Agriculture of Oregon State College to be awarded to worthy Oregon farm-reared boys of good character and scholastic attainment, who have for the past several years demonstrated leadership ability through participation in 4-H Club, Future Farmers, or agricultural or community activities.

Standard Oil Company of California Agricultural Scholarships. The Standard Oil Company of California granted a total of six \$100 scholarships, each year during the five-year period 1942-46 ending with the fall term 1946, to worthy boys graduating from high school, three of the scholarships to be awarded to boys belonging to 4-H Clubs and three to boys belonging to the Future Farmers of America.

Oregon Association of Future Homemakers of America. A grant for the amount to cover tuition for three terms at Oregon State College is provided by the Oregon Association of Future Homemakers of America and is awarded to a worthy Future Homemaker of America graduating from any Oregon high school and having a major interest in home economics.

Pepsi-Cola Scholarships for High School Seniors. In 1945 the Pepsi-Cola Scholarship Board established four-year college scholarships for students throughout the United States, Alaska, Hawaii, and Puerto Rico. Each scholarship pays full tuition and required fees for four years, plus an allowance of \$25.00 a month during the school year, and a travel allowance. One hundred and twenty-one scholarships are awarded each year and are allotted on a regional basis. Winners select their own colleges. Information regarding these scholarships may be obtained from high-school principals or directly from the Pepsi-Cola Scholarship Board, 532 Emerson Street, Palo Alto, California.

Oregon State Mothers Club Student Aid Awards. The Portland, Salem, and Corvallis units of the Mothers Club of Oregon State College provide annual awards to men and women who have shown courage and determination in obtaining an education.

Rotana Club Scholarship. The Rotana Club of Portland provides a scholarship of \$25 awarded each year to a sophomore student in the School of Home Economics on the basis of scholastic promise, qualities of personality, and leadership. In making the selection consideration is given to the need of the student for assistance in financing her education. The recipient of the scholarship is selected by the dean of the School of Home Economics from nominations made by the school faculty.

The School of Pharmacy Scholarships. Scholarships covering tuition and fees are maintained each year by alumni and friends of the School of Pharmacy. Some of these scholarships have been made possible by memorial gifts. Selection is made by the Committee on Scholarships on the basis of scholarship, promise, and financial need in obtaining an education. Recommendation of candidates is made by the faculty of the School of Pharmacy on the basis of application blanks submitted by applicants, letters of recommendation, investigation by an alumnus or practicing pharmacist, and where practicable by personal interview.

The Sears-Roebuck Home-Economics Freshman Scholarships. Under a grant of \$1,200 annually the Sears-Roebuck Foundation provides six scholarships of \$200 each to freshman girls in the School of Home Economics of Oregon State College. The scholarships are awarded on merit to Oregon farm-reared girls of high promise who evince a sincere desire for a broad and thorough education in home economics and who would not otherwise be able to attend college.

Standard Oil Company California Fellowship. A grant of \$500 is made by the Standard Oil Company of California for a special project by a graduate student.

Standard Oil Company of California Graduate Fellowship. The Standard Oil Company of California provides a grant of \$750 for advanced work in mechanical engineering.

Standard Oil Company of California Home Economics Scholarships. The Standard Oil Company of California grants through Oregon State College four \$100 annual scholarships, to worthy girls graduating from high schools that are qualified and operating under the George-Deen Act.

Oregon State College Scholarships for Foreign Students

Many of the scholarships described above are open to foreign students as well as to Oregon Students and those from other states. In addition, a number of scholarships are maintained especially for undergraduate or graduate students from countries outside the United States.

State Scholarships for Foreign Students. A limited number of scholarships are awarded annually to students from foreign countries attending institutions of the Oregon State System of Higher Education. These scholarships cover tuition, the nonresident fee, and laboratory and course fee (a total of \$72 a term or \$216 a year at Oregon State College). Application for scholarships by foreign students wishing to attend Oregon State College should be made to the State College Registrar not later than April 1.

International Friendship Scholarship. The Home Economics Club of the State College on March 2, 1926, established a scholarship of \$500 which is awarded annually to a graduate foreign student to study home economics at Oregon State College. The recipient of the scholarship is selected by a committee composed of the executive council of the Home Economics Club, the dean of the School of Home Economics, and a representative of Omicron Nu.

Phi Kappa Phi Exchange Scholarship. To encourage interchange among students of the cultures of this and other countries, the local chapter of Phi Kappa Phi supports in alternate years an international exchange scholarship, under which a foreign student receives tuition, board, and room for one academic year at Oregon State College. The Oregon State student who goes abroad receives similar assistance from the foreign institution; he returns to this campus for the year following the one spent abroad.

Other Scholarships

In addition to the Oregon State College scholarships described above, a number of other scholarships of special interest are open to Oregon State College students.

The American Association of University Women Graduate Scholarship. Every two years the Oregon Division of the American Association of University Women gives a scholarship of \$1,200 to a woman who is a resident of Oregon, and who holds at least a bachelor's degree, for advanced study at an American or foreign university.

Bernard Daly Scholarships. Under terms of the will of the late Dr. Bernard Daly of Lakeview, Oregon, worthy self-supporting young men and women of Lake County, Oregon, may receive a part or all of their necessary college expenses. The terms of the will provide that the income from this fund

be used to pay the college expenses of at least fifteen students each year. The fund is administered by the board of trustees, who select candidates annually from a list of applicants recommended by the county judge and county school superintendent of Lake County, following a qualifying examination held in Lake County.

Danforth Summer Fellowship for Agriculture Students. The Danforth Foundation and Ralston-Purina Mills, St. Louis, Missouri, provide 41 four-week summer fellowships for outstanding agricultural students in 41 state universities to help students enlarge their horizons, broaden their contacts, make decisions, and find their largest place in life. The award covers the student's expenses for two weeks in St. Louis and vicinity and two weeks of leadership training at the American Youth Foundation Camp on Lake Michigan. The fellowship affords opportunity to study through actual experience problems of manufacture, consumer research, distribution, advertising, personnel, and leadership.

Danforth Fellowships in Home Economics. The Danforth fellowships include a freshman fellowship to a student in home economics, offering two weeks in a Michigan summer camp; a junior fellowship to a student in home economics, offering four weeks experience and study in problems of manufacturing, commercial research, distribution, advertising, personnel, and leadership, two weeks in St. Louis, Missouri, and two weeks in a Michigan summer camp; and a graduate fellowship offering opportunity to study in the field of religious education, including five weeks at a Michigan summer camp and a year of study at certain colleges and universities—awarded jointly by Danforth Foundation and Ralston-Purina Mills.

Honors, Prizes, and Awards

DISTINCTION in scholarship is recognized at the State College by the presentation of Freshman Honors following the freshman year and of Senior Honors at the time of graduation, through election to the various honor societies, and through prizes and awards. Awards are classified in two groups: those open to students irrespective of school or curriculum in which they are registered, and those limited to students in particular schools or departments. A list of honor societies will be found elsewhere in this Catalog. There are also essay and oratorical prizes, and awards for proficiency in special fields, and for all-round distinction in student life. Oregon State College students compete for awards provided by national and regional sponsors in many fields.

General Awards

Freshman Honors. Under the sponsorship of the Oregon State Chapter of Phi Kappa Phi, Freshman Honors are awarded each year to sophomore students who during their freshman year completed a total of at least 45 term hours of credit with a grade-point average of 3.25 or higher, and with no failure. The certificates are provided by Phi Kappa Phi and are presented each fall by the President of the College at the Honors Accolade.

Senior Honors. Senior honors are conferred each year by the Faculty Council upon those members of the graduating class, candidates for a bachelor's degree, who throughout their entire college course have maintained the highest scholastic standing in their respective schools. A student to be eligible to such

honor must have a grade-point average of 3.25 or higher and must have been in attendance at Oregon State College for two regular academic years. Election is limited to 10 per cent of the graduating members of a school. Students attaining this honor are listed in the commencement program as Senior Honor Students.

The Clara H. Waldo Prizes are awarded each spring in the proportions of \$50, \$30, \$20, and \$10 respectively to the woman student of highest standing registered as a regular student in the senior, junior, sophomore, and freshman year. The committee having charge of the award of these prizes is guided by the following points: (a) proficiency in scholarship, (b) success in student activities, (c) qualities of womanhood, and (d) qualities of leadership.

The Cummings Prizes, established by Mrs. E. A. Cummings in memory of her husband, the late Edward A. Cummings, are awarded each spring in the proportions of \$50, \$30, \$20, and \$10 respectively to the man of highest standing registered as a regular student in the senior, junior, sophomore, and freshman year. The committee having charge of the award of these prizes is guided by the following points: (a) proficiency in scholarship, (b) success in student activities, (c) qualities of manhood, and (d) qualities of leadership.

The Lipman Wolfe Prizes, totaling \$100 annually, are awarded each year in the proportions of \$50, \$30, and \$20 respectively to the man or woman of highest standing registered as a regular student in the senior, junior, and sophomore classes. The committee having charge of the award of these prizes is guided by the following points: (a) proficiency in scholarship, (b) qualities of manhood or womanhood with special emphasis on unselfishness and kindness, (c) qualities of leadership, and (d) contribution to campus welfare.

A.W.S. Senior Awards. The Associated Women Students provide awards not exceeding \$100 to the senior woman or women who, through campus-wide and house service and the maintenance of high scholarship have proved themselves worthy of recognition.

Sigma Xi Award. The Oregon State College chapter of The Society of Sigma Xi has established an annual award of \$25 for the best master's thesis in science or related fields. The society reserves the right of nonaward in case no thesis of exceptional merit is submitted.

The Chi Omega Prize. Eta Alpha of Chi Omega offers an annual award of \$25 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.

Delta Delta Delta Prize. Yearly awards of \$75 are made by Theta Mu of Delta Delta Delta 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.

Mortar Board Service Awards. Mortar Board provides service awards to outstanding senior women students who have contributed unselfishly to the happiness and welfare of their fellow students. Strength of character and high standards of thought, word, and deed are recognized.

Altrusa Award is an award of \$50 given by the Altrusa Club of Portland to a senior woman whose performance during her college years has shown the qualities of integrity, loyalty, and firmness of purpose in making the most of her opportunities.

The Panhellenic Cup is awarded by the Panhellenic Council to the sorority making the highest scholastic average for the year.

The Phrateres Scholarship Cup is awarded to the member of Phrateres who has attained the highest standing in scholarship for the year.

Sigma Delta Pi Spanish Award. A Spanish masterpiece and the medal of the American Association of Teachers of Spanish are given annually by the Oregon chapter of Sigma Delta Pi (Spanish national honor society) to the advanced student of Spanish who has made the greatest progress during the academic year.

The Alpha Chi Omega Cup is awarded by Xi Xi chapter to Alpha Chi Omega to the student of music who has rendered the greatest service to the campus.

The Women's Athletic Association Plaque is maintained by the Women's Athletic Association and on it each year is inscribed the name of the senior woman student who has rendered the highest service to the association and best represents the ideals of physical education.

Alpha Lambda Delta Awards. The local chapter of Alpha Lambda Delta gives an award to the senior woman in Alpha Lambda Delta with the highest scholastic standing. The national society gives certificates to senior members who have a grade-point average of 3.33 or above for eleven terms.

Phi Sigma Scholarship Award. The Phi Sigma scholarship award is a sterling silver medal awarded annually by the national organization of Phi Sigma, honor society in biological science, to the outstanding senior student at Oregon State College, who has shown creative interest in biology. The purpose of the award is to stimulate interest and application in science, especially in the biological sciences.

The Drucilla Shepard Smith Prize. Through the generosity of John E. Smith of the Class of 1902 a sum of \$500 has been contributed as a memorial to his mother, the late Drucilla Shepard Smith (Mrs. F. S. Smith) formerly of McCoy, Polk County, Oregon. The income from this gift is awarded annually to the senior woman having the highest scholastic standing during the eight terms preceding her selection for this award, provided that it shall not be given to any student who receives any other award during the same academic year.

The Co-op Book Awards, consisting of purchase orders of \$25, \$15, and \$10 donated annually by the Oregon State College Cooperative Association, are made each year to upperclassmen judged to possess the most outstanding personal libraries.

Awards Open to Students in Particular Schools

Alpha Gamma Rho Freshman Award. The Alpha Beta chapter of Alpha Gamma Rho maintains a rotating trophy that is awarded each year to a student in agriculture who has completed a minimum of 45 term hours of college work with a grade-point average of at least 2.75 and who is enrolled for his fourth term in college. The purpose of the award is to promote and recognize scholarship, leadership, development, and character. Selection is made by the dean, assistant dean, and student adviser of the School of Agriculture on the basis of collective recommendations from the department heads of the school and the committee's personal knowledge of the student.

The Alpha Zeta Scholarship Cup is awarded during the first term of the sophomore year to the student in agriculture receiving the highest grade average in the freshman class.

The Ben Rodenwold Awards. In memory of her husband who served for many years as professor of animal husbandry and coach of the College livestock judging teams, Mrs. B. W. Rodenwold has established a \$1,000 memorial, the income from which is to be used for the purchase of medals known as the Ben Rodenwold Awards. The medals are awarded each year to the members of the five-man team that represents Oregon State College in the intercollegiate livestock judging contest at the Pacific International Livestock Show in Portland.

Swift & Company Essay Award. An award of \$130 is given to the student registered in agriculture who submits the best essay on any phase of the methods employed by the meat-packing business in marketing meats, poultry, eggs, butter, and cheese. The award is used for traveling and other expenses in making a trip to Chicago to attend the International Livestock Exposition and participate while there in a market study program under the direction of Swift & Company.

The Phi Chi Theta Awards in secretarial science include: (a) a prize of \$5 to the freshman having the highest scholastic standing; (b) a senior key.

The Kappa Delta Pi Award of \$25 is made annually to the sophomore enrolled in the School of Education who as a freshman in that school made the highest scholastic average.

The American Institute of Electrical Engineers Prize is an associate membership in the institute, awarded annually by the Portland Section for the best paper prepared and delivered by an undergraduate member of the Oregon State College student branch.

The A. S. M. Awards. The American Society of Metals (Oregon Chapter) awards annually three memberships in the society and cash awards of \$10 and \$5 each for the best papers prepared by student members of the society.

Epsilon Pi Tau Award. A certificate of merit is awarded annually to the sophomore in industrial arts who during his freshman year has made the greatest progress in scholarship and development of fellowship.

American Institute of Chemical Engineers Certificate of Merit. A certificate of merit and a pin are awarded each year by the student chapter of the American Institute of Chemical Engineers to the junior member of the chapter who has made the highest record during his freshman and sophomore years.

American Society of Mechanical Engineers Prizes. Prizes of \$20, \$15, \$10, and \$5 respectively are awarded by the Oregon Section of the American Society of Mechanical Engineers for the best papers prepared and delivered in the student branch of the society.

The American Society of Civil Engineers Prizes are a first prize of \$10 and junior membership in the society (\$10), a second prize of junior membership, and a third prize of \$5 awarded by the Portland section of the society for the three best papers prepared and delivered in the student branch of the society.

The American Society of Mechanical Engineers Prizes of \$20, \$15, \$10, and \$5 are awarded annually for the best papers prepared and delivered in the student branch of the society.

Institute of Aeronautical Sciences Awards. The Student Branch of the Institute of the Aeronautical Sciences awards annually a certificate of merit and a two-year membership (\$20) in the Institute to the senior member having the highest scholastic rank during the junior and senior years and to the student member preparing and presenting the best lecture at a regular meeting of the Student Branch.

Eta Kappa Nu Award. A certificate of merit is awarded annually to the outstanding student in the sophomore electrical engineering class. A permanent record of this award is kept on a bronze plaque in Apperson Hall.

The S. A. E. Awards. The Society of Automotive Engineers (Oregon Section) awards annually three prizes of \$10 each for the best papers prepared by student members of the society.

Sigma Tau Award. A medal is awarded each year to the sophomore student in engineering who as a freshman was the most outstanding student.

Tau Beta Pi Local Awards. The Tau Beta Pi award of \$5 is presented by the local chapter of Tau Beta Pi 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.

The Pi Tau Sigma Award is three mechanical engineering handbooks presented to the outstanding student in the sophomore mechanical engineering class.

Kelly Axe Award. The Kelly Axe Company provides an annual award to the senior in forestry who has contributed most to the success of the School of Forestry.

The Charles Lathrop Pack Forestry Prize. Through the generosity of Mr. Charles Lathrop Pack of New Jersey, a gift of \$2,000 has been made to the State College to encourage forestry students to write for publication. The income from the gift is awarded each year to the student in forestry who produces the most interesting, logical, and technically significant paper for publication.

The Xi Sigma Pi Plaque is awarded each year to the student in forestry who has maintained the highest grade average during the sophomore year.

The Omicron Nu Plaque is awarded each year to the senior woman who has best lived the teachings of home economics throughout her college career.

Oregon Home Economics Association Award. An award of \$25 is made annually by the Oregon Home Economics Association to an Oregon girl majoring in home economics who is a sophomore and needs financial aid to continue her education.

The Home Economics Freshman Award of \$10 was established (1928) by members of Omicron Nu for the purpose of promoting scholarship and leadership in home economics, the recipient being selected by a joint committee representing Omicron Nu and the faculty in home economics.

Philip W. Pillsbury Shelf of Home Economics Books. A dozen volumes selected to aid the home economist are presented by Pillsbury Mills to a senior who has been outstanding in her class work and shows promise in the field of professional home economics.

Blumauer-Frank Drug Company Award. An award of \$50, established 1935, is awarded annually to the senior student in pharmacy who makes the highest average in a competitive examination given to selected members of his class whose records have been outstanding during their four years in college. The Blumauer-Frank Drug Company has furnished a heavy bronze plaque upon which is engraved the name of the winner and the year.

Lambda Kappa Sigma Scholarship Key. A key is awarded annually to the senior member of Lambda Kappa Sigma, women's honorary in pharmacy, who has maintained a high scholastic average.

The Lehn and Fink Medal. A gold medal, appropriately engraved, is awarded each year to the senior student in the School of Pharmacy who has attained the highest scholarship rank, or who in the judgment of the faculty has made the most distinctive contribution to the advancement of science in pharmacy.

McKesson and Robbins Award. The McKesson and Robbins award of \$50 annually is provided for a senior in pharmacy who makes the highest average in a competitive examination.

Women's Auxiliary to Oregon State Pharmaceutical Association Prizes. Cash prizes of \$25 and \$15 are awarded annually to outstanding women students in pharmacy.

North Pacific Branch of the American Pharmaceutical Association Award. This award, consisting of a year's membership in the American Pharmaceutical Association and a scholarship certificate, is made annually to an outstanding junior in pharmacy.

The Merck and Company Awards. Merck and Company make annual awards of pharmaceutical books (value \$15) to two senior students who have attained the highest standing in the fields of pharmacology and pharmacognosy and practical pharmacy.

The Phi Lambda Upsilon Award is a handbook presented to the two highest ranking sophomores in chemistry or chemical engineering.

The Phi Lambda Upsilon Key is awarded annually for the best thesis submitted to Phi Lambda Upsilon.

Extracurricular Activities

CENTER for democratic fellowship among all students, faculty, alumni, and friends of Oregon State College is the Memorial Union. Beautiful in design, materials, and furnishings, the building has been planned for practical usefulness and, with its social rooms, student bookstore, post office, telegraph office, barber shop, tea room, and other facilities, is a busy center of student life throughout each day of the academic year. Students read or converse in the lounges; the business of the student body is transacted in the student offices; here the student publications are edited and student activities are

planned and carried out. In the ball room are held afternoon or evening dances. In the committee and assembly rooms meetings of many kinds fill a busy calendar each week.

Here faculty and students meet in many relationships. Alumni, especially at Homecoming, Commencement, and on other similar occasions, use the Union as their campus headquarters. Visitors from within and without the state, parents and friends of students, and notable institutional guests are welcomed in the Union.

The Memorial Union has demonstrated its efficiency as a center of College life on the Oregon State campus. Dedicated in 1928 "to the service and inspiration of the living and to the memory of our immortal dead," it conforms to the standard set by the International War Memorial Association, which determined that all memorials should be, not only commemorative of the dead, but of use to the living. The president of the Memorial Union is a student, and students share actively in the management of the Union.

Oregon State College recognizes the values of extracurricular student activities as a part of a college education: formation of habits of civic responsibility and leadership through self-government and student clubs and societies; cultural development through participation in the intellectual and esthetic life of the campus. Regulations governing student participation in extracurricular activities are as follows:

(1) A certificate of eligibility must be obtained from the Dean of Men or the Dean of Women before a student can qualify for an elective or appointive office in any student, extracurricular, or organization activity. Any student is eligible to hold an elective office or to accept an appointment in a student activity provided he is registered for at least 12 term hours, has 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 hours of academic work.

(2) A grade-point average of less than 2.00 automatically removes a student from any such office, and prevents him from participating in any such activity.

(3) Any student shall be disqualified to continue in office in any term in which he drops below a 12-term-hour load.

Before a student may represent Oregon State College in intercollegiate athletics he must comply with the Pacific Coast Conference Rules, which are as follows:

No student shall represent his institution in any athletic contest—

(1) Unless he shall have presented fifteen Carnegie units for entrance requirements;

(2) Unless he is a bona fide student carrying at least 12 hours of work in a regular or special course as defined in the curriculum of the institution he represents;

(3) Unless he shall have passed in at least 10 hours of work in the last semester or quarter of residence previous to participation;

(4) If he has total failures on his previous record exceeding one-fifth of the total hours passed by him. Failures must remain failures on the record. Incomplete grades shall not be counted either as failed or passed, until adjusted. A condition shall count as a failure until removed. "Previous record" means the student's entire record, in all collegiate institutions.

(5) If he has completed the requirements for the bachelor's degree.

Associated Students. The students of Oregon State College are organized for self-government. All campus-wide programs such as Homecoming, Dad's Day, Mother's Weekend, Campus Weekend, Campus Chest Drive, and special emphasis weeks are sponsored and coordinated through Associated Students. The Associated Students may delegate the specific responsibility for carrying out campus-wide programs to various student organizations or groups.

The Associated Women Students, a group within the general student body organization, coordinates, sponsors, and supervises activities of all women students' organizations. The A.W.S. is a chapter of the Intercollegiate Association of Women Students.

Each entering class forms an organization which retains its identity throughout the four undergraduate years at Oregon State College and after graduation.

Class reunions are held regularly by alumni. During their undergraduate days students in the different classes uphold various distinctive traditions. Graduating classes usually leave a gift to the institution. Classes returning from their silver anniversary jubilee also make gifts as an expression of their loyalty and appreciation toward the institution at which they received their undergraduate education.

All students, both men and women, not affiliated with sororities and fraternities have representation in the Associated Independent Students. This organization unifies independent students for participation in campus life and government.

All sororities are organized into an association known as Panhellenic. This organization supervises intersorority activities and their coordination with campus life and government.

All fraternities are organized in the Interfraternity Council. This organization supervises fraternity activities and coordinates them into the general student-body program.

The House Presidents' Council is a policy-forming organization composed of presidents of all women's living groups which formulates social standards and regulations within women's living groups and on campus.

Clubs and Associations. A large number of clubs and associations flourish on the State College campus. Some of these organizations are:

ALPHA PHI OMEGA—national service fraternity composed of college men who are or have been affiliated with the Boy Scout movement.

ROOK AND ROOKERS COUNSELORS—all-school service organization sponsored by Round Table.

ROUND TABLE—campus group affiliated with the national YW-YMCA.

TALONS—sophomore service honorary for women.

THANES—sophomore men's service honorary.

Honor Societies. A number of honor societies are maintained on the Oregon State College campus for the recognition of general scholarship, scholarship in particular fields, and student leadership. Most of them are national organizations with chapters at the leading colleges and universities of the country. Among these societies are:

ALPHA DELTA SIGMA—national professional advertising honorary for men.

ALPHA LAMBDA DELTA—national honorary scholastic fraternity for freshmen.

ALPHA ZETA—agricultural honorary.

AQUABATS—local honorary for women with outstanding aquatic ability.

BLUE KEY—recognition society for senior men.

DELTA SIGMA RHO—national forensic honor society open to both men and women.

EPSILON PI TAU—national professional honorary for men in industrial arts.

ETA KAPPA NU—national men's professional honorary in electrical engineering.

EUTERPE—local women's music association.

GAMMA SIGMA DELTA—national honor society in agriculture.

KAPPA DELTA PI—national honor society in education.

KAPPA KAPPA ALPHA—national honorary fraternity for outstanding students of art.

KAPPA KAPPA PSI—honorary music organization.

KAPPA PSI—national honor and professional fraternity for pharmacists.

LAMBDA KAPPA SIGMA—national professional fraternity for women in pharmacy.

MORTAR BOARD—national honorary organization for senior women.

MU BETA BETA—Four-H club honorary fraternity.

NATIONAL COLLEGIATE PLAYERS—national dramatic honorary fraternity.

OMICRON NU—national honorary fraternity for professional home economists.

ORCHESIS—national honorary for modern dance.

PARTHENIA—honorary for women in physical education.

PHI CHI THETA—national honorary for women in commerce.

PHI KAPPA PHI—national honor society composed of faculty, graduate and undergraduate members of all departments of American universities and colleges.

PHI LAMBDA UPSILON—national honorary chemical society.

PHI SIGMA—honorary biological fraternity.

PI MU EPSILON—national honorary fraternity in mathematics.

PHI TAU SIGMA—national honorary fraternity for mechanical engineers.

RHO CHI—national pharmaceutical honor society.

SCABARD AND BLADE—national military honorary of the ROTC and NROTC.

SIGMA DELTA CHI—professional journalistic fraternity.

- SIGMA DELTA PSI—national honorary fraternity in athletics.
 SIGMA GAMMA EPSILON—national honorary fraternity for professional biologists and geology students.
 SIGMA PI SIGMA—honorary physics fraternity.
 SIGMA TAU—national honorary fraternity for student and professional engineers.
 SIGMA XI—honorary graduate research organization.
 TAU BETA PI—national honor society for professional engineers.
 THETA SIGMA PHI—national professional and honorary fraternity for women in journalism.
 XI SIGMA PI—national professional honorary in forestry.

Social and Special Interest Clubs. A wide variety of social and special-interest clubs are maintained by Oregon State students, including:

- AMERICAN VETERANS' COMMITTEE—organization of World War II veterans.
 BEAVER MATES—organization to provide social activities for married students on the campus.
 BERNARD DALY CLUB—organization of students from Lake County who are attending Oregon State on scholarships provided for in the will of the late Dr. Bernard Daly of Lakeview, Oregon.
 COSMOPOLITAN CLUB—open to all students interested in international understanding.
 DING DARLING WILD LIFE CLUB—promotes professional interest among students in fish and game.
 FIN AND ANTLER CLUB—semiprofessional organization for all students in fish and game management.
 MOUNTAINEERS CLUB—a recreation club for men and women.
 OREGON STATE COLLEGE ACADEMY OF RIDING (OSCAR)—Riding club which conducts weekly rides at the H-Bar-H Dude Ranch.
 PROGRESSIVE CITIZENS OF AMERICA—political organization.
 PHRATERES—national organization which promotes friendliness among women students on the campus and attempts to get off-campus women into activities. Any woman student is eligible for membership.
 STUDENTS FOR DEMOCRATIC ACTION (SDA)—political organization, subsidiary of Americans for Democratic Action.
 SCIENCE CLUB—furtheres fellowship and acquaintance of students with work done in the science field.
 SQUARE AND COMPASS—Masonic club on the campus for all Master Masons in good standing.
 YOUNG REPUBLICAN CLUB—political organization, student members of Republican party.

Oregon State Dad's and Mother's Clubs. The Dad's Club of Oregon State College is composed of fathers or male guardians of students attending Oregon State. The objects and purposes of the club are to preserve the traditions of the College and the future usefulness of the institution in its duty of training the citizenry of this commonwealth; to cooperate with those in charge of the administration of higher education in the state of Oregon; and to cooperate with similar organizations throughout the state. The Mother's Club of Oregon State College is open to membership to all mothers and other women interested in furthering the interests and welfare of the students of Oregon State College. "Once an Oregon State Mother, Always An Oregon State Mother." Individual units of Mother's clubs are organized in many communities of the state. Also, there are clubs of mothers of individual fraternity, dormitory, and cooperative residence groups. Annual meetings of the state organization is held on campus Mother's Weekend.

School and Departmental Clubs. School and departmental clubs in Agriculture are:

- AGRICULTURAL CLUB—promotes events pertaining to agriculture and entertainment for agriculture students.
 AGRICULTURAL ECONOMICS FORUM—sponsors forums with leaders in the field as participants.
 AGRICULTURAL EXECUTIVE COUNCIL—composed of officers of the Agricultural Club and a representative from each departmental club; coordinates activities within the clubs of the School of Agriculture.
 CAMPUS 4-H CLUB—students who were members of the 4-H clubs before college registration.
 DAIRY CLUB—for dairy husbandry students.
 FARM ECONOMICS FORUM—service organization for students in farm management and agricultural economics.
 FOOD TECHNOLOGY CLUB—for those majoring in food technology.

FUTURE FARMERS OF AMERICA—encourages interest in agriculture among the nation's youth.

HORTICULTURAL CLUB—open to any student interested in horticulture.

OSC GRANGE—furthers acquaintance of college students with the work of the national Grange.

WITHYCOMBE CLUB—composed of animal husbandry majors.

Engineering clubs and associations include:

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS—professional society promoting chemical engineering as a profession.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—professional engineering society promoting interest in electrical engineering.

AMERICAN INSTITUTE OF MINING AND METALLURGY ENGINEERS—provides fellowship between students in mining and metallurgy.

AMERICAN SOCIETY OF AGRICULTURAL ENGINEERS—provides fellowship and a basis for better acquaintanceship and personal leadership for the students majoring in this field.

AMERICAN SOCIETY OF CIVIL ENGINEERS—student section of professional civil engineers society.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—student branch of national professional society for mechanical engineers.

ENGINEERING STUDENT COUNCIL—a legislative student organization which correlates the activities of the various engineering societies, and directs activities of engineering students.

INSTITUTE OF AERONAUTICAL SCIENCE—national organization for professional aeronautical men.

SOCIETY OF AUTOMOTIVE ENGINEERS—technical organization open to any student interested in the automotive field.

Other clubs include:

AMERICAN CHEMICAL SOCIETY—professional and social organization in chemistry and chemical engineering.

BUSINESS AND TECHNOLOGY CLUB—for students in business and technology and secretarial science.

FORESTRY CLUB—social organization for students in forestry.

INDUSTRIAL ARTS CLUB—student and faculty organization to realize the benefits of industrial arts.

HOME ECONOMICS CLUB—school club for all students enrolled in home economics.

LOWER DIVISION COUNCIL—local organization which provides leadership training for lower division students and opportunities for vocational and professional orientation and guidance for students at Oregon State College.

OREGON STATE RIFLES—Oregon State drill team.

AMERICAN PHARMACEUTICAL ASSOCIATION—student branch of national professional pharmacy association.

Athletics and Sports. Oregon State College is a member of the Pacific Coast Intercollegiate Athletic Conference composed of ten leading universities and colleges of the coast region. In addition to intercollegiate athletics a comprehensive program of intramural sports is sponsored by the institution through the Division of Physical Education. The sports program is closely correlated with instruction in physical education.

Organizations for men are:

MINOR "O" SOCIETY—winners of minor sports letters in tennis, golf, boxing, wrestling, skiing, and fencing.

ROWING CLUB—organized to arrange and handle the competitive rowing program. Awards ten heavy and ten light weight letters each year. Numerals are awarded to one freshman crew.

VARSITY "O" ASSOCIATION—all-school athletic club for the five major sports.

Organizations for women are:

ORANGE "O" ASSOCIATION—local honor awards for members of Women's Athletic Association.

PHYSICAL EDUCATION CLUB—promotes professional interest in physical education.

WOMEN'S ATHLETIC ASSOCIATION—all school organization for women who have participated in sports. Promotes good sportsmanship and has charge of women's intramural program.

Lectures. The regular State College curriculum is supplemented by frequent public lectures by faculty members and visiting scholars, and persons prominent in national and international affairs. Lectures are sponsored by the Committee on Concerts and Lectures, the Faculty Men's Club, the American

Association of University Women, the Faculty Women's Club, the College Folk Club, the Committee on Religious Education, the Associated Students, the Associated Women Students, Phi Kappa Phi, Sigma Xi, and schools and departments.

Forensics and Dramatics. Forensics and dramatics are fostered at the State College not only for their value to those participating but also for their intellectual and cultural value for the whole campus community. The State College is a member of the Pacific Forensic League composed of the leading colleges and universities on the coast, and of the Intercollegiate Forensic Association of Oregon composed of ten colleges and universities.

Training and experience in acting, play production, and stage craft are provided by the Speech Department. Each season groups of short plays are given in connection with the instruction in community drama. Three major and three Workshop plays are presented each year by the National Collegiate Players, Workshop Theater Players; or Mask and Dagger, the campus dramatic groups. Special student organizations such as the Wesley Players and the Westminster Players also provide outlets for dramatic talent. Radio programs are written and produced over KOAC, KEX, KWIL, and KRUL. The Associated Students sponsor a full schedule of varsity and freshman debate and oratory for both men and women. From 36 to 40 Oregon State teams supporting both negative and affirmative of many questions participate each year in more than 100 inter-collegiate debates. Oregon State representatives compete in the old-line State Oratorical Contest, the state Peace oratorical contest, and other state, national, and Pacific Coast extempore-speaking, oratorical, and debate contests.

Art and Music. The State College gives special encouragement to extra-curricular activities in art and music. Exhibitions, concerts, and recitals sponsored by the departments of Art and Music, the Associated Students, and student musical and art organizations play a central part in the cultural life of the State College community.

Under the patronage of the Convocations Committee and the Art Department, eighteen exhibitions are displayed each year in the Kidder Hall galleries. The exhibits stimulate interest in architecture, painting, sculpture, and the related arts, as well as provide student acquaintance with the best of his historical inheritance and a knowledge of contemporary art movements throughout the world. Exhibits of art work by State College students are also shown continuously throughout the school year to acquaint student artists with the work of their contemporary art students.

The Oregon State Symphony Orchestra gives two or more major concerts each year; it plays for Commencement and other important institutional events. The orchestra cooperates with the choral organizations in oratorio productions. All State College students are eligible to try out for the orchestra.

Membership in the Co-ed and R.O.T.C. bands is open to students passing a satisfactory examination in the elements of music and displaying the ability to perform on a band instrument. Individual practice and attendance at rehearsals are required. The Band furnishes basses, baritones, altos, and drums. Other instruments are supplied by the individual members using them.

The Glee Club, men's choral organization; and the Madrigal Club, women's choral organization, are open to all college students, subject to try-out. The College Chorus is composed of the members of both the Glee and Madrigal clubs. In addition to attending regular rehearsals of the club to which they belong, the members participate in joint rehearsals of the combined clubs, in

preparation for concerts given at Christmas, Easter, and Commencement. The *a capella* choir is selected from the combined membership of the College Chorus.

The Educational Activities Board brings musical artists of international fame to the campus each year for concerts and recitals. Free public recitals by advanced music students and faculty are given frequently during the academic year.

Kappa Kappa Alpha, honor society in art; Euterpe and Kappa Kappa Psi, women's and men's honor societies in music, promote art and music interests on the campus.

Several dance recitals are given each year under the auspices of the Division of Physical Education, Orchesis, and other organizations.

Social Organizations. Personal associations with fellow students through social organization constitute one of the most satisfying features of campus life and are valuable for personal and social development. All students have opportunity to belong to some social organization.

Each living group on the campus, including college residence halls, co-operative houses, sororities, and fraternities, is organized for self-government and social activities. Students of all these living groups take an active part in campus life.

Membership in fraternities and sororities is by invitation, but eligibility to initiation is based on satisfactory scholarship. The high standards of scholarship maintained by these groups require study conditions that will promote achievement in academic as well as social growth.

Fraternities at Oregon State College are:

Acacia, Alpha Gamma Rho, 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 Psi, Phi Kappa Tau, Phi Sigma Kappa, Pi Kappa Alpha, Pi Kappa Phi, Sigma Alpha Epsilon, Sigma Chi, Sigma Nu, Sigma Phi Epsilon, Sigma Pi, Theta Chi, Theta Xi.

Sororities at Oregon State College are:

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.

Other social organizations of students on the campus are Phrateres, national society for college women, and Beaver Mates, an organization of married students.

Student Publications. Oregon State College student publications are listed below. The official publications of the State College and of the State System of Higher Education are listed on another page.

THE OREGON STATE BAROMETER is a full-sized newspaper, containing campus news and selected general and educational news, issued five days a week during the academic year. It is edited, managed, and financed by students. Any student may qualify for a position on the staff. Payment of registration fees entitles every student to a subscription to the BAROMETER.

THE BEAVER, the year book of the Associated Students, is a pictorial record of student life, published in May.

THE AGRICULTURAL JOURNAL, a quarterly magazine published by the Agricultural Club, is devoted to the promotion of agricultural interests.

THE OREGON STATE TECHNICAL RECORD, a quarterly magazine (a member of Engineering College Magazines Associated), is devoted to engineering and industry.

THE ANNUAL CRUISE, an illustrated magazine published annually by the Forestry Club, is devoted to scientific forestry and lumbering and to the forestry and lumbering industries.

THE STUDENT DIRECTORY, "Fussers Guide," is compiled and published twice a year by the Oregon State chapters of Sigma Delta Chi, Alpha Delta Sigma, and Theta Sigma Phi. A directory of faculty is included.

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 \$3.00 and include a year's subscription to THE OREGON STATER. A life membership costs \$50.00 and may be paid in ten cumulative installments of \$5.00 each over a period of ten years.

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

Officers and directors are:

CLAUDE PALMER, '22, Portland.....	President
LYNN SABIN, '20, Portland.....	Vice President
PHIL SMALL, '35, Corvallis.....	Treasurer
JOHN BUHL FENNER, '40, Corvallis.....	Manager
ALBERT BAUER, '22, Portland.....	Director
IRENE BRYE CARL, '20, Portland.....	Director
KENNETH POOLE, '23, Tillamook.....	Director
ROBERT E. SHINN, '14, Salem.....	Director
VERNON HAWN, '27, Eugene.....	Director
FREDERICK SALINGS, '34, Roseburg.....	Director
J. VERNON OWENS, '27, Klamath Falls.....	Director
RICHARD RICHARDS, '16, Prairie City.....	Director
MARION WEATHERFORD, '30, Arlington.....	Director
WESTERMAN WHILLOCK, '25, Boise.....	Director
DAVID TUCKER, '28, Oakland, California.....	Director
GEORGE POWELL, '21, Long Beach, California.....	Director
JOSEPH W. JARVIS, '32, Omaha, Nebraska.....	Director
ANTHONY G. SCHILLE, '22, Tacoma, Washington.....	Director
MILTON E. WOODCOCK, '14, Corvallis.....	Director
JOANNE LINDBERG, '49, Portland.....	Student Member

Lower Division

Faculty

MAHLON ELLWOOD SMITH, Ph.D., Dean of Lower Division, Dean of Lower Division and Service Departments.

LENA CURRIER EMERSON, Secretary to the Dean.

Arts and Letters

Art

PROFESSOR GILKEY (department head).

ASSOCIATE PROFESSORS MATSEN, FOX.

ASSISTANT PROFESSORS WASSON, FIELD.

INSTRUCTOR E. JOHNSON.

Architecture

PROFESSOR SINNARD (department head).

ASSISTANT PROFESSORS WASSON, GRIEBELER.

English

PROFESSORS S. H. PETERSON (department head), M. E. SMITH, KIERZEK*, COLBY, CHILDS, H. B. NELSON.

ASSISTANT PROFESSORS JENKINS, SCHROEDER, GIBSON.

INSTRUCTORS BEEBE, BROWN, BUTTS, COMBELLACK, CRONIN, DANIELS, G. G. ELLISON, FELDE, HEADLAND, IRELAND, L. M. LAPALOMBARA, LAWRENCE, LIGON, MCCORKLE, MUSSELMAN, NORRIS, POPOVICH, REDDICK, RICE, SAVAGE, E. D. SMITH, SNIPPER, WILSON, WOODRING.

Journalism

PROFESSOR SHIDELER (department head).

ASSISTANT PROFESSORS LAKE, BAILEY, MEADE.

Landscape Architecture

PROFESSOR PECK* (department head).

ASSOCIATE PROFESSOR SOLBERG.

ASSISTANT PROFESSOR MARTEL (in charge of department).

Modern Languages

PROFESSOR MARTIN (department head).

ASSOCIATE PROFESSORS KUNEY, LEWIS, BOURBOUSSON.

ASSISTANT PROFESSORS RIASANOVSKY, JURGENSON.

ACTING INSTRUCTOR YANG.

ASSISTANTS ARNDT, MESTAS.

* On leave of absence.

Music

PROFESSORS WALLS (department head), MOORE.
ASSISTANT PROFESSORS GRAY, BRYE, SITES.
INSTRUCTOR BASKAM.

Speech

PROFESSORS MITCHELL (department head), E. W. WELLS.
ASSOCIATE PROFESSORS KNOLL, D. P. YOUNG, WINGER.
ASSISTANT PROFESSOR CORTRIGHT.
INSTRUCTORS CAIN, FULLER, HUME, C. N. HARRIS, LIVINGSTON, MONCUR.

*Social Science**Economics*

PROFESSORS M. N. NELSON (department head), JENSEN.
ASSOCIATE PROFESSORS RUBIN, H. G. VATTER.
ASSISTANT PROFESSORS HIGHSMITH, LA VALLEE, BOWEN, MYATT.
INSTRUCTORS BETT, E. L. VATTER.

History

PROFESSORS J. W. ELLISON (department head), C. K. SMITH.
ASSOCIATE PROFESSOR R. W. SMITH.
INSTRUCTORS BERKELEY, BERRY.

Philosophy

PROFESSOR WARRINGTON (department head).
ASSISTANT PROFESSOR D. A. WELLS.

Political Science

PROFESSOR POLING.
ASSOCIATE PROFESSORS SWARTHOUT (acting department chairman), SWYGARD.
INSTRUCTORS J. G. LAPALOMBARA, BARTLEY.

Psychology

PROFESSORS CHAMBERS (department head), SHERBURNE.
INSTRUCTORS ALLER, R. D. HARRIS, CROOKS, L. M. DANN, FORBES, GORDON, HAGEN.

Religion

PROFESSOR WARRINGTON (department head).
ASSISTANT PROFESSOR D. A. WELLS.

Sociology

PROFESSOR BAKKUM (department head).
ASSOCIATE PROFESSORS R. H. DANN, HOFFMAN.
ASSISTANT PROFESSOR PLAMBECK.

General Statement

FRESHMAN and sophomore work in the liberal arts and sciences is unspecialized. The work is offered through the Lower Division and leads to the Junior Certificate. Students completing the work of the Lower Division and fulfilling all requirements for the Junior Certificate may select a major in a specialized field at the close of the sophomore year.

Courses in arts and social science are offered in the Lower Division and Service Departments (pages 111-139). Courses in biological and physical sciences including mathematics are offered in the School of Science (pages 140-188).

Lower Division Liberal Arts and Sciences

Purpose. For students who plan to complete work for the bachelor's degree the two lower-division years provide broad general education and a foundation for specialization during the junior and senior years in some major field in the liberal arts and sciences or in a professional or technical curriculum. Lower-division students explore several fields of study with a view to determining special interests and aptitudes.

For students who complete no more than the first two years of college work, the Lower Division aims to afford a balanced cultural program and preparation for intelligent citizenship.

The State Board of Higher Education, in establishing the Lower Division, defined its primary purpose as follows:

(1) **Basic Education.**

Insuring to all students the elements of a sound general education during their first two years; delaying specialization until the junior and senior years and then encouraging it to a high degree.

(2) **Orientation.**

Providing students with a period of exploratory contact which will enable the institution to assist them to make a wise selection of specialization on the basis of their abilities and aptitudes.

Group Requirements. For the purpose of adjusting the work to the two-fold objectives of basic education and orientation, lower-division work in the liberal arts and sciences has been arranged in three groups, each representing a comprehensive field of knowledge, as follows: **LITERATURE**, **SCIENCE** (including the biological and physical sciences and mathematics), and **SOCIAL SCIENCE**. Students intending to major in the liberal arts and sciences must complete at least 9 approved term hours in each of the three groups and at least 9 additional approved term hours in courses numbered 200-210, or equivalent, in any one of the same three groups. Courses that satisfy group requirements are usually numbered from 100 to 110 and from 200 to 210. A list of courses applicable in meeting group requirements is printed on pages 137-139. (For group requirements for students in the professional schools see page 70.)

Required Courses. Besides fulfilling group requirements, lower-division students must take required work in English Composition, Hygiene, Physical Education, and Military Science and Tactics, as stated on page 70. Entering students are required to take certain aptitude and placement examinations, and to make any adjustments indicated as a result of standings achieved in these tests.

Major Requirements and Electives. Students complete their study programs with courses required by major departments or schools or with electives. Students who have decided on a major field take the courses prescribed by the major school or department. Students who are uncertain of their dominant interest or their vocational intentions or who do not plan to pursue major specialization later, take a program of studies designed to aid them in self-exploration and individual development.

The general distribution of work for lower-division students is shown in the curriculum on page 111.

Lower-Division Advisers. Each entering student is assigned to a lower-division adviser, whom the student consults in making out his study program. It is the duty of the adviser to assist the student in building an integrated program, in line with his interests and with institutional and lower-division requirements.

Certificates. Students who have met the group requirements, and have completed a total of at least 93 term hours of required and elective freshman and sophomore work, qualify for the Junior Certificate, the Junior Certificate with Honors Privileges, or the Lower Division Certificate, depending on their objectives and attainments. See pages 70-71.

Lower Division and Service Departments

ALL departments of instruction at Oregon State College not included in the major departments and schools, except the departments of Military Science and Tactics, Naval Science, and Physical Education, are administered under the Dean of Lower Division and Service Departments.

Under the plan adopted for the Oregon State System of Higher Education, major work in the fields of arts and letters, architecture and allied arts (including art and architecture and landscape architecture), journalism, music, and social science is confined to the University of Oregon. The work at Oregon State College in these fields parallels the lower-division work at the University. 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 intending to major in any of these fields enter the institution at which major work is offered at the beginning of the freshman year, 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.

Lower-division and service departments at Oregon State College are listed in two main groups as follows:

ARTS AND LETTERS: English, Modern Languages, Speech. For convenience the following departments are listed alphabetically with this group: Art, Architecture, Journalism, Landscape Architecture, Music.

SOCIAL SCIENCE: General Social Science, Economics, History, Philosophy, Political Science, Psychology, Sociology. For convenience the Department of Religion is listed with the Social Science departments.

The departments offer work required or elected by students in liberal arts and sciences and in the professional schools. Year sequences, paralleled by similar sequences in Science offered in the School of Science, are offered to meet "group requirements" in the Literature and Social Science groups. Other courses meet elective and service needs of students enrolled in the major schools throughout the institution.

Curricula

LOWER-DIVISION LIBERAL ARTS AND SCIENCES

*Junior Certificate
Junior Certificate with Honors Privileges
Lower-Division Certificate*

Freshman Year

	Term hours		
	F	W	S
Year sequence in any one of the three groups	3-4	3-4	3-4
Year sequence in another of the three groups (may be deferred until sophomore year)	3-4	3-4	3-4
English Composition (Eng 111, 112, 113)	3	3	3
Military or Naval Science (men)	2-3	2-3	2-3
¹ Physical Education	1	1	1
² Departmental or school requirements or exploratory electives	4-3	4-3	4-3
	16	16	16

Sophomore Year

Sophomore year sequence in one of the groups begun in the freshman year	3-4	3-4	3-4
Year sequence in a third group	3-4	3-4	3-4
Military or Naval Science (men)	2-3	2-3	2-3
Physical Education	1	1	1
² Departmental or school requirements or exploratory electives	8-6	8-6	8-6
	16	16	16

LOWER-DIVISION PROFESSIONAL CURRICULA

Oregon State College offers lower-division curricula leading to the Junior Certificate in the following professional fields: Architecture and Allied Arts, Journalism, Music, and Physical Education. 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 through the School of Science (pages 153-155).

Arts and Letters

INSTRUCTION in English, Modern Languages, and Speech aims to help the student to think clearly, to read with discrimination, to express himself effectively, and to appreciate literature. Oregon State College offers lower-division and service courses in these departments for students planning to major in these fields at the University, and for students majoring in other fields. Similarly, the courses in art, architecture, journalism, landscape architecture, and music are intended, not only to lay the foundation for major work at the University, but also to serve the needs of students majoring in other fields.

Architecture

CCOURSES in architecture and allied arts include lower-division professional and service courses intended to serve the cultural and informational needs of students interested in building construction. Professional courses permit a student to prepare to major in architectural design, structural design, or interior design at the University of Oregon.

¹General Hygiene (PE 150), 1 term hour for men, 2 term hours for women, must be taken in place of physical education one term of the freshman year.

²Chosen with the approval of the dean of the Lower Division. If one of the year sequences in group requirements is deferred to the sophomore year, the opportunity for school requirements or electives in the freshman year is correspondingly increased.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

AA 111, 112, 113. Graphics I. 2 hours each term.

First year. The principles of orthographic projection or descriptive geometry; application to the construction of plans and elevations; projections of points, lines, and planes; location of shades and shadows for design problems. Assistant Professor Griebeler.

AA 178. House Planning and Architectural Drawing. 3 hours any term.

Aim is to stimulate appreciation and criticism of domestic architecture. Small-house planning and drawing with particular reference to the needs of students in Agriculture, Engineering, Forestry, and Home Economics. Professor Sinnard, Assistant Professors Wasson, Griebeler.

AA 179, 180. House Planning and Architectural Drawing. 3 hours each term, winter and spring.

Small-house construction; detail drawing; development of working drawings begun in AA 178; presentation plans, advanced planning, and design. Prerequisite for either course: AA 178. Professor Sinnard.

AA 212. Graphics II. 2 hours.

Second year. Continuation of AA 113. Completion of the work in shades and shadows; practical methods of constructing perspectives.

AA 220, 221, 222. Construction I. 2 hours each term.

Introduction to architectural elements and construction by means of individual research and observation; sketching of existing examples; class discussion.

AA 297. Lower-Division Architectural Design. 1 to 5 hours each term.

Through lectures and individual problems the fundamental principles of architectural design are studied. The student is oriented in the methods, concepts, and ideals that make up the field of architectural design and planning. In a two-year sequence a progressive series of related problems is studied and executed by presentation in plan, elevation, isometric, perspective, and model.

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 appreciation. Students majoring in other fields may take art as a minor or specific art subjects as service courses. Students may elect the courses in preparation for majoring in art or architecture at the University of Oregon or elsewhere.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

AA 114, 115, 116. Survey of Visual Arts (History and Appreciation). 3 hours each term.

Creative fundamentals and functions of architecture, painting, sculpture, and the other arts. Historical and contemporary works of the best of man's creations are studied to develop an individual taste and increased appreciation.

AA 160, 161. Color and Composition. 3 hours each term.

Studio and lecture classes in the everyday use of the principles of composing or creating with lines, colors, and textures. The course fulfills the art requirements of the School of Home Economics.

AA 195. Basic Design. 2 hours each term, three terms.

Instruction through individual projects, leading to creative mastery of basic design in the major visual arts and an understanding of the design factors involved in the various professional art fields. Three terms required of all students who expect to major in art, architecture, interior design, or landscape architecture at the University of Oregon. The work is correlated with that of AA 114, 115, 116.

AA 290. Lower-Division Painting. 2 or 3 hours each term, three terms.

Offered in oil, water color, and mixed painting techniques. Individual creative expression and progress are encouraged, as well as the pursuit of special interests in painting. Prerequisite or parallel: AA 160 or AA 291.

AA 291. Lower-Division Drawing. 2 or 3 hours each term, three terms.

Primary means of art expression and communication. Principles of composition and the techniques of fine draughtsmanship are presented in specialized classes such as industrial arts drawing, fashion illustrating, sketching, figure sketching, and graphic arts (etching, lithography, block printing).

AA 292. Lower-Division Composition. 2 or 3 hours each term, three terms.

Basic creative composing with colors, lines, and textures. Abstract compositions leading into representational problems develop individual creativeness.

AA 296. Lower-Division Decorative Design (Crafts Design). 2 or 3 hours each term, six terms.

Application of original designs in creation and enrichment of useful or commercial art and craft objects. Specialized classes in art craft, ceramics (pottery), display advertising and lettering, interior design, jewelry, leathercraft, metalcraft, industrial arts design, and weaving.

English

THE Department of English offers instruction in literature and written English. The courses are intended to supply the training in writing necessary to every educated man, to afford a cultural background for those students who are limited to two years of work in English, and to prepare liberal-arts students to major in English at the upper-division level. (Courses in speech, including platform and radio speaking, dramatics and interpretation, and speech correction, are offered in the Department of Speech.)

Literature. The study of English literature begins with an introduction in the form of either a historical presentation of the tradition of English literature or an examination of the motives and ideas of literature. This is followed by a more detailed study of periods, epochs, and centuries of English literary movements; a careful analysis of the chief literary forms such as the novel, drama, and poetry; and a more intensive study of the major authors.

Written English. The purpose of the study and practice of written English is technical accuracy in the fundamental forms of composition, the development of the power of expression, and the survey of special art forms such as versification, play writing, the essay, and short story.

English K. All entering students are required to take an examination in English. Those who receive a low rating in this examination are enrolled in a writing course called English K, the object of which is the diagnosis and correction of defects manifested in the placement examination.

COURSES IN LITERATURE

LOWER-DIVISION COURSES

Eng 101, 102, 103. Literature Survey. 3 hours each term.

History of English literature in general outline. Fall: from beginnings to seventeenth century. Winter: seventeenth and eighteenth centuries. Spring: nineteenth century. Professor Nelson, Assistant Professor Jenkins.

*Eng 104, 105, 106. Introduction to Literature. 3 hours each term.

Aim is to stimulate appreciation and criticism of literature. The emphasis throughout is on ideas and motives. Professor Peterson and Staff.

Eng 131. Directed Recreational Reading. 1 or 2 hours.

Readings and discussions based on the principle of interest. For students in professional schools and others who do not take other literature courses. Not applicable toward literature group requirement. Prerequisite: consent of instructor. Professor Childs.

Eng 201, 202, 203. Shakespeare. 3 hours each term.

The important historical plays, comedies, and tragedies. Courses in sequence but may be taken separately. Prescribed for major. Professor Smith.

Eng 253, 254, 255. American Literature. 3 hours each term.

American literature from its beginnings to the present day. Professors Childs and Nelson.

Eng 261, 262. Individual Authors. 3 hours fall.

Each term devoted to the study of a single author. (Eng 261, Browning; 262, Tennyson or another author—only one course given each year.) Assistant Professor Gibson.

Eng 263. Great Books. 3 hours winter.

The Bible, the Odyssey, Arabian Nights, Divine Comedy, Autobiography of Benvenuto Cellini, Don Quixote, Pilgrim's Progress, Gulliver's Travels, Faust, etc.; contribution to western culture. Professor Peterson.

Eng 264, 265, 266. Continental European Literature. 3 hours each term.

A survey of those writers, chiefly modern and contemporary, whose works have in translation become part of our literary heritage and which aid in understanding the world today. Fall term: Romance; winter term: Germanic; spring term: Slavic. Professor Colby.

Eng 271, 272, 273. Contemporary Literature. 3 hours each term.

The contemporary American novel; modern drama; American poetry. Professors Kierzek and Colby.

Eng 274. The Short Story. 3 hours spring.

The development of the American short story; analysis of recognized masterpieces as well as of the best present-day magazine stories, with the idea of developing critical taste in reading. Professor Peterson.

Eng 275. The Bible as Literature. 3 hours spring.

Designed to enlarge appreciation of the art and beauty of Bible folklore, storytelling, history, poetry, drama, wisdom literature, oratory, and essay. Theology and dogma are avoided. Assistant Professor Gibson.

* Students intending to major in English should take either Eng 101-103 or Eng 104-106.

Eng 276. The Novel. 3 hours winter.

Aim is to enrich the student's background of knowledge in the field of the novel and prepare him for critical appreciation of fiction. Professor Peterson.

UPPER-DIVISION SERVICE COURSES**Eng 327, 328, 329. Survey of Russian Culture. 3 hours each term.**

Achievements of old and new Russia in the fields of art, science, music, literature, and education that have contributed significantly to western civilization. Not applicable toward literature group requirement. Assistant Professor Riasanovsky.

Eng 331, 332, 333. The Democratic Tradition in Literature. 3 hours each term.

Study and search of the most significant utterances on democracy in the literature of western civilization from ancient times to the present. Not open to freshmen and sophomores except by permission of instructor. Professor Childs.

COURSES IN WRITTEN ENGLISH**LOWER-DIVISION COURSES****English K. 1 hour fall or winter.**

A one-term refresher course in English fundamentals. The student must pass the English placement examination or English K before he is permitted to register for any other written English course. Three recitations. Staff.

Eng R. Effective Reading. 1 hour each term.

Designed to help students develop better comprehension and greater speed in their reading. Three recitations. Staff.

Eng 111, 112, 113. English Composition. 3 hours each term.

Composition and rhetoric; frequent written themes in the various forms of discourse; special attention to fundamentals and to organization of papers. Prerequisite: English placement examination. Professor Peterson and staff.

Eng 118. Technical Report Writing. 3 hours any term.

Application of principles learned is made to specific needs and interests of students having papers in progress during the term. Prerequisite: Eng 111, 112, 113, or equivalent. Mr. Ligon.

Eng 211. Vocabulary Building. 3 hours any term.

Advanced course in writing; the study and perfection of style and vocabulary; the analysis of various forms and models. Prerequisite: Eng 111, 112, 113.

Eng 213, 214, 215. Short Story Writing. 2 hours each term.

Designed to develop proficiency in the art of writing the short story. Courses in sequence but may be taken separately. Prerequisite: consent of instructor. Mrs. Beebe.

Eng 217. Business English. 3 hours any term.

Modern practices in business correspondence; analysis and writing of all types of correspondence. Prerequisite: Eng 111, 112, 113. Mr. Ligon.

Eng 218. Creative Writing. 3 hours any term.

Creative expression in prose forms. 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: Eng 111, 112, 113. Mrs. Beebe.

UPPER-DIVISION SERVICE COURSE

Eng 324. English Composition for Teachers. 3 hours spring.

For students expecting to teach English in high schools. Practice in writing and a review of the rules of composition. Prerequisite: Eng 111, 112, 113. Professor Nelson.

COURSES IN LIBRARY

UPPER-DIVISION SERVICE COURSES

Lib 381. Secondary-School Library. 3 hours.

Aims to aid teacher librarian in planning, organizing, and administering a high-school library. Relation of library to curriculum; acquisition, processing, care, and use of library materials; routines; records. Prerequisite: junior standing.

Lib 386. Literature for High-School Libraries. 3 hours.

Books and periodicals for secondary-school students, including reading for information and recreation. Various approved lists are examined. Individual books are considered critically. Prerequisite: junior standing.

Journalism

ELEMENTARY courses in journalism, in addition to furnishing a certain cultural background in newspaper methods, are intended to 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 a training school 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 the professional schools to write competently for newspapers and magazines on the subjects or in the fields in which they are specializing. These courses are intended to 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.

The lower-division courses permit a student to prepare to major in journalism at the University of Oregon. A full journalistic training combined with a technical specialty may be arranged in a four- or five-year curriculum utilizing the facilities at both the University and Oregon State College.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

J 111, 112. Elementary Journalism. 3 hours each term.

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. Assistant Professors Lake, Bailey, and Meade.

J 211. Copyediting. 3 hours any term.

Copy reading, head writing, proof reading, and make-up; actual experience in editing copy. Required for advanced positions on the Barometer. Prerequisite: J 111. Two lectures; 1 laboratory period. Lectures, Assistant Professor Lake; laboratory, Professor Shideler, Assistant Professor Lake.

J 223. Editorial Writing. 3 hours fall.

Materials, style, and arrangement of periodical editorials; training in writing editorials; policy and ethics; make-up of editorial page of farm and trade journals. Prerequisite: J 111. Professor Shideler.

UPPER-DIVISION SERVICE COURSES**J 312. Special Feature Articles. 3 hours fall or spring.**

Writing of special articles along the line of the student's own major; study of the media of such articles; practice in popularization of scientific material. Prerequisite: J 111. Assistant Professor Bailey.

J 313. Public Information Methods. 3 hours winter or spring.

Planning and executing informational campaigns; methods of informing the public of public affairs and other enterprises in which it has an interest. Prerequisite: J 111. Professor Shideler.

J 314. Technical Writing. 3 hours any term.

Writing and editing popular and scientific bulletins; preparing reports and writing articles for scientific publications; preparing radio manuscripts. Prerequisite: J 111. Assistant Professor Bailey.

J 351, 352, 353. Journalism Projects. 2 hours each term.

Application of news-writing, copyediting, feature-writing, and technical-writing principles; actual experience through work on student publications and preparation of articles for trade and technical publications or specialized material for general publications. Prerequisite: J 111, 211, and consent of instructor. One lecture: 1 laboratory period. Professor Shideler, Assistant Professor Lake.

Landscape Architecture

ALL instruction in landscape design is correlated with the instruction in closely related arts. In addition to the landscape courses, the student is instructed also in plant propagation, soils, surveying, and other practical phases of the profession. The campus constitutes an out-of-door living laboratory of unusual interest and value to students in landscape architecture.

Field Trip. It is recommended, but not required, that students take the departmental field trip of about one week. Parks, gardens, city planning, and other landscape projects are studied. The areas about Seattle, Portland, and San Francisco are visited in turn. Students have opportunities to speak before garden clubs and other organizations.

Student Drawings and Models. All student drawings and models remain the property of the department.

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

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

LA 179. Landscape Architecture (Descriptive). 2 hours fall.

Home-ground layouts, city parks, national parks, wilderness areas, city planning, and modern garden cities; good taste and general information. No drawing.

LA 279. Home-Ground Planning. 2 or 3 hours any term.

Layout and organization of different kinds of property; improvement of home grounds, rural and urban; drafting. Two two-hour drafting periods; 1 lecture. Professor Peck.

LA 290. Lower-Division Landscape Design. 2 hours each term.

Design of small residence properties, ordinary city lot, town-house, and suburban residence properties of not more than three acres. Prerequisite: LA 279.

UPPER-DIVISION COURSES

LA 326, 327, 328. Plant Materials. 3 hours each term.

Trees, shrubs, vines, and perennials and their uses in plant composition. Professor Peck.

LA 356, 357, 358. History and Literature of Landscape Architecture. 2 hours each term.

Story of gardens as an outgrowth of living conditions of the times from early Egyptian to the modern America; builds up judgment and knowledge concerning landscape design. Professor Peck.

LA 359, 360, 361. Maintenance and Construction. 3 hours each term.

Concise and practical knowledge of the maintenance of parks, estates, cemeteries, and golf courses; golf-course construction and the building of tennis courts, walks, roads, and water effects. Prerequisite: LA 279. Professor Peck.

LA 379. Landscape Architecture. 3 hours spring.

Arrangement of features and elements in ranger stations, recreation areas, state parks, overlooks, and summer-home sites. Prerequisite: LA 279. Two lectures; 1 two-hour drafting period. Professor Peck.

LA 382, 383, 384. Layout of Small Properties. 2 or 3 hours each term.

The city lot, small suburban properties, and other areas; sketch plans, finished renderings, and contour problems. Two three-hour laboratory periods. Prerequisite: LA 279, 290.

LA 390. Intermediate Landscape Design. 3 hours.

Continuation and enlargement of LA 290. Prerequisite: LA 290.

LA 392, 393, 394. Planting Plans. 2 hours each term.

Planting plans; estimates of costs; construction and seasonal care of the planting areas. Two three-hour laboratory periods. Prerequisite: LA 326, 327, 328, 390.

Modern Languages

IN THE Department of Modern Languages instruction is offered in Chinese, French, German, Portuguese, Russian, and Spanish. The lower-division and service courses in these languages are planned to meet the demand for practical use of the language as well as the cultural needs of all students, to provide the 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.

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 First-Year French, First-Year German, or First-Year Spanish. Those entering with

two units of entrance credit in a language should register for the second-year college course; those with three or more entrance units should register for the course in the literature of the language. Students having other preparation and students 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 1, 2, 3. First-Year German.** 4 hours each term.

Elements of pronunciation, grammar, reading, and conversation. Three recitations; 2 hours practice in conversation. Associate Professor Lewis.

GL 4, 5, 6. 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: 2 two-hour practice periods in conversation, including student discussion of current topics and systematic vocabulary building. (c) For 5 hours credit: (a) and (b) combined. Prerequisite: GL 1, 2, 3, or equivalent. Associate Professor Lewis.

GL 201, 202, 203. German Literature. 3 hours each term.

Reading of masterpieces of various periods; general survey of German literature. Prerequisite: GL 4, 5, 6 or equivalent. Associate Professor Lewis.

UPPER-DIVISION SERVICE COURSES

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

GL 311, 312, 313. German Literature. 3 hours each term.

Reading of masterpieces of various periods; general survey of German literature. Prerequisite: GL 4, 5, 6, or equivalent. Not open to students who have taken GL 201-203. Associate Professor Lewis.

GL 320, 321, 322. Scientific German. 1, 2, or 3 hours each term.

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. Prerequisite: consent of instructor. Associate Professor Lewis.

COURSES IN ORIENTAL LANGUAGES: CHINESE

LOWER-DIVISION COURSES

OL 1, 2, 3. First-Year Chinese. 4 hours each term.

Essentials of colloquial Mandarin with emphasis on conversation and easy reading. Prerequisite: consent of instructor. Three recitations; 2 hour-periods conversational drill. Mr. Yang.

COURSES IN ROMANCE LANGUAGES: FRENCH

LOWER-DIVISION COURSES

†RL 1, 2, 3. First-Year French. 4 hours each term.

Elements of pronunciation, grammar, reading, and conversation. Three recitations; 2 hours practice in conversation. Associate Professors Kuney, Bourbousson.

* A special section of GL 1, 2, 3 for engineering students is offered for 3 hours each term.

† A special section of RL 1, 2, 3 for engineering students is offered for 3 hours each term.

RL 4, 5, 6. 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: 2 two-hour practice periods in conversation, including student discussion of current topics and systematic vocabulary building. (c) For 5 hours credit: (a) and (b) combined. Associate Professors Kuney, Bourbousson.

RL 201, 202, 203. French Literature. 3 hours each term.

(Third-year French.) Reading of masterpieces of various periods; general survey of French literature. Prerequisite: two years of college French or the equivalent. Associate Professor Bourbousson.

RL 211, 212, 213. Directed Reading in French. 1 or 2 hours each term.

Reading in French in the field of the student's major. Students who register for 1 hour any term may register for an additional hour in a subsequent year. Prerequisite: consent of instructor. Associate Professor Kuney.

UPPER-DIVISION SERVICE COURSES

RL 311, 312, 313. French Literature. 3 hours each term.

(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. Associate Professor Kuney.

COURSES IN ROMANCE LANGUAGES: PORTUGUESE

LOWER-DIVISION COURSES

*RL 21, 22, 23. First-Year Portuguese (Brazilian). 4 hours each term.

Elements of pronunciation, grammar, reading, and conversation. Three recitations; 2 periods practice in conversation. Associate Professor Kuney.

RL 217, 218, 219. Directed Reading in Portuguese. 1 to 2 hours each term.

Reading in Portuguese to aid students to maintain facility in the language. Prerequisite: consent of instructor. Associate Professor Kuney.

COURSES IN ROMANCE LANGUAGES: SPANISH

LOWER-DIVISION COURSES

*RL 11, 12, 13. First-Year Spanish. 4 hours each term.

Elements of pronunciation, grammar; reading and conversation. Three recitations; 2 hour-periods in conversation practice. Professor Martin, Mr. Mestas.

RL 14, 15, 16. 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: 2 two-hour practice periods in conversation, including student discussion of current topics and systematic vocabulary building. (c) For 5 hours credit: (a) and (b) combined. Professor Martin, Mr. Mestas.

RL 207, 208, 209. Spanish Literature. 3 hours each term.

(Third-year Spanish.) Reading of masterpieces of various periods; general survey of Spanish literature. Prerequisite: two years of college Spanish or the equivalent. Professor Martin, Mr. Mestas.

* Special sections of RL 21, 22, 23, and one of RL 11, 12, 13, is offered for 3 hours each term for engineering students.

- RL 214, 215, 216. Directed Reading in Spanish. 1 or 2 hours each term.
Reading in Spanish in the field of the student's major. Students who register for 1 hour any term may register for an additional hour in a subsequent year. Prerequisite: consent of instructor. Professor Martin.

UPPER-DIVISION SERVICE COURSES

- RL 341, 342, 343. Spanish Literature. 3 hours each term.
(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. Professor Martin, Mr. Mestas.

COURSES IN SLAVIC LANGUAGES: RUSSIAN

LOWER-DIVISION COURSES

- SL 1, 2, 3. First-Year Russian. 4 hours each term.
Elements of pronunciation, grammar, reading, and conversation. Three recitations; 2 hour-periods in conversation practice. Assistant Professor Jergenson.
- SL 4, 5, 6. 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: 2 two-hour practice periods in conversation, including student discussion of current books and systematic vocabulary building. (c) For 5 hours credit: (a) and (b) combined. Prerequisite: SL 1, 2, 3, or equivalent. Assistant Professor Riasanovsky.

Music

MUSICAL activities at Oregon State College are considered an essential part of campus life. A wide variety in the offerings of the Department of Music makes it possible for students interested in furthering their musical education to find some activity to suit their individual needs and abilities. They may choose to participate in music solely for its general cultural and avocational contributions to their well-being, or by following a planned course of study they may lay the foundation for majoring in music at the University of Oregon.

Musical Activities. The Bands, Orchestra, Glee Club, and Madrigal Club are open to all students in the College after consultation with the directors. Each organization is presented in concert every term. Various small vocal and instrumental ensemble groups are organized for the benefit of the more advanced performers. Recitals by members of the faculty and advanced students are held each year.

Teaching Minor. Students who are preparing to enter some field of teaching for which training is given at the State College may take a minor in music designed to fit them to take charge of high-school choruses, bands, and orchestras in connection with their other teaching. For the minors in music (vocal and instrumental) see SCHOOL OF EDUCATION.

Individual Instruction. Individual instruction is defined as private lessons for which one credit hour is offered for one lesson a week, or two credit hours for two lessons a week, for a term. Instruction is offered in piano, voice, and the instruments of the band and orchestra. Students may register for indi-

vidual instruction at any time, but no credit will be allowed for less than one lesson a week for a full term.

Any phase of individual instruction may be taken as an elective by any student throughout four years, a maximum of 12 credit hours applying toward a B.A. or B.S. degree.

Regulations. Students are expected to consult the departmental office regarding regulations governing registration, attendance, public performance of music students, etc.

Fees. All fees for private music lessons are payable 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 by the College unless other arrangements are made specifically with the departmental office. The schedule of music fees is as follows:

	<i>Per term</i>
INDIVIDUAL INSTRUCTION (Private lessons)	
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)	\$60.00
*GROUP INSTRUCTION	
One lesson a week (50 minutes)	\$15.00
PRACTICE ROOM RENTAL—with piano	
One-half hour a day, a term	\$ 3.00
One hour a day, a term	\$ 5.00
Two hours a day, a term	\$ 7.50
Three hours a day, a term	\$10.00
PRACTICE ROOM RENTAL—without piano	
One hour a day, a term	\$ 2.50
ORCHESTRA AND BAND INSTRUMENTS	
Viola, cello, bassoon, and oboe are available for practice purposes for \$3.00 a term for one hour weekly. Bassoon and oboe players must furnish their own reeds, and viola and cello students must replace broken strings with new ones. Any damage done to the instruments through carelessness or negligence of student must be repaired at student's expense.	

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

Mus 111, 112, 113. Theory. 3 hours each term.

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. Five periods.

Mus 121. Appreciation of Music. 1 hour any term.

Designed to give the student a wide acquaintance with music of different styles and periods through lecture and frequent use of phonograph recordings. Recommended for all students in the College. Required of home-economics students; elective to others. Two lectures.

Mus 122, 123. Appreciation of Music. 1 hour each term, winter and spring.

Continuation of Mus 121 with greater specialization of topics studied. Prerequisite: Mus 121.

Mus 127, 128, 129. Music Survey. 1 hour each term.

Designed to serve as an introduction to the broad field of music. Provides a limited background in elements of music theory, history, and form. Brief study of symphony orchestra and its instrumentation; of composers and their works.

* See Mus 191, 192, 193. Group instruction is given to class of four or more.

- Mus 180. Accompanying and Sight Reading.** 1 hour each term.
Practical experience in playing studio and rehearsal accompaniments for vocal and instrumental soloists and ensembles. Prerequisite: consent of instructor.
- Mus 190. Individual Instruction.** 1 or 2 hours any term.
Individual instruction in piano, voice, and the instruments of band and orchestra. Term hours on basis of number of lessons a week.
- Mus 191. Group Instruction—Voice.** 1 hour each term, three terms.
- Mus 192. Group Instruction—Stringed Instruments.** 1 hour each term, three terms.
- Mus 193. Group Instruction—Wind and Percussion.** 1 hour each term, three terms.
- Mus 211, 212, 213. Theory.** 2 hours each term.
Continuation of Mus 113 involving use of secondary and altered chords in harmonization and analysis of master works; modulation and keyboard harmony further developed. Three meetings.
- Mus 290. The College Chorus.** 1 hour each term.
Membership is open to all students in the College subject to tryout. Two weekly rehearsals of the Glee Club (men) and the Madrigal Club (women), and one rehearsal of the two groups combined. Concert each term of standard choral works.
- Mus 291, 292, 293. Orchestral Conducting (Elementary).** 2 hours each term.
Organization of the amateur orchestra; progressive materials; transposition; simple arrangements; manipulation of the various instruments; baton technique; experience in conducting. Prerequisite: Mus 111, 112, 113.
- Mus 295. The College Band.** 1 hour each term.
The Oregon State Band is maintained for those students who are qualified musicians and wish to continue their activity while in college. Division I band is military in character, and cooperates with the R.O.T.C.; in addition, it plays at football and basketball games, parades, and other attractions that require the services of such an organization. Open to all students subject to tryout. Division II band is maintained for those students, including women, who are not eligible for the R.O.T.C. and are more interested in the music of the concert band. While this section of the band is operated separately from the military band, membership may be interchangeable at the discretion of the conductor.
- Mus 296. The College Orchestra.** 1 hour each term.
The College Orchestra is a symphonic group including all instruments common to such an organization. Membership is automatically open to all string players and those wind and percussion players who, in the opinion of the conductor, can meet the special requirements of the orchestra.

UPPER-DIVISION SERVICE COURSES

- Mus 324, 325, 326. Advanced Conducting and Orchestration.** 2 hours each term.
Applied orchestral conducting for the advanced student. The fine points of conducting, scoring, and arranging for full symphonic orchestra; literature suitable for such a group. Prerequisite: Mus 291, 292, 293.

- Mus 331, 332, 333. Band Organization.** 2 hours each term.
Technique and repertoire of band instruments; organizing and developing ensembles; band administration; instrumentation; elementary arranging; use of baton. Prerequisite: Mus 111, 112, 113.
- Mus 334, 335, 336. Band Organization.** 2 hours each term.
Organization and administration of the military and concert band. The student is given opportunity to conduct the band in public performance of a standard overture. Prerequisite: Mus 331, 332, 333.
- Mus 380. Accompanying and Sight Reading.** 1 hour each term.
For advanced piano students. Enrollment under the direction of the department office.
- Mus 390. Individual Instruction.** 1 or 2 hours any term.
Advanced study of piano, voice, and the instruments of the band and orchestra. Term hours on the basis of number of lessons a week.
- Mus 433. Glee Club Conducting.** 1 hour spring.
High-school chorus conducting; baton technique; choral arrangements suitable for high-school students; other topics. For students who have completed all other requirements of a teaching minor in music.

Speech

INSTRUCTION in speech has for its purpose to build strength of personality by aiding students in the development of clear, original thinking, and by giving training in the 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 the principles that underlie effective reading and speaking. The training goes far in helping to overcome self-consciousness and other emotional inhibitions, and in aiding to build up 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.

A well-equipped radio studio is maintained by the department for those wishing to acquire a knowledge of and practice in the use of radio techniques.

Courses in speech are required in a number of professional curricula. Such training is regarded as of great value to all students preparing for leadership in any field, including prospective teachers of vocational subjects, agricultural agents, home demonstration agents, club leaders, homemakers, and others. (For courses in written English see Department of English; for courses in literature see departments of English and Modern Languages.)

Many plays, intramural and intercollegiate debates, extempore speaking and oratorical contests take place each year, and much individual attention is given to students who wish to prepare for such work.

A clinic is maintained by the department for those who are handicapped with the various speech impediments, such as stammering, lisping, nasality, and the like. Advice and treatment are given for both organic and functional difficulties. An attempt is made to understand the factors in the life of the individual that have caused any emotional difficulties, and when they are located an attempt is made to eradicate them.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

Sp 111, 112, 113. Extempore Speaking. 3 hours each term.

Development and presentation of original speeches; vocabulary building; pronunciation; voice, gesture, bearing; organization; delivery. Professors Mitchell and Wells, Associate Professors Knoll and Winger, Mr. Hume, Mr. Fuller, Mr. Livingston, Mr. Harris, Mr. Moncur, Mr. Cain.

Sp 120. Voice and Diction. 3 hours any term.

Use of vocal mechanism; tone production and speech sounds; phonetics; vocabulary building; principles that underlie good social, business, platform, and radio speech. Associate Professor Winger, Mr. Harris.

Sp 121. Interpretation I. 3 hours any term.

Fundamental training in analysis and presentation of printed materials; emotional reactions that give color and interest; expressive voice and body; correction of erroneous habits. Associate Professor Young, Assistant Professor Cortright, Mr. Hume.

Sp 122. Interpretation II. 3 hours any term.

Continuation of Sp 121. Interpretation of more advanced literary materials; intensive work in characterization. Prerequisite: Sp 121. Associate Professor Young, Assistant Professor Cortright.

Sp 123. Interpretation III. 3 hours spring.

Advanced work in expressive body and voice; choral reading; interpretation of dramatic literature. Prerequisite: Sp 121, 122. Associate Professor Young, Assistant Professor Cortright.

Sp 190. Corrective Speech. 1 hour each term, maximum 3 hours.

Designed specifically for students afflicted with speech disorders (one to three hours in one term, or extended over several terms according to need); group meetings of the class, supplemented by clinical periods devoted to individual diagnosis and treatment. Mr. Fuller.

Sp 211. Oratory Squad. 3 hours.

Original manuscript speeches; preparation for intercollegiate competition. Prerequisite: Sp 111, 121; consent of instructor. Professors Mitchell and Wells, Mr. Cain.

Sp 214. Extempore Speaking Squad. 3 hours.

Preparation for intercollegiate competition. Prerequisite: Sp 111, 112; consent of instructor. Professor Mitchell, Associate Professor Winger.

Sp 217. Debating. 3 hours.

Argumentation principles; analysis and brief-drawing; debate participation. Prerequisite: consent of instructor. Professor Mitchell, Associate Professor Knoll, Mr. Fuller.

Sp 220. Argumentation. 3 hours any term.

Theory; brief-drawing, collection and handling of evidence, construction of speeches. Each student works out several briefs and delivers several speeches. Prerequisite: Sp 111. Associate Professor Knoll.

Sp 221. Speech Composition. 3 hours fall or winter.

Textbook work; study of models; lectures, composition exercises, writing a term speech; mastery of audience psychology and effective style. Prerequisite: Sp 111. Professor Wells.

Sp 231. Parliamentary Procedure. 3 hours fall or spring.

Parliamentary usage applied in deliberative assembly, conference, symposium, and panel discussion. Students serve as chairman and secretary of meetings. Practice in group discussions and procedure. Associate Professor Winger.

Sp 244. Stagecraft and Lighting. 3 hours any term.

Construction of scenery and stage properties; lighting and lighting equipment; practical experience in lighting, stage management, construction of settings, including realistic and suggestive. Associate Professor Young, Assistant Professor Cortright.

Sp 247, 248, 249. Community Drama. 3 hours each term.

Training for participation and leadership in community dramatics; the community-drama idea; play selection; stage technique and acting; costume and make-up; short cuts in craftsmanship; directing and play production. Prerequisite: Sp 121. Associate Professor Young, Assistant Professor Cortright.

Sp 251. Workshop Theater. 1 to 3 hours any term.

For participation in campus plays, credit totaling not more than 6 hours is given on recommendation of the instructor. Prerequisite: consent of instructor. Professor Mitchell, Associate Professor Young, Assistant Professor Cortright, Mr. Hume.

Sp 291. Speech Science. 3 hours.

Scientific basis 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. Professor Wells.

Sp 292. Speech Defects. 3 hours any term.

Nature, causes, diagnosis, and treatment of speech defects. For students requiring knowledge of speech problems of children and adolescents. (See also Sp 190). Professor Wells, Mr. Fuller.

UPPER-DIVISION SERVICE COURSES

Sp 334, 335, 336. Radio Speaking. 3 hours each term.

Voice and diction as they pertain to radio; special techniques; radio speeches and continuity; program building; some practice broadcasting over KOAC. Prerequisite: Sp 111, 120, 121, or consent of instructor. Professor Mitchell, Mr. Livingston, Mr. Moncur.

Sp 393. Speech Clinic. 3 hours.

Student acquires a knowledge of speech clinical procedures. Continual practical experience in handling clinical cases, including taking of case history, making diagnosis, and giving remedial treatment. Prerequisite: Sp 291, 392. Professor Wells, Mr. Fuller.

Sp 312. Oratory Squad. 3 hours.

Continuation of Sp 211. Professor Wells, Mr. Cain.

Sp 315. Extempore Speaking Squad. 3 hours.

Continuation of Sp 214. Associate Professor Winger.

Sp 318. Debating. 3 hours.

Continuation of Sp 217. Associate Professor Knoll, Mr. Fuller.

Sp 413. Oratory Squad. 3 hours.

Continuation of Sp 312. Professor Wells, Mr. Cain.

Sp 416. **Extempore Speaking Squad.** 3 hours.

Continuation of Sp 315. Associate Professor Winger.

Sp 419. **Debating.** 3 hours.

Continuation of Sp 318. Associate Professor Knoll, Mr. Fuller.

Social Science

KNOWLEDGE of the social sciences is essential for enlightened citizenship and for leadership in the political and economic life of our time. Instruction in this field is offered at Oregon State College through the departments of General Social Science, Economics, History, Philosophy, Political Science, Psychology, and Sociology.

Oregon State College offers lower-division and service courses in the social sciences, not only for students planning to major in this field at the University of Oregon, but also for students majoring in other fields.

General Social Science

CERTAIN phases of the instructional work in social science are of general character, being broader in scope and objectives than any of the departments. Year sequences in general social science are offered at both the lower-division and the upper-division levels.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

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

Factors that constitute the make-up of society; student thought on social phenomena challenged; scientific methods and application in social sciences; psychology of prejudices, crowd egoism, etc.; social controls; social institutions. Staff.

UPPER-DIVISION SERVICE COURSES

SSc 441, 442, 443. **Foundations of National Power.** 3 hours each term.

Aim is to promote among the Navy's future citizens a keener interest and a clearer understanding of the world position of the United States, of the problem of American security, and of the degree to which security for the United States depends on establishing a more stable international order. Required of Naval R.O.T.C. students; open to others.

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 Human Geography are also offered.

COURSES IN ECONOMICS

LOWER-DIVISION COURSES

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

The principles that underlie production, exchange, and distribution; practical problems, such as monetary and banking reform, trade regulations, taxation, labor movements, regulation of railways and public utilities. A three-term sequence.

Ec 211. Outlines of Economics. 4 hours any term.

Economic institutions and their relation to individual and group conduct; income flow; production, distribution, and exchange of wealth; impact on consumer under varying political-economic systems.

Ec 212. Outlines of Economics. 3 hours any term.

A rapid survey of the principles of economics and economic institutions. Restricted to science and upper-division professional school students.

Ec 213, 214. Principles of Economics. 4 hours each term, winter and spring.

Similar to Ec 201, 202, 203. A two-term sequence.

Ec 215. Economic Development of the United States. 4 hours winter.

Origin and development of economic institutions including industry, agriculture, commerce, transportation, labor, and finance. Analyzes the economic progress of the United States.

UPPER-DIVISION SERVICE COURSES

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

Ec 310. Economics of War and Reconstruction. 3 hours fall.

Human and material resources as war potentials; problems of war production; labor problems; war finance; wartime monetary and banking management; economic warfare; reconstruction. Prerequisite: consent of instructor.

Ec 411. Economics of Consumption. 3 hours fall.

Economic principles applied to consumer problems; wealth consumption; living standards; living cost; budgeting; consumer markets; choice in buying; conservation policies; consumption theories. Prerequisite: elementary economics.

Ec 412. Economics of Public Utilities. 4 hours winter.

Development of public utilities in the United States; their economic and legal characteristics; problems of regulation, rates, services, and finance. Prerequisite: introductory course in economics.

***Ec 413. Money and Banking.** (g) 4 hours fall or spring.

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.

Ec 418. Public Finance. (g) 4 hours fall.

Public expenditures, local, state, and national; taxes, customs, and fees; land taxation; proposed reforms; war finance; bonds versus taxes; management of national and local debts. Prerequisite: elementary economics.

* Applicable toward a graduate major in Division of Agricultural Economics, School of Agriculture.

- Ec 420. Business Combinations.** 4 hours spring.
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.
- Ec 421. Business Fluctuations.** 4 hours winter.
Variations in economic activity viewed in historical perspective; fluctuations and cycles; prosperity and depression; measurement and control. Prerequisite: elementary economics and statistics.
- Ec 425. Labor Problems.** (g) 4 hours winter.
Industrial revolution; trade unions; strikes and lockouts; trade agreements; conciliation and arbitration; immigration; unemployment; women and children in industry; prison labor. Prerequisite: elementary economics.
- Ec 426. Collective Bargaining and Labor Legislation.** 4 hours spring.
Wages and hours; unemployment; labor relations and social insurance; collective bargaining; legal, social, and economic implications of the labor movement. Prerequisite: Ec 425.
- Ec 427. Comparative Economic Systems.** 3 hours spring.
Analysis and critical appraisal of contemporary economic systems. Prerequisite: elementary economics.
- *Ec 435. Transportation.** (g) 4 hours winter.
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.
- *Ec 440. International Trade.** (g) 4 hours spring.
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.
- *Ec 475, 476, 477. Current Economic Theory and Problems.** (g) 3 hours each term.
Economic theories and relation to current problems; value, price, distribution, money and credit, public credit and finance, foreign trade and exchange, etc. Prerequisite: elementary economics.

GRADUATE SERVICE COURSES

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

COURSES IN HUMAN GEOGRAPHY

LOWER-DIVISION COURSES

- HG 101. Human Geography.** 3 hours any term.
World survey of geographic fundamentals emphasizing human adjustments to climatic conditions and physical environment; geographical regions of the world in respect to environmental conditions and human activities. Staff.
- HG 102. Economic Geography.** 3 hours any term.
Interrelationship between the physical environment and man's productive occupations; occupational analysis of world resources; geography of international trade. Prerequisite: HG 101 or permission of instructor. Professor Jensen.

* Applicable toward a graduate major in Division of Agricultural Economics, School of Agriculture.

- HG 103. Geography of North America.** 3 hours any term.
Regional analysis of North America, including Canada and Alaska but not Mexico. Prerequisite: HG 101 or permission of instructor. Assistant Professor Myatt.
- HG 201. Regional Geography of Latin America.** 3 hours any term.
Regional analysis of Latin America, including Mexico and Caribbean America; emphasis on trade relationships and development in Latin American nations. Prerequisite: HG 101 or permission of instructor. Professor Jensen.
- HG 202. Regional Geography of Europe.** 3 hours any term.
Study of Europe, including Mediterranean regions of North Africa but not U.S.S.R. For each region emphasis is on implications of environment on human and economic adjustments that have been made or may be achieved in future. Prerequisite: HG 101 or permission of instructor. Assistant Professor Highsmith.
- HG 203. Regional Geography of Asia.** 3 hours any term.
Regional study of Asiatic continent including all of the U.S.S.R. and Japan; geographic regions with emphasis on human and economic conditions and implications of geography for present and future. Prerequisite: HG 101 or permission of instructor. Assistant Professor Highsmith.
- HG 211. Regional Geography of Pacific Northwest.** 3 hours fall or spring.
Analysis of human and economic geography of Pacific Northwest with special attention to Oregon. Includes field study. Prerequisite: HG 101. Assistant Professor Myatt.

History

HISTORY courses are intended to supply the necessary background for intelligent citizenship. The aim of the several courses is to afford an opportunity for a survey of world history and the development of western civilization together with a more detailed study of the English people, the British Empire, and the history of America from the earliest period to the present. The courses also prepare students to major in history at the upper-division level.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

- Hst 201, 202, 203. History of Western Civilization.** 3 hours each term.
Origins and development of western civilization to the present; social, economic, and political factors; relation of the past to contemporary civilization. Professors Ellison and C. K. Smith, Associate Professor R. W. Smith, Mr. Berkeley, Miss Berry.
- Hst 204. History of the Far East.** 3 hours.
Aim is to introduce students to the history, civilization, and political, economic, cultural, and social problems of China, Japan, India, and the Pacific Islands. Applies toward group requirement in Social Science. Professor Ellison.
- Hst 206. Modern Russia.** 3 hours.
Aims to enrich student's knowledge of political, diplomatic, economic, and social development of Russia from the revolution of 1905 to the present. Prerequisite: Hst 201, 202, 203 or special consent of instructor. Professor C. K. Smith.

Hst 207, 208. **England and the British Empire.** 3 hours each term fall and winter.

Constitutional and political history of England; expansion and present position of the British Empire. Hst 207, 208 when followed by Hst 209 satisfy group requirement in Social Science. Prerequisite: Hst 201, 202, 203 or special consent of instructor. Professor C. K. Smith.

Hst 209. **The World Since 1914.** 3 hours spring.

Origin and background of the Second World War; course of the war; problems of American war mobilization; war aims and post-war planning. With Hst 207, 208 satisfies group requirement in Social Science. Prerequisite: Hst 201, 202, 203 or special consent of instructor. Professor C. K. Smith.

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

The rise and development of American civilization from the beginning to the present; special attention to economic, social, and cultural life, political changes, and international relations. Professor Ellison, Associate Professor R. W. Smith, Miss Berry.

Hst 230, 231, 232. **Great Americans in Thought and Action.** 2 hours each term.

A study in personality and leadership of men and women who have been outstanding in various fields of endeavor, great movements, and critical periods. Professor Ellison.

UPPER-DIVISION SERVICE COURSES

Hst 341, 342, 343. **Main Currents in American Thought.** 3 hours each term.

Aim is to present an account of the growth of American thought, ideals, and institutions. It analyzes significant contributions to various fields of culture; agencies of public opinion and education: schools, newspapers, magazines, movies, radio. Not open to freshmen and sophomores except by permission of instructor. Mr. Berkeley.

Hst 360, 361. **Latin American Civilization.** 3 hours each term.

The rise and growth of the social and cultural institutions of our neighbors of the south. Associate Professor R. W. Smith.

Hst 377. **History of Oregon.** 3 hours any term.

Aims to present a fairly detailed survey of the political, economic, social, and cultural development of Oregon and the Pacific Northwest from the beginning to the present. Professor Ellison.

Philosophy

LOWER-division 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.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

Phil 201, 202, 203. **Introduction to Philosophy.** 3 hours each term.

A unified year sequence but work of the three terms may be taken in any order. Phil 201 is a study of elementary problems of knowledge and nature; Phil 202, of the philosophy of ethics; Phil 203 considers social philosophy. Assistant Professor Wells.

Phl 211, 212, 213. Practical Life Philosophies. 2 hours each term.

The developing philosophy of the American way of life; a study of the foundations of the world's major political systems; basic values underlying the various methods of solving social values. Professor Warrington, Assistant Professor Wells.

Phl 214, 215, 216. Modern Logic and Scientific Method. 3 hours each term.

Investigation of the nature of argument and the nature of proof; analysis of fallacies; investigation of syllogistic reasoning, and the relation between probability and truth. Assistant Professor Wells.

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 structure of political life and the operation of governments, and an understanding of current political questions; and to lay a foundation for majoring in political science at the upper-division level.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

PS 201. American National Government. 3 hours each term.

Basic features of the American political system; structure, operation and functions of the national government. Staff.

PS 202. State and Local Governments. 3 hours each term.

Practical operation and contemporary reforms in government at state and local level in the United States. Associate Professor Swarthout.

PS 203. European Governments. 3 hours winter or spring.

Government in England, Russia, France, Germany, Italy; a comparative study of the ideology, origin, structure and operation of the political systems in other countries. Associate Professor Swarthout.

PS 231, 232, 233. Current Affairs. 2 hours each term.

Designed to acquaint student with current political, economic, and sociological problems and developments that arise on both domestic and international levels, and to encourage objective analysis and discussion of these events in order to mold responsible citizens. Open to freshmen and sophomores only. Professor Poling, Associate Professor Swarthout, Mr. La Palombara.

UPPER-DIVISION SERVICE COURSES

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

PS 331. Current Affairs. 2 hours spring.

For juniors and seniors only. Similar to PS 231 except that more extensive readings are expected. Associate Professor Swarthout.

PS 415. Municipal Government. (g) 3 hours spring.

Organization, functions, and present-day problems of city and town governments.

PS 417. International Relations. (g) 3 hours fall or winter.

Survey of international relations; emergence of modern state; search for collective security; impact of diplomacy and power struggles; relation to contemporary international problems. Associate Professor Swygard.

PS 418. Latin-American Relations. (g) 3 hours fall or winter.

Critical study of internal social, economic, and political factors in Latin America as they relate to developing patterns of government; foreign relations, particularly extension of inter-American security system and role of Western Hemisphere in power struggle. With Hst 360 and 361 forms a full year sequence in Latin American Studies on the upper-division level. Associate Professor Swygard.

PS 419. Pacific Area Relations. (g) 3 hours spring.

Emergence of nationalism, changing patterns of government and political relationships; American policy; problems of security and commercial relationship. Associate Professor Swygard.

PS 430. Public Service. 3 hours.

Designed primarily for technical student who expects to reach administrative level of government service. Organization of governmental administrative agencies; administrative methods and problems; personnel and fiscal policies and problems; administrative public relations; basic administrative law.

GRADUATE SERVICE COURSES

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

Psychology

PSYCHOLOGY courses are intended to meet the needs of students desiring a knowledge of psychology as part of their general education or as a foundation for work in education or in child development; 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.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

Psy 111. Mental Hygiene. 3 hours any term.

Conditions of healthy mental development and of effective reactions to life and college environment; habits, attitudes, and reactions of the efficient mind. No credit is given to students who have taken Ed 102.

Psy 112, 113, 114. Aids to Effective Thinking. 3 hours each term.

Examination into main travelways of human thinking (past and present) to reveal modes, methods, illusions, and errors of the mind in attempting to solve problems of life. Any term may be taken independently. Professor Chambers.

Psy 201, 202, 203. Elementary Psychology. 3 hours each term.

Introductory study of material of general experimental psychology, learning, memory, perception, imagination, sensation, attention, reasoning, instinct, emotion, will, etc. Terms must be taken in sequence.

Psy 204, 205, 206. Elementary Psychology Laboratory. 1 hour each term.

Introduction to laboratory experimental methods. Operated in coordination with Psy 201, 202, 203, which must be taken at the same time or have been taken previously. One three-hour laboratory period. Terms must be taken in sequence.

Psy 207, 208. Outlines of Psychology. 3 hours each term.

A study of the fundamental facts of human equipment and behavior; instinct, emotion, sensation, feeling, memory, imagination, suggestion, will, reason, and personality. A two-term sequence.

Psy 215. Industrial Psychology. 3 hours any term.

Application of psychology to business and industrial problems; measurement, prediction and influence of individual and group behavior; industrial psychology research. Intended primarily for students in agriculture, engineering, etc.

UPPER-DIVISION SERVICE COURSES

Psy 471, 472, 473. Individual Differences. (g) 3 hours each term.

Theories in regard to individual differences; experimental evidence; importance in personal, educational, and social adjustments; guiding and directing normal development. Prerequisite: Psy 201, 202, 203, or Psy 207, 208. First two terms may be taken independently; the third term must be preceded by both the others.

GRADUATE SERVICE COURSES

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

Religion

ESTABLISHMENT of a chair of Religion at Oregon State College was authorized in 1928, and the first courses were offered in the fall term of 1928-29. The Department of Religion is nonsectarian in spirit and organization.

The purpose of the Department of Religion is threefold:

(1) The courses in religion seek to develop an appreciation of the nature and processes of religion in the light of conditions affecting life today, thus enabling students to make such adjustments as will vitalize religion for them.

(2) The courses are determined for the most part by the needs of the larger group of students at the College, who are preparing for service in the fields of science, engineering, agriculture, home economics, teaching, etc.

(3) Special attention is given to the religious training of those students who anticipate lay-leadership in the churches of their local communities, as well as to those who plan to enter social service or the religious vocations, such as missionary work, the ministry, director of religious education, pastor's assistant, professional leadership of religious organizations, etc.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

R 211. The New Testament and Its Historical Background. 2 hours winter.

Special attention is given to the times and conditions out of which the New Testament writings came and the problems that gave rise to the Christian movement. Assistant Professor Wells.

R 220. The Sermon on the Mount. 2 hours any term.

A study of the philosophy of Jesus' teaching as embodied in a selected passage. Professor Warrington.

R 225. The Prophets and Their Message. 1 hour spring.

The early Hebrew prophets as heralds of a new day, spokesmen of a new idealism; significance of the prophets and the value of their messages for the present day. Assistant Professor Wells.

Eng 275. The Bible as Literature. 3 hours spring.

Designed to enlarge appreciation of the art and beauty of Bible folklore, story telling, history, poetry, drama, wisdom literature, oratory, and essay. Assistant Professor E. K. Gibson.

UPPER-DIVISION SERVICE COURSES

R 370. Principles of Religious Leadership. 2 hours spring.

A 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 461. Philosophy of Religion. 3 hours fall.

Basic convictions underlying religious thinking; values, God, problem of good and evil, immortality, human nature, religious experience. Assistant Professor Wells.

R 462. History of Great Religions. 3 hours winter.

Comparative study of the religions that command a large following today, such as Hinduism, Buddhism, Confucianism, Judaism, Christianity, and Islam. Professor Warrington.

R 463. Psychology of Religion. 3 hours spring.

The bearing of psychology on religious thought and action, both past and present; psychology of prayer, conversion, faith, mysticism, and worship. Assistant Professor Wells.

Sociology

ALL the lower-division instruction in sociology, like that in the related social sciences, is intended to contribute to the task of training good citizenship through a better understanding of the principles that govern human associations and relationships. Particular attention is given to attitudes and habits of mind and characteristic reactions to public events and social institutions. An insight is given into contemporary social problems. Fundamental instruction is provided for students who may later wish to major in sociology at the upper-division level. Courses are also designed to meet the needs of those who are majoring in home economics, engineering, education, and other fields.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

Soc 201, 202, 203. Elements of Sociology. 3 hours each term.

Man's cultural heritage; man's social nature; collective behavior; community and social organization; social interaction; social change and its effects; social problems. Professor Bakum, Associate Professors Dann and Hoffman, Assistant Professor Plambeck.

Soc 212. General Sociology. 3 hours any term.

An abridgment of Soc 201, 202, 203. Not open to students who have taken Soc 201, 202, 203. Professor Bakum, Associate Professors Dann and Hoffman, Assistant Professor Plambeck.

UPPER-DIVISION SERVICE COURSES

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

Soc 312. Sociology of the Family. 3 hours winter.

Evolution of matrimonial institutions; legal status; economic and social aspects; the new woman's movement in relation to the family; divorce problem. Prerequisite: upper-division standing. Professor Bakkum, Associate Professor Dann.

Soc 314. Educational Sociology. 3 hours spring.

Analysis of contributions of sociology to educational problems and practices. School of Education students may count this course toward the 36 required hours in education. Prerequisite: introductory sociology. Professor Bakkum.

Soc 364. Sociology of Rural Life. 3 hours fall.

Rural life and institutions contrasted with urban; community, family, school, church, recreation, and welfare activities in the rural setting; field observation. Professor Bakkum.

Soc 411, 412. Social Problems. (g) 2 or 3 hours each term, winter and spring.

Current social problems; field observation. The contents of the work are varied to meet the needs of particular groups. School of Education students whose work in this sequence covers social education may count 3 hours of credit so earned toward required hours of education if approved by the dean. Prerequisite: introductory sociology. Professor Bakkum, Associate Professor Dann.

Soc 465. Sociology of Urban Life. 3 hours spring.

Introduction to the study of urban society; history, structure, functions, and problems of the modern city. Prerequisite: introductory sociology. Offered 1947-48. Associate Professor Dann.

Soc 474. Social Psychology. (g) 3 hours fall.

Biological and social functions of human behavior; individual and social adjustments; behavior in presence of others; social psychology of institutions; social conflict. Prerequisite: introductory sociology. Professor Bakkum.

Soc 475. Community Organization and Leadership. 3 hours.

Social and psychological aspects of leadership; group and community organization and structure; recreational, economic, and program-planning aspects of group and community activities. Prerequisite: introductory sociology or permission of instructor in charge. Not offered 1947-48. Professor Bakkum.

GRADUATE SERVICE COURSES

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

Group Courses

Sequences applicable in meeting group requirements are offered by the Lower Division and the School of Science. These courses may also be taken as electives. The lists are revised on recommendation of the Joint Committee on Liberal Arts Requirements appointed by the President on nomination of the Dean of the Lower Division and the Dean of the School of Science. The committee is assisted by the Curriculum Council in matters of curriculum coordination. Descriptions of the courses in the following lists are printed under the several departmental headings in the two schools.

LITERATURE GROUP

English

- *Eng 101, 102, 103. Literature Survey, 3 hours each term.
- *Eng 104, 105, 106. Introduction to Literature, 3 hours each term.
- Eng 201, 202, 203. Shakespeare, 3 hours each term.
- Eng 253, 254, 255. American Literature, 3 hours each term.

Germanic Languages

- GL 201, 202, 203. German Literature, 3 hours each term.

Romance Languages

- FRENCH
- RL 201, 202, 203. French Literature, 3 hours each term.
- SPANISH
- RL 207, 208, 209. Spanish Literature, 3 hours each term.

Other Acceptable Sequences or Combinations

School of Science freshmen or sophomores may choose one of the following. Lower-Division freshmen or sophomores may do so in cases having the dean's approval. *Indicated sequences (reading horizontally) are preferable, but any nonduplicating combinations are permissible.*

- | | |
|--|---|
| Two terms of PROSE combined with | One term of POETRY. |
| Eng 104, 105. Introduction to Literature. | Eng 106. Introduction to Literature. |
| Eng 271, 272. Contemporary Literature. | Eng 273. Contemporary Literature. |
| Eng 276. The Novel. Eng 274. The Short Story. | Eng 275. The Bible as Literature. |
| Eng 263. Great Books. Another prose course. | Eng 261. Browning. Or Eng 262. Tennyson. |
| Eng 264, 265, 266. Continental European Literature (any 3 or 6 hours). | Eng 201, 202, 203. Shakespeare (any 3 hours). |

School of Science students who have to postpone completion of the requirements in Literature to the upper-division years may choose any of the sequences or combinations listed above or one of the following:

- Eng 264, 265, 266. Continental European Literature. 3 hours each term.
- Eng 331, 332, 333. The Democratic Tradition in Literature. 3 hours each term (open to sophomores only by permission of instructor).
- GL 311, 312, 313. German Literature. 3 hours each term.
- RL 311, 312, 313. French Literature. 3 hours each term.
- RL 341, 342, 343. Spanish Literature. 3 hours each term.

SCIENCE GROUP

Science Surveys

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

Bacteriology

- Bac 201, 202, 203. Elementary Bacteriology, 3 hours each term.
- Bac 204, 205, 206. General Bacteriology, 3 hours each term.

Botany

- Bot 201, 202, 203. General Botany, 3 hours each term.

Chemistry

- Ch 101, 102, 103. General Chemistry, 3 hours each term.
- Ch 104, 105, 106. General Chemistry, 4 hours each term.
- Ch 201, 202, 203. General Chemistry, 3 hours each term.
- Ch 204, 205, 206. General Chemistry, 5 hours each term.

Entomology

- Ent 201, 202, 203. General Entomology, 3 hours each term.

* Students may choose either Eng 101, 102, 103 or Eng 104, 105, 106, but may not take both sequences for credit.

Geology

- G 201, 202, 203. Geology, 3 hours each term.
G 204, 205, 206. Geology Laboratory, 1 hour each term.

Mathematics

- Mth 100. Intermediate Algebra, 4 hours.
Mth 101, 102, 103. Elementary Analysis, 4 hours each term.
Mth 104, 105, 106. Mathematics of Business and Industry, 3 hours each term.
Mth 109. Elements of Statistics, 4 hours.
Mth 201, 202, 203. Differential and Integral Calculus, 4 hours each term.

Physics

- Ph 101, 102, 103. Engineering Physics, 3 hours each term.
Ph 201, 202, 203. General Physics, 4 hours each term.
Ph 204, 205, 206. Astronomy. 3 hours each term.
Ph 317, 318, 319. Physics Problems, 3 hours each term.

Psychology

- Psy 201, 202, 203. Elementary Psychology, 3 hours each term. (Applicable in satisfying group requirements in Science group if accompanied by Psy 204, 205, 206.)
Psy 204, 205, 206. Elementary Psychology Laboratory, 1 hour each term.

Zoology

- Z 101, 102, 103. Human Biology. 3 hours each term.
Z 201, 202, 203. General Zoology. 3 hours each term.
Z 321, 322. Elementary Human Anatomy, 3 hours each term.
Z 323. Applied Human Anatomy, 3 hours.

SOCIAL SCIENCE GROUP**General Social Science**

- SSc 101, 102, 103. Background of Social Science, 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, 4 hours.

- HG 101. Human Geography. 3 hours.
HG 102. Economic Geography. 3 hours.
HG 103. Geography of North America.

} Any two of following with
HG 101 may be counted
as a sequence: HG 102,
103, HG 201, 202, 203.

- HG 201. Regional Geography of Latin America. 3 hours.
HG 202. Regional Geography of Europe. 3 hours.
HG 203. Regional Geography of Asia. 3 hours.

} HG 201, 202, 203 may be
counted as a sophomore
sequence.

History

- Hst 201, 202, 203. History of Western Civilization, 3 hours each term.
Hst 204. History of the Far East, 3 hours.
Hst 206. Modern Russia. 3 hours.
Hst 207, 208. England and the British Empire, 3 hours fall and winter terms.
Hst 209. The World Since 1914, 3 hours spring term.
Hst 224, 225, 226. History of American Civilization, 3 hours each term.

} Hst 204 or 206 may be substituted for Hst 203.

} Hst 207, 208, 209 constitute a year sequence.

Political Science

- PS 201. American National Government. 3 hours.
PS 202. State and Local Government. 3 hours.
PS 203. European Governments. 3 hours.

Philosophy

- Phl 201, 202, 203. Introduction to Philosophy. 3 hours each term.

Psychology

- Psy 201, 202, 203. Elementary Psychology, 3 hours each term.
Psy 204, 205, 206. Elementary Psychology Laboratory, 1 hour each term.
Psy 207, 208. Outlines of Psychology, 3 hours any term. Psy 215. Industrial Psychology, 3 hours.

Sociology

- Soc 201, 202, 203. Elements of Sociology, 3 hours each term.

Other Acceptable Sequences or Combinations

School of Science freshmen and sophomores may choose one of the following. Lower Division freshmen or sophomores may do so in cases having the dean's approval.

Two terms in one department and one term in a second department selected from the two lists below:

Principal Department (two terms):

Ec 213, 214. Principles of Economics, 4 hours each term.

*Hst 201, 202, 203. History of Western Civilization, 3 hours each term. (Any two terms.)

Hst 203. History of Western Civilization, 3 hours. Hst 226. History of American Civilization, 3 hours.

Phl 201. Introduction to Philosophy, 3 hours. *Either:* Phl 202 or 203. Introduction to Philosophy, 3 hours each term.

PS 201. American National Government, 3 hours.

PS 202. State and Local Government, 3 hours.

PS 203. European Governments, 3 hours.

Psy 207, 208. Outlines of Psychology, 3 hours each term.

Second Department (one term):

Ec 212. Outlines of Economics, 3 hours.

Hst 203. History of Western Civilization, 3 hours.

Hst 209. The World Since 1914, 3 hours.

Hst 226. History of American Civilization, 3 hours.

PS 201. American National Government, 3 hours.

PS 202. State and Local Government, 3 hours.

Soc 212. General Sociology, 3 hours.

School of Science freshmen and sophomores may choose, in lieu of foregoing listings, a special combination of courses in each of three different departments dealing with modern society. The choice must be made from three of the following four groups:

(1) Ec 211. Outlines of Economics, 4 hours, *or* Ec 212. Outlines of Economics, 3 hours.

(2) Hst 203. History of Western Civilization, 3 hours, *or* Hst 209. The World Since 1914, 3 hours, *or* Hst 226. History of American Civilization, 3 hours.

(3) PS 201. American National Government, 3 hours, *or* PS 202. State and Local Government, 3 hours, *or* PS 203. European Governments, 3 hours.

(4) Soc 212. General Sociology, 3 hours.

School of Science students who have had to postpone completion of the requirements in Social Science to the upper-division years may choose any of the sequences or combinations listed above or one of the following:

SSc 441, 442, 443. Foundations of National Power, 3 hours each term.

Hst 341, 342, 343. Main Currents in American Thought, 3 hours each term.

*PS 417. International Relations, 3 hours; PS 418. Latin-American Relations, 3 hours; PS 419. Pacific Area Relations, 3 hours.

Or they may take one of the following combinations of two terms of work in one department and one term in a second department selected from the courses listed below:

Principal Department (two terms):

Ec 211. Outlines of Economics, 4 hours (or Ec 212. Outlines of Economics, 3 hours) and Ec 413. Money and Banking, 3 hours.

Hst 341, 342. Main Currents in American Thought, 3 hours each term.

PS 415. Municipal Government, 3 hours, and PS 430. Public Service, 3 hours.

PS 417. International Relations, 3 hours; PS 418. Latin-American Relations, 3 hours;

PS 419. Pacific Area Relations, 3 hours. (Any two of these courses.)

Soc 212. General Sociology, 3 hours, and Soc 474. Social Psychology, 3 hours.

Second Department (one term):

Ec 212. Outlines of Economics, 3 hours.

Hst 203. History of Western Civilization, 3 hours.

Hst 209. The World Since 1914, 3 hours.

Hst 226. History of American Civilization, 3 hours.

PS 201. American National Government, 3 hours, *or* PS 202. State and Local Government, 3 hours.

Soc 212. General Sociology, 3 hours.

* Preferably but not necessarily taken in order.

School of Science

Faculty

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

GEORGENA SAMSON KNAPP, B.S., Secretary to the Dean.

*General Science**

PROFESSORS HANSEN (department chairman), JENSEN.

ASSOCIATE PROFESSOR WILLIAMSON.

ASSISTANT PROFESSORS HIGSMITH, MYATT.

INSTRUCTOR BEER.

GRADUATE ASSISTANT ILLIGE.

TEACHING FELLOW WALKER.

Bacteriology and Hygiene

PROFESSORS COPSON (department head), SIMMONS, LANGTON, ELLIKER.

ASSOCIATE PROFESSORS BOLLEN, MORRIS.

INSTRUCTOR TAKALO.

GRADUATE ASSISTANT VAN ARSDEL.

Botany

PROFESSORS DIETZ (department chairman), GILKEY, ATWOOD, GILFILLAN (chairman of executive committee, Institute of Marine Biology), PACKARD (director of research, Institute of Marine Biology), OWENS (emeritus).

ASSOCIATE PROFESSORS SANBORN, SMITH, ROTH.

ASSISTANT PROFESSOR H. K. PHINNEY.

INSTRUCTORS LUND (technician), MERKLE, G. S. PHINNEY.

GRADUATE ASSISTANTS FRANCE, BAKER, SKINNER.

Chemistry

PROFESSORS GILBERT (department chairman), FULTON (emeritus), JONES, (emeritus), BUTTS, CHRISTENSEN, KURTH, FRIEDMAN, PEASE, MEHLIG, CALDWELL.

ASSOCIATE PROFESSORS SCHULEIN, CHELDELIN, SPITZER, RICHARDSON.

ASSISTANT PROFESSORS M. B. WILLIAMS, LOGAN, SCOTT, NORRIS, REESE.

INSTRUCTORS R. W. PARKINSON, J. L. BUBL, HUSTON, FREUND, ISENSEE, NAFF, CEHRS (acting), EVES (acting), BAUER (acting).

RESEARCH ASSISTANTS NAFF, WANG, CROMWELL, KING, HUMPHREY, LINDSEY, LOCHER, PARSON, NYGAARD.

TEACHING FELLOWS SCHREYER, LAMBERT, SWEENEY, MATER, BUPP, RYDALCH, GALLAHER, CASE, JENNINGS, LACKEY, FOLLETTE, DAVIS.

GRADUATE ASSISTANTS LABBE, STEARMAN, SIEGLE, LEVITT, PERSON, E. EVANS, SNIPPER, HROSTOWSKI, WHITE, HULL, DURST, JOHNSON, LEE, PLANKINTON, WEBER, ZIEGLER, K. EVANS.

SHELL FELLOW HARRIS.

DUPONT FELLOW McCULLOUGH.

RESEARCH ASSOCIATE KAHN.

SWIFT & CO. RESEARCH FELLOW FELS.

* The Department of General Science is in general charge of a committee composed of the heads of the departments, with a chairman in immediate charge.

Entomology

PROFESSOR MOTE (department head).

ASSOCIATE PROFESSORS CHAMBERLIN, SCULLEN, MARTIN.

GRADUATE ASSISTANT DICKASON.

Geology

PROFESSORS PACKARD (department head; director of research, Institute of Marine Biology), HODGE, ALLISON, WILKINSON.

ASSOCIATE PROFESSOR SANBORN.

GRADUATE ASSISTANT DOBELL.

Mathematics

PROFESSORS MILNE (department head), McALISTER (emeritus), BEATY (emeritus), G. A. WILLIAMS, TALLMAN (acting).

ASSOCIATE PROFESSORS CLARK, KIRKHAM, HOSTETTER, HAMMER.†

ASSISTANT PROFESSORS ARNOLD, BEARD (emeritus), MANNING†, POOLE, SAUNDERS, EVES, LI, BREWER, STONE.

INSTRUCTORS BAKKUM, SCHROEDER (acting), THURMAN, WISE, BOGART (acting), PRICE, SPENCER (acting).

GRADUATE ASSISTANTS KAHN, SMITH, MYERS, ERICKSON, RICKARD, STALLEY, TILLEY.

*Nursing Education**

PROFESSOR DOLTZ (director of department).

ASSISTANT PROFESSOR SLOCUM.

Physics

PROFESSORS WENIGER (department head), BOYNTON (emeritus), ANDERSON (emeritus), YUNKER, BRADY.

ASSOCIATE PROFESSORS DEMPSTER, VARNER, H. R. VINYARD.

ASSISTANT PROFESSORS MORGAN, GARMAN.

INSTRUCTORS CHURCH, TROLAN, BYERS, DAY, DECKER, FORBES, LINCOLN, PRATHER, L. H. VINYARD, JEWELL, PEARSON.

GRADUATE ASSISTANTS CREWS, WANG.

Science Education

ASSOCIATE PROFESSOR WILLIAMSON (department head).

PROFESSORS ATWOOD, MILNE.

ASSOCIATE PROFESSORS MORRIS, WILKINSON.

Zoology

PROFESSORS GORDON (chairman), GILFILLAN (chairman of executive committee, Institute of Marine Biology), PACKARD (director of research, Institute of Marine Biology), WULZEN (emeritus).

ASSOCIATE PROFESSORS ALLMAN, DORNFELD, OSBORN (emeritus), PRATT.

ASSISTANT PROFESSOR HILLEMANN.

TEACHING FELLOWS STORM, LESHER, CUTRESS.

GRADUATE ASSISTANTS BECKMAN, ADAMS, BEATTY, REISH, RETZLAFF, REISCHEL, VON BORSTEL, BROOK, SOWELL, VINCENT.

RESEARCH FELLOW WEIMAR (National Health Institute Fellowship).

* Members of the faculty of the Department of Nursing Education, University of Oregon Medical School, Portland.

† On leave winter and spring terms, 1947-48.

General Statement

MAJOR work in the Oregon State System of Higher Education leading to baccalaureate and advanced degrees in the biological and physical sciences and mathematics is centered in the School of Science at the State College. The School of Science performs a three-fold function; it provides:

1. Liberal-arts education with majors in science leading to degrees of Bachelor of Arts or Bachelor of Science.
2. Professional education for students planning to enter some scholarly occupation in the realm of science. Such students take an undergraduate science major and from one to three or more years 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 allied schools.

Instruction in science is afforded students preparing for science teaching in secondary schools or in colleges; for study in medicine, dentistry, nursing, or medical technology; for positions in which a knowledge of science is fundamental for research; or for professional work in science or in its many applications in modern civilization.

The instruction in the first two years is made as broad and liberalizing as possible, laying a solid foundation for upper-division and graduate work in the various fields of science and professional schools.

Major Curricula

The departments of General Science, Bacteriology and Hygiene, Botany, Chemistry, Entomology, Geology, Mathematics, Physics, and Zoology provide the usual undergraduate majors in their respective fields. At the graduate level, where specialization is provided, the number of possible majors is larger. The Department of Science Education is a joint department with the School of Education. The Department of Nursing Education is a joint department with the University of Oregon Medical School.

Departmental Majors. The undergraduate curricula indicate the most satisfactory sequence of courses leading to a degree and the minimum courses required for a major in a given department. Most curricula permit election of at least one-half of a student's work outside of the School of Science, thus enabling the student to obtain a liberal-arts education even though he may be preparing for specialized work in some field of science. The electives should be utilized to meet a definite objective rather than as an easy way of accumulating credit for graduation.

Where the student's chosen field involves an applied field as well as science, he may elect one or more minors in a professional school.

The undergraduate departmental curricula are printed on pages 147-155.

General Science Majors. The general science majors have been organized to meet the needs of students of scientific interests who desire broad general education in science; or plan to be teachers of high-school science, and hence must be adequately prepared in a considerable range of subject matter.

The courses pursued by students are selected on a rather flexible basis from

the offerings of the various departments. A special committee is responsible for the advising of students majoring in this department. The curriculum in General Science is printed on page 147.

Interdepartmental Majors. For students interested in the developing fields that involve two or more of the traditional sciences—as for example, 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.

Science Teaching. Students preparing to teach science in the secondary schools may major in one of the sciences or in Science Education or General Science, fulfilling the requirements for a State Teacher's Certificate. Preparation for science teaching is coordinated through the Department of Science Education (see pages 183-184).

Special Curricula

To meet the needs of special groups of students, the School of Science offers special curricula (1) for premedical students, (2) for predental students, (3) for nursing-education students, and (4) for students preparing to be medical laboratory technicians. Students may likewise prepare for entrance to schools of veterinary medicine, optometry schools, and other fields where preparation in science is a prerequisite; for such students programs of study are outlined and guidance given in the work pursued.

Premedical Curriculum. A premedical curriculum including courses prescribed by the American Medical Association for entrance to standard medical schools is offered at both Oregon State College and the University of Oregon. At each institution students pursuing this curriculum work 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. At the State College the chairman of this committee is Dr. E. J. Dornfeld, associate professor of zoology.

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-aptitude test of the Association of American Medical Colleges is given each year by the advisory committee 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 entrance requirements of the University of Oregon Medical School are as follows:

(1) **High-School Preparation.** Applicants for admission are required to have satisfactorily completed four years in an accredited high school, or its equivalent.

Recommended High-School Course. The following high-school course, which meets all the formal requirements, is strongly recommended:

	Units		Units
English	4	Latin	2
Algebra	1½	History	1
Geometry	1	German or French	2
Physics	1	Electives	1½
Chemistry	1		

Total 15

Students entering college with less than the amount of work recommended in these fields (especially mathematics and science) may find it necessary to devote more than the minimum of three years to collegiate premedical preparation.

(2) **Collegiate Preparation.** The Medical School requires for admission at least three academic years of preparatory work (135 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 Russian. 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 requirement. Students electing additional work are advised to take a course in elementary physical chemistry. At least 25 per cent 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.

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, foreign language, mathematics, biology, embryology, general physiology, physics (especially elementary electronics), and elementary physical chemistry.

The Medical School also requires that the student who enters without a Bachelor of Arts or Bachelor of Science degree must complete the work for one of these degrees in the Oregon State System of Higher Education, or 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 in residence toward the bachelor's degree.

Before entering the Medical School, the student should satisfy all requirements for the Junior Certificate and all requirements for a degree (including 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 the 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 requirement in chemistry, and Physiology (Phy 412) toward the major requirement in zoology.

Students at the Medical School who are candidates for a bachelor's degree from Oregon State College are eligible for loans from the Student Loan Fund of the State College on making arrangements acceptable to the loan fund administration. The Premedical Curriculum is printed on pages 153-154.

Predental Curriculum. Oregon State College offers a two-year and a three-year predental curriculum 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 three-year curriculum may qualify for a bachelor's degree after one year of dental-school work.

The two-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 counselor for all predental students is Dr. Ivan Pratt, associate professor of zoology.

The two-year and three-year curricula are printed on page 154.

Preparatory Nursing Curriculum. The Department of Nursing Education of the University of Oregon Medical School offers a four-year curriculum which leads to the Bachelor of Science degree and prepares for state examination for nurse registration. The student takes five terms of preprofessional work at Oregon State College at Corvallis or at the University of Oregon at Eugene. The preprofessional curriculum is completed with one term of work on the campus of the Medical School (during which the student satisfies academic requirements for the Junior Certificate), and is followed by ten terms of clinical instruction coordinated with practice in the hospitals and clinics of the Medical School. At the State College the adviser of students in the Preparatory Nursing Curriculum is Assistant Professor Olive A. Slocum.

Students in nursing education receive their degree from the University, with the exception that students who take their first two years at Oregon State College receive their degrees from the latter institution.

The Preparatory Nursing Curriculum is printed on page 155.

Curriculum for Medical Technicians. The two-year Curriculum in Preparation for Medical Technicians (page 155) represents the minimum requirements of the American Society of Clinical Pathologists as given in regular courses at Oregon State College with the addition of two terms in physics (12 hours of physics is highly recommended by the Society). As it is difficult to complete all the courses listed here in two years, it is recommended that three years or more be devoted to this curriculum since some hospitals require three years of college work and a few demand a college degree for entrance to the technician's course. The counselor for students pursuing this curriculum is Professor J. E. Simmons of the Department of Bacteriology and Hygiene.

Requirements for Admission and Graduation

The student's aim for his first two years in college should be to obtain a broad general education and to determine upon a field in which he desires a major. During this time, he should, if possible, complete all lower-division requirements and receive the Junior Certificate.

The science advisers, representing the different departments of the School, help students in the selection of specific courses prerequisite to major work. In the science curricula (pages 147-155), suggested lower-division programs are

included to aid students in meeting the requirements for a Junior Certificate and in the selection of those courses that will best prepare for majoring in a particular department.

Baccalaureate Degrees. A student may be granted the degree of Bachelor of Arts or Bachelor of Science by meeting the institutional requirements for the particular degree and completing 192 term hours, of which 45 must be in upper-division work and of these at least 24 must be in the major department. Curricula have been so planned that students are enabled to follow their own interests outside the School of Science while obtaining adequate preparation in science, including the requirements for entering upon graduate work leading to advanced degrees.

Advanced Degrees. Through the Graduate School graduate work is offered leading to the degrees of Master of Arts and Master of Science in each of the science departments, and to the degree of Doctor of Philosophy in the departments of Bacteriology and Hygiene, Botany, Chemistry, Entomology, Geology, Mathematics, Physics, and Zoology. For the requirements for the M.A., M.S., and Ph.D. degrees see GRADUATE SCHOOL.

Facilities

Material facilities for the work of the School of Science include the various laboratories equipped for instruction and research in science. The biological-science laboratories are located in Agriculture Hall. The Department of Mathematics occupies the third and fourth floors of Education Hall; the Department of Geology occupies the first floor of Education Hall and the main portion of the Paleontology Laboratory; the Department of Chemistry occupies Chemistry Hall. The Department of Physics occupies the Physics Building and a part of the Mines Building. Important adjuncts to the instruction in physics are radio station KOAC and the Photographic Service, both located in the Physics Building.

Oregon is a region of almost unlimited opportunities for field studies with plants, animals, and geological materials, thus offering many interesting research problems for advanced and graduate students.

Scientific Collections. In addition to the usual laboratory equipment available in each department, mention should be made of the Herbarium, consisting of more than 109,000 plants, the Department of Entomology collection of insects numbering nearly 200,000 specimens, the Department of Zoology collection of representative birds of Oregon, the Braly Ornithological collection, and the extensive geological collection of invertebrate fossils and igneous rocks of Oregon. See MUSEUMS AND COLLECTIONS.

Institute of Marine Biology. The Oregon State System of Higher Education maintains an interinstitutional Institute of Marine Biology at Coos Head on the Oregon coast during the summer months. The institute, located on a 100-acre tract between Coos Bay and the Pacific, occupies a group of 20 buildings erected by the Civilian Conservation Corps. A specially built 33-foot launch is used for exploring and collecting. The institute is administered under an executive committee of which the Dean of the School of Science is chairman.

Curricula in Science

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

For each department a general undergraduate curriculum is outlined, including a suggested freshman and sophomore program. Where several majors are listed in a department, the student's electives, or in some cases approved substitutions, provide the desired differentiation.

For the graduate level no specific curricula are outlined. Each graduate student's program is planned according to his particular needs and objectives, under the regulations of the Graduate School.

GENERAL NOTES

All students in science curricula should observe carefully the following notes:

- The maximum number of term hours required within the School of Science does not exceed 105 in any major curriculum. The maximum number of hours required for a major in any department is 69. The student thus has liberal opportunity to elect courses in other fields as well as in science.
- In the freshman year General Hygiene (PE 150), 1 term hour for men, 2 term hours for women, is taken one term in place of physical education.
- Students expecting to meet the language requirements for a B.A. degree or to obtain a reading knowledge of Russian, German, or French in preparation for graduate work may elect a language in the freshman and sophomore years. If two years of a language are elected in the freshman and sophomore years, the completion of the group requirement in either Literature or Social Science may be postponed until the junior year. Students expecting to major in certain of the science curricula may have to postpone two groups.
- For state teacher's certificate 6 hours of psychology should be elected in the sophomore year as it is prerequisite to upper-division courses in education. This requirement may be met by either Psy 207, 208 or Psy 201, 202, 203.
- Students wishing to qualify for a state teacher's certificate should elect 12 term hours in prescribed education courses in the junior year, at least 11 term hours in the senior year, and 9 term hours in the first term of the graduate year.

DEPARTMENT OF GENERAL SCIENCE¹

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			Term hours		
	F	W	S	F	W	S
Approved group requirement in Science	3-5	3-5	3-5	3	3	3
English Composition (Eng 111, 112, 113)	3	3	3	3	3	3
Elementary Analysis (Mth 101, 102, 103) or approved science elective	4	4	4	4	4	4
Military or Naval Science (men)	2-3	2-3	2-3	2-3	2-3	2-3
Physical Education	1	1	1	1	1	1
Electives	0-3	0-3	0-3	0-3	0-3	0-3
	16	16	16			
	Sophomore Year			Term hours		
	F	W	S	F	W	S
Group requirement in Literature	3	3	3	3	3	3
Sophomore Science sequence	3-5	3-5	3-5	3-5	3-5	3-5
Military or Naval Science (men)	2-3	2-3	2-3	2-3	2-3	2-3
Physical Education	1	1	1	1	1	1
² Approved electives	7	7	7	7	7	7
	15-17	15-17	15-17			
	Junior Year			Term hours		
	F	W	S	F	W	S
Group requirement in Social Science	3	3	3	3	3	3
² Approved upper-division Science	4	4	4	4	4	4
³ Approved electives	9	9	9	9	9	9
	16	16	16			
	Senior Year			Term hours		
	F	W	S	F	W	S
² Approved upper-division Science	4	4	4	4	4	4
³ Approved electives	12	12	12	12	12	12
	16	16	16			

¹See GENERAL NOTES above.

²These courses should be in fields related to work taken in Lower Division, and must include one year-sequence. G 330, 331, 332, G 340, 341, 442 apply as either biological or physical science.

³The electives may include courses in health education leading to special preparation in that field. See SCIENCE EDUCATION.

DEPARTMENT OF BACTERIOLOGY AND HYGIENE¹

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

Graduate majors: Bacteriology, Agricultural Bacteriology, Dairy Bacteriology, Food Bacteriology, Hygiene and Sanitation, Soil Bacteriology.

	Freshman Year			Term hours		
	F	W	S	F	W	S
General Zoology (Z 201, 202, 203)	3	3	3	3	3	3
English Composition (Eng 111, 112, 113)	3	3	3	3	3	3
General Chemistry (Ch 204, 205, 206)	5	5	5	5	5	5
Military or Naval Science (men)	2-3	2-3	2-3	2-3	2-3	2-3
Physical Education	1	1	1	1	1	1
Electives	1	1	1	1	1	1
	16	16	16	16	16	16

	Sophomore Year					
General Bacteriology (Bac 204, 205, 206)	3	3	3	3	3	3
Group requirement in Literature	3	3	3	3	3	3
Organic Chemistry (Ch 226, 227), Quantitative Analysis (Ch 234)	5	5	5	5	5	5
Military or Naval Science (men)	2-3	2-3	2-3	2-3	2-3	2-3
Physical Education	1	1	1	1	1	1
² Electives	1	1	1	1	1	1
	16	16	16	16	16	16

	Junior Year					
Group requirement in Social Science	3	3	3	3	3	3
Dairy Bacteriology (Bac 411), Pathogenic Bacteriology (Bac 332), Immun- ity and Serum Therapy (Bac 333)	3	3	3	3	3	3
General Physics (Ph 201, 202, 203)	4	4	4	4	4	4
Elementary Physical Chemistry (Ch 340)	6	6	3	6	6	3
Electives (recommended)	6	6	3	6	6	3
	16	16	16	16	16	16

	Senior Year					
Bacteriological Technique (Bac 431)	5	---	---	5	---	---
Systematic Bacteriology (Bac 441)	---	3	---	---	3	---
Systematic Bacteriology Laboratory (Bac 442)	---	2	---	---	2	---
Physiology of Bacteria (Bac 451)	---	---	3	---	---	3
Physiology of Bacteria Laboratory (Bac 452)	---	---	2	---	---	2
Seminar (Bac 407)	1	1	1	1	1	1
Electives (recommended)	10	10	10	10	10	10
	16	16	16	16	16	16

DEPARTMENT OF BOTANY¹

Undergraduate majors: General Botany with emphasis, if desired, on one of fields of the graduate majors.

Graduate majors: Cytology, Ecology, Morphology, Mycology, Plant Pathology, Physiology, Systematic Botany.

	Freshman Year			Term hours		
	F	W	S	F	W	S
Group requirement in Literature	3	3	3	3	3	3
General Botany (Bot 201, 202, 203)	3	3	3	3	3	3
English Composition (Eng 111, 112, 113)	3	3	3	3	3	3
² General Chemistry (Ch 101, 102, 103)	3	3	3	3	3	3
Military or Naval Science (men)	2-3	2-3	2-3	2-3	2-3	2-3
Physical Education	1	1	1	1	1	1
	15-16	15-16	15-16	15-16	15-16	15-16

¹See GENERAL NOTES on page 147.

²Mathematics recommended.

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

	Term hours		
	F	W	S
Sophomore Year			
Group requirement in Social Science	3	3	3
The Lower Plants (Bot 311), The Higher Plants (Bot 312), Systematic Botany (Bot 313)	4	4	4
Elementary Analysis (Mth 101, 102, 103)	4	4	4
Military or Naval Science (men)	2-3	2-3	2-3
Physical Education	1	1	1
Approved Electives	1	1	1
	15-16	15-16	15-16
Junior Year			
Principles of Plant Pathology (Bot 351), Principles of Plant Ecology (Bot 341), Principles of Plant Physiology (Bot 331)	4	4	4
General Physics (Ph 201, 202, 203)	4	4	4
General Zoology (Z 201, 202, 203)	3	3	3
*Approved Electives	5-6	5-6	5-6
	16-17	16-17	16-17
Senior Year			
Microtechnique (Bot 469)	—	4	—
Seminar (Bot 407)	1	1	1
Geology (G 201, 202, 203)	3	3	3
Electives	12-13	8-9	12-13
	16-17	16-17	16-17

DEPARTMENT OF CHEMISTRY²

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

	Term hours		
	F	W	S
Freshman Year			
General Chemistry (Ch 204, 205, 206)	5	5	5
English Composition (Eng 111, 112, 113)	3	3	3
Elementary Analysis (Mth 101, 102, 103)	4	4	4
Military or Naval Science (men)	2-3	2-3	2-3
Physical Education	1	1	1
	15-16	15-16	15-16
Sophomore Year			
Advanced Qualitative Analysis (Ch 231), Quantitative Analysis (Ch 232, 233)	5	5	5
General Physics (Ph 201, 202, 203)	4	4	4
Differential and Integral Calculus (Mth 201, 202, 203)	4	4	4
Military or Naval Science (men)	2-3	2-3	2-3
Physical Education	1	1	1
	16-17	16-17	16-17
Junior Year			
Organic Chemistry (Ch 430, 431, 432)	5	5	5
Physical Chemistry (Ch 440, 441, 442)	4	4	4
*Russian, German, or French	4	4	4
Group requirement in Literature	3	3	3
	16	16	16
Senior Year			
*Approved upper-division Chemistry courses	4	4	4
Group requirement in Social Science	3	3	3
*Electives	8	8	8
	15	15	15

¹Students majoring in botany should elect work in bacteriology and entomology and, if possible, advanced work in the botanical field of chief interest. Hrt 311 is advised for second term of junior or senior year.

²See GENERAL NOTES on page 147.

³Students are expected to acquire a reading knowledge of German prior to graduation.

⁴Of the 12 upper-division chemistry electives, at least 3 term hours must consist of laboratory courses.

⁵Electives must include at least 5 term hours in humanities, social science, or biological science in addition to the group requirements in these fields.

DEPARTMENT OF ENTOMOLOGY¹

Undergraduate and graduate majors: Entomology, Applied Entomology, Bee Culture, Forest Entomology.

	Term hours		
	F	W	S
Freshman Year²			
General Entomology (Ent 201, 202, 203)	3	3	3
General Zoology (Z 201, 202, 203)	3	3	3
English Composition (Eng 111, 112, 113)	3	3	3
² General Chemistry (Ch 101, 102, 103)	3	3	3
Military or Naval Science (men)	2-3	2-3	2-3
Physical Education	1	1	1
	15-16	15-16	15-16
Sophomore Year			
Principles of Forest Entomology (Ent 321), Introduction to Economic Entomology (Ent 314), Introduction to Bee Culture (Ent 335)	3	3	3
Entomological Nomenclature and Literature (Ent 352)	3	---	---
General Botany (Bot 201, 202, 203)	3	3	3
Military or Naval Science (men)	2-3	2-3	2-3
Physical Education	1	1	1
Group requirement in Literature	3	3	3
Electives	---	3	3
	16	16	16
Junior Year			
Group requirement in Social Science	3	3	3
Approved upper-division courses in Entomology	6	6	6
Historical Entomology (Ent 353)	---	4	---
Principles of Plant Pathology (Bot 351)	4	---	---
General Bacteriology (Bac 204)	---	3	---
³ Electives	3	---	7
	16	16	16
Senior Year			
Seminar (Ent 407)	1	1	1
Research (Ent 401)	2	2	2
⁴ Electives	13	13	13
	16	16	16

DEPARTMENT OF GEOLOGY¹

Undergraduate and graduate majors: General Geology, Paleontology, Professional Geology.

	Term hours		
	F	W	S
Common Freshman Year			
Group requirement in Language and Literature or Social Science	3	3	3
English Composition (Eng 111, 112, 113)	3	3	3
Geology (G 201, 202, 203)	3	3	3
Geology Laboratory (G 204, 205, 206)	1	1	1
Military Science (men)	2	2	2
Physical Education	1	1	1
⁴ Electives	3	3	3
	16	16	16
MAJOR IN GENERAL GEOLOGY			
Sophomore Year			
Group requirement in Language and Literature or Social Science	3	3	3
Military Science (men)	2	2	2
Physical Education	1	1	1
Geology electives	3	3	3
⁵ Electives	7	7	7
	16	16	16

¹See GENERAL NOTES on page 147.²Students planning to major in Forest Entomology should confer with Dr. W. J. Chamberlin.³Students interested in the statistical phases of applied entomology should elect Elementary Analysis and Statistical Methods. Prospective professional entomologists should elect Ch 251, 252, and 254, or their equivalent as early as convenient. Students majoring in entomology should also elect courses in geology.⁴Students preparing for professional geology are advised to elect Ch 204, 205, 206.⁵Advanced Field Geology (G 380) can be taken during the summer.

	Junior Year			Term hours		
	F	W	S	F	W	S
Upper-Division Geology	4	4	4	4	4	4
Electives	12	12	12	12	12	12
	16	16	16	16	16	16

	Senior Year			Term hours		
	F	W	S	F	W	S
Upper-Division Geology	4	4	4	4	4	4
Electives	12	12	12	12	12	12
	16	16	16	16	16	16

MAJOR IN PALEONTOLOGY

For a major in paleontology, students will follow the curriculum in professional geology, making substitutions indicated.

MAJOR IN PROFESSIONAL GEOLOGY

	Freshman Year			Term hours		
	F	W	S	F	W	S
English Composition (Eng 111, 112, 113)	3	3	3	3	3	3
Geology (G 201, 202, 203)	3	3	3	3	3	3
Geology Laboratory (G 204, 205, 206)	1	1	1	1	1	1
Intermediate Algebra (Mth 100), Elementary Analysis (Mth 101, 102) ..	4	4	4	4	4	4
Engineering Drawing (GE 111, 112, 113)	2	2	2	2	2	2
Physical Education and Hygiene	1	2	1	1	2	1
Military or Naval Science (men)	2-3	2-3	2-3	2-3	2-3	2-3
	16-17	16-17	16-17	16-17	16-17	16-17

	Sophomore Year			Term hours		
	F	W	S	F	W	S
Group requirement in Literature	3	3	3	3	3	3
Mineralogy (G 312, 313, 314)	4	4	4	4	4	4
*Chemistry	3-5	3-5	3-5	3-5	3-5	3-5
Physical Education	1	1	1	1	1	1
Military or Naval Science (men)	2-3	2-3	2-3	2-3	2-3	2-3
	16	16	16	16	16	16

	Junior Year			Term hours		
	F	W	S	F	W	S
Group requirement in Social Science	3	3	3	3	3	3
*Upper-Division Geology sequence	4	4	4	4	4	4
*General Physics (Ph 201, 202, 203)	4	4	4	4	4	4
Plane Surveying (CE 226)	3	---	---	3	---	---
Advanced Field Geology (G 380)	---	---	3	---	---	3
*Electives	2-3	5	2-3	2-3	5	2-3
	16-17	16	16-17	16-17	16	16-17

	Senior Year			Term hours		
	F	W	S	F	W	S
*Upper-Division Geology sequence	4	4	4	4	4	4
Seminar (G 407)	1	1	1	1	1	1
*Advanced sequence in Science or Engineering	3-5	3-5	3-5	3-5	3-5	3-5
*Electives	5-7	5-7	5-7	5-7	5-7	5-7
	15	15	15	15	15	15

DEPARTMENT OF MATHEMATICS*

Undergraduate majors: Mathematics with emphasis on any of the fields of the graduate majors.

Graduate majors: Analysis, Algebra, Geometry, Applied Mathematics (including Statistics).

	Freshman Year			Term hours		
	F	W	S	F	W	S
Group requirement in Literature	3	3	3	3	3	3
Elementary Analysis (Mth 101, 102, 103)	4	4	4	4	4	4
English Composition (Eng 111, 112, 113)	3	3	3	3	3	3
Military or Naval Science (men)	2-3	2-3	2-3	2-3	2-3	2-3
Physical Education	1	1	1	1	1	1
Electives	3-2	3-2	3-2	3-2	3-2	3-2
	16	16	16	16	16	16

*Ch 204, 205, 206 recommended if schedules permit.

*Usual sequences are G 321, 322, 323; G 340, 341, 442 and 412, 413, 414.

*Paleontology students may substitute Z 201, 202, 203.

*Recommended courses are Ch 231, 232, 233 or 340; Ph 311, 312, 313; Mth 201, 202, 203, mining, metallurgy, hydraulics.

*Students contemplating graduate work are advised to elect German, French, or Russian.

*See GENERAL NOTES on page 147.

	Term hours		
	F	W	S
Sophomore Year			
Differential and Integral Calculus (Mth 201, 202, 203)	4	4	4
Group requirement in Social Science	3	3	3
Physical or Biological Science	3	3	3
Military or Naval Science (men)	2-3	2-3	2-3
Physical Education	1	1	1
Electives	3-2	3-2	3-2
	16	16	16

Junior Year			
Upper-Division Mathematics	6	6	6
Physical or Biological Science	3-4	3-4	3-4
Electives	7	7	7
	16-17	16-17	16-17

Senior Year			
Upper-Division Mathematics	3	3	3
*Electives	13	13	13
	16	16	16

DEPARTMENT OF PHYSICS*

Undergraduate major: Physics (Classical and Modern, including Measurements).

Graduate majors: Physics with theses in any of the Classical branches, Modern Physics, Electronics, Meteorology, Photography, Radio, and Applied Physics.

	Term hours		
	F	W	S
Freshman Year			
Engineering Physics (Ph 101, 102, 103)	3	3	3
Elementary Analysis (Mth 101, 102, 103)	4	4	4
English Composition (Eng 111, 112, 113)	3	3	3
Military or Naval Science (men)	2-3	2-3	2-3
Physical Education	1	1	1
Electives	2	2	2
	15-16	15-16	15-16

Sophomore Year			
Introduction to Modern Physics (Ph 311, 312, 313)	3	3	3
Differential and Integral Calculus (Mth 201, 202, 203)	4	4	4
General Chemistry (Ch 204, 205, 206 or Ch 201, 202, 203 or Ch 101, 102, 103)	5-3	5-3	5-3
Military or Naval Science (men)	2-3	2-3	2-3
Physical Education	1	1	1
Fundamental course in one of the biological sciences	0-3	0-3	0-3
	16	16	16

Junior Year			
Group requirement in Literature	3	3	3
Physics Problems (Ph 317, 318, 319)	3	3	3
Physical Measurements (Ph 321, 322, 323)	3	3	3
*Electives	6-8	6-8	6-8
	15-17	15-17	15-17

Senior Year			
Group requirement in Social Science	3	3	3
Electronics and Radio (Ph 331, 332, 333)	3	3	3
Photography (Ph 361)	3	3	3
Light (Ph 465, 466)	3	3	3
*Electives	7	7	7
	16	16	16

*Include supporting science courses for students planning graduate work in mathematics.

*See GENERAL NOTES on page 147.

*Suggestions: mathematics, photography, modern languages, physics. German, Russian, or French is recommended for students planning to earn the Ph.D. degree.

DEPARTMENT OF SCIENCE EDUCATION¹

Undergraduate and graduate majors: Biological science (general biology, health education, human biology), general science, mathematics, physical science.

The minimum requirements for students preparing to teach in any of the fields of this department are printed on pages 264-265. Additional courses are necessary to complete the requirements for a major in either the School of Science or the School of Education. For students qualifying for a degree in the School of Science, four-year programs in all majors are outlined according to objectives of students. Students who complete both human biology and health education teaching majors (page 265) meet the requirements for a major in the School of Science.

DEPARTMENT OF ZOOLOGY²

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, natural history and ecology.

	Term hours		
	F	W	S
Freshman Year			
English Composition (Eng 111, 112, 113)	3	3	3
General Zoology (Z 201, 202, 203)	3	3	3
General Chemistry (Ch 204, 205, 206)	5	5	5
Physical Education	1	1	1
Military or Naval Science	2-3	2-3	2-3
Electives	2-1	2-1	2-1
	16	16	16
Sophomore Year			
Group requirement in Literature	3	3	3
Comparative Vertebrate Embryology (Z 326) and Comparative Vertebrate Anatomy (Z 324, 325)	4	4	4
Mathematics (Mth 101, 102, 109) or equivalent	4	4	4
Physical Education	1	1	1
Military or Naval Science	2-3	2-3	2-3
Electives	2-1	2-1	2-1
	16	16	16
Junior Year			
Group requirement in Social Science	3	3	3
Physiology (Z 331, 332, 333)	3	3	3
Genetics (Z 341) or Evolution (Z 345)	3	3	3
Electives	10	10-7	10-7
	16	16	16
Senior Year			
Invertebrate Zoology (Z 451, 452), Parasites of Man (Z 456)	4-0	4-0	4-0
Zoology option (see major requirements in Zoology, item 6, page 184)	3-4	3-4	3-4
Electives	8-9	8-9	8-9
	16	16	16

PREMEDICAL CURRICULUM³

(School of Science and Medical School)

A minimum of 135 term hours exclusive of military or naval science is required before entering the Medical School. See page 143.

	Term hours		
	F	W	S
Freshman Year			
General Zoology (Z 201, 202, 203)	3	3	3
English Composition (Eng 111, 112, 113)	3	3	3
General Chemistry (Ch 204, 205, 206)	5	5	5
*Elementary Analysis (Mth 101, 102, 103) or substitute	4	4	4
*Military or Naval Science (men)	2-3	2-3	2-3
Physical Education	1	1	1
	18-19	18-19	18-19

¹See GENERAL NOTES on page 147.

²See GENERAL NOTES on page 147 and departmental requirements on page 184.

³Student should confer with the premedical counselor concerning any substitution for this sequence.

*Premedical and premedical students who elect Naval Science should pursue a four-year curriculum leading to a degree, either in zoology or general science. Physics must be included in the sophomore year.

	Term hours		
	F	W	S
Sophomore Year			
Comparative Vertebrate Embryology (Z 326), Comparative Vertebrate Anatomy (Z 324, 325)	4	4	4
Organic Chemistry (Ch 226, 227), Quantitative Analysis (Ch 234)	5	5	5
Group requirement in Literature	3	3	3
Military or Naval Science (men)	2-3	2-3	2-3
Physical Education	1	1	1
Group requirement in Social Science	3	3	3
	18	18	18
Junior Year			
General Physics (Ph 201, 202, 203)	4	4	4
Russian, German, French, or Spanish	4	4	4
¹ Electives	8	8	8
	16	16	16

MAJOR IN SCIENCE AT OREGON STATE COLLEGE

B.A., B.S. Degrees

The student preparing to enter a medical school should complete by the end of his junior year an approved major in science and all requirements for a degree except the fourth year of undergraduate residence. The first year at the medical school may be counted in lieu of the fourth year of undergraduate residence. The courses taken during the first year of medical training, together with the science courses prescribed in the 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.

PREDENTAL CURRICULA

TWO-YEAR CURRICULUM

	Term hours		
	F	W	S
Freshman Year			
General Zoology (Z 201, 202, 203)	3	3	3
English Composition (Eng 111, 112, 113)	3	3	3
General Chemistry (Ch 204, 205, 206)	5	5	5
Elementary Analysis (Mth 101, 102, 103)	4	4	4
² Military or Naval Science (men)	2-3	2-3	2-3
Physical Education	1	1	1
	18-19	18-19	18-19
Sophomore Year			
Group requirement in Literature or Social Science	3	3	3
Organic Chemistry (Ch 226, 227)	5	5	5
Quantitative Analysis (Ch 234)	5	5	5
General Physics (Ph 201, 202, 203)	4	4	4
Military or Naval Science (men)	2-3	2-3	2-3
Physical Education	1	1	1
Approved Zoology elective	3	3	3
Electives	3	3	3
	18-19	18-19	18-19

THREE-YEAR CURRICULUM

Junior Year			
Comparative Vertebrate Embryology (Z 326), Comparative Vertebrate Anatomy (Z 324, 325)	4	4	4
German, Russian, French, or Spanish	4	4	4
Electives	8	8	8
	16	16	16

Predental students following the two-year curriculum may apply for admission to dental school at the end of the second year or may continue through the junior year.

On successful completion of the three-year program and 48 term hours (32 semester hours) of dental-school work, the student may be awarded a bachelor's degree with a major in general science or with a major in zoology at the end of the second year in dental school. The suggested curriculum followed by the standard first-year dental curriculum, satisfies all requirements for the Bachelor of Science degree; by taking the second year of a foreign language before entering dental school, the student may satisfy all requirements for the Bachelor of Arts degree.

¹Students should confer with their premedical adviser in the selection of all electives.

²Premedical and predental students who elect Naval Science should pursue a four-year curriculum leading to a degree in zoology or general science. Physics must be included in the sophomore year.

PREPARATORY NURSING CURRICULUM¹

FOUR-YEAR DEGREE CURRICULUM

See page 145.

	Term hours		
	F	W	S
Freshman Year			
General Chemistry (Ch 104, 105, 106)	4	4	4
English Composition (Eng 111, 112, 113)	3	3	3
English Literature (Approved)	3	3	3
Backgrounds of Nursing (Nur 111, 112, 113)	1	1	1
Elementary Psychology (Psy 201)	—	—	3
Physical Education	1	1	1
Electives	3	3	—
	15	15	15

Sophomore Year

At Oregon State College:			
General Zoology (Z 201, 202)	3	3	—
Elements of Sociology (Soc 201, 202)	3	3	—
Food Preparation (FN 218)	3	—	—
Elementary Psychology (Psy 202, 203)	3	3	—
Physical Education	1	1	—
Electives	3	6	—

At the Medical School:

Anatomy (An 311)	—	—	4
Bacteriology (Bac 230)	—	—	5
Organic and Biochemistry (Ch 255)	—	—	5
Elementary Pharmacology (Phc 213)	—	—	2
Elementary Nursing Arts (Nur 210)	—	—	1
	16	16	17

CURRICULUM IN PREPARATION FOR MEDICAL TECHNICIANS

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.

	Term hours		
	F	W	S
Freshman Year			
General Zoology (Z 201, 202, 203)	3	3	3
English Composition (Eng 111, 112, 113)	3	3	3
*Social Science including 6 hours in American History and Government	3	3	3
General Chemistry (Ch 104, 105, 106)	4	4	4
Literature or approved elective	3	3	3
General Hygiene (PE 150)	—	—	2
Physical Education	1	1	—
	17	17	18

Sophomore Year²

General Bacteriology (Bac 204). Pathogenic Bacteriology (Bac 332), Im-			
munity and Serum Therapy (Bac 333)	3	3	3
Organic Chemistry (Ch 226, 227), Quantitative Analysis (Ch 234)	5	5	6
Abridged General Physics (Ph 211, 212)	3	3	—
Elementary Physiology (Z 233)	—	—	5
Physical Education	1	1	1
Approved electives	5	4	2
	17	16	17

¹Students who wish to take a longer period of time to fulfill prenursing requirements may do so with the consent of the adviser.

²Unless the student has completed one unit in American History and Government in high school, she must include at least 6 term hours of American History and Government.

*See recommendation in the first paragraph on this page on advisability of devoting more than two years to this curriculum.

General Science

CERTAIN phases of the instructional work of the School of Science are of general character, broader in scope and objective than any of the departments. The Department of General Science is peculiarly the ally of all of the science departments, with the function of supplementing and correlating the work. The courses aim to give the student a comprehensive view of science as a division of knowledge, and are open, both to students majoring in science and to students in the professional schools. Through the 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 newer sciences such as biophysics, life sciences, and other fields involving joint majors.

The survey courses in biological and physical science cover the fundamental fields of science rather than the content usually included in the special-science departments. These courses are nontechnical and 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.

NOTE: 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.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

GS 101, 102, 103. Biological Science Survey. 4 hours each term.

The fundamental principles of biology as they apply to both plants and animals. For general students and those majoring in fields other than biology. Three lectures; 1 one-hour laboratory period. Mr. Beer.

GS 104, 105, 106. Physical Science Survey. 4 hours each term.

Fundamental principles of physics, chemistry, astronomy, and geology; development and application of the scientific method. For students majoring in fields other than the physical sciences who wish a broad view of the principles of several physical sciences. Three lectures; 1 one-hour laboratory-recitation period. Mr. Beer.

UPPER-DIVISION COURSES

GS 341. Bioecology. 3 hours fall or spring.

Interrelations of plants and animals in their life processes, and their reaction upon the environment. Human relations and bioeconomics stressed. For students majoring in General Science. Two lectures; 3 hours laboratory and field work. Prerequisite: one year of biological science and junior standing. Professor Hansen.

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.

The development of science from the beginnings, with emphasis on the scientific method and spirit. Prerequisite: eighteen hours of upper-division science, or equivalent. Offered alternate years. Not offered 1948-49. Professor Hansen.

GS 421, 422, 423. **Classics of Science.** (G) 2 hours each term.

Works notable in the development of science, studied for (1) significance to science and (2) form; biographies of men of science studied as background. Prerequisite: eighteen hours of upper-division science, or equivalent. Offered alternate years. Offered 1948-49. Professor Hansen.

GS 461, 462, 463. **Physical Geography.** 3 hours each term.

Physical aspects of earth's surface; their description, analysis, classification, interpretation, distribution, and interrelationships. Fall: climatology. Winter: climatography. Spring: land forms. GS 461 and 463 may be taken separately, but 461 is prerequisite to 462. Prerequisite: upper-division standing and one year of college geography or physical science. Professor Jensen, Assistant Professor Highsmith.

GRADUATE COURSES

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

GS 505. **Reading and Conference.** Terms and hours to be arranged.

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

Bacteriology and Hygiene

BACTERIOLOGY, especially through its application in agriculture, sanitation, and medicine, is of 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 instruction in bacteriology, hygiene, and related fields is planned to give undergraduates a thorough understanding of the subject and its importance. The graduate majors include general bacteriology, agricultural bacteriology, dairy bacteriology, food bacteriology, hygiene and sanitation, 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 hygiene.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

Bac 201, 202, 203. **Elementary Bacteriology.** 3 hours each term.

Bacteriology of food and water supplies; sanitation and hygiene; infectious disease; sewage disposal, etc. Two lectures; 1 two-hour laboratory period.

Bac 204, 205, 206. **General Bacteriology.** 3 hours each term.

General principles; studies of water, milk, foods, infectious diseases, disinfection, germicides, and preservatives. Prerequisite: one year of chemistry. Two lectures; 2 two-hour laboratory periods. Bac 204 is offered each term.

Bac 230. **Principles of Bacteriology.** 3 hours spring.

Lectures and demonstrations in the basic principles of bacteriology as applied to everyday life.

Bac 261. Sanitary Bacteriology. 3 hours.

Principles of bacteriology as applied to problems of community and municipal sanitation. Two lectures; 2 two-hour laboratory periods. Professor Simmons.

Bac 262. Microscopy of Waters. 3 hours.

Microorganisms found in surface waters; treatment of water by chemicals, aeration, etc. Prerequisite: Bac 261. One lecture; 2 two-hour laboratory periods. Professor Simmons.

UPPER-DIVISION COURSES

Bac 332. Pathogenic Bacteriology. 3 hours winter.

Confined strictly to the microorganisms associated with disease in man. Prerequisite: Bac 204. Two lectures; 2 two-hour laboratory periods. Professor Simmons.

Bac 333. Immunity and Serum Therapy. 3 hours spring.

Theories of immunity and their application to serum therapy; toxins, antitoxins, vaccines, etc. Prerequisite: Bac 332. Two lectures; 2 two-hour laboratory periods. Professor Simmons.

Bac 341. Clinical Laboratory Procedure. 3 hours fall.

Microscopic and clinical examination of body fluids such as blood, urine, gastric contents, exudates, transudates, stools, etc., usually carried out to aid the physician in making a diagnosis of pathological processes in man. Prerequisite: Bac 332. Two lectures, 2 two-hour laboratory periods. Professor Simmons.

Bac 361. Forest Sanitation. 3 hours fall.

The sanitary provisions necessary for forest camps, camp grounds, and summer homes; location and construction of camp facilities. Prerequisite: junior standing in forestry or equivalent. Professor Langton.

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. Professor Copson.****Bac 411. Dairy Bacteriology. (g) 3 hours fall.**

Physiological activities of dairy microorganisms; production and processing milk and cream with emphasis on sanitation and public health problems. Prerequisite: Bac 204 and Ch 221, 226, or 250. Two lectures; 2 two-hour laboratory periods. Professor Elliker.

Bac 412. Dairy Bacteriology. (g) 3 hours winter.

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. One lecture; 2 two-hour laboratory periods. Professor Elliker.

Bac 413. Agricultural Bacteriology. 3 hours spring.

Application of bacterial activities to farm practices; rural sanitation, disease control, fermentation, food preservation. Prerequisite: Bac 204, Ch 250. One lecture; 2 two-hour laboratory periods. Professor Copson.

Bac 421. Soil Bacteriology. (g) 4 hours spring.

Relation of microorganisms to soil fertility; biochemistry of humus decomposition; nitrogen-fixation; ammonification. Prerequisite: Bac 204. Two lectures; 3 two-hour laboratory periods. Associate Professor Bollen.

- Bac 422. **Soil Bacteriology.** (G) 3 hours winter.
Continuation of Bac 421. Review of literature on soil bacteriology. Prerequisite: Bac 421. One lecture; 2 two-hour laboratory periods. Associate Professor Bollen.
- Bac 425, 426. **Community Health Problems.** (g) 3 hours each term.
Application of the principles of hygiene to sanitary, statistical, governmental, epidemiological, and sociological problems. Prerequisite: junior or senior standing. Associate Professor Morris.
- Bac 431. **Bacteriological Technique.** (g) 5 hours fall.
Intensive study of the fundamental principles involved in the study of bacteria. Prerequisite: Bac 206 or equivalent and two years of chemistry. Three lectures; 2 two-hour laboratory periods. Associate Professor Bollen.
- Bac 441. **Systematic Bacteriology.** (g) 3 hours winter.
Taxonomy and nomenclature; history of bacterial classifications; International Rules of Nomenclature and Bacteriological Code; Bergey's Manual. Prerequisite: Bac 206 or equivalent and two years of chemistry. Associate Professor Bollen.
- Bac 442. **Systematic Bacteriology Laboratory.** (g) 2 hours winter.
Laboratory studies to accompany Bac 441. Prerequisite: Bac 431. Two two-hour laboratory periods.
- Bac 451. **Physiology of Bacteria.** (g) 3 hours spring.
Bacterial growth, reproduction, and death factors of environment; digestion and metabolism; microbial nutrition enzymes and fermentations. Prerequisite: Bac 206 and organic chemistry. Associate Professor Bollen.
- Bac 452. **Physiology of Bacteria Laboratory.** (g) 2 hours spring.
Laboratory studies to accompany Bac 451. Prerequisite: Bac 442. Two two-hour laboratory periods.
- Bac 453. **Epidemiology.** 3 hours spring.
Causes and behavior of communicable diseases in general population; factors influencing occurrence of epidemics; basic principles underlying control. Prerequisite: Bac 205 or equivalent. Professor Langton.
- Bac 472, 473. **Bacteriological Problems.** (g) 5 hours each term, winter and spring.
For students qualified to study intensively some of the problems concerned with systematic bacteriology and the principles underlying physiological activities of bacteria. Prerequisite: Bac 441, 442, or their equivalent. Three lectures; 2 two-hour laboratory periods. Staff.

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. Professor Copson.
- Bac 551, 552. **Advanced Bacterial Physiology.** 3 hours each term, fall and winter.
Growth, fermentation, and death of microorganisms; emphasis on the mor-

phology, cytology, and cell microchemistry. Prerequisite: Bac 451 or equivalent; organic and physical chemistry. One lecture; 2 two-hour laboratory periods. Associate Professor Bollen.

Bac 553. Biochemistry of Bacteria. 3 hours spring.

Changes that microorganisms induce in the substratum; isolation and identification of fermentation products; factors involved in fermentative variability. Prerequisite: Bac 551, 552, and Organic Analysis. One lecture; 2 two-hour laboratory periods.

Botany

THE courses in botany provide comprehensive and advanced training in the various branches of this subject: first, for those who expect to make some field of plant science their major or life work; second, as a foundation for the work of students majoring in such professional schools as Agriculture and Forestry; and third, for those wishing a liberal-arts major in botany.

In the professional field it is proposed to meet the needs of students preparing (1) to be plant pathologists, plant physiologists, ecologists, taxonomists, or for other specialized positions at experiment stations, in the United States Department of Agriculture, or in other research institutions, or to teach botany or do research in colleges and universities; (2) for technical positions in which a knowledge of botany is essential, such as in agricultural extension work, plant disease control work, plant quarantine inspection, grazing assistant work, seed testing, food and drug analysis; and (3) for advanced study and research in such fields as horticulture, agronomy, forestry, soil science, biochemistry, and paleontology.

The herbarium collections total more than 109,000 specimens, including 57,800 classified specimen sheets of higher plants, 10,000 unmounted specimens, 39,000 packets of parasitic fungi, 2,318 myxomycetes, and 800 packets of bryophytes.

Excellent greenhouse facilities are available at the State College for botanical instruction and research.

An extensive and diversified research program relating to plant disease is conducted under the Botany Department by a group of State and Federal investigators. This involves the use of modern equipment and technique for laboratory, greenhouse, and field. These research men do not give formal courses in the department but from time to time a number of graduate students are granted research assistantships in plant pathology and are thus enabled to gain valuable training in plant disease research under the guidance of these state experiment station workers. Occasionally also a graduate student may obtain part-time employment and experience under some of the Federal plant pathologists.

Botany students also have a special advantage since they may elect minor work in the fields of forestry and agriculture, which provide the greatest opportunities for the useful application of plant science.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

Bot 201, 202, 203. General Botany. 3 hours each term.

Structure and functions of higher plants; chief groups of plants, reproduction and genetics; plant identification. Prerequisite to further work in botany. One lecture; 1 recitation; 2 two-hour laboratory periods. Staff.

Bot 211. Elementary Botany. 3 hours fall.

Morphology and economic importance of the algae, fungi, mosses, and ferns; structure, functions, and development of seed plants. One lecture; 1 recitation; 2 two-hour laboratory periods. Associate Professor Smith.

UPPER-DIVISION COURSES

Bot 311. The Lower Plants. 4 hours fall.

Typical structure and life histories of the algae, fungi, hepatics, and mosses. Prerequisite: Bot 201, 202 or equivalent. Two lectures; 2 three-hour laboratory periods. Associate Professor Sanborn.

Bot 312. The Higher Plants. 4 hours winter.

Typical structure and life histories of the ferns, fern allies, gymnosperms, and flowering plants. Prerequisite: Bot 201, 202 or equivalent. Two lectures; 2 three-hour laboratory periods. Associate Professor Sanborn.

Bot 313. Systematic Botany. 4 hours fall or spring.

Principles of classification; families and orders; collection and identification of higher plants. Prerequisite: Bot 201, 203 or equivalent. Two lectures; 2 three-hour laboratory periods. Professor Gilkey.

Bot 314. Range and Pasture Botany. 3 hours spring.

Range and pasture ecology; requirements, distribution, and value of range plants; poisonous plants; taxonomy of grasses. Prerequisite: Bot 201, 202. Two lectures; 2 two-hour laboratory periods.

Bot 315. Forest Pathology. 3 hours winter.

Nature, cause, and prevention of tree diseases and timber defects, especially those related to fungi. Prerequisite: Bot 201, 202. One lecture; 2 two-hour laboratory periods. Associate Professor Roth.

Bot 321. Aquatic Plants. 3 hours fall.

Food plants of wild fowl, particularly of Pacific Coast; identification and distribution of species; growth-limiting factors. Prerequisite: Bot 203 or equivalent. One lecture; 2 three-hour laboratory periods. Professor Gilkey.

Bot 331. Principles of Plant Physiology. 4 hours spring.

Physiology of living plants with experiments of special interest in agriculture and forestry. Prerequisite: Bot 201, 202, or equivalent, and at least one year of chemistry. Two lectures, 3 two-hour laboratory periods. Professor Atwood.

Bot 341. Principles of Plant Ecology. 4 hours winter or spring.

Interrelationships of plant and environment; succession and ecological structure of the plant community; economic ecology. Prerequisite: Bot 201, 202, 203. Two lectures; 2 two-hour laboratory periods. Professor Hansen.

Bot 351. Principles of Plant Pathology. 4 hours fall.

Cause, symptoms, effects, spread, and control of plant diseases; laboratory examination of typical specimens. Prerequisite: Bot 201, 202. One lecture, one recitation; 3 two-hour laboratory periods. Professor Dietz, Associate Professor Roth.

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.** Terms and hours to be arranged.

- Bot 411, 412, 413. Comparative Morphology.** (G) 3 hours each term.
Morphology and relationships of the algae, bryophytes, pteridophytes, and spermatophytes. Prerequisite: Bot 311, 312, or equivalent. One lecture; 2 three-hour laboratory periods. Offered alternate years. Not offered 1948-49. Associate Professor Sanborn.
- Bot 414. Advanced Range and Pasture Ecology.** (g) 3 hours winter.
Plant successions on the range; methods of vegetation analysis; ecology of range species. Prerequisite: Bot 314, 341. Two lectures; 2 two-hour laboratory periods. Offered 1948-49.
- Bot 419. Principles of Botany.** (g) 3 hours spring.
Intensive study of structure, functions, and life cycles of plants; biological principles involving plant life. Prerequisite: upper-division or graduate standing, and consent of instructor. Two lectures; 2 two-hour laboratory periods. Offered 1948-49. Professor Hansen.
- Bot 421, 422, 423. Advanced Systematic Botany.** (G) 3 hours each term.
Field and laboratory studies of higher plants; phylogeny; preferred systems; evaluation of taxonomic criteria. Prerequisite: Bot 313 or equivalent. One lecture; 2 three-hour (or 3 two-hour) laboratory periods. Offered alternate years. Offered 1948-49. Professor Gilkey.
- Bot 431, 432, 433. Advanced Plant Physiology.** (G) 3 hours each term.
Plant physiological processes and relations; reviews of literature. Prerequisite: Bot 331 and organic chemistry. One lecture; 2 three-hour laboratory periods. Professor Atwood.
- Bot 441, 442, 443. Advanced Plant Ecology.** (G) 3 hours each term.
Environmental factors; applied ecology; bioeconomics; conservation; plant indicators; autecology. Prerequisite: Bot 341, or equivalent. Two lectures; 1 three-hour laboratory period. Offered alternate years. Offered 1948-49. Professor Hansen.
- Bot 451. Plant Pathological Technique.** (g) 3 hours fall.
Introduction to the treatment of problems involved in study and research on the fungus, bacterial, and virus diseases of plants. Prerequisite: Bot 351 or equivalent. One lecture; 2 three-hour laboratory periods. Associate Professor Roth.
- Bot 452. Field and Truck Crop Diseases.** (G) 3 hours winter.
Chief diseases of field crops and vegetables; control. Prerequisite: Bot 351 or equivalent. Three two-hour periods. Associate Professor Roth.
- Bot 453. Fruit Diseases.** (G) 3 hours spring.
Chief diseases of fruits and their control. Prerequisite: Bot 351 or equivalent. Three two-hour periods. Associate Professor Roth.
- Bot 461, 462, 463. Mycology.** (G) 3 hours each term.
Morphology, identification and classification of the fungi. Prerequisite: Bot 311 or equivalent. One lecture; 2 three-hour laboratory periods. Associate Professor Roth.
- Bot 469. Microtechnique.** (g) 4 hours winter.
Principles and practices in preparation of permanent microscopic slides of plant materials. Prerequisite: Bot 201, 202. Three three-hour laboratory periods. Associate Professor Smith.
- Bot 470. Microtechnique.** (G) 4 hours spring.
Making slides for cytological study of reduction divisions. Prerequisite: Bot 469. Three three-hour laboratory periods. Offered alternate years. Not offered 1948-49. Associate Professor Smith.

Bot 471. Plant Anatomy. (G) 3 hours fall.

Microscopic structure and development of plant tissues. Prerequisite: Bot 201, 202, and two terms of upper division botany, or equivalent. One lecture; 2 three-hour laboratory periods. Associate Professor Smith.

Bot 473. Plant Cytology. (G) 3 hours spring.

Cell components; nuclear and cell division, meiosis and fertilization. Prerequisite: Bot 201, 202, and two terms of upper-division botany or equivalent. Two lectures; 2 two-hour laboratory periods. Associate Professor Smith.

GRADUATE COURSES

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

Bot 501. Research. Terms and hours to be arranged.**Bot 503. Thesis. Terms and hours to be arranged.****Bot 505. Reading and Conference. Terms and hours to be arranged.****Bot 507. Seminar. Terms and hours to be arranged.****Bot 541. Plant Geography. 3 hours fall.**

Distribution, development, and history of vegetation areas of the world, particularly North America; paleogeography; paleobotany; paleoecology. Prerequisite: Bot 313, 341, 441. Two lectures; 1 three-hour laboratory period. Professor Hansen.

Bot 542. Plant Communities. 3 hours winter.

Major plant communities, their structure, composition, and phytosociological status; ecology of principal species. Emphasis on North America and the Pacific Northwest. Prerequisite: Bot 313, 331, 341, 442, 470. Two lectures; 1 three-hour laboratory period. Professor Hansen.

Bot 543. Field Ecological Methods. 3 hours spring.

Statistical analysis of the plant community; measurement of the physical environment; use of ecological instruments. Prerequisite: Bot 341, 443, 542. One lecture; 2 three-hour laboratory periods. Professor Hansen.

Bot 573. Cytogenetics. 3 hours spring.

Cytological basis of inheritance. Prerequisite: Bot 473 or Z 561; AI 315, FC 315, or Z 341. Two lectures; 1 two-hour laboratory period. Offered alternate years. Offered 1948-49. Associate Professor Smith.

Chemistry

IN THE first three years of the chemistry curriculum provision is made for thorough grounding in fundamental chemistry and related sciences, as well as cultural subjects. 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 fourth 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.

The Department of Chemistry thus aims to prepare its students for (1) graduate work in pure or applied chemistry or (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 sorts, 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.

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 curriculum serves well as a foundation for this specialization, and qualified students are encouraged to continue toward the master's or doctor's degree involving research and original investigation.

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

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

Ch 101, 102, 103. General Chemistry. 3 hours each term.

For students in agriculture, home economics, and other fields requiring a general course. It does not include qualitative analysis. One lecture; 1 recitation; 1 three-hour laboratory period. Students whose college aptitude test scores indicate the need will be required to attend one extra recitation per week without additional credit.

Ch 104, 105, 106. General Chemistry. 4 hours each term.

Required for nursing education and medical technician students. One lecture; 2 recitations; 1 three-hour laboratory period. (See statement under Ch 101 concerning aptitude examination.)

Ch 130. Descriptive General Chemistry. 3 hours spring.

Nonlaboratory course as an aid to better understanding of the numerous chemical developments in the commercial and industrial world; particularly for forestry students. May not be substituted for other chemistry courses.

Ch 201, 202, 203. General Chemistry. 3 hours each term.

Course content particularly adapted for students in engineering. One lecture; 1 recitation; 1 three-hour laboratory period.

Ch 204, 205, 206. General Chemistry. 4 or 5 hours each term.

A year sequence. Ch 204 and 205 are devoted primarily to the basic principles of general chemistry, Ch 206 includes a study of semi-micro qualitative analysis, chemistry of selected metallic elements, and other subjects not covered in the more elementary courses. The course constitutes beginning chemistry for students majoring in chemistry, chemical engineering, premedics, and others requiring extensive knowledge of the subject. Two lectures; one recitation; 2 three-hour laboratory periods. Students taking 4 hours take but one laboratory period, in Ch 204, 205; the two laboratory periods are required of all for Ch 206.

Ch 221. Organic Chemistry. 4 hours.

Organic chemistry adapted to use of home-economics students. Prerequisite: Ch 103. Two lectures; 2 three-hour laboratory periods.

Ch 226. Organic Chemistry. 5 hours.

Carbon compounds of the aliphatic series. Prerequisite: Ch 206. Two lectures; 1 recitation; 2 three-hour laboratory periods.

Ch 227. Organic Chemistry. 5 hours winter.

An intensive study of the chemistry of the aromatic series. Prerequisite: Ch 226.

- Ch 231. **Advanced Qualitative Analysis.** 4 or 5 hours fall.
Advanced theory of qualitative analysis and examination of commercial products. Prerequisite: Ch 206. Two lectures; 2 or 3 three-hour laboratory periods.
- Ch 232, 233. **Quantitative Analysis.** 4 or 5 hours each term, winter and spring.
Fundamental principles and laboratory practice. Prerequisite: Ch 206. Two lectures; 2 or 3 three-hour laboratory periods.
- Ch 234. **Quantitative Analysis.** 5 or 6 hours spring.
Principles of gravimetric analysis, volumetric analysis, and H-ion concentration. Designed for pharmacy and premedical students and medical technicians. Prerequisite: Ch 103. For 5 hours credit: 2 lectures; 3 three-hour laboratory periods. For 6 hours credit: 2 lectures; 1 recitation; 3 three-hour laboratory periods.
- Ch 241. **Chemical Theory.** 4 hours fall.
Theory and calculations in inorganic chemistry as a foundation for industrial chemistry. Prerequisite: Ch 206. Three lectures; 1 two-hour computation period.
- Ch 242. **Quantitative Analysis for Chemical Engineering Students.** 4 hours.
Brief course covering theory and practice in typical methods of gravimetric and volumetric analysis. Prerequisite: Ch 241. Two lectures; 2 three-hour laboratory periods.
- Ch 243. **Commercial Methods of Analysis.** 4 hours spring.
Theory and practice in analysis and testing of water, oil, gaseous, and solid fuels and other materials of industrial importance. Prerequisite: Ch 242. Two lectures; 2 three-hour laboratory periods.
- Ch 250. **Elements of Biochemistry.** 4 hours winter or spring.
Proteins, carbohydrates, fats, and other compounds having biochemical significance; fundamentals of analysis as applied in this work. Prerequisite: Ch 221 or equivalent. Two lectures; 2 three-hour laboratory periods.
- Ch 251, 252. **Organic and Agricultural Biochemistry.** 5 hours fall, 3 hours winter.
Fundamental principles of organic chemistry and biochemistry, with applications in agriculture and related industries. Prerequisite: Ch 103. Three lectures, 2 three-hour laboratory periods, fall; 3 lectures, winter.
- Ch 253. **Agricultural Biochemistry.** 2 hours winter.
Biochemical laboratory work to accompany Ch 252. Two three-hour laboratory periods.
- Ch 254. **Quantitative Analysis for Agricultural Students.** 3 hours spring.
Fundamental training in quantitative procedure necessary for laboratory work in any phase of agricultural technology. Prerequisite: Ch 103. One lecture; 2 three-hour laboratory periods.

UPPER-DIVISION COURSES

- Ch 321, 322, 323. **Metallurgical Chemistry.** 3 hours each term.
The chemistry involved and techniques employed in winning various metals from ores, including principles of fire assaying; special attention to chemical treatment and analysis of Northwest chemicals. Prerequisite: Ch 206. Professor Caldwell.

- Ch 330, 331. **Physiological Chemistry.** 2 hours winter, 3 hours spring.
For home economics, pharmacy, and bacteriology students. Prerequisite: Ch 251 or 227. One lecture, 1 three-hour laboratory period, winter; 2 lectures, 1 three-hour laboratory period, spring. Professor Pease.
- Ch 340. **Elementary Physical Chemistry.** 3 hours.
Nonmathematical. Kinetic theory, atomic structure, molecular weights, classification of elements, solubility, ionization, colloids, hydrogen-ion measurements, electrochemistry. Prerequisite: Ch 203 or equivalent and some knowledge of physics.
- Ch 350, 351, 352. **Agricultural Chemical Technology.** 3 hours each term.
Fertilizers, insecticides, feeding stuffs, food industries products, irrigation and drainage waters, etc. Intensive reading; laboratory work. Prerequisite: Ch 233 or Ch 254. Three three-hour laboratory periods. Assistant Professor Reese.
- Ch 353. **Dairy Chemistry.** 3 hours.
Chemistry of organic acids, fats, proteins, amino acids, carbohydrates, and vitamins applied to creamery products. Prerequisite: Ch 252, 254. Associate Professor Richardson.
- Ch 354. **Dairy Chemistry Laboratory.** 2 hours.
A laboratory course to accompany Ch 353. Two three-hour laboratory periods.
- Ch 370, 371, 372. **Glass Blowing.** 1 hour each term.
Practice in the manipulation of glass and assembling set-ups. Prerequisite: one year of laboratory science. Two two-hour laboratory periods.
- 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.** 1 hour each term.
- Ch 411, 412, 413. **Advanced Inorganic Chemistry.** (g) 2 hours each term.
Chemistry of inorganic elements and compounds from the standpoint of the periodic table and atomic structure; inorganic isomerism and complex compounds; chemical conversion of inorganic materials for industrial use. Prerequisite: Ch 206, 233 or equivalent. Staff.
- Ch 414, 415. **Inorganic Preparations.** (g) Terms and hours to be arranged.
Preparation and purification of typical inorganic compounds. Prerequisite: Ch 232, 233, or their equivalent. Assistant Professor Scott.
- Ch 418. **History of Chemistry.** (G) 3 hours.
Rise and development of chemical theories and laws. Prerequisite: three years of chemistry. Professor Friedman.
- Ch 420, 421, 422. **Advanced Quantitative Analysis.** (g) 3 hours each term.
Analytical procedures such as those of electroanalysis, fuel analysis, analysis of nonferrous alloys, water, iron and steel. Prerequisite: Ch 231, 232, 233. One lecture; 2 three-hour laboratory periods. Professor Mehlig.
- Ch 423. **Organic Quantitative Microanalysis.** (G) 3 hours.
Laboratory practice in methods of quantitative organic microanalysis. Prerequisite: Ch 233, 432. One lecture; 2 three-hour laboratory periods. Professor Christensen.

Ch 424. Chemical Microscopy. (g) 3 hours fall.

Theory and use of microscope in microscopical measurements, quantitative analysis of mixtures, identification of organic compounds, optical crystallography, crystallization phenomena, etc. Prerequisite: two years of college chemistry, college physics. One lecture; 2 three-hour laboratory periods. Assistant Professor Williams.

Ch 425. Instrumental Analysis. (G) 3 hours winter.

Principles and practice in the use of special optical and electrical instrumental methods of analysis; spectroscopy, colorimetry, spectrophotometry, etc. Prerequisite: Ch 442. One lecture; 2 three-hour laboratory periods. Assistant Professor Williams.

Ch 426. Gas, Oil, and Fuel Analysis. (g) 3 hours.

Analysis of natural, artificial, and flue gases; gas calorimetry; coal calorimetry; physical testing of oils. Prerequisite: Ch 231. One lecture; 2 three-hour laboratory periods. Assistant Professor Williams.

Ch 427, 428, 429. Advanced Laboratory Methods. (G) 2 hours each term.

Principles and practice in fractionation, crystallization, filtration, adsorption, extraction, hydrogenation, and chlorination. Prerequisite: Ch 432, 442. One lecture; 1 three-hour laboratory period. Professor Christensen.

Ch 430, 431, 432. Organic Chemistry. (g) 4 or 5 hours each term.

Compounds of carbon; compounds important from the theoretical, technical, and biological standpoints; aliphatic compounds; aromatic series. Prerequisite: two years of college chemistry. For 4 hours credit: 3 lectures; 1 three-hour laboratory period. For 5 hours credit: 3 lectures; 2 three-hour laboratory periods. Professor Christensen.

Ch 433. Organic Combustion Analysis. (G) 3 hours any term.

Quantitative analysis of organic compounds. Prerequisite: Ch 227, 233, 432. Three three-hour laboratory periods. Professor Pease.

Ch 434, 435, 436. Organic Preparations. (G) 1 or 2 hours each term.

Important methods of synthesis, such as Grignard, Friedel-Craft's, Perkins' reaction, and others. Prerequisite: Ch 432 or equivalent. One three-hour laboratory period per hour of credit. Professor Pease.

Ch 437, 438, 439. Organic Chemistry. (G) 2 hours each term.

Continuation of Ch 432. Emphasis on the methods of synthesis, interpretation of reactions, and structure of organic compounds. Two lectures. Staff.

Ch 440, 441, 442. Physical Chemistry. (g) 4 hours each term.

Molecular weights, properties of liquids, solids and solutions, chemical equilibrium, reaction kinetics, electrochemistry, atomic and molecular structure. Prerequisite: quantitative analysis, and calculus. Three lectures; 1 three-hour laboratory period. Professor Gilbert, Associate Professor Spitzer.

Ch 443. Chemical Literature. (G) 1 hour fall.

Use of the chemical literature; character of various chemical journals, dictionaries, reference books, and other sources of information. Prerequisite: senior or graduate standing. Professor Gilbert.

Ch 445, 446. Chemical Thermodynamics. (G) 3 hours each term.

Application of the principles of thermodynamics to chemical phenomena; heat of reaction, free energy, activity, fugacity of gases, chemical equilibrium, entropy. Prerequisite: Ch 442. Professor Gilbert.

Ch 447. Electrochemistry. (G) 3 hours.

A lecture course dealing with theoretical and applied electrochemistry. Designed to precede Ch 465. A knowledge of thermodynamics is desirable preparation. Prerequisite: Ch 442. Assistant Professor Scott.

Ch 448, 449. Colloidal Chemistry. (G) 3 hours each term.

Properties and preparation of substances in the colloidal state. Laboratory courses Ch 467 and 468 accompany this course. Prerequisite: three years of college chemistry. Professor Friedman.

Ch 450, 451, 452. Biochemistry. (G) 3 or 5 hours each term.

Fall: carbohydrates, proteins and fats of importance in biological systems. Winter: vitamins and enzymes. Spring: metabolism. Prerequisite: organic chemistry. Three lectures; 2 three-hour laboratory periods. Professor Butts and Associate Professor Cheldelin.

Ch 453. Plant Physiological Chemistry. (G) 5 hours spring.

Prerequisite: Ch 451. Associate Professor Cheldelin.

Ch 454, 455, 456. Agricultural Biochemical Methods. (G) Hours to be arranged.

For students planning to enter research in plant or animal industries. Ch 455 and Ch 456 deal with plant and animal compounds and enzymes that accomplish transformations in living bodies. Prerequisite: quantitative analysis and organic chemistry. Assistant Professor Reese.

Ch 457, 458. Experimental Endocrinology. (G) 3 hours each term, winter and spring.

Chemistry of the endocrine glands; various ductless glands are extracted and the resulting solutions are assayed biologically. Prerequisite: organic chemistry, general zoology. One lecture; 2 three-hour laboratory periods. Not offered 1948-49. Professor Butts.

Ch 459. Biochemistry of the Phenanthrene Nucleus. (G) 2 hours spring.

Chemistry and relationship of sex hormones, bile acids, adrenal and carcinogenic compounds, and their influence on the function of the organism. Prerequisite: Ch 430, 431, 432.

Ch 460, 461, 462. Pulp and Paper Chemistry. (G) 3 hours each term.

Chemistry of cellulose; fundamental chemical processes of the pulp and paper industry. Prerequisite: analytical and organic chemistry. Professor Friedman.

Ch 465. Applied Electrochemistry. (G) 3 hours fall.

Laboratory study and calculations of fundamental phenomena underlying applied electrochemistry, such as polarization, overvoltage, corrosion, electrode potentials; laboratory instruments. One lecture; 1 recitation; 1 four-hour laboratory period. Prerequisite: Ch 442. Associate Professor Schulein.

Ch 466. Advanced Electrochemistry and Electrometallurgy. (G) Terms and hours to be arranged.

A laboratory course dealing with electrolytic preparation of chemical compounds and practice in electrometallurgy, and special problems in these fields. Prerequisite: Ch 465. Associate Professor Schulein.

Ch 467, 468. Colloidal Chemistry Laboratory. (G) 1 hour each term.

Prerequisite or parallel: Ch 448, 449. Professor Friedman.

Ch 470, 471. Wood Chemistry. (G) 2 hours each term.

Chemistry of the components of wood and related materials. Prerequisite: organic chemistry. Professor Kurth.

- Ch 472. **Chemical Analysis of Wood and Related Products.** (G) 2 hours.
Laboratory methods of analysis of wood and related fibrous materials. Prerequisite: analytical and organic chemistry. Two three-hour laboratory periods. Professor Kurth.
- Ch 480, 481, 482. **Physical Chemistry.** (G) 2 hours each term.
Review of fundamentals and more advanced study of physical chemistry principles. Prerequisite: Ch 442 or equivalent. Staff.

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.** 1 hour each term.
A reading knowledge of German and French is expected.
- Ch 511, 512, 513. **Advanced General Chemistry.** 2 hours each term.
Theory and application; inorganic catalysts, double and complex compounds, geochemistry, metallurgical chemistry, and flotation of nonmetallics. Prerequisite: Ch 442. Assistant Professor Norris, Dr. Huston.
- Ch 520, 521, 522. **Advanced Analytical Chemistry.** 3 hours each term.
Special analytical procedures adapted to those enrolling. Prerequisite: Ch 231, 232, 233. Professor Mehlig, Dr. Freund.
- Ch 530, 531, 532. **Selected Topics in Organic Chemistry.** 2 hours each term.
Topics: (1) Organic nitrogen compounds, Professor Pease; (2) Carbohydrates, Professor Pease; (3) Terpenes, Professor Pease; (4) Organic-metallic compounds, Assistant Professor Logan; (5) Steroids, _____; (6) Heterocyclic compounds, Professor Christensen.
Prerequisite: Ch 432 or equivalent.
- Ch 533, 534, 535. **Advanced Organic Chemistry.** 2 hours each term.
A three-term sequence in theoretical organic chemistry. Prerequisite: Ch 432 or equivalent and consent of instructor.
- Ch 536, 537. **Organic Analysis.** 2 hours winter, 3 hours spring.
Qualitative tests and analysis of organic compounds and mixtures. Prerequisite: Ch 232, 432. One lecture, 1 three-hour laboratory period, winter; 1 lecture, 2 laboratory periods, spring. Professor Pease.
- Ch 540, 541, 542. **Advanced Physical Chemistry.** 2 hours each term.
Theories of atomic and molecular structure; calculation of thermodynamic functions from spectral data. Newer theories of solution; phase rule and its applications. Prerequisite: Ch 442. Professor Gilbert, Associate Professor Spitzer.
- Ch 543, 544, 545. **Advanced Physical Chemistry.** 2 hours each term.
Experimental methods of determining molecular structure; the nature of the chemical bond; kinetics; photochemistry; low temperature phenomena. Prerequisite: Ch 442. Professor Gilbert, Associate Professor Spitzer.

Ch 550, 551, 552. **Selected Topics in Biochemistry.** 3 hours each term.

Nonsequence courses designed to acquaint student with recent advances in biochemistry and their application to special fields of study. Fall: enzymes and enzyme systems. Winter: endocrinology. Spring: chemotherapy. Prerequisite: Ch 452 or equivalent. Associate Professor Cheldelin, Professor Butts.

Ch 554. **Biochemical Preparations.** Terms and hours to be arranged.

Preparation, purification, and analysis of compounds of biological importance; chemical and biological resolutions. Prerequisite: Ch 432.

Entomology

ENTOMOLOGY courses are planned to acquaint the student with the proper relationship of entomology to general agriculture and forestry, to train for commercial honey production, to prepare for state and Federal service in economic entomology, and to meet the 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 four fields: applied and fundamental entomology, bee culture, and forest entomology.

Advanced courses are planned to equip students specializing in entomology with a fundamental ground work in the science sufficient to prepare them for effective service in applied entomology or for advanced research study. The insect collection consists of nearly 200,000 insects, a large part of which are named and classified. This collection of insects serves the institution and the department as follows: (1) undergraduate class instruction; (2) graduate student research; (3) research by staff members conducted under a general research grant; (4) research by staff members conducted on agricultural pests; (5) technical advisory service—determination of injurious and beneficial insects and letters about control sent in by the county agricultural agents and citizens of Oregon.

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

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

Ent 201, 202, 203. **General Entomology.** 3 hours each term.

For students whose principal interest is in biology. Classification, biology, collecting and rearing insects. Two lectures; 1 two-hour laboratory period. Associate Professor Martin.

UPPER-DIVISION COURSES

Ent 314. **Introduction to Economic Entomology.** 3 hours fall or winter.

Primarily for agriculture students; typical economic insect forms; insect-pest control. Two lectures; 2 two-hour laboratory periods. Associate Professor Martin.

- Ent 321. **Principles of Forest Entomology.** 3 hours fall.
For forestry students. Forest losses due to insects; the groups responsible; prevention and control. Prerequisite: one year of forestry, or Ent 314 or equivalent. Two lectures; 1 two-hour laboratory period. Associate Professor Chamberlin.
- Ent 322, 323. **Forest Entomology.** 3 hours each term, winter and spring.
Insects injurious to forests and forest products; forest-insect surveys; control. Prerequisite: Ent 321. Two lectures; 1 two-hour laboratory period. Associate Professor Chamberlin.
- Ent 324. **Insects Injurious to Forest Products.** 3 hours winter.
A consideration of the damage by insects to timber products both raw and finished and to metals and concrete. Required of students in Forest Products. Two lectures; 1 two-hour laboratory demonstration or outside assignment. Associate Professor Chamberlin.
- Ent 335. **Introduction to Bee Culture.** 3 hours spring.
Habits and life history; management for honey production; and pollination of fruit and seed crops. Prerequisite: upper-division standing or consent of instructor. Two lectures; 1 three-hour laboratory period. Associate Professor Scullen.
- Ent 341. **Aquatic Entomology.** 4 hours spring.
Aquatic insects, ecologies, life histories, and economic importance as food of game fishes; survey techniques. Prerequisite: upper division standing or consent of instructor. One lecture or recitation; 2 three-hour laboratory periods or field work. Associate Professor Martin.
- Ent 352. **Entomological Nomenclature and Literature.** 3 hours fall.
Entomological nomenclature; International Code; sources of entomological literature; Bureau of Entomology; periodicals and books; bibliographies; preparation of articles for scientific publications. Prerequisite: Ent 201 or equivalent. Associate Professor Chamberlin.
- Ent 353. **Historical Entomology.** 4 hours winter.
Insects of the ancients; early treatises; beginnings in America; introduced pests; Bureau of Entomology; early work in Oregon. Prerequisite: Ent 201 or equivalent. Associate Professor Chamberlin.
- Ent 401. **Research.** Approved problems carried on in library, laboratory, or field. Terms and hours to be arranged.
- Ent 403. **Thesis.** Terms and hours to be arranged.
- Ent 405. **Reading and Conference.** Terms and hours to be arranged.
- Ent 407. **Seminar.** 1 hour each term.
Reading, discussing, and abstracting the leading articles on entomological topics as they appear in current scientific literature.
- Ent 411. **Fruit Insects. (G)** 3 hours fall.
Major fruit insects and their control. Especially for students in horticulture and entomology. Prerequisite: Ent 314 or equivalent. Two lectures; 1 two-hour laboratory period. Offered alternate years. Offered 1948-49. Associate Professor Martin.
- Ent 412. **Medical Entomology. (G)** 3 hours winter.
Insects responsible for diseases of man; disease parasites, their carriers, and possible means of control. Prerequisite: Ent 314 or equivalent. Two lectures; 1 three-hour laboratory period. Associate Professor Chamberlin.

- Ent 413. Field and Truck-Crop Insects.** (G) 3 hours spring.
Major field and truck-crop insects and their control. Especially for farm crops, vegetable crops, and entomology students. Prerequisite: Ent 314, or equivalent. Two lectures; 1 two-hour laboratory period. Offered alternate years. Not offered 1948-49. Associate Professor Martin.
- Ent 415. Principles of Entomological Research.** (G) 3 hours winter.
Procedures in investigative entomological work; applied biometry; insect populations; problems in indirect and direct control of insects. Prerequisite: Ent 314 or equivalent. Two lectures; 1 recitation or outside assignment. Offered alternate years. Offered 1948-49. Associate Professor Martin.
- Ent 419. Principles of Entomology.** (g) 3 hours winter.
Insects and their habits; relation to human welfare; collection, preservation, classification, and rearing of living forms. Primarily for students preparing to teach biology in high schools. Two lectures; 2 two-hour laboratory periods. Prerequisite: upper-division or graduate standing. Associate Professor Martin.
- Ent 423. Advanced Forest Entomology.** (G) 3 hours.
An intensive study of the bark beetles injurious to forest trees. Prerequisite: Ent 323 or equivalent. Two lectures; 1 laboratory period. Associate Professor Chamberlin.
- Ent 431. Biological Control.** (G) 3 hours spring.
Possibilities and limitations; artificial propagation of insects; examples of successes and failures; typical species. Prerequisite: Ent 352. Two lectures; 1 three-hour laboratory period. Associate Professor Chamberlin.
- Ent 451, 452, 453. Insect Taxonomy.** (G) 3 hours each term.
The several orders; intensive study in selected groups; phylogenetic relationships and distribution. Prerequisite: Ent 203 or equivalent. Two recitations; 1 three-hour laboratory period. Associate Professor Chamberlin.
- Ent 472. Insect Physiology.** (G) 3 hours winter.
Life processes of insects, including nutrition, respiration, circulation, excretion, and reproduction. Prerequisite: Ent 482, Z 411. Two lectures; 1 three-hour laboratory period.
- Ent 473. Insect Ecology.** (G) 3 hours spring.
Environmental factors and their influence on insect development, distribution, and behavior. Prerequisite: Ent 203. Two lectures; 1 three-hour laboratory period.
- Ent 481, 482. Insect Morphology.** (G) 3 hours each term.
Fall term: morphology of the external skeleton of insects and its appendages. Winter term: morphology of the internal organs of insects. Prerequisite: Ent 203. Two lectures; 1 three-hour laboratory period.

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.

Geology

GEOLGY is the science of the earth. Some knowledge and appreciation of the earth on which we live is essential for those who wish to face intelligently the problems of modern life. The Department of Geology offers three types of majors: one intended for students who are interested in geology for a liberal-arts degree; one professional in economic geology; and one professional 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 such topics as advanced petrology, geological engineering, oil geology, geophysical exploration methods, interpretation of aerial photographs, cartography, map interpretation, advanced studies in structure, stratigraphy, sedimentation or paleontology.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

G 201, 202, 203. Geology. 3 hours each term.

Processes of nature by which earth's surface has been built up, deformed, and torn down; natural history and occurrence of common rocks and useful minerals; outline of history of earth and life. Professor Allison.

G 204, 205, 206. Geology Laboratory. 1 hour each term.

Laboratory and field work to accompany G 201, 202, 203 for all students desiring a more intimate knowledge of geology. One two-hour laboratory period.

UPPER-DIVISION COURSES

G 312, 313, 314. Mineralogy. 4 hours each term.

Physical and chemical methods useful in the recognition of materials of which the earth is composed. Prerequisite: chemistry. Two lectures; 2 three-hour laboratory periods. Professor Wilkinson.

G 321. Structural Geology. 4 hours spring.

Study of origin, interpretation, and mapping of minor rock structures and joints, faults, and folds. Prerequisite: G 201, 202. Three lectures; 1 three-hour laboratory or field period. Professor Allison.

G 322. Physiography. 4 hours winter.

Development of the surface features of the earth by erosion, deposition, earth movements, and volcanism. Prerequisite: general geology. Three lectures; 1 three-hour laboratory or field period. Professor Allison.

G 323. Stratigraphy. 4 hours fall.

Genesis and subsequent history of stratified rocks; geologic processes concerned with sedimentation and cementation. Prerequisite: G 201, 202, 203. Three lectures; 1 three-hour laboratory or field period. Professor Allison.

G 324. Engineering Geology. 3 hours winter.

The general field from the engineering standpoint. Open to other than engineering students. Prerequisite: upper-division standing. Professor Hodge.

G 330. Life of the Past. 3 hours fall.

History of life as recorded in the fossil record; invertebrates and lower vertebrates studied as illustrations of biological principles and relationships to higher animals. Prerequisite: one year of biology or geology. Professor Packard.

G 331. Geologic History of Mammals. 3 hours winter.

Rise and development of the mammals with special attention to certain groups of ancient animals that once lived on the Pacific Coast. Prerequisite: one year of biology or geology. Professor Packard.

G 332. Geologic History of Man. 3 hours spring.

Physical and cultural development of the ancient types of men, as shown by their fossil remains, their implements and art. Prerequisite: one year of biology or geology. Professor Packard.

G 340, 341. Invertebrate Paleontology. 4 hours each term.

Major fossil invertebrates; important West Coast genera. Prerequisite: general geology or one year of any biological science. Two lectures; 2 three-hour laboratory periods. (G 340, 341, 442 form a sequence.) Professor Packard.

G 350. Rocks and Minerals. 3 hours fall.

This course gives opportunity to become acquainted with rocks and minerals without having to meet the requirements of the more technical courses. Especially useful to students expecting to teach general science. Prerequisite: upper-division standing. Two lectures; 1 two-hour laboratory period. Professor Wilkinson.

G 352. Geology of Oregon. 3 hours spring.

Affords opportunity to obtain a general knowledge of the geology of the state without having to meet the technical requirements imposed for a professional geology major. Prerequisite: upper-division standing. Professor Hodge.

G 355. Economic Geology and Mineral Resources. 3 hours fall.

Origin, occurrence, uses, and economic and political importance of geological resources, including coal, petroleum, metallic and nonmetallic minerals, ground water, and water power. Prerequisite: upper-division standing. Professor Hodge.

G 380. Advanced Field Geology. 3 to 9 hours.

Geologic mapping and surveying methods; intensive study of a small area. Conducted in a summer camp of four weeks; may be taken successive summers for credit up to 9 hours each summer, maximum 21 hours. Prerequisite: one year of general geology. Professor Wilkinson.

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. Any term, 1 hour each term.

G 412, 413. Petrography. (G) 4 hours fall and winter.

Sedimentary, igneous and metamorphic rocks and ores studied megascopically and microscopically, to train in recognition, classification, and interpretation of earth materials. Prerequisite: G 312, 313, 314. Two lectures; 2 three-hour laboratory periods. Professor Hodge.

G 414. Mineral Deposits. (G) 4 hours spring.

Studies in the recognition, association, occurrence of minerals and the criteria for the recognition of origin, types, and properties of mineral deposits. Prerequisite: G 412, 413. Two lectures; 2 three-hour laboratory periods. Professor Hodge.

- G 420. **Interpretation of Geophysical Data.** (G) 3 hours.
Physical methods now used in mining and oil prospecting, with particular emphasis on the geologic interpretation of data obtained by these methods. Prerequisite: Ph 203, G 321, 323. Professor Wilkinson.
- G 424. **Advanced Paleontology.** (G) Terms and hours to be arranged.
Special work assigned to meet the requirements of the advanced student. Prerequisite: G 340, 341. Professor Packard.
- G 431. **Geologic History of North America.** (G) 4 hours.
The geologic development of the North American continent. Prerequisite: G 323. Professor Allison.
- G 432. **Geologic History of the Pacific Coast.** (G) 4 hours.
The geologic history of the Pacific Coast of North America. Prerequisite: G 323, 340, 341. Professor Allison.
- G 442. **Paleobotany.** (g) 4 hours spring.
Paleobotanically important plants; plant history revealed in fossil record; Tertiary floras of Oregon. Prerequisite: general geology or general botany. Two lectures; 2 three-hour laboratory periods. Associate Professor Sanborn.

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. **Microscopy.** Hours to be arranged.
Use and theory of the microscope in the recognition and determination of the properties of organic and inorganic materials. Professor Hodge.
- G 520. **Advanced Economic Geology.** Terms and hours to be arranged.
Special work assigned to meet the requirements of advanced students in metallic and nonmetallic mineral deposits. Professor Hodge.
- 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

THE courses in mathematics are designed to provide for the general student the training in rigorous thinking and analytical processes that is a fundamental part of a liberal-arts education; to supply the mathematical preparation desirable for students in professional schools; to prepare prospective teachers; and finally to give advanced and graduate work for those who specialize in mathematics or science.

Sequences Satisfying Group Requirements. The following constitute sequences satisfying group requirements: (1) Forestry students—Mth 101, 102, 103. (2) Business and Technology students—Mth 104, 105, 106. (3) Science students—Mth 100, 101, 102; Mth 101, 102, 103; Mth 201, 202, 203.

Statistics. The Department of Mathematics offers two types of courses in statistics: (a) The mathematical theory of statistics develops the theoretical foundations of applied statistics. It should be elected by prospective statistical analysts since only by a mastery of this background can they achieve the desired proficiency. It can profitably be elected by students majoring in mathematics who are interested in the pure mathematics involved. (b) Applied statistics emphasizes the use of the formulas and methods in the interpretation of statistical and experimental data. It gives the statistician practical experience in numerical computations.

Computational Service. The Department of Mathematics operates a computational service available to schools, departments, or staff members wishing assistance or advice in connection with mathematical problems, laborious calculations, or statistical analysis. Having calculating machines, mathematical tables, and other computational aids, as well as experience, the department can perform such work systematically and efficiently. The actual work is done by competent students in mathematics, who are paid for the service, and who incidentally obtain practical mathematical and statistical experience.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

Mth 5. Elementary Mathematics. 1 or 2 hours.

A short course in numerical calculations, elements of algebra and trigonometry, designed to aid students in elementary science courses.

Mth 10. Elementary Algebra. 4 hours.

Mth 20. Elementary Geometry. 4 hours.

Mth 30. Solid Geometry. 2 hours.

Mth 100. Intermediate Algebra. 4 hours.

Mth 101, 102, 103. Elementary Analysis. 4 hours each term.

Trigonometry, graphs, algebra, elements of calculus, and analytic geometry.

Mth 104, 105, 106. Mathematics of Business and Industry. 3 hours each term.

Algebra and mathematics of finance. Prerequisite: Mth 10 or equivalent high-school algebra.

Mth 109. Elements of Statistics. 4 hours.

Mth 201, 202, 203. Differential and Integral Calculus. 4 hours each term.

Prerequisite: Elementary Analysis or equivalent.

Mth 230. Spherical Trigonometry and Rudiments of Navigation. 2 hours spring.

Prerequisite: Mth 101 or equivalent.

UPPER-DIVISION COURSES

Mth 311. History of Mathematics. 3 hours.

Brief history of our oldest science; its beginnings in relation to social problems; reciprocal effect of mathematics on society. Prerequisite: upper-division standing. Staff.

- Mth 341, 342. Applied Statistics.** 3 hours each term.
Theory and technique of statistical methods with special reference to applications. Prerequisite: calculus or consent of instructor. Assistant Professor Li.
- Mth 405. Reading and Conference.** Terms and hours to be arranged.
Staff.
- Mth 410. Foundations of Elementary Mathematics.** (g) 3 hours.
Fundamental concepts and logical structure of arithmetic, algebra, and geometry. Designed for prospective teachers of high-school mathematics. Prerequisite: calculus. Assistant Professor Eves.
- *Mth 411. Theory of Equations and Determinants.** (G) 3 hours.
Properties and methods of solution of algebraic equations; brief study of determinants and their applications. Prerequisite: calculus. Professor Williams.
- *Mth 412. Higher Algebra.** (G) 3 hours.
Determinants, linear dependence, matrices, linear transformations, invariants, and quadratic forms. Prerequisite: calculus. Professor Williams.
- *Mth 413. Advanced Plane Analytic Geometry.** (g) 3 hours.
Prerequisite: calculus. Professor Williams.
- *Mth 414. Solid Analytic Geometry.** (G) 3 hours.
Prerequisite: calculus. Professor Williams.
- *Mth 415. Advanced Geometry.** (G) 3 hours.
Euclidean geometry from a modern point of view. Prerequisite: calculus. Professor Williams.
- *Mth 416. Projective Geometry.** (G) 3 hours.
Introduction to analytic and synthetic projective geometry. Prerequisite: calculus. Professor Williams.
- *Mth 417. Actuarial Mathematics.** (g) 3 hours.
A course in algebra and probability. Recommended as preparation for actuarial examinations. Prerequisite: calculus. Associate Professor Hammer.
- Mth 421, 422. Differential Equations.** (G) 3 hours each term.
Practical study of the solution of ordinary differential equations. Prerequisite: calculus. Professor Milne, Associate Professors Kirkham, Hostetter, Assistant Professors Poole, Saunders, Arnold.
- Mth 424. Elementary Topology.** (G) 3 hours.
Simple introduction to combinatorial and point-set analysis situs: classification of surfaces; manifolds; fixed points of continuous mappings. Prerequisite: calculus. Associate Professor Clark.
- Mth 425. Vector Analysis.** (G) 3 hours.
Prerequisite: calculus. Associate Professor Hostetter.
- Mth 426. Mathematical Theory of Probability.** (G) 3 hours.
Methods of calculating probabilities with applications to scientific problems. Offered when sufficient demand. Prerequisite: calculus. Associate Professor Kirkham.
- Mth 431, 432, 433. Advanced Calculus.** (G) 3 hours each term.
Aim is (1) to examine critically some of the results of the calculus, (2) to study the calculus of several variables. Prerequisite: elementary calculus. Associate Professor Clark.

* Offered alternate years.

- Mth 435. Numerical Calculus.** (G) 3 hours.
Finite differences, interpolation, numerical differentiation and integration, and numerical solution of differential equations. Prerequisite: differential equations. Professor Milne.
- Mth 441, 442, 443. Mathematical Theory of Statistics.** (G) 3 hours each term.
Mathematical derivation of the various formulas used in statistical analysis and some application of these formulas to practical problems. Prerequisite: calculus. Associate Professor Kirkham.
- Mth 451, 452. Modern Algebra.** (G) 3 hours each term.
Recent theories showing the variety of possible mathematical systems; applications. Prerequisite: calculus and consent of instructor.
- Mth 454. Theory of Numbers.** (G) 3 hours.
Properties of integers, Euclid's algorithm, diophantine equations, prime numbers, congruences, residues of powers and quadratic residues. Prerequisite: algebra and upper-division standing. Associate Professor Clark.
- Mth 461, 462, 463. Theory of Groups.** (G) 3 hours each term.
Permutation of groups; linear groups. Prerequisite: calculus. Assistant Professor Manning.
- Mth 471, 472, 473. Differential Geometry of Curves and Surfaces.** (G) 3 hours each term.
The metric geometry of 3-space with an introduction to the tensor theory of Riemannian space. Prerequisite: differential equations. Assistant Professor Eves.

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.
- Mth 503. Thesis.** Terms and hours to be arranged.
- Mth 505. Reading and Conference.** Terms and hours to be arranged.
- Mth 507. Seminar.** Terms and hours to be arranged.
- *Mth 511, 512, 513. Functions of a Complex Variable.** 3 hours each term.
Introduction to analytic functions, fundamental for advanced study in mathematics. Professor Milne.
- Mth 514. Calculus of Variations.** 3 hours.
Offered on demand. Associate Professor Hostetter.
- Mth 516. Potential Theory.** 3 hours.
Offered on demand.
- *Mth 521, 522, 523. Differential Equations of Mathematical Physics.** 3 hours each term.
Ordinary and partial linear differential equations and boundary value problems, with applications. Professor Milne.
- Mth 526, 527. Vector and Tensor Analysis.** 3 hours each term, winter and spring.
Correlates the analysis of Gibbs with modern tensor analysis. Applications to mechanics, hydrodynamics, and electricity. Prerequisite: Mth 425 or equivalent. Associate Professor Hostetter.

* Offered alternate years.

- Mth 531, 532, 533. Advanced Analytical Mechanics.** 3 hours each term.
Generalized coordinates, Lagrange's equations, Hamilton's principle, Hamilton's canonical equations, statistical mechanics. Associate Professor Hostetter.
- Mth 541, 542. Theory of Elasticity.** 3 hours each term.
Mathematical formulation of the problem of stress, strain, and deformation in elastic solids, with solutions in some cases of practical interest. Offered on demand.
- Mth 551, 552, 553. Functions of Real Variables.** 3 hours each term.
Convergence, continuity, special functions, Riemann and Lebesgue integrals, Fourier series, theory of Hilbert space. Associate Professor Clark.
- Mth 561, 562, 563. Mathematics in Engineering and Physics.** 3 hours each term.
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. Assistant Professor Stone.

Nursing Education

THE preparatory nursing education curriculum offered by Oregon State College is devoted chiefly to general and basic subjects in preparation for professional work at the Medical School and affiliated hospitals. The Department of Nursing Education also offers to registered nurses advanced curricula in nursing specialties, credit for which may be applied toward a degree. (See Catalog of the Medical School.)

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

- Nur 111, 112, 113. Backgrounds of Nursing.** 1 hour each term.
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. Assistant Professor Slocum.
- Nur 230. Home Nursing.** 2 hours.
Home care of the sick; demonstrations of ordinary nursing techniques under home conditions; improvising equipment. Designed for students not in preparatory nursing curriculum. Assistant Professor Slocum.

UPPER-DIVISION COURSES

- Nur 311, 312, 313. Modern Nursing Problems.** 1 hour each term.
Present aims and problems of nursing at home and abroad. Open only to registered nurses.

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 the foundations of a reading knowledge of German, Russian, or French, or all. In special cases courses in closely related departments, involving considerable study of physical principles, may be accepted as part of a major in physics.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

Ph 101, 102, 103. Engineering Physics. 3 hours each term.

Studies in general physics adapted to students in engineering. This sequence is offered each term if demand is sufficient. One lecture; 2 recitations; 2 one-hour laboratory periods. Mr. Decker, Mr. Day, Mr. Church, and others.

Ph 161. Rudiments of Photography. 2 hours any term.

For students not having the science prerequisites for Ph 361. Does not admit to Ph 362. One lecture; 1 two-hour laboratory period. Assistant Professor Garman and others.

Ph 201, 202, 203. General Physics. 4 hours each term.

Mechanics, sound, heat, light, electricity and magnetism. Two lectures; 2 recitations; 1 two-hour laboratory period. Assistant Professor Morgan and others.

Ph 204, 205, 206. Astronomy. 3 hours each term.

Descriptive treatment. Coordinate system; astronomical instruments; the solar system; star types and groupings. Two lectures; 1 two-hour period of observation or laboratory. Mr. Byers.

Ph 211, 212. Abridged General Physics. 3 hours each term.

Mechanics, placing only slight emphasis on rotary motion; heat; electricity. One lecture; 2 recitations; 2 one-hour laboratory periods. Associate Professor Vinyard and others.

Ph 214. Household Physics. 4 hours spring.

Principles of physics with special attention to applications in the home. Four demonstration lectures; 2 discussion periods. Associate Professor Dempster.

UPPER-DIVISION COURSES

Ph 311, 312, 313. Introduction to Modern Physics. 3 hours each term.

Kinetic theory, the electron, radioactivity; photoelectricity, thermionic emission, X-rays, electronic devices, gaseous conduction, cosmic rays. Prerequisite: college physics. Two lectures; 1 two-hour laboratory period. Professor Brady and others.

Ph 317, 318, 319. Physics Problems. 3 hours each term.

Systems of units; applications of calculus to physics; solution of equations by approximation methods; treatment of experimental data; characteristic errors and method of least squares. Prerequisite: Ph 103 and calculus. Two lectures; 1 two-hour computation period. Associate Professor Dempster.

Ph 321, 322, 323. Physical Measurements. 3 hours each term.

Direct and alternating currents; heat. Students may enter fall or spring. Prerequisite: college physics; calculus to be taken concurrently. One lecture; 2 two-hour laboratory periods. Associate Professor Varner.

Ph 330. Fundamentals of Radio. 3 hours spring.

Underlying principles; vacuum tubes; circuits; antennas and wave propagation; construction and use of transmitting and receiving equipment. Prerequisite: one year of college physics. One lecture; 2 two-hour laboratory periods. Associate Professor Vinyard.

Ph 331, 332, 333. Electronics and Radio. 3 hours each term.

Theory; vacuum tubes; circuits; antennas; wave propagation; audio, radio, and very high frequency measurements; radar techniques; modern electronic devices. Prerequisite: general or engineering physics, a second year of physics or electrical engineering or equivalent. One lecture; 2 two-hour laboratory periods. Professor Yunker.

Ph 361. Photography. 3 hours any term.

The hand camera, developing, printing, toning, enlarging, slides. Prerequisite: college chemistry or physics or previous photographic experience, with consent of instructor. One lecture; 2 two-hour laboratory periods. Assistant Professor Garman and others.

Ph 362. Photography. 3 hours winter.

Commercial phases of photography: view cameras, copying, flashlights, indoor lighting, color correction, distant views, etc. Prerequisite: Ph 361. One lecture; 2 two-hour laboratory periods. Assistant Professor Garman.

Ph 363. Photography. 3 hours spring.

The making of pleasing pictures: composition, carbon and carbonyl printing, paper negatives, diffusion, enlarging negatives, etc. Prerequisite: Ph 361. One lecture; 2 two-hour laboratory periods. Assistant Professor Garman.

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

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

Ph 405. Reading and Conference. Terms and hours to be arranged.

Ph 407. Seminar. 1 hour each term.

Ph 411, 412, 413. Biophysics. (G) 3 hours each term.

Physical properties 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. Two lectures; 1 two-hour laboratory period. Associate Professor Dempster.

Ph 421, 422, 423. Atomic and Nuclear Physics. (G) 3 hours each term.

Atomic and nuclear structure as revealed by studies of photoelectricity, spectra, crystal structure, radioactivity, etc.; fission and availability of nuclear energy. Prerequisite: calculus and Ph 313 or graduate standing in chemistry or electrical engineering. Associate Professor Dempster.

Ph 431, 432, 433. Experimental Electronics and High-Frequency Measurements. (G) 3 hours each term.

Microwaves; electronic and high-frequency techniques; modern electronic devices and research methods as applied to physics, chemistry, engineering, psychology, and medicine. Prerequisite: Ph 333 or EE 463. One lecture; 2 two-hour laboratory periods. Professor Yunker.

Ph 461, 462, 463. Advanced Photography. (G) 3 hours each term.

Color photography, photomicrography, microscopic motion pictures, miniature camera technique, etc. Student may enter any term. Prerequisite: Ph 362. One lecture; 2 two-hour laboratory periods. Assistant Professor Garman.

- Ph 465, 466. **Light.** 3 hours winter and spring.
Geometric and physical optics. Prerequisite: Ph 321 and calculus. Two lectures; 1 two-hour laboratory period. Associate Professor Vinyard.
- Ph 467. **The Physics of Light Production.** (G) 3 hours.
Radiation and the development of modern illuminants. Prerequisite: courses in light or illumination. Two lectures; 1 two-hour laboratory period. Professor Weniger.
- Ph 490. **Basic Meteorology.** 3 hours.
Elementary study of weather phenomena; weather instruments; interpretation of the weather map and general principles of forecasting. Prerequisite: college physics. Two lectures; 1 two-hour laboratory period. Mr. Lincoln.
- Ph 491. **Physical Meteorology.** (G) 3 hours winter.
Physics of the atmosphere; applications of meteorology to specialized fields; statistical analysis of climatological data. Prerequisite: one year of college physics; calculus; Ph 205. Mr. Decker.
- Ph 492. **Introduction to Modern Meteorology.** (G) 3 hours spring.
Air-mass and frontal analysis; surface and upper-level weather charts; modern forecasting methods; applications to aviation flight planning. Prerequisite: Ph 491. Two lectures; 1 two-hour laboratory period. Mr. Day.

GRADUATE COURSES

Courses at the graduate level are given when warranted by demand. An appended date indicates that the course is offered only in alternate years.

- Ph 501. **Research.** Terms and hours to be arranged.
- Ph 503. **Thesis.** Terms and hours to be arranged.
- Ph 505. **Reading and Conference.** Terms and hours to be arranged.
- Ph 507. **Seminar.** Terms and hours to be arranged.
- Ph 511. **Laboratory Arts.** Terms and hours to be arranged.
Demonstration and laboratory techniques; care, adjustment, and design of apparatus. Prerequisite: one year of college physics; Ed 408 or equivalent. Lectures, assigned readings, and laboratory. Mr. Church.
- Ph 531, 532, 533. **Advanced Electrical Theory.** 3 hours each term.
A mathematical discussion of the classical and modern theories of electricity. Prerequisite: Ph 322; differential equations. Offered alternate years. Not offered 1948-49. Associate Professor Varner.
- Ph 537, 538, 539. **Conduction of Electricity Through Gases.** 3 hours each term.
Processes taking place at electrodes, in the gas, and at walls of tube; glow, arc, and spark discharges. Prerequisite: Ph 313, 333. Two lectures; 1 three-hour laboratory period. Offered alternate years. Not offered 1948-49.
- Ph 541. **Sound.** 3 hours.
Sound and its applications; acoustics; ultrasonics. Prerequisite: Ph 319 or equivalent. Three lectures; occasional laboratory. Assistant Professor Morgan.

- Ph 551, 552, 553. **Theory of Heat.** 3 hours each term.
Thermodynamics and the kinetic theory. Prerequisite: Ph 323; differential equations. Offered 1948-49. Associate Professor Varner.
- Ph 561, 562, 563. **Optics.** 3 hours each term.
Physical optics; theory of optical instruments; spectroscopy. Prerequisite: Ph 466. Two lectures; 1 three-hour laboratory period. Professor Weniger.
- Ph 571, 572, 573. **Introduction to Theoretical Physics.** 3 hours each term.
A mathematical treatment of the theories of classical physics. Required of all physics majors for the master's degree. Prerequisite: two years of physics; differential equations. Assistant Professor Morgan.
- Ph 574, 575, 576. **Modern Physical Theories.** 3 hours each term.
Electron theory, relativity, the quantum theory, wave mechanics. Prerequisite: Ph 573. Assistant Professor Morgan.
- Ph 577. **Quantum Mechanics.** 3 hours.
Modern theories based on matrices, tensors, Schroedinger's equation, Heisenberg's principle, and Dirac's transformation theory. Prerequisite: Ph 573. Offered 1948-49. Assistant Professor Morgan.
- Ph 582. **History and Philosophy of Physics.** 3 hours winter.
Prerequisite: four years of physics. Physics staff.
- Ph 592. **Astrophysics.** 3 hours.
Stellar spectroscopy, photometry, and radiometry. Prerequisite: Ph 204, 206, 466. Offered 1948-49. Associate Professor Dempster.
- Ph 593. **Geophysics.** 3 hours.
Prerequisite: G 321, Ph 321, and differential equations. Not offered 1948-49. Associate Professor Vinyard.

Science Education

PROFESSIONAL preparation for prospective teachers of biological and physical science and mathematics is afforded by the Department of Science Education, which is 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 or science education, or in education, according to the degree of emphasis on subject matter or professional preparation. The combination of subjects to be taught, and the scope of preparation desired, influence the choice of major school.

The requirements for the State High-School Teacher's Certificate are printed on pages 262-264. Approved teaching majors and minors in science are printed on pages 264-271; these are minimum requirements and may be supplemented by additional courses in the several fields. The teaching majors in biology, general science, mathematics, and physical science provide electives that permit flexibility in selection of courses. The majors in health education and human biology are 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.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSE

SEd 123. Introduction to Health Education. 3 hours spring.

Historical background and underlying philosophy of health education; study of statistical facts that indicate need for health education; survey of modern practices in, and organizations for, health education; opportunities for professional work in field.

UPPER-DIVISION COURSES

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 408b, f, g. Methods and Materials. (See Ed 408, page 274.)

SEd 431, 432, 433. School Health Problems. (G) 3 hours each term.

Maintenance of health of school children; communicable diseases; school sanitation; planning of school buildings; health of school child; hygiene of instruction. Prerequisite: Ed 311, 312, 313, and one year of upper-division biology. Professor Langton.

SEd 441, 442, 443. Health Education. (G) 3 hours each term.

Philosophy and principles of health education; organization and administration; health instruction and its use in secondary schools and in adult health education. Prerequisite: Ed 311, 312, 313, and one year of upper-division biology. Associate Professor Morris.

GRADUATE COURSES

SEd 501. Research. Terms and hours to be arranged.

SEd 503. Thesis. Terms and hours to be arranged.

SEd 505. Reading and Conference. Terms and hours to be arranged.

SEd 507. Seminar. Terms and hours to be arranged.

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:

1. General Zoology (Z 201, 202, 203) or equivalent.
2. Comparative Vertebrate Anatomy (Z 324, 325) and Comparative Vertebrate Embryology (Z 326).
3. Physiology (Z 331, 332, 333).
4. Evolution (Z 345) or Genetics (Z 341).
5. Eight term hours selected from: Invertebrate Zoology (Z 451, 452), Parasites of Man (Z 456).
6. One of the following options:
 - A. Minimum of nine 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. Eight or more term hours selected from: Comparative Vertebrate Histology (Z 461), Microtechnique (Z 462), Experimental Embryology (Z 463),
- C. Microtechnique (Z 462) and any two of the courses listed under option 6A.
7. Cognate courses as follows: one year of chemistry; Elementary Analysis (Mth 101, 102) and Elements of Statistics (Mth 109), or equivalent.

Students may specialize in one of the following divisions within the department: (1) anatomy and embryology, (2) physiology, (3) invertebrate zoology and parasitology, (4) cellular biology, (5) natural history and ecology. The major student should see the instructor in charge of the division of specialization regarding options, additional cognate courses, and electives.

For a graduate major a summer session at a marine or inland biological station or the equivalent in organized field work is strongly recommended.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

Z 101, 102, 103. Human Biology. 3 hours each term.

Man's place in animal kingdom; human anatomy and physiology; development, heredity, evolution; relations to diseases and parasites; human ecology. Two lectures; 1 two-hour laboratory period.

Z 113. Elementary Zoology. 5 hours spring.

Distribution, habits, and functions of animals with reference to their economic importance. Two lectures; 1 three-hour laboratory period. Associate Professor Hillemann.

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

For premedical, prenursing, pharmacy, physical education, psychology, fish and game management students, and others. Two lectures; 1 recitation; 1 two-hour laboratory period. Associate Professor Pratt.

Z 233. Elementary Physiology. 5 hours spring.

For students in medical technicians' curriculum and others desiring a general course in human physiology. Three lectures; 2 laboratory periods. Professor Wulzen.

UPPER-DIVISION COURSES

Z 321, 322. Elementary Human Anatomy. 3 hours each term, fall and winter.

Designed especially to meet the needs of physical education students. Prerequisite: Z 101, 102, 103, or equivalent. Two lectures; 1 two-hour laboratory period. Associate Professor Allman.

Z 323. Applied Human Anatomy. 3 hours spring.

The applied phases of anatomy are considered. Designed especially for physical education students. Prerequisite: Z 321, 322. Two lectures; 1 two-hour laboratory period. Associate Professor Allman.

Z 324, 325. Comparative Vertebrate Anatomy. 4 hours winter and spring.

Gross dissection and comparison of organ systems in representative vertebrates. Prerequisite: Z 201, 202, 203. Two lectures; 2 three-hour laboratory periods. Assistant Professor Hillemann.

Z 326. Comparative Vertebrate Embryology. 4 hours fall.

Comparative study of the development of several representative vertebrate forms. Prerequisite: Z 201, 202, 203. Two lectures; 2 three-hour laboratory periods. Assistant Professor Hillemann.

Z 331, 332. Physiology. 3 hours fall and winter.

Especially for students majoring in home economics, pharmacy, and zoology or minoring in physical education. Prerequisite: Z 201, 202, 203, or consent of instructor. Two lectures; 1 two-hour laboratory period. Professor Wulzen, Associate Professor Allman.

Z 333. Physiology. 3 hours spring.

Continuation of Z 331, 332, especially for students majoring in zoology. Three lectures. Professor Wulzen.

Z 336. Applied Human Physiology. 3 hours spring.

Applied phases of physiology. Designed especially for students minoring in physical education. Prerequisite: Z 331, 332. Two lectures; 1 two-hour laboratory period. Associate Professor Allman.

Z 341. Genetics. 3 hours winter.

Lectures on the principles of heredity and their applications to agriculture, medicine, and human eugenics; nature of gene action; genetics and evolution. Prerequisite: Z 201, 202, 203, or consent of instructor. Associate Professor Dornfeld.

Z 342. Genetics Laboratory. 2 hours spring.

Experiments on *Drosophila* to illustrate operation of hereditary mechanisms; analyses of heredity in human family histories. Prerequisite: Z 341. Two three-hour laboratory periods. Associate Professor Dornfeld.

Z 345. Evolution. 3 hours spring.

Evidences of evolution from comparative anatomy, embryology, physiology, geographic distribution, and paleontology; genetic mechanisms involved; natural selection. Prerequisite: Z 341. Associate Professor Dornfeld.

Z 371. Ornithology. 3 hours fall.

Classification, distribution, and life histories of North American birds. Prerequisite: Z 201, 202, 203. Two lectures; 1 three-hour laboratory period. Professor Gordon.

Z 372. Mammalogy. 3 hours winter.

Classification, distribution, life histories, and economic relationships of mammals. Prerequisite: Z 201, 202, 203. Two lectures; 1 three-hour laboratory period. Professor Gordon.

Z 374, 375. Natural History of Oregon I, II. 3 hours each term, fall and winter.

The 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. Two lectures; 1 three-hour laboratory period. Professor Gordon.

Z 376. Natural History of Oregon III. 4 hours spring.

Identification, distribution, and habits of common land vertebrates. Prerequisite: Z 374, 375, or consent of instructor. Two lectures; 2 three-hour laboratory periods. Professor Gordon.

Z 377. Ichthyology. 3 hours spring.

Morphology, taxonomy, physiology, development, and evolution of fishes. Prerequisite: Z 201, 202, 203. Two lectures; 1 three-hour laboratory period. Not offered 1948-49.

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.
Readings and reports on special topics.
- Z 407. **Seminar.** 1 hour each term.
- Z 410. **Zoological Literature.** (G) 1 hour fall.
Use of zoological literature; character of zoological journals and reference works. Prerequisite: one year of upper-division zoology. Associate Professor Dornfeld.
- Z 411. **Principles of Zoology.** (g) 3 hours fall.
Intensive survey of basic principles of zoology. Prerequisite: upper-division or graduate standing and consent of instructor. Two lectures; 2 two-hour laboratory periods. Associate Professor Dornfeld.
- Z 413. **History of Zoology.** (G) 3 hours winter.
Rise and development of zoological theories and laws. Prerequisite: one year of upper-division zoology. Assistant Professor Hillemann.
- Z 431, 432, 433. **Problems in Physiology.** (G) 3 hours each term.
Detailed study of special physiological problems. Prerequisite: general zoology, general chemistry and physiology, or consent of instructor. Two lectures; 1 three-hour laboratory period. Professor Wulzen.
- Z 434. **Endocrinology.** (G) 3 hours fall.
Functions of the glands of internal secretion. Prerequisite: physiology, organic chemistry.
- Z 451, 452. **Invertebrate Zoology.** (G) 4 hours each term, fall and winter.
The structure, classification, distribution, and life histories of the invertebrates. Two lectures; 2 three-hour laboratory periods. Prerequisite: two years of zoology. Associate Professor Pratt.
- Z 456. **Parasites of Man.** (G) 4 hours spring.
Identification, bionomics, prophylaxis, treatment and geographic distribution of the parasites of man. Prerequisite: two years of biology. Two lectures; 2 three-hour laboratory periods. Associate Professor Pratt.
- Z 461. **Comparative Vertebrate Histology.** (G) 5 hours fall.
Comparative microscopic study of tissues and organs, with special attention to their evolutionary relationships and functional adaptations. Prerequisite: Z 324, 325, 326. Three lectures; 3 two-hour laboratory periods. Associate Professor Dornfeld.
- Z 462. **Microtechnique.** (G) 4 hours winter.
Principles and practice in methods of preparing histological, embryological and cytological specimens for microscopic study. Prerequisite: two years of biology. One lecture; 3 three-hour laboratory periods. Associate Professor Dornfeld.
- Z 463. **Experimental Embryology.** (G) 4 hours spring.
Mechanics of cleavage and gastrulation; inductors and organizers; gradient fields; integration; regeneration; genic action. Prerequisite: Z 324, 325, 326. Three lectures; 1 three-hour laboratory period. Associate Professor Dornfeld.
- Z 473. **Herpetology.** (G) 3 hours spring.
Classification, distribution, and habits of amphibia and reptiles. Prerequisite: Two years of zoology and consent of instructor. Two lectures; 1 three-hour laboratory period. Professor Gordon.

Z 475. Wildlife Photography. (G) 3 hours winter.

Fields, methods, and applications of wildlife photography. Not concerned with photography proper, such as picture taking, developing, printing, enlarging. Prerequisite: one year of upper-division biology and consent of instructor. Two lectures; 1 three-hour laboratory period. Professor Gordon.

Z 483. Animal Ecology. (G) 3 hours spring.

Living animals in relation to their environment. Prerequisite: two years of biology, or consent of instructor. Two lectures; 1 three-hour laboratory period. Professor 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.**

Methods used in field work; intensive studies of limited areas. Conducted field trips of variable length as conditions require. Prerequisite: at least senior standing and consent of instructor. Professor Gordon and staff.

Z 521. Advanced Vertebrate Embryology. 4 hours fall.

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. Assistant Professor Hillemann.

Z 551. Biology of Protozoa. 3 hours fall.

Morphology, physiology, and ecology of freshwater, marine, terrestrial, and parasitic protozoa. Prerequisite: Z 451, 452. Two lectures; 1 three-hour laboratory period. Associate Professor Pratt.

Z 553. Invertebrate Embryology. 3 hours spring.

Cleavage, organogeny, and larval development of marine and fresh-water invertebrates. Prerequisite: Z 451, 452. Two lectures; 1 three-hour laboratory period. Associate Professor Pratt.

Z 558. Parasitology. 3 hours winter.

Collection, preparation, and identification of parasites; serological testing for parasitic infections; culturing of parasitic forms; systematics; evolution and phylogeny of parasitism. Prerequisite: Z 456 or equivalent. Two lectures; 1 three-hour laboratory period. Associate Professor Pratt.

Z 561, 562, 563. Biology of the Cell. 3 hours each term.

Physics and chemistry of protoplasm; chromosomes and their relation to genetics and development; cytoplasmic organoids. Prerequisite: Z 461, 462, 463. Two lectures; 3 hours laboratory. Associate Professor Dornfeld.

Z 581. Zoogeography. 3 hours fall.

Factors affecting distribution of animals; general principles; faunal areas of world and of North America. Prerequisite: Z 371, 372, and 483, or consent of instructor. Professor Gordon.

School of Agriculture

Faculty

WILLIAM ALFRED SCHOENFELD, M.B.A., Dean of the School of Agriculture.
FREDERICK EARL PRICE, B.S., Assistant Dean of Agriculture.
WILLIAM MARTIN LANGAN, B.S., Agricultural Student Personnel Adviser.
MARY HOLTHOUSE, B.S., Accountant.

Division of Agricultural Economics

ERMINA LAWRENCE POTTER, M.S., In Charge, Division of Agricultural Economics.

Agricultural Economics

PROFESSORS POTTER, DeLOACH, HOLLANDS.
ASSOCIATE PROFESSOR UPCHURCH.

Farm Management

PROFESSOR MUMFORD (department head).
ASSOCIATE PROFESSORS KUHLMAN, BLANCH.
ASSISTANT PROFESSOR HYER.

Division of Animal Industries

PHILIP MARTIN BRANDT, A.M., In Charge, Division of Animal Industries.

Animal Husbandry

PROFESSORS MCKENZIE (department head), BOGART, NELSON.
ASSOCIATE PROFESSORS OLIVER, WEIR.
ASSISTANT PROFESSOR JOHNSON.

Dairy Husbandry (including Dairy Manufacturing)

PROFESSORS BRANDT (department head), WILSTER, JONES.
ASSOCIATE PROFESSOR RICHARDSON.
ASSISTANT PROFESSOR WOLBERG.

Fish and Game Management

PROFESSOR DIMICK (department head).
ASSISTANT PROFESSOR LONG.
INSTRUCTOR KUHN.

Poultry Husbandry

PROFESSOR PARKER (department head).
ASSOCIATE PROFESSORS COONEY, BERNIER.
ASSISTANT PROFESSOR HARPER.

Veterinary Medicine

PROFESSORS SHAW (department head), DICKINSON.
ASSOCIATE PROFESSOR SCHNAUTZ.
ASSISTANT PROFESSOR CHAPMAN.
INSTRUCTOR BARTO.

Division of Plant Industries

WILLIAM ALFRED SCHOENFELD, M.B.A., In Charge, Division of Plant Industries.

Farm Crops

PROFESSORS HILL (department head), FORE.
ASSOCIATE PROFESSORS FINNELL, HENDERSON.
ASSISTANT PROFESSORS KANIPE, FOOTE.
INSTRUCTOR SCHUDEL.

Food Technology

PROFESSOR WIEGAND (department head).
ASSOCIATE PROFESSOR ONSDORFF.
ASSISTANT PROFESSORS LITWILLER, WORTHINGTON, NIVEN.
INSTRUCTORS KING, FILZ.

Horticulture

PROFESSORS HARTMAN (department head), DURUZ, BOUQUET.
ASSOCIATE PROFESSORS WADSWORTH, ZIELINSKI.

Soils

PROFESSORS POWERS (department head), RUZEK, STEPHENSON.
ASSOCIATE PROFESSOR TORGERSON*, MARSH.
INSTRUCTOR DANNEN.

*Agricultural Education, Engineering, and Extension Methods**Agricultural Education*

PROFESSOR GIBSON (department head).

Agricultural Engineering

PROFESSORS RODGERS (department head), GILMORE,* SINNARD.
ASSOCIATE PROFESSORS LUNDE, CROPSEY.
ASSISTANT PROFESSORS GRIEBELER, KIRK, WOLFE.
INSTRUCTOR LONG.

Extension Methods

PROFESSORS TEUTSCH, BALLARD.

* On leave of absence.

General Statement

UNDERGRADUATE curricula offered in the School of Agriculture lead to degrees of Bachelor of Science and Bachelor of Agriculture, and graduate curricula lead to degrees of Master of Science and Doctor of Philosophy. The curricula are planned to prepare young men and women to be better farmers, stockmen, dairymen, poultrymen, or fruit or truck growers; to be efficient managers of farm or orchard properties, commercial creameries, cheese plants and ice-cream factories, market-milk plants, and other business 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, as specialists in the United States Department of Agriculture or in agricultural colleges as teachers, investigators, extension specialists, county agricultural agents, 4-H club leaders, as teachers of agriculture in secondary schools, or as specialists in charge of control laboratories in manufacturing industries related to agriculture.

The curriculum in landscape construction and maintenance trains students for the practical application of landscaping principles to problems in the field, as in the management of estates, superintendency of cemeteries and parks, ornamental nursery-stock industry, teaching the practical phases of ornamental gardening, maintenance of golf courses, contracting and construction on new properties, and in other similar occupations.

The curriculum in agriculture with agricultural engineering emphasis prepares for college extension work; sales and development work with manufacturers of implements such as tractors and farm equipment; service as agricultural specialists with building materials and equipment companies; the commercial field, including the farm implement and lumber retail business; service as managers or operators of farms where the knowledge of drainage, farm structures, and machinery and power equipment is important.

In the food technology curriculum the aim is to train students in the fields of canning, preserving, fruit juice and vinegar making, carbonated-beverage manufacturing, pickling, dehydrating, and the byproducts of these industries; and for service as buyers of raw materials, salesmen, food brokers, food inspectors, food chemists, food bacteriologists, food research workers, and instructors in foods.

The curriculum in agricultural technology leads to technical work in the industries handling agricultural and related products and to specialized lines in state or Federal research and regulatory work.

The Bachelor's Degree. The degree of Bachelor of Science or Bachelor of Agriculture is granted on the completion of any of the four-year curricula, which include a total of 192 term hours of credit (see page 71). In most of the curricula the student during his first year pursues a program of basic and introductory work called the common freshman year. In some curricula a common sophomore year is provided.

The several curricula, each leading to the bachelor's degree, are outlined as follows:

GENERAL AGRICULTURE

A four-year curriculum providing liberal opportunity for students to obtain a general training in agriculture and also elect courses in liberal arts, social science and other fields.....Page 194

AGRICULTURAL ECONOMICS

A four-year curriculum—common freshman and sophomore years; differentiated junior and senior curricula in AGRICULTURAL ECONOMICS and in FARM MANAGEMENT.....Pages 194-196

ANIMAL INDUSTRIES

Four-year curricula—common freshman and sophomore years; basic junior and senior curricula, providing opportunity to major in ANIMAL HUSBANDRY, DAIRY PRODUCTION, or POULTRY HUSBANDRY, with an option in RANGE AND RANGE LIVESTOCK MANAGEMENT	Pages 196-200
A four-year curriculum in DAIRY MANUFACTURING.....	Pages 197-198
A four-year curriculum in FISH AND GAME MANAGEMENT.....	Page 199
A four-year curriculum in FISHERIES.....	Page 200

PLANT INDUSTRIES

Four-year curricula—common freshman and sophomore years; differentiated junior and senior curricula in FARM CROPS, in SOILS, and in HORTICULTURE (POMOLOGY AND VEGETABLE CROPS).....	Pages 201-205
A four-year curriculum in FOOD TECHNOLOGY.....	Page 202
A four-year curriculum in FLORICULTURE AND NURSERY MANAGEMENT	Pages 202-203
A four-year curriculum in LANDSCAPE CONSTRUCTION AND MAINTENANCE	Pages 203-204

AGRICULTURAL EDUCATION

A four-year curriculum preparing students to teach agriculture	Page 205
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AGRICULTURAL ENGINEERING

A four-year curriculum in AGRICULTURAL ENGINEERING, leading to a B.S. degree in Engineering (see pages 289-291).	
A four-year curriculum in GENERAL AGRICULTURE with AGRICULTURAL ENGINEERING emphasis leading to a B.S. degree in Agriculture	Pages 194-195

AGRICULTURAL TECHNOLOGY

A four-year curriculum combining a major in agriculture and a minor in science	Page 206
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Pretheological Major in Agriculture. In cooperation with the Conference on Relationships Between Colleges of Agriculture and Theological Seminaries, the School of Agriculture affords opportunity for students who are preparing to enter the rural "town and country" ministry to complete a major in agriculture before entering theological seminary. Such students may pursue the curriculum in General Agriculture, or any of the other curricula offered in the School of Agriculture, including in their program any specific requirements that may be made by the particular seminary that the student expects to enter after completing his undergraduate work. At least one basic course should be taken in each of the following fields: agricultural economics, economics, English literature, history and government, philosophy, speech, psychology, rural sociology, and sociology. Some of these subjects are required in the agriculture curricula; others may be chosen as electives.

Two-Year Curriculum. The School of Agriculture offers a two-year curriculum leading to a Certificate in Agriculture (see page 206). The purpose is to provide training for students who are farming or planning to engage in farming or in nontechnical phases of agriculture, who are unable to take a four-year curriculum.

Advanced Degrees. Opportunities are provided in all the departments of the School of Agriculture for graduates of the State College or other accredited colleges or universities to do graduate work leading to the degree of Master of Science. The degree of Doctor of Philosophy is offered in the Division of Agricultural Economics, the Division of Animal Industries, and the Division of Plant Industries. The requirements for advanced degrees are printed under GRADUATE SCHOOL.

Annual Canners and Frozen-Food Packers School. The annual two-week Canners and Frozen Food Packers School, established in 1921, is the only

course of its kind in the United States giving complete instruction in canning. It is designed primarily for those engaged in commercial canning, freezing, preserving, pickling, and allied industries. The registration includes owners, officers, foremen, mechanics, and all other workers in the industry as well as selling agents and representatives of allied industries. The course is usually given during the first two weeks in February.

Annual Short Course and Conference in Dairy Manufacturing. The short course and conference in dairy manufacturing is of special interest to butter makers and ice-cream makers. The annual convention of the Oregon Dairy Manufacturers Association is expected to be held during the short course. This course is usually held in February.

Facilities. The work in agriculture is centered in Agriculture Hall where are located the administrative offices of the School of Agriculture, the Agricultural Experiment Station, and the Federal Cooperative Extension Service. Agriculture Hall, constructed of brick and concrete, consists of a four-story central unit 66 by 140 feet with wings to the north and south, each 72 by 130 feet and three stories high. United States Department of Agriculture cooperative research workers also occupy offices and laboratories in this building. Other buildings of the School of Agriculture include the Agricultural Engineering Building, Agricultural Utilities Building, Dairy Building, Food Technology Building, the Greenhouses, the Stock Judging Building, the Poultry Building, the Veterinary Clinic Building, and the stables and barns. Some of the facilities of the School of Agriculture are described in detail under the divisions and departments.

Curricula for Undergraduates*

Common Freshman Year

Freshman curriculum for all students in four-year agriculture curricula except as indicated under certain curricula.

	Term hours		
	F	W	S
General Chemistry (Ch 101, 102, 103)	3	3	3
General Botany (Bot 201, 202)	3	3	3
Agricultural Resources (AEc 211)	3	or (3)	or (3)
Elements of Agronomy (FC 111)	(3)	or (3)	or 3
Introduction to Animal Husbandry (AI 121)	(3)	or (3)	or 3
Poultry Production (AI 123)	(3)	or (3)	or 3
Dairy Husbandry (AI 122)	3	or 3	or 3
Agricultural Engineering Survey (AE 111)	(3)	or 3	or 3
¹ Physical Education	1	1	1
² Military Science	2	2	2
	15	15	15

*General Hygiene (PE 150), 1 term hour, is taken one term in place of physical education.

²Students desiring to register for Naval Science instead of Military Science should consult with the Dean of Agriculture.

Common Sophomore Year*

Sophomore curriculum for all students in four-year agriculture curricula except as indicated under certain curricula.

	Term hours		
	F	W	S
English Composition (Eng 111, 112, 113)	3	3	3
¹ Organic and Agricultural Biochemistry (Ch 251) or Agricultural Statistics (AEC 221)	5	---	(3)
² General Bacteriology (Bac 204) or Stock Judging (AH 131)	(3)	3	---
³ Soil Drainage and Irrigation (Sls 213) or General Zoology (Z 113)	---	---	3-5
Soils (Sls 211, 212)	3	3	---
Principles of Economics (Ec 201, 202, 203)	3	3	3
⁴ Forage and Root Crop Production (FC 211) or Plant Propagation (Hrt 311)	(3)	3	---
Principles of Farm Management (FM 211)	---	---	3
Physical Education	1	1	1
⁵ Military Science	2	2	2
⁶ Electives	---	---	6-4
	17	18	18

Curriculum in General Agriculture

B.S. Degree

(See Common Freshman and Sophomore years, page 193 and above.)

	Term hours		
	F	W	S
Principles of Agricultural Marketing (AEC 341)	---	3	---
Animal Breeding (AI 315) or Principles of Agricultural Breeding (FC 315)	3	---	---
Principles of Economic Entomology (Ent 314)	(3)	or 3	---
Elementary Journalism (J 111)	---	3	---
Extempore Speaking (Sp 111)	3	---	---
⁷ Electives	12	9	17
	18	15	17

Senior Year

American National Government (PS 201)	3	---	---
⁷ Electives	15	15	17
	18	15	17

Curriculum in General Agriculture with Agricultural Engineering Emphasis

B.S., B.Agr. Degrees

Freshman Year

	Term hours		
	F	W	S
Abridged General Physics (Ph 211, 212)	---	3	3
Agricultural Engineering Problems (AE 101, 102, 103)	1	1	1
General Chemistry (Ch 101, 102, 103)	3	3	3
Introduction to Animal Husbandry (AI 121)	---	3	---
Elements of Agronomy (FC 111)	---	---	3
General Botany (Bot 201, 202)	3	3	---
Elements of Horticulture (Hrt 111)	3	---	---
Dairy Husbandry (AI 122)	---	---	3
Forging and Welding (IE 250)	2	---	---
⁸ Military Science	2	2	2
Physical Education	1	1	1
	15	16	16

* Students desiring to prepare themselves for technical positions or graduate study may substitute basic science courses or certain applied courses with the approval of the department head, beginning with the sophomore year.

¹Farm Management and Agricultural Economics students will take Statistics.

²Animal Husbandry students will take Stock Judging (AH 131) as sophomores and Bacteriology (Bac 204) as juniors.

³Animal, Dairy, and Poultry Husbandry students will take General Zoology (Z 113), 5 hours.

⁴Horticulture students will take Plant Propagation (Hrt 311).

⁵Students desiring to register for Naval Science instead of Military Science should consult with the Dean of Agriculture.

⁶Elementary Journalism (J 111), Extempore Speaking (Sp 111), and American National Government (PS 201) are suggested as electives.

⁷Electives leading to specific objectives are chosen in conference with the Dean of Agriculture and must include a minimum of 36 hours in agriculture, 24 of which must be in upper division.

	Term hours		
	F	W	S
Sophomore Year			
Elementary Analysis (Mth 101, 102, 103)	4	4	4
English Composition (Eng 111, 112, 113)	3	3	3
Farm Mechanics (AE 221)	3	3	---
Outlines of Economics (Ec 212)	3	---	---
Social Science	---	3	3
General Bacteriology (Bac 204)	---	---	3
Extempore Speaking (Sp 111)	3	---	---
¹ Military Science	2	2	2
Physical Education	1	1	1
	16	16	16
Junior Year			
Engineering Drawing (GE 111, 112)	2	2	---
House Planning and Architectural Drawing (AA 178)	---	---	3
Farm Motors and Tractors (AE 311)	3	---	---
Automobile Mechanics (AE 313)	---	3	---
Farm Implements (AE 231)	---	---	3
Plane Surveying (CE 226)	3	---	---
Soils (Sls 211, 212)	3	3	---
Soil Drainage and Irrigation (Sls 213)	---	---	3
Machine Shop Practices (IA 260)	---	---	2
Farm Electricity (AE 331)	---	3	---
¹ Military Science or elective	3	3	3
Electives	3	3	3
	17	17	17
Senior Year			
Elementary Hydraulics (CE 322)	---	3	---
Principles of Farm Management (FM 211)	---	---	3
Farm Buildings (AE 361)	3	---	---
Elementary Journalism (J 111)	---	3	---
Principles of Accounting (BA 211)	3	---	---
Pumps and Irrigation Equipment (AE 321)	---	---	3
Seminar (AE 407)	3	---	1
¹ Military Science or elective	3	3	3
Electives	9	9	6
	18	18	16

Curricula in Agricultural Economics

*B.S., B.Agr. Degrees**

Agricultural Economics

Farm Management

(See Common Freshman and Sophomore years, pages 193-194, taken by all students in Farm Management and Agricultural Economics.)

AGRICULTURAL ECONOMICS—AGRICULTURAL MARKETING*

	Term hours		
	F	W	S
Junior Year			
Principles of Agricultural Marketing (AEc 341)	3	---	---
Rural Sociology (Soc 364)	3	---	---
¹ Cooperative Marketing (AEc 342)	---	3	---
Principles of Accounting (BA 211, 212)	3	3	---
Cooperative Accounting (AEc 343)	---	---	3
Applied Statistics (AEc 321)	---	---	3
Economic Development of Agriculture (AEc 331)	---	---	3
Business Law (BA 411, 412)	---	3	3
Animal Nutrition I (AI 311)	---	---	4
American National Government (PS 201)	3	---	---
Extempore Speaking (Sp 111)	---	3	---
Elementary Journalism (J 111)	3	---	---
Electives	3	6	2
	18	18	18

*Students desiring to register for Naval Science instead of Military Science should consult with the Dean of Agriculture.

²For the B.S. degree students must take a total of at least 36 term hours in science or 36 term hours in social science or 45 term hours in science and social science.

³The curriculum for students majoring in the marketing of agricultural products is given in cooperation with the production departments concerned. Students may major in marketing of fruits, vegetables, dairy products, poultry, livestock, or farm crops, with the approval of the production departments concerned.

⁴AEc 342 and AEc 451 are offered in alternate years, AEc 342 in even-numbered years and AEc 451 in odd-numbered years.

Senior Year

	Term hours		
	F	W	S
Money and Banking (Ec 413)	3	—	—
Agricultural Finance (AEc 431)	—	3	—
¹ Agricultural Prices (AEc 451)	3	—	—
Agricultural Economics (AEc 411)	—	—	3
Consumption of Agricultural Products (AEc 412)	—	3	—
Current Economics Theory and Problems (Ec 475, 476, 477)	3	3	3
Agricultural Land Economics (AEc 462)	—	—	3
Electives	8	8	7
	17	17	16

FARM MANAGEMENT

Junior Year

Farm Organization (FM 312)	3	—	—
Operation Efficiency (FM 313)	—	—	3
Enterprise Costs and Profits (FM 414)	—	3	—
Principles of Agricultural Marketing (AEc 341)	3	—	—
¹ Cooperative Marketing (AEc 342)	—	3	—
Economic Development of Agriculture (AEc 331)	—	—	3
Animal Nutrition I (AI 311)	—	—	4
Farm Accounting (FM 311)	—	3	—
Sociology of Rural Life (Soc 364)	3	—	—
Geology of Oregon (G 352)	—	—	3
American National Government (PS 201)	—	—	3
Extempore Speaking (Sp 111)	—	3	—
Elementary Journalism (J 111)	3	—	—
² Electives	4	5	2
	16	17	18

Senior Year

Applied Farm Management (FM 411, 412)	3	3	—
Federal Programs and the Farmer (FM 418)	—	—	2
Types and Systems of Farming (FM 420)	—	3	—
Agricultural Appraisal (FM 425)	—	—	3
Agricultural Finance (AEc 431)	—	3	—
¹ Agricultural Prices (AEc 451)	3	—	—
Seminar (FM 407)	—	—	1
² Electives	11	8	11
	17	17	17

Curricula in Animal Industries

B.S. Degrees

Dairy Manufacturing
Dairy Production

Animal Husbandry
Poultry Husbandry

Fish and Game Management
Fisheries

(See Common Freshman and Sophomore years, pages 193-194, taken by all students in animal industries except those in dairy manufacturing, fish and game management, and fisheries. For the freshman and sophomore curriculum in dairy manufacturing see pages 197-198 and in fish and game management see page 199.)

ANIMAL HUSBANDRY

Junior Year

	Term hours		
	F	W	S
Types and Market Classes of Livestock (AH 211)	—	—	3
Animal Breeding I (AI 315)	3	—	—
Anatomy of Domestic Animals (VM 320)	3	—	—
Physiology of Domestic Animals (VM 321, 322)	—	3	3
General Bacteriology (Bac 204)	—	3	—
Farm Accounting (FM 311)	—	3	—
Animal Breeding II (AI 316)	—	3	—
Principles of Agricultural Marketing (AEc 341)	3	—	—
Business Law (BA 411)	—	—	3
American National Government (PS 201)	3	—	—
Extempore Speaking (Sp 111)	—	—	3
Electives	5	5	5
	17	17	17

¹AEc 451 offered in odd-numbered years, alternating with AEc 342 offered in even-numbered years.

²Elective courses leading to production, agricultural teaching, research, extension, or commercial careers are chosen in conference with the head of the department. Certain substitutions for required courses may be requested.

	Senior Year ¹		
	F	W	S
Animal Nutrition II (AI 411)	4	—	—
Livestock Genetics (AH 422) or Reproduction Problems (AH 423)	—	—	4 or 3
Diseases of Livestock (VM 441, 442, 443)	3	3	3
Range Livestock Management (AH 419) or Farm Livestock Management (AH 415 or 416)	—	3	(3)
Livestock Economics (AH 424)	—	—	3
Seminar (AH 407)	1	or 1	or 1
Elementary Journalism (J 111)	3	—	—
Electives	6	10	6 or 7
	17	17	17

OPTIONS

Students specializing in *range and range-livestock management* are required to take the following courses:

	Freshman Year		
	F	W	S
General Botany (Bot 203)	—	—	3
Junior Year			
Systematic Botany (Bot 313), Range and Pasture Botany (Bot 314)	4	—	3
Wildlife Management (FG 351, 352)	—	3	—
Forest Administration (F 213)	—	3	—
Principles of Plant Ecology (Bot 341)	—	—	4
Senior Year			
Public Land Policies (AEc 461)	3	—	—
Range Livestock Management (AH 419, 420)	—	3	3
Range Survey Methods (AH 333)	—	—	3
Range Improvement and Maintenance (FC 319)	—	3	—

DAIRY PRODUCTION

Junior Year			
Animal Nutrition II (AI 411)	4	—	—
Anatomy of Domestic Animals (VM 320)	3	—	—
Physiology of Domestic Animals (VM 321, 322)	—	3	3
Dairy Herd Management (DH 322)	—	3	—
Dairy Breed Types (DH 321)	—	—	3
Dairy Products Standards (DH 318)	—	—	1
Animal Breeding I (AI 315)	3	—	—
Extempore Speaking (Sp 111)	—	3	—
Elementary Journalism (J 111)	—	3	—
American National Government (PS 201)	—	—	3
Electives	6	6	7
	16	18	17

Senior Year

Principles of Agricultural Marketing (AEc 341)	3	—	—
Breeding Dairy Cattle (DH 421)	—	3	—
Dairy Cattle Feeding (DH 422)	—	—	3
Utilization of Dairy Products (DH 430)	—	—	3
Market Milk and Related Products (DH 410)	3	—	—
Seminar (DH 407)	1	1	1
Diseases of Livestock (VM 441, 442, 443)	3	3	3
Dairy Bacteriology (Bac 411)	3	—	—
Dairy Chemistry (Ch 353)	—	3	—
Electives	5	6	6
	18	16	16

DAIRY MANUFACTURING

Freshman Year

English Composition (Eng 111, 112, 113)	3	3	3
General Chemistry (Ch 101, 102, 103)	3	3	3
Dairy Husbandry (AI 122)	3	—	—
Poultry Production (AI 123)	—	—	3
Extempore Speaking (Sp 111)	—	3	—
Intermediate Algebra (Mth 100)	4	—	—
Abridged General Physics (Ph 211, 212)	—	3	3
Military Science	2	2	2
Physical Education	1	1	1
	16	15	15

¹At the graduate level major work is also offered in veterinary medicine.

	Sophomore Year		
	Term hours		
	F	W	S
Principles of Economics (Ec 201, 202, 203)	3	3	3
Organic and Agricultural Biochemistry (Ch 251)	5	---	---
Quantitative Analysis for Agricultural Students (Ch 254)	---	---	3
General Bacteriology (Bac 204)	3	---	---
Elementary Journalism (J 111)	3	---	---
Business English (Eng 217)	---	---	3
Dairy Products Standards (DH 318)	---	---	1
American National Government (PS 201)	---	3	---
Farm Motors and Tractors (AE 311)	---	3	---
¹ Military Science	2	2	2
Physical Education	1	1	1
Electives	---	6	3
	17	18	16

Junior Year			
Dairy Products Manufacturing (DH 312, 313, 314)	3	3	3
Dairy Products Laboratory Practice (DH 315, 316, 317)	2	2	2
Dairy Bacteriology (Bac 411, 412)	3	3	---
Dairy Chemistry (Ch 353)	---	3	---
Principles of Agricultural Marketing (AEc 341)	3	---	---
Dairy Breed Types (DH 321)	---	---	3
Refrigeration and Cold Storage (ME 363)	---	---	3
Principles of Accounting (BA 211, 212)	3	3	---
Electives	3	3	6
	17	17	17

Senior Year			
Market Milk and Related Products (DH 410)	3	---	---
Milk Marketing (AEc 444)	---	3	---
Utilization of Dairy Products (DH 430)	---	---	3
Dairy Technology (DH 412, 413)	---	3	3
Seminar (DH 407)	1	1	1
Dairy Cattle Feeding (DH 422)	---	---	3
Business Law (BA 411)	4	---	---
Condensed and Dry Milk Products (DH 411)	---	2	---
Electives	9	6	6
	17	15	16

POULTRY HUSBANDRY

	Junior Year		
	Term hours		
	F	W	S
Animal Nutrition II (AI 411)	4	---	---
Principles of Agricultural Marketing (AEc 341)	3	---	---
Turkey Management (PH 351)	3	---	---
Farm Buildings (AE 361)	3	---	---
Incubation (PH 321)	---	3	---
Farm Accounting (FM 311)	---	3	---
Elementary Journalism (J 111)	---	3	---
Anatomy and Physiology of the Fowl (VM 311)	---	3	---
Poultry Judging (PH 341)	2	---	---
American National Government (PS 201)	---	---	3
Diseases of Poultry (VM 351)	---	---	4
Brooding (PH 322)	---	---	3
Electives	3	5	7
	18	17	17

Senior Year			
Extempore Speaking (Sp 111)	---	3	---
Animal Breeding I (AI 315)	3	---	---
Poultry Feeding (PH 411)	4	---	---
Marketing Poultry Products (PH 421)	---	4	---
Poultry Plant Management (PH 431)	---	---	3
Poultry Breeding (PH 441)	---	---	3
Seminar (PH 407)	---	1	1
Electives	9	9	8
	16	17	15

¹Students desiring to register for Naval Science instead of Military Science should consult with the Dean of Agriculture.

FISH AND GAME MANAGEMENT

	Freshman Year			Term hours		
	F	W	S	F	W	S
English Composition (Eng 111, 112, 113)	3	3	3			
General Zoology (Z 201, 202, 203)	3	3	3			
Wildlife Conservation (FG 251, 252)	3	3	3			
Wildlife Techniques (FG 261)	3	—	3			
Dendrology (F 153)	3	—	—			
Agricultural Engineering Survey (AE 111)	—	—	3			
Introduction to Animal Husbandry (AI 121)	—	3	—			
*Military Science	2	2	2			
Physical Education	1	1	1			
	15	15	15			
Sophomore Year						
Economics and Social Sciences	3	3	3			
General Chemistry (Ch 101, 102, 103)	3	3	3			
Wildlife Management (FG 351, 352, 353)	3	3	3			
Ornithology (Z 371)	3	—	—			
Mammalogy (Z 372)	—	3	—			
Elements of Agronomy (FC 111)	—	—	3			
General Botany (Bot 201, 202, 203)	3	3	3			
*Military Science	2	2	2			
Physical Education	1	1	1			
	18	18	18			
Junior Year						
Genetics (Z 341)	—	3	—			
Extempore Speaking (Sp 111)	3	—	—			
Animal Nutrition I (AI 311)	—	—	4			
Management of Game Birds (FG 451, 452, 453)	3	3	3			
Aquatic Plants (Bot 321)	3	—	—			
Principles of Plant Ecology (Bot 341)	—	4	—			
Range and Pasture Botany (Bot 314)	—	—	3			
Anatomy of Domestic Animals (VM 320)	3	—	—			
Physiology of Domestic Animals (VM 321, 322)	—	3	3			
Introduction to Economic Entomology (Ent 314)	3	—	—			
Electives	3	3	3			
	18	16	16			
Senior Year						
Elementary Journalism (J 111)	3	—	—			
American National Government (PS 201)	—	—	3			
Management of Big Game (FG 457, 458)	—	3	3			
Management of Game Fish (FG 454, 455)	3	—	—			
Management of Fur Bearers (FG 460)	3	—	—			
Rodent Control Methods (FG 320)	—	—	3			
Animal Ecology (Z 483)	—	—	3			
Wildlife Food Crops (FC 318)	—	3	—			
Parasitic Diseases of Domestic and Game Animals (VM 361)	—	4	—			
Range and Range Livestock Management (AH 220)	3	—	—			
Seminar (FG 407)	1	1	1			
Electives	3	3	3			
	16	17	16			
Suggested Electives or Substitutes						
Rudiments of Photography (Ph 161)	—	2	—			
Food Selection and Preparation (for Men) (FN 240)	—	—	2			
Soils for Forestry Students (SIs 214)	—	—	3			
Business Law (BA 411)	3	—	—			
General Bacteriology (Bac 204, 205)	—	3	3			
Anatomy and Physiology of the Fowl (VM 311)	—	3	—			
Forest Administration (F 213)	3	—	—			
Invertebrate Zoology (Z 451, 452)	4	4	—			
Agricultural Statistics (AEc 221)	—	—	3			
Technical Report Writing (Eng 118)	—	3	—			
Public Information Methods (J 313)	—	—	3			
Geology (G 201, 202, 203)	3	3	3			
Wildlife Photography (Z 475)	—	3	—			
Range Livestock Management (AH 419, 420)	—	3	3			

*Students desiring to register for Naval Science instead of Military Science should consult with the Dean of Agriculture.

FISHERIES

Freshman Year

	Term hours		
	F	W	S
English Composition (Eng 111, 112, 113)	3	3	3
General Chemistry (Ch 101, 102, 103)	3	3	3
General Zoology (Z 201, 202, 203)	3	3	3
Wildlife Conservation (FG 251, 252)	3	3	—
Wildlife Techniques (FG 261)	—	—	3
¹ Military Science	2	2	2
Physical Education	1	1	1
	15	15	15

Sophomore Year

Elementary Algebra (Mth 10)	4	—	—
Economics and Social Science	3	3	3
Abridged General Physics (Ph 211, 212)	—	3	3
Economic Ichthyology (FG 274, 275, 276)	3	3	3
General Botany (Bot 201, 202, 203)	3	3	3
Agricultural Engineering Survey (AE 111)	—	—	3
¹ Military Science	2	2	2
Physical Education	1	1	1
	16	15	18

Junior Year

Commercial Fisheries (FG 464, 465, 466)	3	3	3
Principles of Food Preservation (FT 250)	3	—	—
Preservation of Meats and Marine Products (FT 254)	—	—	3
Elementary Journalism (J 111)	—	3	—
Anatomy of Domestic Animals (VM 320)	3	—	—
Physiology of Domestic Animals (VM 321, 322)	—	3	3
General Bacteriology (Bac 204, 205)	3	3	—
Animal Nutrition I (AI 311)	—	—	4
Extempore Speaking (Sp 111)	—	3	—
Electives	6	3	5
	18	18	18

Senior Year

Management of Game Fish (FG 454, 455, 456)	3	3	3
Invertebrate Zoology (Z 451, 452)	4	4	—
Aquatic Entomology (Ent 341)	—	—	4
Agricultural Statistics (AEc 221)	—	—	3
Aquatic Plants (Bot 321)	3	—	—
Animal Ecology (Z 483)	—	—	3
Parasitic Diseases of Domestic and Game Birds (VM 361)	—	4	—
Introduction to Business and Industry (BA 111, 112)	3	3	—
Seminar (FG 405)	1	1	1
Electives	3	3	4
	17	18	18

¹Students desiring to register for Naval Science instead of Military Science should consult with the Dean of Agriculture.

Curricula in Plant Industries

B.S. Degree

Farm Crops
Soils
Food Technology

Horticulture:
Floriculture and Nursery Management
Landscape Construction and Maintenance
Pomology and Vegetable Crops

FARM CROPS

(See Common Freshman and Sophomore Years, pages 193-194.)

	Term hours		
	F	W	S
Principles of Agricultural Breeding (FC 315)	3	—	—
Principles of Plant Pathology (Bot 351)	4	—	—
Cereal Production Lectures (FC 322)	—	3	—
Cereal Morphology (FC 323)	—	2	—
Principles of Plant Physiology (Bot 331)	—	—	4
Principles of Agricultural Marketing (AEc 341)	—	3	—
Farm Accounting (FM 311)	—	3	—
Introduction to Economic Entomology (Ent 314)	—	3	—
Extempore Speaking (Sp 111)	—	—	3
Elementary Journalism (J 111)	3	—	—
American National Government (PS 201)	3	—	—
Forage and Related Crops (FC 324)	—	—	3
Electives	3	4	6
	16	18	16

Senior Year

Seed Production (FC 414)	3	—	—
Crop Inspection (FC 411)	—	4	—
Plant Breeding (FC 415)	—	—	3
Crop Efficiency (FC 421)	—	—	3
Soil Physics Lectures (Sls 421)	3	—	—
Soil Fertility Lectures (Sls 424)	—	3	—
Animal Nutrition II (AI 411)	4	—	—
Seminar (FC 407)	1	1	1
Electives	5	9	10
	16	17	17

SOILS

Junior Year

Principles of Agricultural Breeding (FC 315)	3	—	—
Plant Propagation (Hrt 311)	—	3	—
Principles of Plant Physiology (Bot 331)	—	—	4
Animal Nutrition II (AI 411) or Fruit and Nut Production (Hrt 331)	4	—	(4)
Farm Accounting (FM 311)	—	3	—
Irrigation Farming (Sls 311)	3	—	—
Western Land and Water Laws (Sls 411)	—	3	—
Soil Conservation (Sls 413)	—	3	—
American National Government (PS 201)	—	—	3
Introduction to Economic Entomology (Ent 314)	—	3	—
Soil Bacteriology (Bac 421)	—	—	4
Climatology (Sls 319)	—	—	2
Elementary Journalism (J 111)	3	—	—
Electives	3	3	5
	16	18	18

Senior Year

Extempore Speaking (Sp 111)	3	—	—
Soils of Oregon (Sls 431)	—	2	—
Soil Survey (Sls 432)	—	—	3
Types and Systems of Farming (FM 420)	—	3	—
Soil Physics Lectures (Sls 421)	3	—	—
Soil Physics Laboratory (Sls 422)	2	—	—
Soil Fertility Lectures (Sls 424)	—	3	—
Soil Fertility Laboratory (Sls 425)	—	2	—
Soil Management (Sls 423)	—	—	5
Seminar (Sls 407)	1	1	1
Irrigation Investigations (Sls 414)	3	—	—
Electives	6	5	6
	18	16	15

FOOD TECHNOLOGY

Freshman Year

	Term hours		
	F	W	S
English Composition (Eng 111, 112, 113)	3	3	3
General Chemistry (Ch 101, 102, 103)	3	3	3
Elementary Algebra (Mth 10)	4	—	—
General Botany (Bot 201, 202)	—	3	3
Engineering Drawing (GE 111, 112, 113)	2	2	2
Elements of Horticulture (Hrt 111)	—	—	3
Industrial Psychology (Psy 215)	—	3	—
*Military Science	2	2	2
Physical Education, General Hygiene	1	1	1
	15	17	17

Sophomore Year

Principles of Food Preservation (FT 250)	3	—	—
Principles of Canning Fruits and Vegetables (FT 251)	—	3	—
Nutrition (FN 225)	—	—	3
Organic and Agricultural Biochemistry (Ch 251, 252)	5	3	—
Quantitative Analysis for Agricultural Students (Ch 254)	—	—	3
Abridged General Physics (Ph 211, 212)	—	3	3
General Bacteriology (Bac 204, 205, 206)	3	3	3
Outlines of Economics (Ec 212)	—	3	—
American National Government (PS 201)	—	—	3
Extempore Speaking (Sp 111)	3	—	—
*Military Science	2	2	2
Physical Education	1	1	1
	17	18	18

Junior Year

Food Technology (FT 321, 322)	3	3	—
Technology of Preserves and Jellies (FT 352)	—	3	—
Vegetable Crops for Processing (Hrt 343)	—	3	—
Principles of Plant Physiology (Bot 331)	—	—	4
Production (BA 311)	4	—	—
Principles of Accounting (BA 211)	3	—	—
Marketing (BA 313)	—	4	—
Refrigeration and Cold Storage (ME 363)	—	—	3
Agricultural Chemical Technology (Ch 350)	3	—	—
Electives	3	2	5
	16	15	18

Senior Year

Regulatory Control of Food Products (FT 421)	—	—	3
Food Processing Control Methods (FT 423, 424)	—	3	3
Frozen Foods (FT 412, 413)	—	3	3
Industrial Food Fermentations (FT 341)	3	—	—
Fruit Handling and Distribution (Hrt 431)	—	4	—
Latin-American Relations (PS 418)	—	3	—
International Relations (PS 417)	3	—	—
Business Law (BA 413)	—	—	3
Seminar (FT 407)	1	1	1
Electives	9	3	4
	16	17	17

HORTICULTURE: FLORICULTURE AND NURSERY MANAGEMENT

Freshman Year

	Term hours		
	F	W	S
General Botany (Bot 201, 202, 203)	3	3	3
General Chemistry (Ch 101, 102, 103)	3	3	3
English Composition (Eng 111, 112, 113)	3	3	3
Elements of Horticulture (Hrt 111)	3	—	—
General Floriculture (Hrt 151)	—	3	—
Home Ground Planning (LA 279)	—	—	3
Physical Education, General Hygiene	1	1	1
*Military Science (Men)	2	2	2
	15	15	15

*Students desiring to register for Naval Science instead of Military Science should consult with the Dean of Agriculture.

	Term hours		
	F	W	S
Sophomore Year			
Lower-Division Landscape Design (LA 290)	2	2	2
Soils (Sls 211, 212)	3	3	—
*Organic and Agricultural Biochemistry (Ch 251)	5	—	—
Outlines of Economics (Ec 212)	3	—	—
American National Government (PS 201)	—	3	—
Approved course in Social Science	—	—	3
Plant Propagation (Hrt 311)	—	3	—
Greenhouse Construction and Management (Hrt 313)	—	3	—
Flower Arrangement (Hrt 253)	—	—	3
Herbaceous Plant Materials (Hrt 355)	—	—	3
Principles of Plant Physiology (Bot 331)	—	—	4
Physical Education	1	1	1
*Military Science (Men)	2	2	2
	16	17	18

Junior Year			
*Commercial Floriculture (Hrt 351, 352, 353)	3	3	3
Plant Materials (LA 326, 327, 328)	3	3	3
Basic Horticulture (Hrt 315)	3	—	—
History and Literature of Horticulture (Hrt 317)	—	3	—
Spraying, Dusting, and Fumigation (Hrt 415)	—	—	3
Principles of Plant Pathology (Bot 351)	4	—	—
Introduction to Economic Entomology (Ent 314)	—	3	—
Principles of Agricultural Breeding (FC 315)	3	—	—
General Bacteriology (Bac 204)	—	—	3
Elementary Journalism (J 111)	—	—	3
Electives	3	3	3
	19	15	18

Senior Year			
Principles of Accounting (BA 211, 212)	3	3	—
Planting Plans (LA 392, 393, 394)	2	2	2
Flower Shop Operation (Hrt 451)	3	—	—
Handling and Distribution of Florist Crops (Hrt 453)	3	—	—
Horticultural Plant Breeding (Hrt 413)	—	—	3
Business Law (BA 413)	—	—	3
Extempore Speaking (Sp 111)	—	3	—
Effective Selling and Promotion (BA 465)	—	—	3
Electives	6	9	6
	17	17	17

HORTICULTURE: LANDSCAPE CONSTRUCTION AND MAINTENANCE

	Term hours		
	F	W	S
Freshman Year			
General Botany (Bot 201, 202, 203)	3	3	3
General Chemistry (Ch 101, 102, 103)	3	3	3
English Composition (Eng 111, 112, 113)	3	3	3
History and Literature of Landscape Architecture (LA 356, 357, 358)	2	2	2
Elements of Horticulture (Hrt 111)	3	—	—
General Floriculture (Hrt 151)	—	3	—
Home Ground Planning (LA 279)	—	—	3
Construction (AA 120)	—	—	1
Physical Education, General Hygiene	1	1	1
*Military Science (men)	2	2	2
	17	17	18

*Other science courses may be substituted for Ch 251 with the approval of the major professor.

*Students desiring to register for Naval Science instead of Military Science should consult with the Dean of Agriculture.

*Students majoring in nursery management will take Nursery Management (Hrt 361, 362, 363) instead of Commercial Floriculture.

	Term hours		
	F	W	S
Sophomore Year			
Lower-Division Architectural Design (AA 297)	1	1	—
Lower-Division Architectural Drawing (AA 178, 180)	3	—	3
Lower-Division Landscape Design (LA 290)	2	2	2
Soils (Sls 211, 212)	3	3	—
American National Government (PS 201)	—	3	—
Basic Horticulture (Hrt 315)	3	—	—
Approved courses in social science	—	3	3
Plane Surveying (CE 221, 223)	3	—	3
Plant Propagation (Hrt 311)	—	3	—
Elementary Journalism (J 111)	—	—	3
Physical Education	1	1	1
*Military Science (men)	2	2	2
	18	18	17
Junior Year			
Plant Materials (LA 326, 327, 328)	3	3	3
Intermediate Landscape Design (LA 390)	3	3	3
Maintenance and Construction (LA 359, 360, 361)	3	3	3
Biological Science Survey (GS 101)	4	—	—
Principles of Plant Physiology (Bot 331)	—	—	4
History and Literature of Horticulture (Hrt 317)	—	3	—
Electives	3	5	3
	16	17	16
Senior Year			
Planting Plans (LA 392, 393, 394)	2	2	2
Layout of Small Properties (LA 382, 383, 384)	2	2	2
Principles of Plant Pathology (Bot 351)	4	—	—
Introduction to Economic Entomology (Ent 314)	—	3	—
Photography (Ph 361)	—	3	—
Nursery Management (Hrt 361)	3	—	—
Spraying, Dusting, and Fumigation (Hrt 415)	—	—	3
Herbaceous Plant Materials (Hrt 355)	—	—	3
Lawns and Turfs (FC 313)	2	—	—
Extempore Speaking (Sp 111)	—	3	—
*Electives	3	3	6
	16	16	16

HORTICULTURE: POMOLOGY AND VEGETABLE CROPS

Junior Year			
Basic Horticulture (Hrt 315)	3	—	—
History and Literature of Horticulture (Hrt 317)	—	3	—
Fruit and Nut Production (Hrt 331)	—	—	4
Vegetable Production (Hrt 341)	—	3	—
General Floriculture (Hrt 151)	—	3	—
Principles of Plant Pathology (Bot 351)	4	—	—
Introduction to Economic Entomology (Ent 314)	—	3	—
Principles of Food Preservation (FT 250)	3	—	—
Principles of Agricultural Breeding (FC 315)	3	—	—
Home Ground Planning (LA 279)	—	—	3
Extempore Speaking (Sp 111)	—	—	3
Elements of Journalism (J 111)	—	3	—
Electives	3	3	6
	16	18	16
Senior Year			
NORM			
Spraying, Dusting, and Fumigation (Hrt 415)	—	—	3
Plant Materials (LA 326)	3	—	—
Principles of Agricultural Marketing (AEc 341)	3	—	—
Cooperative Marketing (AEc 342) or Horticultural Plant Breeding (Hrt 413)	—	—	3
Principles of Accounting (BA 211)	—	3	—
American National Government (PS 201)	—	3	—
Business Law (BA 411) or Methods of Research (Hrt 411)	—	3	—
	6	9	6

*Students desiring to register for Naval Science instead of Military Science should consult with the Dean of Agriculture.

*In this curriculum the major is composed of courses in horticulture, soils, farm crops and plant materials. The required courses listed cover the requirements of 36 term hours for a major, including 24 hours of upper-division work.

	POMOLOGY		
	Term hours		
	F	W	S
Senior Year Norm	6	9	6
Fruit Handling and Distribution (Hrt 431)	—	4	—
Systematic Pomology (Hrt 433)	4	—	—
Fruit Insects (Ent 411)	3	—	—
Fruit Diseases (Bot 453)	—	—	3
Electives	3	3	6
	16	16	15

	VEGETABLE CROPS		
	Term hours		
	F	W	S
Senior Year Norm	6	9	6
Vegetable Handling and Distribution (Hrt 441)	3	—	—
Vegetable Varieties (Hrt 443)	2	—	—
Vegetable Growing Practices (Hrt 445)	—	—	3
Field and Truck Crop Insects (Ent 413)	—	—	3
Field and Truck Crop Diseases (Bot 452)	—	3	—
Electives	5	5	3
	16	17	15

Curriculum in Agricultural Education¹

B. S. Degree²

(See Common Freshman and Sophomore Years, pages 193-194.)

	Junior Year		
	Term hours		
	F	W	S
Animal Nutrition I (AI 311) or Animal Nutrition II (AI 411)	(4)	—	4
Farm Motors and Tractors (AE 311)	—	3	—
Farm Implements (AE 231)	—	3 or (3)	—
Farm Mechanics (AE 221)	3 or (3)	3	—
Soil Fertility Lectures (Sls 424)	—	—	—
Forging and Welding (IE 152)	2 or (2)	or (2)	or (2)
Farm Organization (FM 312)	3	—	—
Farm Accounting (FM 311)	—	3	—
Enterprise Costs and Profits (FM 414)	—	3	—
Diseases of Livestock (VM 341)	4	—	—
Extempore Speaking (Sp 111)	—	—	3
Educational Psychology (Ed 312)	—	—	3
Methods and Materials (Ed 308a) (or fall term, senior year)	—	—	3
*Electives	6	3	5
	18	18	18

	Senior Year		
	Term hours		
	F	W	S
Elements of Journalism (J 111)	—	3	—
Welding Practices (IA 350)	—	1	—
Principles of Teaching (Ed 313) (or spring term, junior year)	(3) or (3)	—	—
Seed Production (FC 414)	3	—	—
Adult Education in Agriculture (AEd 418)	—	3 or (3)	—
Supervised Teaching (Ed 415)	9 or (9)	or (9)	or (9)
American National Government (PS 201)	3 or (3)	or (3)	or (3)
Agricultural Curriculum (AEd 417)	—	(3)	3
*Electives	3	8	15
	18	18	18

¹Eighty term hours are required in technical agriculture in four major fields with a minimum number of hours in each field as follows: (1) agricultural economics and farm management, 12 term hours; (2) animal industries including dairy husbandry, poultry husbandry, and livestock diseases, 22 term hours; (3) plant industries including soils, farm crops, and horticulture, 24 term hours; (4) agricultural engineering, 15 term hours. A minimum of 18 term hours in education and agricultural education including supervised teaching is required for a vocational teaching certificate.

²For B.S. degree, 36 hours of science or 36 hours of social science or 45 hours of science and social science are required.

³A portion of the student's electives, chosen in consultation with the department head, should be used to meet any individual needs or interests or to remove deficiencies he may have in any one or more of the four named major fields of agriculture. Electives in education and general electives will be recommended in conference with the individual student. Students who have had vocational (Smith-Hughes) agriculture in high school may have greater freedom of choice in electives, and on the approval of the Dean of Agriculture, may be excused from certain introductory courses in agriculture ordinarily required in order to take advanced and additional work in the various departments.

Curriculum in Agricultural Technology

B.S. Degree

	Term hours		
	F	W	S
Freshman Year			
English Composition (Eng 111, 112, 113)	3	3	3
General Chemistry (Ch 101, 102, 103)	3	3	3
General Zoology (Z 201, 202, 203) or General Botany (Bot 201, 202, 203) ..	3	3	3
Elementary Analysis (Mth 101, 102, 103) or Lower-division agriculture courses	4	4	4
¹ Physical Education	1	1	1
Military Science	2	2	2
	16	16	16
Sophomore Year			
Principles of Economics (Ec 201, 202, 203)	3	3	3
Principles of Agricultural Breeding (FC 315) or Animal Breeding I (AI 315)	(3)	or 3	---
General Bacteriology (Bac 204)	3	3	---
Lower-division Science sequence (see Group Courses)	3	3-5	3-8
Agriculture electives from courses numbered 211 to 299	4	4-6	4-9
Military Science	1	1	1
Physical Education	2	2	2
Electives	6	---	---
	16	17	17
Junior and Senior Years			
Extempore Speaking (Sp 111)	3	---	---
Elementary Journalism (J 111)	---	3	---
American National Government (PS 201)	3	---	---
⁴ Electives	24	27	30
	30	30	30

Two-Year Curriculum in Agriculture

Certificate in Agriculture

	Term hours		
	F	W	S
First Year			
² Science	3	3	3
Elements of Agronomy (FC 111)	3	---	---
Elements of Horticulture (Hrt 111)	---	---	3
Introduction to Animal Husbandry (AI 121)	3	---	---
³ Introduction to Poultry Husbandry (AI 123)	---	3	---
Dairy Husbandry (AI 122)	---	3	---
Agricultural Engineering (AE 111)	3	---	---
Military Science	2	2	2
¹ Physical Education	1	1	1
Electives	---	3	6
	15	15	15
Second Year			
Principles of Farm Management (FM 211)	---	---	3
Soils Improvement (Sls 215)	2	---	---
Farm Accounting (FM 311)	---	3	---
Plant Propagation (Hrt 311)	---	3	---
Forage and Root Crop Production (FC 211)	---	---	3
Diseases of Livestock (VM 341)	4	---	---
Farm Structures (AE 461) or House Planning and Architectural Drawing (AA 178)	3	---	---
American National Government (PS 201)	---	3	---
Public Speaking	---	---	3
Military Science	2	2	2
Physical Education	1	1	1
Electives	3	3	5
	17	15	17

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

²Not less than 24 term hours of upper-division courses in agriculture including 3 hours of Seminar.

³Courses in the basic sciences may be selected from the following: Biological Science Survey, Physical Science Survey, Chemistry, Botany, Zoology, Entomology.

⁴Students especially interested in plant industries or some other phase of agriculture that does not require all three courses in animal industries may make a substitution.

Division of Agricultural Economics

OFFICES of the Division of Agricultural Economics are located in the Dairy Building. This division deals with the business, financial, and managerial phases of agriculture and agricultural business. The Department of Farm Management deals largely with the individual farm. The Department of Agricultural Economics deals with the broader economic phases of agriculture. No sharp line of distinction is drawn, however, between farm management and agricultural economics. Every effort is made, moreover, to coordinate the work in agricultural economics and farm management with that of the Plant Industries and Animal Industries divisions:

Agricultural Economics—Agricultural Marketing

THE Department of Agricultural Economics, including Agricultural Marketing, aims primarily to meet the needs of students interested in the business side of agriculture and its broader economic relationships, together with sufficient work in agricultural science and technique to give the student a scientific concept of the industry.

The increasing economic, financial, and marketing problems accompanying the growth of agriculture into a vast commercial industry are opening up attractive opportunities to well-trained students in agricultural economics. The curriculum (pages 195-196) not only affords excellent preparation for those who intend to farm and assume positions of business, educational, and community leadership, but also gives the basic training needed for professional careers as teachers, research workers, and extension specialists. It lays a foundation for a business career in connection with farmers' buying and selling associations, real-estate and farm-mortgage companies, banks, brokerage, jobbing, wholesale and retail houses, and expert business service for the agricultural field. It gives valuable training for positions in county agricultural extension work, both professional and commercial; chamber of commerce work; or professional work as adviser to business houses or railway companies where aggressive qualities of leadership and an intimate knowledge of town and country relations are required.

In order that the student may have ample opportunity to acquire the broad and liberal training requisite for entry into many of these occupations, ample electives are provided for in the junior and senior years.

The practical character of the instruction in agricultural economics is enhanced by the extension and research activities conducted by this department. Through the Agricultural Experiment Station investigations dealing with (a) rural taxation, (b) marketing, (c) transportation, and (d) economic trends and the market situation and outlook for Oregon's leading agricultural commodities are being conducted.

Through the Extension Service, market news and agricultural situation and outlook materials are disseminated to farmers and others. Special attention is given also to the marketing, processing, and handling of agricultural commodities through both cooperative and private agencies. The department has leased-wire connections with the leading markets of the country, through which daily and even hourly market reports are received.

All of the work in agricultural economics is very closely coordinated with the work in agricultural production in the various other departments of the State College.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

AEc 211. Agricultural Resources. 3 hours fall or winter.

Agricultural resources of the world, the United States, and Oregon; a broad survey of agriculture, including soil, climate, topography, institutions, and population and their relation to present-day problems. Two lectures; one recitation. Associate Professor Upchurch.

AEc 221. Agricultural Statistics. 3 hours spring.

Methods of analyzing, simplifying, and presenting statistical material; sources of business and agricultural statistics; study of statistical devices used in the fields of business and agriculture.

UPPER-DIVISION COURSES

AEc 321. Applied Statistics. 3 hours.

Development and use of statistical techniques; interpretation of economic statistics and statistical methods; statistical methods as research tool. Prerequisite: AEc 221. Two recitations; 1 two-hour laboratory period.

AEc 331. Economic Development of Agriculture. 3 hours spring.

History of the development of agriculture, of political economy as applied to agriculture, and of present-day agricultural problems. Prerequisite: Ec 203. Professor Potter.

AEc 341. Principles of Agricultural Marketing. 3 hours.

Marketing staple, semistaple, and perishable products; producing areas; routes; middlemen; cooperative marketing associations; costs; standardization; prices; marketing system. Prerequisite: Ec 203. Professor DeLoach.

AEc 342. Cooperative Marketing. 3 hours.

Organization, management, and operation of cooperative marketing associations; policies; membership relations; sales; public relations. Offered even-numbered years. Prerequisite: AEc 341. Professor DeLoach.

AEc 343. Cooperative Accounting. 3 hours.

Application of accounting principles to cooperative type of corporation; emphasis on accounting for pools, members' equities, allocation of reserves to comply with federal and state tax legislation. Prerequisite: BA 211, 212 or equivalent.

AEc 405. Reading and Conference. Terms and hours to be arranged.**AEc 407. Seminar.** 1 hour each term.**AEc 411. Agricultural Economics.** 3 hours spring.

Application of economic principles to agricultural problems, and particularly to agricultural policies established by state and federal agencies. Prerequisite: Ec 203.

AEc 412. Consumption of Agricultural Products. (G) 3 hours.

Principles governing demand for and consumption of Oregon's farm products as affected by nutritional needs, consumption habits, dependability, distribution, packaging, transportation, advertising, income levels, and legislation; competition with other foods and with nonfood items; industrial uses. Prerequisite: AEc 341. Professor Potter.

AEc 431. Agricultural Finance. (G) 3 hours winter.

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. Professor Potter.

AEc 444. Milk Marketing. (G) 3 hours winter.

Marketing as affected by economic and state or federal sanitary controls; state and federal milk control measures and their administration. Prerequisite: AEc 341, DH 410, or consent of instructor. Professor DeLoach.

AEc 451. Agricultural Prices. (G) 3 hours fall.

Price trends; prices of agricultural and nonagricultural products; prices in relation to production and marketing programs; agricultural situation and outlook. Offered odd-numbered years. Prerequisite: Ec 203 or 211; AEc 341. Professor DeLoach.

AEc 461. Public Land Policies. (G) 3 hours fall.

Economic, legislative, and historical background of present public-land and range problems; public-land legislation and administration; relation to land-use and nonland-use factors. Professor Potter.

AEc 462. Agricultural Land Economics. 3 hours.

Economic principles determining use of land; rent, taxation, transportation, and tenure; nature of and reasons for major land uses in United States and in Oregon. Prerequisite: Ec 203. Associate Professor Upchurch.

AEc 471. Agricultural Labor. (G) 3 hours.

Seasonality of demand; migratory labor; year-around labor; family labor; transportation; social security; bargaining and unionization. Prerequisite: AEc 341. Professor DeLoach.

GRADUATE COURSES

Courses numbered 400-499 and designated (p) or (G) may be taken for graduate credit. Courses Ec 413, 435, 440, 475, 476, 477, 510, 511, 512, 513 (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 each term.

Ec 510, 511. History of Economic Thought. 3 hours each term.

Contribution of greatest economic thinkers from earliest times to present with particular attention to schools of thought. Limited to students who have been accepted as candidates for an advanced degree in Division of Agricultural Economics.

Ec 512, 513. Economic History. 3 hours each term.

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 students who have been accepted as candidates for an advanced degree in Division of Agricultural Economics. In 1948-49 this sequence will deal with Economic History of United States.

AEc 561, 562, 563. Land Problems. 2 hours each term.

Contemporary land problems and policies with reference to distribution of major land uses, reclamation, conservation, and techniques and objectives of land planning and classification. Prerequisite: AEc 461, 462. Associate Professor Upchurch.

AEc 571, 572, 573. Marketing Problems. 2 hours each term.

Agricultural policy since World War I; distribution of national income; effects on producing groups, those engaged in marketing farm products, and consumers. Prerequisite: consent of instructor. Professor DeLoach.

Farm Management

FARM management deals with (1) the organization and operation of the farm as a business enterprise; (2) the cost of production; and (3) agricultural land appraisal. Its aim is to correlate and synchronize the various phases of production on the farm in such a way as to result in a smoothly running, efficient plant from which continuous maximum returns may be obtained. The curriculum in farm management (page 196) is designed to give the student a broad, well-rounded training in all phases of agriculture that will prepare him for successful farm operation and management, with emphasis on those studies that will best fit him for success. The work also prepares students for professional work as farm managers and supervisors, county agricultural agents, FHA farm supervisors, extension specialists, farm appraisers, soil conservationists, agricultural statisticians, bank and railroad agriculturalists, United States Department of Agriculture civil-service candidates, college instructors, and experiment-station research men.

Opportunity for graduate work leading toward the master's and doctor's degrees is well provided for in the upper-division and graduate courses offered by this department combined with the offerings of other departments appropriate for minors.

Candidates for the doctorate should be, of course, more fully qualified in advanced study in economics and related fields.

Equipment. The farm-management laboratory and seminar room is provided with drafting tables and instruments, surveying instruments, original data and record sheets, charts, and a periodical and bulletin reference library. Investigational work carried on in many different parts of the state affords the advanced student excellent opportunities for field work or thesis study.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSE

FM 211. Principles of Farm Management. 3 hours fall or spring.

Farming as a business; factors affecting success in farming such as volume of business, rates of production, labor and capital efficiency, combination of enterprises and farm layout; types of farming; farm leases; selecting and buying a farm. (Fall section for juniors and seniors only.) Two lectures; 1 two-hour laboratory period. Associate Professor Blanch.

UPPER-DIVISION COURSES

FM 311. Farm Accounting. 3 hours winter.

Inventories; financial statements; enterprise analyses; income tax reports. One lecture; 1 recitation; 1 two-hour laboratory period. Prerequisite: FM 211. Assistant Professor Davis.

FM 312. Farm Organization. 3 hours fall.

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: FM 211. Two lectures; 1 three-hour laboratory period. Associate Professor Blanch.

FM 313. Operation Efficiency. 3 hours spring.

Farm work simplification stressing economical use of labor, machinery, buildings and fencing on farms of different types and sizes. Two lectures; 1 two-hour laboratory period. Prerequisite: FM 211. Associate Professor Kuhlman.

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

FM 405. Reading and Conference. Terms and hours to be arranged.

FM 407. Seminar. 1 hour each term.

FM 411, 412. Applied Farm Management. (G) 3 hours each term.

Organization and management plan for a specific farm, applying student's knowledge of production and management. Field trips, laboratory periods, and weekly round table. Prerequisite: FM 211, 312, or equivalent. Associate Professor Kuhlman.

FM 414. Enterprise Costs and Profits. (G) 3 hours winter.

Northwest farm, livestock, and orchard enterprises; competition; causes of failure; size, capital, labor, and maintenance; production possibilities and markets; costs, prices, profits. Prerequisite: FM 211, 311, or equivalent. Associate Professor Blanch.

FM 418. Federal Programs and the Farmer. (G) 2 hours spring.

Discussion of federal and state programs (AAA, FHA, SCS, BAE, state and county committees) as they affect the operation of Oregon farms. Prerequisite: Ec 203, FM 211, or equivalent. Professor Mumford.

FM 420. Types and Systems of Farming. (G) 3 hours winter.

Problems of individual farmers in different types of farming areas of the United States in adapting their farm programs to existing physical and economic conditions; differences in labor and capital requirements; characteristic landlord-tenant agreements and problems. Prerequisite: Ec 203, FM 312 or equivalent. Associate Professor Blanch.

FM 425. Agricultural Appraisal. (G) 3 hours spring.

Field work in appraisal of farms of different types, land areas, farm enterprises; commercial and federal appraisal methods. Weekly field trips. Prerequisite: FM 414, 420; SIs 212, 213, or equivalent. Associate Professor Kuhlman.

GRADUATE COURSES

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

FM 501. Research. Terms and hours to be arranged.

FM 503. Thesis. Terms and hours to be arranged.

FM 505. Reading and Conference. Terms and hours to be arranged.

FM 507. Seminar. 1 hour each term.

FM 511. Types and Systems of Farming. Term and hours to be arranged.

Types and systems of farming in the United States. Farm capital requirements; land utilization; livestock; labor, equipment, and farm marketing factors. Prerequisite: AEc 211, 221, 341; FM 312, 414, or equivalent.

FM 512. Farm Tenure and Administration. Terms and hours to be arranged.

Forms of farm tenure and their relation to capital requirements, production and income. Prerequisite: FM 211, 312, or equivalent.

FM 514. Advanced Agricultural Appraisal. Terms and hours to be arranged.

Appraisal of farm structures, perennial plantings, reclamation district lands, range, and submarginal areas. Field work. Prerequisite: FM 418, 425, or equivalent.

FM 518. Farm Management Research Methodology. Term and hours to be arranged.

Research methods in obtaining, analyzing, and presenting farm business information; cost of production and farm business related to successful farm operation. Limited to advanced and graduate students. Prerequisite: FM 311, 312; AEc 221, or equivalent.

Division of Animal Industries

IN THE Division of Animal Industries are included the departments of Animal Husbandry, Dairy Husbandry (includes Dairy Manufacturing), Fish and Game Management, Poultry Husbandry, and Veterinary Medicine. Training for dairy manufacturing and for range and range-livestock management is also given through the curricula in this division.

The specialized producer of livestock products can no longer ignore relationship of competitive livestock industries to his own in the modern business scheme. One livestock product is easily substituted for another, and consumer demands are quick to reflect change in prices of livestock commodities.

The instruction in animal industries is arranged not only to train students in their fields of special interest, but to make them sufficiently familiar with other types of livestock production to appreciate the importance of proper adjustment of production and marketing operations to competitive conditions. Liberal opportunity is provided for fundamental training in the several phases of agricultural economics—the technique of farm management, agricultural credits, rural finance, and agricultural trade, both international and domestic. Present economic conditions in agriculture demand such training. Business involving the distribution of livestock products or the financing of livestock operations affords one of the greatest opportunities to the student of today. The intricate problems of marketing and distribution require more and more fundamental training in methods of production.

Courses in Animal Industries

BASIC and supplementary to the work of the several departments in the division, the courses in animal industries for both undergraduate and graduate students are planned from the broad point of view of animal industries as a whole or are concerned with more than one field.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

AI 121. Introduction to Animal Husbandry. 3 hours any term.

Economic importance and geographical distribution of beef cattle, horses, swine, sheep and goats; feeding, care, management, and marketing of animals and products. Three one-hour lecture-demonstration periods. Professor Bogart, Associate Professor Weir, Assistant Professor Johnson.

AI 122. Dairy Husbandry. 3 hours any term.

Economic importance and geographical distribution of dairy cattle; management practices; methods and importance of dairy manufacturing. Three one-hour lecture-discussion periods. Assistant Professor Wolberg.

AI 123. Poultry Production. 3 hours any term.

Economic importance and geographical distribution of poultry; correct management practices of farm poultry and of marketing poultry products. Two lectures; 1 two-hour laboratory period. Professor Parker, Associate Professor Cooney.

UPPER-DIVISION COURSES

AI 311. Animal Nutrition I. 4 hours spring.

Application of nutrition to the feeding of farm, game, and fur-bearing animals; functions of the various nutrients in the animal body; feeding standards and nutritive ratios; adaptability of feeds to animal functions. Primarily for students who have not had organic chemistry; not recommended for animal, dairy, or poultry husbandry majors. Professor Nelson.

AI 315. Animal Breeding I. 3 hours winter.

Principles of heredity as applied to the breeding of domestic animals and fowls. Professor Bogart.

AI 316. Animal Breeding II. 3 hours winter.

The male and female genital organs; estrus, semen; fertility and factors affecting it—nutritional, genetical, hormonal, etc.; artificial insemination. Course is designed to help the student analyze the fertility complex and exercise control over breeding efficiency through management of livestock and poultry. Professor McKenzie.

AI 411. Animal Nutrition II. (g) 4 hours fall.

Nutrition principles; requirements for growth, maintenance, reproduction and lactation; functions and metabolism of nutrients in the animal body; relation of chemical composition of feeds to their functions in the animal body. Prerequisite: Ch 251. It is recommended that animal husbandry majors take Ch 252 before taking this course. Associate Professor Weir.

GRADUATE COURSES

Course AI 411 may be taken for graduate credit. Courses in animal husbandry, dairy husbandry (includes dairy manufacturing), fish and game management, and veterinary medicine numbered 400-499 and designated (g) or (G) may be taken for graduate credit.

AI 501. Research. Terms and hours to be arranged.**AI 503. Thesis.** Terms and hours to be arranged.**AI 505. Reading and Conference.** Terms and hours to be arranged.**AI 507. Seminar.** 1 hour each term.**AI 511. Animal Nutrition.** 5 hours winter.

Nutritional research methods; energy concepts; protein metabolism; mineral and vitamin requirements; dietary deficiency disorders. Prerequisite: Ch 251, AI 411 or their equivalent. Offered in alternate years. Offered 1948-49. Professor Haag.

Animal Husbandry

CCOURSES in animal husbandry are planned to fit the student to produce the highest grade of livestock in the most economical and businesslike manner. Special attention is given to the training of students for careers in professional agriculture such as agricultural extension, Smith-Hughes teaching, livestock breeding and feeding operations, livestock artificial breeding associations, and grazing work with the federal agencies especially needing range-management technicians.

The student is thoroughly grounded in the underlying principles in order that he may successfully continue his study after leaving college; but the practical details are thoroughly treated, a special effort being made to keep him in close touch with the financial facts of the industry. Students taking animal husbandry as a specialty are expected not to devote their entire time to livestock, but on the contrary to familiarize themselves also with veterinary science, crop production, soil sciences, range management, marketing, and other phases of agriculture as well as general education subjects.

Students majoring in animal husbandry (see curriculum, pages 196-197) are given a very free range of electives so that they may fit their programs to their own particular needs. Opportunity is afforded in this department in the field of range and range-livestock management for students who wish to qualify as grazing specialists or who desire to engage in the operation of a range-livestock business.

The department is particularly well equipped to offer work for undergraduate and graduate students in livestock genetics, reproduction physiology, and animal nutrition. Thus a well-balanced program can be developed that will take into account the individual student's interests and capabilities.

The stables and barns are located in the western part of the campus. The barns and farm service buildings are arranged in groups according to their use—horse, beef-cattle, hog, and sheep barns. Located on the farm proper, close to the land that the livestock use, is the hog barn south and west of the older barn group. Five hundred acres of typical Willamette Valley hill brush land used in the sheep breeding studies provide an excellent laboratory for pasture management and commercial sheep work. Ordinary demonstration work of livestock is carried on in the stock judging pavilion. Laboratory facilities are available for training in livestock genetics, reproduction physiology including artificial insemination, animal nutrition, meats, and wool.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

AH 131. Stock Judging I. 3 hours winter.

Types of farm animals studied by score cards and comparative methods; acceptable types for market and breeding purposes; market types of feeder and fat livestock. Beef cattle, sheep, swine, and horses studied. Three two-hour laboratory periods. Professor Nelson.

AH 211. Types and Market Classes of Livestock. 3 hours spring.

Classification of all kinds of livestock, market types in particular. Prerequisite: AH 131 or equivalent. Three two-hour laboratory periods. Assistant Professor Johnson.

AH 220. Range and Range Livestock Management. 3 hours fall.

General survey of the field of range and range livestock management primarily for forestry students who do not intend to major or minor in the field. Associate Professor Weir.

UPPER-DIVISION COURSES

AH 312. Stock Judging II. 3 hours fall.

Practical judging of all kinds of livestock, with trips to fairs and stock farms. Prerequisite: at least 3 term hours in stock judging. Three two-hour laboratory periods. Assistant Professor Johnson.

- AH 317. **Breeds of Livestock.** 3 hours winter.
Breeds of sheep, swine, horses, and beef cattle; their development, breeding, types, and best uses. Prerequisite: AI 315, or equivalent. Two recitations; 1 two-hour laboratory period. Professor Bogart.
- AH 319. **Livestock Practice.** 1 hour fall.
Dipping, dehorning, hoof trimming, shearing, horse training, and other operations. (Department may limit number of students in course.) One three-hour laboratory period. Associate Professor Oliver.
- AH 320. **Livestock Practice.** 2 hours spring.
Similar to AH 319. Two three-hour laboratory periods. Associate Professor Oliver.
- AH 326. **Meats.** 3 hours any term.
Meats of all meat animals; butchering; cuts; judging meat; sanitation and inspection; abattoirs, packing house, retail markets. One lecture; 2 three-hour laboratory periods. Associate Professor Oliver.
- AH 333. **Range Survey Methods.** 3 hours spring.
Range-forage appraisal methods. Two lectures and 1 three-hour Saturday laboratory period. One-week field trip. Prerequisite: AE 111, Bot 203, or their equivalent. Not offered 1948-49.
- AH 401. **Research.** Terms and hours to be arranged.
- AH 405. **Reading and Conference.** Terms and hours to be arranged.
- AH 407. **Seminar.** 1 hour each term.
- AH 412. **Livestock Feeding.** (G) 3 hours fall.
Practices of best stockmen; investigations carried on by experiment stations. Prerequisite: AI 411. Professor Nelson.
- AH 415. **Farm Livestock Management.** (G) 3 hours winter.
Beef cattle, their feeding, care, and management for maintenance, breeding, and fattening; selection of feeder cattle; horses, especially light horses, their care, feeding, and management. Prerequisite: AI 311 or 411. Two lectures; 1 two-hour laboratory period. Assistant Professor Johnson.
- AH 416. **Farm Livestock Management.** (G) 3 hours spring.
Sheep and swine; feeding, care and management of breeding and fattening animals; management practices for control of diseases and parasites. Prerequisite: AI 311 or 411. Two lectures; 1 two-hour laboratory period. Assistant Professor Johnson.
- AH 418. **Wool and Mohair.** (G) 3 hours fall.
Commercial value; physical and chemical structure; preparation and marketing; judging; sorting; grading; scouring; manufacture. Two lectures; 1 two-hour laboratory period. Professor Nelson.
- AH 419, 420. **Range Livestock Management.** (G) 3 hours each term, winter and spring.
AH 419: a typical sheep and a typical cattle operation through the entire year's cycle of operation, with emphasis on the northern United States where winter feeding is practiced. AH 420: range management methods, tools and reasons for their use. Prerequisite: AI 311 or 411. Associate Professor Weir.

AH 422. Livestock Genetics. (G) 4 hours spring.

Inheritance of anatomical and physiological abnormalities; sex and autosomal linkage; systems of breeding in livestock production; genetic significance in inbreeding and crossbreeding; improvement through breeding; inheritance of color. Prerequisite: AI 315 or Z 341. Three lectures; 1 two-hour laboratory period. Professor Bogart.

AH 423. Reproduction Problems. (G) 3 hours spring.

Breeding efficiency of livestock; effect of nutritional, genetic, and physiological factors; care and management of young and breeding animals; artificial insemination. Prerequisite: AI 316, 411. Professor McKenzie.

AH 424. Livestock Economics. (G) 3 hours spring.

Economic and financial phases of livestock speculation; trends in production and costs; marketing and financing in livestock enterprises. Prerequisite: AI 311 or 411. Professor Potter.

GRADUATE COURSES

See *ANIMAL INDUSTRIES*, pages 212-213.

Dairy Husbandry

DAIRY cows produce about one-sixth of Oregon's gross farm income. At present about 255,000 head of dairy cows of milking age are kept on 46,000 of the state's 65,000 farms. Approximately two out of three farmers in Oregon sell some milk or cream. The importance of the industry to individual farmers varies from the sale of a small amount of byproduct from a family cow or two to more than 75 per cent of the cash farm income of counties or the entire income of a farm. The average production of butterfat per cow in Oregon is the second highest in the nation.

There are three major dairy regions in Oregon with the industry widely different in each. In the Coast counties where the cows are on pasture about eight months of the year, most of the milk produced is used for cheese. Summer dairying prevails and emphasis is placed on the productivity of pastures and the preservation of surplus pasture as silage or hay for winter feed. Very recently the milk from some Coast counties is being sold to the Portland market for fluid consumption.

In the Willamette Valley, where diversified farming prevails, with the exception of those in the more definite market milk area, the cows generally freshen in the fall and their heaviest production is in winter months. In recent years the increased demand for fluid milk in cities due to increased population and other causes and the increased use of irrigated pastures and grass ensilage is changing the condition.

In the irrigated sections of eastern and southern Oregon until very recently all the milk on the farm was separated, butterfat being sold as cream and skim milk used for production of poultry and swine. This condition is changing, and more of this milk is finding its way into wider uses in the manufacturing plants or into use as fluid milk.

Students in dairy husbandry are taught how to meet best all the problems inherent to such a diversified set of conditions. They are trained to meet these various conditions regardless of whether they engage in the production of milk or manufacture of dairy products. The curriculum in dairy production is broad with emphasis on the basic sciences, the selection, care, feeding, breeding and management of dairy cattle, and the production and marketing of dairy prod-

ucts. Special facilities have been added to the barn for intensive training in methods of artificial insemination. A student graduating in this curriculum is well qualified first to farm and then to engage in agricultural extension work, to teach vocational agriculture, to be a field man for a marketing association, or to be an expert employee of a feed manufacturer.

In the dairy-manufacturing curriculum the training is to qualify men to be successful operators, technicians, and research workers in dairy manufacturing plants, supervisors or inspectors of milk supplies, and teachers in colleges and experiment stations.

Equipment. The College maintains for instructional and experimental purposes from 125 to 150 head of purebred dairy cattle representing two major dairy breeds. The herd is free from both tuberculosis and brucellosis. The dairy barn is equipped with modern facilities and there the College effectively demonstrates the economical production of high-quality milk. Adjacent to the barn is 75 acres of irrigated pasture, extremely important in dairy-herd operations.

The department has reasonably good equipment for teaching manufacturing and processing. Rapidly developing plans for the new dairy-manufacturing laboratory building assure modern facilities in which to teach the manufacture of all dairy products, from the standpoint of both efficiency and sanitation. The student receives all his instruction under practical conditions.

The present Dairy Building, similar in outside and inside architecture to Agriculture Hall, is 54 by 141 feet, three stories high.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

DH 111, 112, 113. Dairy Products Plant Practices. 8 hours each term.

Sanitation of the dairy plant; testing dairy products; operation of steam and refrigeration plant; general plant routine and maintenance; processing milk and cream; manufacture of dairy products; preparation for State Department of Agriculture examinations for weigher and tester, pasteurizer operator, milk and cream grader, and buttermaker; reading assignments. Students participate 24 hours a week in the daily work in the dairy products laboratory under supervision. Prerequisite: consent of instructor.

UPPER-DIVISION COURSES

DH 312, 313, 314. Dairy Products Manufacturing. 3 hours each term.

Commercial manufacture of butter, cheese, casein, ice cream, dairy plant sanitation. Two lectures; 1 five-hour and 1 three-hour laboratory period. Prerequisite: AI 122. Professor Wilster.

DH 315, 316, 317. Dairy Products Laboratory Practice. 2 hours each term.

Laboratory work in the manufacture and handling of dairy products. Two four-hour laboratory periods. Professor Wilster and Mr. Glynn.

DH 318. Dairy Products Standards. 1 hour.

Critical study of butter, cheese, milk, and ice cream with score cards; discussion of defects and reasons therefor. One two-hour lecture and laboratory period. Professor Wilster.

DH 320. Herd Record Systems. 3 hours winter.

Methods of recording breeding, calving, health, identification, registration, and production for dairy herd operations; study of artificial insemination records, herd improvement association and official testing procedures. Prerequisite: AI 122. Assistant Professor Wolberg.

- DH 321. Dairy Breed Types.** 3 hours spring.
Correlation of form with milk production; gross breed characteristics; comparative judging; show ring terminology; fitting for show. Prerequisite: AH 131. Three two-hour laboratory periods.
- DH 322. Dairy Herd Management.** 3 hours winter.
Breed characteristics, adaptability, and selection; foundation animals; factors affecting growth and development; factors influencing quality and quantity of milk; records; cost of production. Prerequisite: AI 411. Professor Jones.
- DH 401. Research.** Terms and hours to be arranged.
- DH 405. Reading and Conference.** Terms and hours to be arranged.
- DH 407. Seminar.** 1 hour each term.
- DH 410. Market Milk and Related Products.** (G) 3 hours fall.
Legal requirements for producing, handling, and processing milk and related products; approved production methods; quality tests; processing operations; plant sanitation and efficiency. Prerequisite: senior standing or consent of instructor.
- DH 411. Condensed and Dry Milk Products.** (G) 2 hours winter.
Commercial manufacture of condensed and dry milk products. Prerequisite: DH 312, 313; DH 315, 316, 317. Professor Wilster.
- DH 412, 413. Dairy Technology.** (G) 3 hours, winter and spring.
Analysis of dairy products; technical control of plant operation; management; laws and regulations; plant construction; cost of manufacture. Prerequisite: Ch 254; DH 410. One lecture; 1 recitation; 1 three-hour laboratory period.
- DH 421. Breeding Dairy Cattle.** (G) 3 hours winter.
Origin and development of dairy cattle; systems of breeding; study of inherited characteristics; pedigree study and analysis; progeny tests; planning the breeding program. Prerequisite: AI 315. Professor Jones.
- DH 422. Dairy Cattle Feeding.** (G) 3 hours spring.
Feeding standards and feedstuffs for dairy cattle, calves and heifers, herd sire; feeding for milk production and reproduction; investigational technique. Prerequisite: AI 411. Professor Jones.
- DH 425. Dairy Judging.** 2 hours fall.
Judging of dairy cattle or dairy products with trips to fairs, stock farms, or manufacturing plants. Prerequisite: DH 321 or 318. Professor Wilster, Assistant Professor Wolberg.
- DH 430. Utilization of Dairy Products.** (G) 3 hours spring. (Alternate years.)
Importance of dairy products in human and animal nutrition; utilization in industry; physical properties; chemical composition. Prerequisite: senior standing and consent of instructor. Professors Wilster and Jones.

GRADUATE COURSES

See ANIMAL INDUSTRIES, pages 212-213.

Fish and Game Management

THE four-year curriculum in fish and game management, including those subjects having direct and practical application in wildlife conservation, together with basic and general studies, is designed to prepare students for any of the following and other fields of wildlife conservation: state and federal service; land-using industries; management of fish and game for estates and for game and fish clubs; private fur and game farming. A special four-year curriculum is offered for students planning to enter the fields of game and commercial fisheries.

Many of the courses are valuable to students in allied fields who wish the practical aspects of wildlife conservation, especially in its correlation with the livestock industry and with public land-use problems.

Strategically located for the study of wildlife, Oregon State College has within easy access state fish hatcheries, game farms and refuges, and fur farms. Most forms of Oregon's varied wildlife are within a few hours travel from Corvallis. Research work by the United States Fish and Wildlife Service and the Oregon State Game Commission conducted at the State College in cooperation with the Agricultural Experiment Station is of basic value to the instruction offered in this field.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

FG 251, 252. Wildlife Conservation. 3 hours each term, fall and winter.

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. Assistant Professor Long.

FG 261. Wildlife Technique. 3 hours spring.

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. Two lectures or recitations; 1 three-hour laboratory period. Assistant Professor Long.

FG 271, 272. Fur Farming. 3 hours each term, fall and winter.

Important fur-bearing mammals raised on fur farms; breeding, feeding, and sanitation; construction; marketing; judging pelts and animals; business principles. Mr. Kuhn.

FG 274, 275, 276. Economic Ichthyology. 3 hours each term.

Classification and distribution of fishes; general consideration to orders and families of fishes with special attention to those of economic and recreational importance in North America and adjacent marine areas. Prerequisite: Z 201, 202, 203. Two lectures; 1 recitation; 1 two-hour laboratory period. Professor Dimick.

UPPER-DIVISION COURSES

FG 310, 311, 312. Forest Wildlife Management. 3 hours each term.

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 320. Rodent Control Methods. 3 hours winter or spring.

Classification, life histories, and control of rodents important in human disease transmission and in destruction of agricultural crops. Mr. Kuhn.

- FG 341. Fish and Game Law Enforcement.** 2 hours winter.
National and state game laws; law enforcement and scientific methods of evidence collection, preservation, and presentation. One lecture; 1 two-hour laboratory period. Mr. Kuhn.
- FG 351, 352, 353. Wildlife Management.** 3 hours each term.
Management principles applied to important wildlife species; measurements of animal populations and productivity; special attention directed to refuge management, hunting and predatory control, food and cover improvements, and other techniques used in increasing and decreasing wild animal populations. Prerequisite: Z 203, FG 252.
- 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 451, 452, 453. Management of Game Birds.** (G) 3 hours each term.
Identification, distribution, life histories, ecology and management of important game bird species. Water fowl and related forms, fall and winter terms; upland birds, spring term. Prerequisite: Z 371, FG 353. Two lectures; 1 three-hour laboratory or field period. Assistant Professor Long.
- FG 454, 455, 456. Management of Game Fish.** (G) 3 hours each term.
Freshwater fishes of North America, with special reference to trout, salmon, and spiny-rayed fishes; biologies of important species; limnology; management in relation to dams, fishladders, diversion ditches; pollution, etc.; farm fish ponds; and hatchery methods and techniques. Two lectures, 1 recitation, and 1 two-hour laboratory period of field work. Professor Dimick.
- FG 457, 458. Management of Big Game.** (G) 3 hours each term.
Species of game mammals; habits, distribution, management under natural conditions; values; laws. Prerequisite: Z 372, FG 352. Two lectures; 1 three-hour laboratory period or field work.
- FG 460. Management of Fur Bearers.** (G) 3 hours fall.
Management in forest areas, submarginal lands, and agricultural lands. Prerequisite: Z 372, FG 352. Two lectures or recitations; 1 three-hour laboratory or field period.
- FG 464, 465, 466. Commercial Fisheries.** 3 hours each term.
Commercial fisheries; biologies of important species; values; harvesting; regulating fisheries resources. Two lectures; 1 three-hour laboratory or field trip. Professor Dimick.

GRADUATE COURSES

See ANIMAL INDUSTRIES, pages 212-213.

Poultry Husbandry

POULTRY keeping as a specialized business has developed rapidly throughout the Northwest and especially in western Oregon. Climatic conditions throughout the state are particularly adapted to successful breeding and raising of poultry. With this development has come a demand for young men trained in the various fields of the poultry industry. Besides the opportunities afforded in the actual work of poultry farming there is an increasing demand for properly qualified men for positions as government and experiment-station

workers, as field men and poultry-feed specialists with the larger feed companies, and for positions with packing houses and cooperative marketing associations.

In the major curriculum (page 198) poultry courses and elective subjects are so arranged that the student may receive training that will fit him for any of the lines of work mentioned.

Equipment. The Poultry Building contains well-equipped laboratories for incubation, judging, killing, and egg candling, in addition to modern refrigeration facilities for study of marketing problems. Different makes of incubators, including several mammoth machines, are available for student instruction as are also sets of charts, lantern slides, motion pictures, and photographs that are used to illustrate the rarer breeds of fowls, types of poultry houses and equipment. Large flocks of White Leghorns and representatives of other common breeds are kept on a plant adjacent to the Poultry Building. This plant contains modern laying houses, an eight-room stationary brooder house, a ten-room breeder house, a granary equipped with feed-mixing machinery, and much other equipment suitable for use on practical poultry farms, all of which is available for instruction and experimentation.

Another poultry farm located one mile from the main plant and comprising 60 acres is devoted to poultry breeding and rearing. A third farm of 50 acres is used exclusively for turkey investigations.

DESCRIPTION OF COURSES

UPPER-DIVISION COURSES

PH 321. Incubation. 3 hours winter.

The incubation requirements of chicken and turkey eggs. Students may work on a selected problem. Prerequisite: AI 123. One lecture; 2 two-hour laboratory periods. Associate Professor Cooney.

PH 322. Brooding. 3 hours spring.

Brooding requirements of chickens and turkey poults; types of brooding equipment. Students are assigned a brooding project. Prerequisite: PH 321. Associate Professor Cooney.

PH 331. Poultry Housing. 3 hours fall.

Poultry-house types and housing problems; field trips to neighboring poultry farms. Prerequisite: AI 123. Two lectures; 1 three-hour laboratory period.

PH 341. Poultry Judging. 2 hours winter.

Judging poultry for standard and production. Intercollegiate judging teams are chosen largely from members of this class. Prerequisite: AI 123. Two two-hour laboratory periods. Offered alternate years. Professor Parker.

PH 351. Turkey Management. 3 hours fall.

Practical details in the breeding, feeding, rearing, and marketing of turkeys. Prerequisite: AI 123. Two recitations; 1 two-hour laboratory period. Offered alternate years. Assistant Professor Harper.

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

PH 405. Reading and Conference. Terms and hours to be arranged.

PH 407. Seminar. 1 hour winter and spring terms.

PH 411. Poultry Feeding. (g) 4 hours winter.

Poultry feeds; feeding breeding stock, feeding for egg production; fattening for market; feeding appliances; compounding of rations. Prerequisite: AI 123, 411. Two recitations; 2 two-hour laboratory periods. Associate Professor Cooney.

PH 421. Marketing Poultry Products. (g) 4 hours fall.

Preparation of poultry and eggs for market. Commercial handling of poultry products. Prerequisite: AI 123. Two lectures; 2 two-hour laboratory periods. Associate Professor Bernier.

PH 431. Poultry Plant Management. (g) 3 hours.

Location, layout, and arrangement of buildings and equipment. Management practices. Visits to commercial poultry farms. Prerequisite: PH 322, 411. Two recitations; 1 two-hour laboratory period. Professor Parker.

PH 441. Poultry Breeding. (G) 3 hours spring.

Inheritance of eggs and meat production in domestic fowls. Prerequisite: AI 123, 315. Associate Professor Bernier.

GRADUATE COURSES

See *ANIMAL INDUSTRIES*, pages 212-213.

Veterinary Medicine

THE courses in veterinary medicine aim to fit the student for the successful handling of livestock. Anatomy and physiology of domestic animals familiarize the student with the 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 work in diseases is taken up from the standpoint of the livestock owner. The students learn to recognize diseases, to care for sick animals, and to prevent disease through proper methods of sanitation and management. The importance of quarantine, the different methods of control and eradication of disease, and the role of the stock owners in maintaining this work are considered. The department does not train men to enter the veterinary profession.

Equipment. This department has its offices, physiological laboratory, and lecture rooms in the Poultry-Veterinary Building. The Veterinary Clinic building is equipped for dissection, autopsies, and clinics.

DESCRIPTION OF COURSES

UPPER-DIVISION COURSES**VM 311. Anatomy and Physiology of the Fowl. 3 hours winter.**

Structure and physiology of body of fowl. Two lectures; 1 two-hour laboratory period. Professor Dickinson.

VM 320. Anatomy of Domestic Animals. 3 hours.

Foot, teeth, muscles of locomotion of horse; digestive, urinary, genital and respiratory systems; circulatory, muscular, and nervous systems. Three two-hour laboratory periods.

- VM 321, 322. **Physiology of Domestic Animals.** 3 hours each term.
Functions of the body; physiological processes of all domestic animals with emphasis on horse and cow. Prerequisite: VM 211. Two lectures; 1 two-hour laboratory period.
- VM 341. **Diseases of Livestock.** 4 hours fall.
For students specializing in the plant group. The more common diseases, with methods of prevention and control. Professor Shaw.
- VM 351. **Diseases of Poultry.** 4 hours spring.
Poultry hygiene and sanitation; nature and cause of common poultry diseases; relation of management to control of poultry diseases. Three lectures; 1 two-hour laboratory period. Prerequisite: VM 311. Professor Dickinson.
- VM 355. **Diseases of Game Birds.** 3 hours spring.
Similar to VM 351, but concerned with game birds. Two lectures; 1 two-hour laboratory period. Prerequisite: VM 311. Professor Dickinson.
- VM 361. **Parasitic Diseases of Domestic and Game Animals.** 4 hours winter.
Intensive study of common parasitic diseases of domestic animals. Two lectures; 2 two-hour laboratory periods. Professor Shaw.
- VM 441, 442, 443. **Diseases of Livestock.** (g) 3 hours each term.
Parasitic, infectious, and noninfectious diseases of domesticated animals. Prerequisite: VM 321, 322, or equivalent. Two recitations; 1 two-hour laboratory period. Professor Shaw.

GRADUATE COURSES

See ANIMAL INDUSTRIES, pages 212-213.

Division of Plant Industries

THE Division of Plant Industries deals with the nation's major agricultural resources, the soils and their crops. The research, resident instruction, and extension work in plant industries is basic to practically all phases of general and specialized agriculture. It covers the nation's water and soil resources, their mapping, use, management, storage, processing, and preservation; and the plant resources that include the major basic food, forage, and clothing commodities and the food luxuries of the world's diet.

Educational work conducted in this division is broad, covering ecological relationships, production, management, grading, preservation, manufacture, storage, transportation, and marketing of food, forage, textile, and seed crops. Cereals, fruits, nuts, vegetables, ornamental plants, and plant and soil phases of pasture, range, soil conservation, and wildlife work are given attention. Liberal opportunity is provided for students to elect courses of their own choice with the guidance of the faculty. Special curricula are developed to suit the needs of those more mature students who have a definite objective in view. Students are encouraged to undertake individual work in connection with training for special state, federal, or private positions.

Farm Crops

PROBLEMS of production, improvement, marketing, manufacture, and uses of each of the field crops produced for food, forage, textile, and special purposes are dealt with by this department. The purpose of the major curriculum (page 201) is primarily to teach students scientific, practical, and economical methods of crop production, marketing, and improvement that may be put into actual use on the farm. In addition the courses are so arranged that men may 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 with broad training for leadership along agricultural and general lines and to provide scientific training such that graduates may succeed in the professional and technical agricultural fields. Considerable flexibility in electives together with the study of original problems is encouraged in order to meet special needs of individual students.

Farm-crops graduates occupy technical, commercial, and teaching positions involving considerable responsibility and are successful in farm operation. They are in federal and state experimental and regulatory positions, some are county agents, others are in the seed and grain business, and some are in graduate study and teaching positions. The field is a large one and deals principally with well-known and staple crops that are constantly in use and in demand. Farm-crops work is closely related to six important fields: (1) the daily food supply of our human population, (2) the feed requirements of all classes of farm animals, (3) the growth of plants for textiles, (4) seed and special crops, such as drug plants, (5) plant problems of soil conservation, and (6) the range and wildlife food crops. Crops courses make practical application of scientific principles from such fields as soils, physics, chemistry, bacteriology, plant pathology, and plant physiology.

Equipment. The department has excellent recitation rooms, greenhouses, and well-equipped laboratories. The Experiment Station plots and farm fields afford superior opportunities for field study and make possible extensive collection of valuable material for class work. Federal cooperative investigations in seed testing, forage crops, fiber flax, cereals, and hops form a distinct instructional asset. A large collection of the best books, periodicals, and other publications dealing with the subject is available. Oregon State College is excellently equipped for grain and hay grading and seed-inspection work; the crop-inspection and grading work is a marked advance over anything heretofore offered; the weed research program provides the most recent information on weed control.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

FC 111. Elements of Agronomy. 3 hours any term.

Tillage and production; seed selection; identification; rotation; economics of crop production. Winter term adapted to needs of fish and game management students. Prerequisite to all farm-crops courses except FC 311, 317. One lecture; 1 recitation; 1 two-hour laboratory period.

FC 211. Forage and Root Crop Production. 3 hours fall or spring.

Economic production, rotation, storage, costs, marketing, uses, and improvement of the important forage and pasture crops and their seeds, and the root

crops. Prerequisite: FC 111. Two lectures; 1 two-hour laboratory period. Assistant Professor Foote.

UPPER-DIVISION COURSES

- FC 311. **Potato Growing.** 3 hours spring.
Production; improvement; storage; cost; marketing; distribution; uses; experimental work; varietal studies; identification, judging, and scoring. One recitation; 1 two-hour laboratory period. Professor Hill.
- FC 313. **Lawns and Turfs.** 2 hours fall.
Turf plants and seeds; seedbed preparation, seeding, fertilization, management, weed and pest control for lawns, golf courses, grass nurseries, etc. One recitation; 1 two-hour laboratory period. Professor Hill.
- FC 315. **Principles of Agricultural Breeding.** 3 hours fall.
Practical application of modern conceptions of breeding. Two lectures; 1 two-hour laboratory period. Professor Fore.
- FC 317. **Weed Eradication.** 3 hours spring.
Weed types; habits of growth; legislation; prevention, control, and eradication; noxious, persistent, perennial, and poisonous weeds of ranch and range. Prerequisite: FC 211. Two lectures; 1 two-hour laboratory period. Associate Professor Freed.
- FC 318. **Wildlife Food Crops.** 3 hours fall.
Native and introduced food, forage, and cover plants for wildlife and game refuges, breeding areas, fur and game farms; seed and plant supplies and markets. Prerequisite: FC 111. One lecture; 1 two-hour laboratory period. Mr. Schudel.
- FC 319. **Range Improvement and Maintenance.** 3 hours winter.
Reseeding, improvement, and maintenance of range, cut-over, overflow, marginal, and other grazing lands. Prerequisite: FC 211 or equivalent. Two lectures; 1 two-hour laboratory period. Mr. Schudel.
- FC 320. **Cover Crop and Soil-Erosion Prevention Plants.** 2 hours winter.
Production, development, and maintenance of plants suited to soil, dike, and bank protection, cover-cropping purposes, and building up organic control. One lecture; 1 two-hour laboratory period. Prerequisite: junior standing.
- FC 322. **Cereal Production Lectures.** 3 hours winter.
Cereals and allied grains; distribution; adaptability; ecological relationship; seed treatment; markets; manufacture and movement in commerce. Prerequisite: FC 111, Bot 202, or equivalent. Professor Fore.
- FC 323. **Cereal Morphology.** 2 hours winter.
Morphological and taxonomic characters of common cereals; identification; seed structure in relation to cereal manufacturing processes. Two two-hour laboratory or field periods. Mr. Schudel.
- FC 324. **Forage and Related Crops.** 3 hours spring.
Pasture management in humid areas and with irrigation; hay making, storage, transportation, and marketing; use and cost of forage crops. Prerequisite: FC 211. Two lectures; 1 two-hour laboratory period. Professor Hill.
- FC 327. **Specialty Crops.** 3 hours winter.
Production, harvest, storage, distribution, marketing, and costs of hops, pyrethrum, drug, oil, related plants. Prerequisite: Bot 203 or equivalent. Two lectures; 1 two-hour laboratory period.

- 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.
- FC 411. **Crop Inspection.** (G) 4 hours winter.
Inspection, grading, and valuation of cereals, hay, forage, potatoes, beans, seeds, stock feeds, etc. Prerequisite: FC 111, 211, 322, 323; Ch 251; or equivalents. Two lectures; 2 two-hour laboratory periods. Professor Hill.
- FC 414. **Seed Production.** (G) 3 hours fall.
Production, distribution, and use of seed crops; inspection, certification, and legislation. Prerequisite: FC 111, 211, 322, 323. Professor Hill.
- FC 415. **Plant Breeding.** (G) 3 hours spring.
Practical application of genetics to improvement of field and horticultural plants. Prerequisite: senior standing and consent of instructor. Two lectures; 1 two-hour laboratory period. Professor Fore.
- FC 416. **Field-Plot Technique.** (G) 3 hours spring.
Methods, theory, and technique of plot experiments and demonstrations with plants. Prerequisite: senior standing, consent of instructor. Two lectures; 1 two-hour laboratory period. Professor Fore.
- FC 417. **Plant Genetics.** (G) 3 hours winter.
The theory and technique of plant-inheritance studies. Prerequisite: FC 111, 211; Bot 202, 331; FC 315; or equivalents. Two lectures; 1 two-hour laboratory period. Professor Fore.
- FC 418. **Economic Plant Adaptation.** 3 hours spring.
Relation of environment for strains, varieties, and species to production conditions. Prerequisite: FC 111, 211, 322, or 324; Bot 202, 331, 341; or equivalents. Two lectures; 1 two-hour laboratory period.
- FC 421. **Crop Efficiency.** (G) 3 hours spring.
Production, conditioning, storage, and marketing of farm crops; specialization; warehousing; grades and standards; export and import regulations; byproducts. Prerequisite: FC 322, 323, 414, or equivalents. Professor Hill.

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.

Food Technology

TRAINING covers the broad field of food technology and food manufacture. Work is required in biological sciences, chemistry, physics, mathematics, and engineering, to equip the student to enter such food manufacturing and research fields as commercial canning of fruits, vegetables, fish, and meat; commercial freezing of foods; dehydration of foods; commercial fruit and vegetable juice and carbonated beverage manufacture; industrial fermenta-

tion and many other manufacturing fields. Students are also trained for positions as food buyers, brokers, food inspectors, and instructors in food technology.

The teaching and laboratory work deal with the underlying scientific fundamentals of food and food manufacturing. Practical processes involved in the manufacture of food products are studied. Students are given a thorough knowledge of preserving, manufacturing, grading, packaging, standardizing, and analyzing foods.

Special instruction is offered covering the preservation and utilization of fish and other marine products. These courses are designed particularly to assist students majoring in fish and game management.

Instruction includes lectures, demonstrations, laboratory exercises, pilot-plant operations, and visits to food manufacturing establishments to study commercial applications. The problems involved in the designing and establishment of the new processing plant are given considerable emphasis. Opportunity is afforded students who wish to do research on problems in food technology.

Food research is given considerable emphasis especially to the graduate student who may wish to enter a private or public laboratory to carry on control and research in food manufacturing.

Short Courses. A short course held annually in early February for commercial operators and those interested in the fields of canning and freezing foods gives the regular student an opportunity to become acquainted with men who rank high in food-preservation industries. Representatives of these and associated industries contribute discussions and materials.

Equipment. The Food Technology Building is equipped for the study, research, and manufacture of all food products such as canned foods, beverages, preserves, jams, jellies, condiments, sirups, vegetable oils, and byproducts of agricultural crops. The laboratories have complete equipment for commercial canning, freezing, and dehydration of foods, preparation of fruit juices and the products of industrial fermentations, and manufacture of carbonated beverages.

The scientific laboratories are equipped with all necessary instruments to make complete analysis of food and food products. Specialized instruments for vitamin determination, food heating, and sterilization by ultraviolet light are available.

Seafoods Laboratory. The seafoods research branch of the department, located in Astoria, one of the centers of the fishing industry for the state, has been designed to study the various problems in the preservation of marine food products. Studies conducted include freezing and canning, with considerable emphasis on the high vitamin oils. New marine products are being developed. This additional facility affords opportunity for the graduate student to become better acquainted with all food processing methods.

The building that houses the laboratory is approximately 50 by 80 feet, is constructed of tile and concrete, and has complete freezing and canning facilities and a well equipped chemical laboratory. A testing laboratory where products may be examined is well lighted and provided with all necessary equipment for the work. Opportunity is also given the undergraduate student to study fish preservation methods at this laboratory. A complete apartment in the building provides necessary living accommodations for students who wish to spend some time at the laboratory.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

FT 250. Principles of Food Preservation. 3 hours fall.

Fundamental physical and chemical principles governing food preservation by freezing, canning, drying, concentrating, salting, smoking, fermenting, carbonating. Two lectures; 1 three-hour laboratory period. Associate Professor Onsdorff, Assistant Professor Litwiller.

FT 251. Principles of Canning Fruits and Vegetables. 3 hours winter.

Varieties; grading; preparation; exhausting methods; sealing; cooking; retorting; cooling; storage. Field trips permitting study of actual operating conditions in canning plants. Prerequisite: FT 250. Two lectures; 1 three-hour laboratory period. Associate Professor Onsdorff.

FT 254. Preservation of Meats and Marine Products. 3 hours spring.

Fundamental principles, thermal death points; effect of acidity, vacuum, can fill, grading, seaming, retorting, storage, corrosion. Prerequisite: FT 250, Bac 204. Two lectures; 1 three-hour laboratory period. Associate Professor Onsdorff.

UPPER-DIVISION COURSES

FT 311. Food Processing Plant and Equipment. 3 hours spring.

Location, construction; equipment; operation; designing plants and estimating costs; machinery; field trips to processing plants. Two lectures; 1 three-hour laboratory period. Associate Professor Onsdorff.

FT 321, 322. Food Technology. 3 hours each term.

Commercial manufacture of all important food products, including spices, condiments, flavoring extracts, sirups, leavening agents, flesh foods. Prerequisite: Ch 251, 252, Bac 206. Two lectures; 1 recitation period. Assistant Professor Litwiller.

FT 331. Dehydration of Food Products. 3 hours fall.

Actual drying of foods; types of dehydrators and principles of dehydration; physical and chemical study of dehydrated products. Two lectures; 1 three-hour laboratory period. Professor Wiegand, Assistant Professor Litwiller.

FT 341. Industrial Food Fermentations. 3 hours fall.

Principles and practices of commercial food fermentations; methods involving pickling, brining, and others; adaptation of yeasts, molds, and bacteria to the production of food of this type. Prerequisite: Ch 252, Bac 206. Two lectures; 1 three-hour laboratory period. Associate Professor Onsdorff, Assistant Professor Litwiller.

FT 351. Technology of Beverages. 3 hours fall.

Fruit and vegetable juices and carbonated beverages involving filtration, sterilization, carbonation, and bottling. Prerequisite: Bac 206, Ch 252. Two lectures; 1 three-hour laboratory period. Professor Wiegand, Assistant Professor Litwiller.

FT 352. Technology of Preserves and Jellies. 3 hours winter.

Manufacture of jellies, preserves, marmalades, conserves, maraschino cherries, glazed and candied fruits; testing yield, sugar, acidity, and pectin contents. Prerequisite: Ch 252, Bac 206. Two lectures; 1 three-hour laboratory period. Assistant Professor Litwiller.

FT 371. Inspection of Processed Food. 3 hours.

Techniques of federal and state inspection and quality grading of processed foods; practical examination and quality grading of canned, frozen, and dehydrated food products. One lecture; 2 two-hour laboratory periods. Associate Professor Onsdorff, Assistant Professor Litwiller.

- FT 401. Research. Terms and hours to be arranged.
- FT 403. Thesis. Terms and hours to be arranged.
- FT 405. Reading and Conference. Terms and hours to be arranged.
- FT 407. Seminar. Terms and hours to be arranged.
- FT 412, 413. Frozen Foods. (G) 3 hours winter and spring.
Chemical and physical changes involved in preparation, freezing, and storage of foods, with special attention to modern methods of packing, handling, and distributing. Prerequisite: Ch 252, Bac 206, or equivalents. Two lectures; 1 three-hour laboratory period. Professor Wiegand, Associate Professor Onsdorff.
- FT 421. Regulatory Control of Food Products. (g) 3 hours winter.
Laws and regulations dealing with quality control of food products, with emphasis on labeling, adulteration, and sanitary aspects of production and distribution. Prerequisite: senior standing. Assistant Professor Litwiller.
- FT 423, 424. Food Processing Control Methods. (g) 3 hours each term.
Methods of systematic examination of food products with practice in laboratory techniques of food analysis for quality control. One lecture; 2 three-hour laboratory periods. Prerequisite: Ch 252, 254, 350, 351; Bac 206. Assistant Professor Litwiller.

GRADUATE COURSES

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

- FT 501. Research. Terms and hours to be arranged.
- FT 503. Thesis. Terms and hours to be arranged.
- FT 505. Reading and Conference. Terms and hours to be arranged.
- FT 507. Seminar. Terms and hours to be arranged.
- FT 511. Food Industries Research Methods. 2 hours.
Designed to acquaint student with the scope and scientific methods used by the food industries in research and development. Assistant Professor Worthington.

Horticulture

THE Department of Horticulture offers major work in pomology, vegetable crops, floriculture, nursery management, and landscape construction and maintenance. These courses of study represent the major phases of Oregon's extensive and highly diversified horticultural industry and afford students a wide choice as to vocations and careers in horticultural and related fields.

The curricula offered in pomology and vegetable crops cover the broad and general fields of fruit, nut, and vegetable growing, distribution and marketing. They aim to prepare students both for fruit and vegetable farming and for technical and executive positions. Adjustments of the 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.

The curricula in floriculture and nursery management provide intensive instruction in the scientific and applied phases of these professional fields and offer a fairly wide range of subjects intended to provide a liberal or cultural

background. They aim to prepare students for participation in the various branches of the florist and nursery business and for positions as teachers, research workers, and technicians.

The curriculum in landscape construction and maintenance lays the foundation for professional careers in the laying out, planting, care, and supervision of country and municipal homes, parks, playground areas, and highway landscape developments. Emphasis is laid on the practical application of landscape knowledge and on the fundamentals of ornamental plant culture.

Students interested in advanced study may undertake graduate work in any of the branches enumerated. Graduate students are given wide latitude in their choice of courses and may elect freely from the broad curriculum of the College as a whole.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

- Hrt 111. Elements of Horticulture.** 3 hours fall, winter, or spring.
A beginning course in the general field of horticulture. Application of principles underlying the culture and utilization of fruits, nuts, vegetables, and ornamental plants. Prerequisites to all horticultural courses except Hrt 253 and 411. One lecture; 1 recitation; 1 two-hour laboratory period.
- Hrt 151. General Floriculture.** 3 hours winter.
To acquaint the student with the field of floriculture, its development, its branches and opportunities it offers as a vocation. Two lectures; 1 two-hour laboratory period.
- Hrt 253. Flower Arrangement.** 3 hours spring.
Basic principles of flower arrangement as applied to florist work. Two lectures; 1 two-hour laboratory period.

UPPER-DIVISION COURSES

- Hrt 311. Plant Propagation.** 3 hours winter.
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. One lecture; 2 two-hour laboratory periods.
- Hrt 313. Greenhouse Construction and Management.** 3 hours winter.
Details of planning, layout, construction, and heating of modern greenhouses; factors involved in the efficient operation of a greenhouse range. Two lectures; 1 two-hour laboratory period.
- Hrt 315. Basic Horticulture.** 3 hours fall.
Continuation of Hrt 111. Consideration and application of principles underlying horticultural practices and techniques. One lecture; 1 recitation; 1 two-hour laboratory period.
- Hrt 317. History and Literature of Horticulture.** 3 hours winter.
Brief history of horticulture; systematic survey of the literature of horticulture acquainting the student with the sources of horticultural knowledge. One lecture; one recitation; 1 two-hour laboratory period in the library.
- Hrt 331. Fruit and Nut Production.** 4 hours spring.
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. Two lectures; one recitation; 1 two-hour laboratory period.

Hrt 341. Vegetable Production. 3 hours fall or winter.

Problems of general vegetable production; soils, fertilizers, irrigation, seeds, plants, crop rotation; disease and insect control. Two lectures; 1 two-hour laboratory period.

Hrt 343. Vegetable Crops for Processing. 3 hours winter.

Production and handling of vegetable crops for canning, freezing, and dehydration; emphasis on vegetable crops of special importance in the Pacific Northwest. Two lectures; 1 two-hour laboratory period.

Hrt 351, 352, 353. Commercial Floriculture. 3 hours each term.

Culture of cut flowers, pot plants and forced bulbous crops grown on a commercial scale; modern techniques and recent research findings. Two lectures; 1 two-hour laboratory period.

Hrt 355. Herbaceous Plant Materials. 3 hours spring.

Annual, biennial, and perennial flowering plants; their use, arrangement, and culture in commercial and home-garden production. Two lectures; 1 two-hour laboratory period.

Hrt 361, 362, 363. Nursery Management. 3 hours each term.

Organization and management of nurseries; propagation techniques, planting, culture, digging, packing and storing of nursery stocks; inspection, quarantine regulations; transportation and marketing. One lecture; 1 recitation; 1 two-hour laboratory period.

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 411. Methods of Research. (G)** 3 hours winter.

Procedures in investigative work; experimental design; statistical methods; analysis of research problems; reasoning and weighing of experimental evidence; briefs and outlines; preparation of research manuscripts. Two lectures; 1 recitation.

Hrt 413. Horticultural Plant Breeding. 3 hours spring.

Application of principles of genetics to improvement of horticultural plants; origin of horticultural strains and varieties; breeding techniques as applied to horticultural plants. Prerequisite: FC 315. One lecture; 1 recitation; 1 two-hour laboratory period.

Hrt 415. Spraying, Dusting, and Fumigation. (g) 3 hours spring.

Insect and disease control; preparation and application of sprays, dusts, and fumigants; spray combinations and compatibility; equipment; spray calendars and programs. One recitation; 2 two-hour laboratory periods.

Hrt 431. Fruit Handling and Distribution. (G) 4 hours winter.

Problems of fruit handling; harvesting, grading, packing, inspection, storage, transportation, and marketing. Two lectures; 1 recitation; 1 two-hour laboratory period.

Hrt 433. Systematic Pomology. (G) 4 hours fall.

Fruit taxonomy; fruit groups and botanical relationships; variety description; nomenclature and classification; judging and displaying. One lecture; 1 recitation; 2 two-hour laboratory periods.

- Hrt 441. Vegetable Handling and Distribution.** (g) 3 hours fall.
Harvesting, grading, packing, inspection, transportation, storage; distribution and marketing. Two lectures; 1 two-hour laboratory period.
- Hrt 443. Vegetable Varieties.** (G) 2 hours fall.
Description, nomenclature, classification; identification of vegetable varieties and strains; displaying and judging. Two two-hour laboratory periods.
- Hrt 445. Vegetable Growing Practices.** 3 hours spring.
Practice in the commercial growing and handling of vegetable crops. Two lectures; 1 two-hour laboratory period.
- Hrt 447. Vegetable Forcing.** 3 hours spring.
Commercial vegetable growing under glass; greenhouse operations; soils and fertilization; pest control; handling. Two lectures; 1 two-hour laboratory period.
- Hrt 451. Flower Shop Operation.** 3 hours fall.
Efficient operation of florist shops; advanced work in design of floral pieces. Restricted to students majoring in floriculture and nursery management. Two lectures; 1 two-hour laboratory period.
- Hrt 453. Handling and Distribution of Florist Crops.** 3 hours fall.
Problems of precooling, packaging, storing, transporting, and distributing florist crops. Two lectures; 1 two-hour laboratory period.

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.
Special attention to application of genetic theories and fundamental principles in development of horticultural plants. Inheritance studies; mutation phenomena; polyploidy and interspecific hybridization. Prerequisite: FC 315, Hrt 413. Associate Professor Zielinski.
- Hrt 512. Horticultural Genetics Laboratory.** 2 hours.
Reports; field and laboratory problems involving hybridization, artificial induction of mutations, data analyses, readings, and genetic and cytological techniques. Prerequisite: FC 315; Hrt 413, 511. Two two-hour laboratory periods. Associate Professor Zielinski.
- Hrt 513. Horticultural Genetics Lectures.** 3 hours winter.
Continuation of Hrt 511. Associate Professor Zielinski.
- Hrt 514. Horticultural Genetics Laboratory.** 2 hours winter.
Continuation of Hrt 512. Associate Professor Zielinski.

Soils

COURSES in soils include soil physics, soil drainage, irrigation farming, soil fertility, soil surveying, soil biology, soil conservation, and soil management and utilization. The purpose of the major curriculum in soils (page 201) is to give the student thorough training in fundamentals of agriculture, making him competent to manage a farm or preparing him for state or federal service.

The wealth of Oregon rests in her soil and water resources, and their intelligent development, management, and preservation. With the further extension of reclamation, there will be a greater demand for men who have a knowledge of how most successfully and economically to use water that the engineer's canals and reservoirs provide. These men must know the best time, amount, and method of irrigation, and the effects of irrigation on soils and crops. They should also know the relations between soils, soil waters, and drainage, and understand how to locate and construct drains and how to treat or fertilize the soil so as to obtain the highest possible efficiency for each unit of tiling or fertilizer employed.

Equipment. The Department of Soils is well equipped for offering research work. The experimental fields, greenhouses, laboratories, the library, and the plans and methods used in soil, irrigation, and drainage investigations, afford valuable opportunities to graduate students.

The soils laboratories are equipped with apparatus for complete study of physical and chemical properties of soils and problems of soil management. Laboratory desks are supplied with running water, gas, compressed air, and electricity. Soil surveying and mapping outfits, soil survey charts of the United States, and a collection of samples of the chief soil types of Oregon and the United States are available. The soil-preparation room is equipped with soil-grinding and sifting machinery, and space for drying, preparation, and storage of large quantities of the different soil types used in the laboratories. For field work in drainage and irrigation, surveying instruments, tiles, and ditching tools, weirs, flumes, hook gauges, water-stage register, electric pumping plant, etc., are available. Weather-recording instruments of different kinds supply equipment for the course in climatology. Laboratories and greenhouses afford opportunity for studies of the movement and retention of irrigation water in soil, effect of irrigation on soils and crops, effect of tile drainage on soils of different types, their rate of drainage, etc. The exhibits, displayed in cases and racks, include soil-sample collections, subsoil, hardpans, soil analysis, soil colors, soil drainage, and irrigation equipment. A well-stocked reference library is available.

On the State College farm students build weirs, measure water, lay out distribution systems, make cement pipes for laterals, and test pumping machinery. On the drainage plots they measure the rate of discharge and the effect of drains and soil conditions on water table. The Experiment Station farms at Corvallis and in other parts of the state, together with the cooperative trials in different counties, afford opportunity for field study of soil problems.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

SlS 211, 212. Soils. 3 hours each term (SlS 211 fall or spring, SlS 212 winter).

Soil origin, formation, classification; soil moisture, heat, and air; effects of tillage, drainage, and irrigation; plant foods and fertilizers; rotations. Prerequisite: Ch 101, 102, 103. Two lectures; 1 three-hour laboratory period.

Sls 213. Soil Drainage and Irrigation. 3 hours spring.

Soil mapping, reclamation, and use; chain, level, and soil auger; installation of drains or irrigation systems; effect on soils and crops; cost and benefits. Two lectures; 1 three-hour laboratory period.

Sls 214. Soils for Forestry Students. 3 hours spring.

Origin, development, characteristics, and classification of forest soils; relation to vegetation, moisture reaction and fertility; soil management and conservation. Two lectures; 1 three-hour laboratory period.

Sls 215. Soils Improvement. 2 hours fall.

Soil-fertility gains and losses, maintenance, and improvement; effect of manures, fertilizers, and crop rotations on soil productiveness.

UPPER-DIVISION COURSES**Sls 311. Irrigation Farming. 3 hours fall.**

Obtaining, distributing, and conserving irrigation waters; different crops under irrigation; costs and profits; duty of water; water rights; field studies. Two lectures; 1 three-hour laboratory period. Professor Powers.

Sls 319. Climatology. 2 hours spring.

Practical meteorology; observing and recording local weather and forecasting; climate of Oregon; effect of climate on agriculture. One recitation; 1 two-hour laboratory period.

Sls 401. Research. 3 hours each term.

Soil, drainage, or irrigation work. Prerequisite: Sls 421, 424.

Sls 405. Reading and Conference. Terms and hours to be arranged.**Sls 407. Seminar. 1 hour each term.****Sls 411. Western Land and Water Laws. (g) 3 hours winter.**

Development of water laws; homestead laws, water rights, and irrigation codes in different states, particularly in Northwest; organization and administration of irrigation projects; water users associations. Professor Powers.

Sls 413. Soil Conservation. (g) 3 hours winter.

Climate, topography, and soil in relation to erosion; soil mapping; control. Preparation for soil conservation service. Two recitations; 1 three-hour laboratory period.

Sls 414. Irrigation Investigations. (G) 3 hours fall.

Irrigation literature and methods of investigation; field and laboratory studies of irrigation experiments; preparation of a thesis; field examinations of projects. One lecture; 2 three-hour laboratory periods. Professor Powers.

Sls 421. Soil Physics Lectures. (g) 3 hours fall.

Soil origin, formation, physical composition, and classification; soil moisture, surface tension; osmosis, capillarity, diffusion, aeration, temperature. Prerequisite: Sls 212. Professor Stephenson.

Sls 422. Soil Physics Laboratory. (g) 2 hours fall.

Determination and comparison of physical properties of soil types; physical effects of mulches, rotation, and cropping; sampling and judging; mechanical analysis. Two three-hour laboratory periods. Professor Stephenson.

- Sls 424. **Soil Fertility Lectures.** (g) 3 hours winter.
Composition and value of fertilizers and barnyard and green manures; maintenance and improvement of fertility; effect of the various crops and farming systems; rotations. Prerequisite: Sls 212. Professor Ruzek.
- Sls 425. **Soil Fertility Laboratory.** (g) 2 hours winter.
Laboratory work accompanying Sls 424. Two three-hour laboratory periods. Professor Ruzek.
- Sls 428. **Soil Management.** (G) 5 hours spring.
Occurrence, composition, productivity, plant-food requirements, comparative values, management of different soil types. Prerequisite: Sls 424. Two recitations; 3 three-hour laboratory periods. Professor Powers.
- Sls 431. **Soils of Oregon.** (g) 2 hours winter.
Distinguishing characteristics of the various soil types of Oregon. Prerequisite: Sls 212. Associate Professor Torgerson.
- Sls 432. **Soil Survey.** (G) 3 hours spring.
Classification of soils and soil areas; making regular and complete soil surveys; field trips report. Prerequisite: Sls 421 or 424, 431. One recitation; 2 three-hour laboratory periods. Associate Professor Torgerson.

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.** 1 hour each term.
- Sls 511. **Pedology.** 3 hours spring.
Advanced soil classification and morphology; soil-forming processes; evolution of soil profiles; distribution of United States soils. Two recitations; 1 three-hour laboratory period. Professor Powers.
- Sls 512. **Soil Colloids.** 2 hours fall.
Physical chemistry of soils with special reference to the nature and function of soil colloids, soil acidity, absorption, and base exchange. Limited to advanced and graduate students. Professor Stephenson.
- Sls 513. **Plant Nutrition.** 2 hours winter.
Soil, water, and plant relationships; external factors controllable by agricultural practices; soil solution in relation to nutrient requirements of plants. Limited to advanced and graduate students. Professor Powers.
- Sls 514. **Soil Organic Matter.** 2 hours winter.
Humification processes; properties of humus; effect on soil reaction; biological processes and nutrient-supplying power of soil; relation of humus to soil conservation and to plant growth and adaptation. Professor Stephenson.

Agricultural Education, Engineering, Extension Methods

THE departments of Agricultural Education, Agricultural Engineering, and Extension Methods are administered in close relation to the three divisions of the School of Agriculture. Preparation for professional service as agricultural educator or extension worker involves fundamental training in agricultural economics, animal industries, and plant industries, supplemented by special preparation in the particular field of professional specialization.

Agricultural Education

THE Department of Agricultural Education is responsible for the training of teachers and supervisors of agriculture in high schools and other secondary schools, teachers and supervisors of schools and classes for adult farmers and young men not enrolled in the regular day schools. Special consideration is given to the provisions of the federal laws for vocational education commonly known as the Smith-Hughes Act and the George-Barden Act. Included within the scope of this department are certain field activities including follow-up service for new teachers and involving the preparation of instructional material for use by agricultural instructors in cooperation with staff members of the School of Agriculture.

The Department of Agricultural Education is a joint department within the School of Agriculture and the School of Education.

Opportunities and Demand for Agricultural Teachers. The strong demand for teachers of vocational agriculture in Oregon, in states of the Pacific Region including Hawaii, and throughout the United States as a whole, is expected to continue for a number of years, if not indefinitely. The George-Barden Act, recently passed by Congress, approximately doubles the federal funds previously provided for vocational-agriculture education. Publications explaining the work and opportunities in teaching vocational agriculture are available on request.

Requirements for Teaching Agriculture. Teachers of agriculture need fundamental knowledge and a high level of doing ability in most of the departmental fields of the School of Agriculture. At the beginning of his college course the prospective teacher should advise with the head of the Department of Agricultural Education regarding the courses he should select in each of the fields of agriculture. Certain qualifications essential in teaching vocational agriculture should be considered by the student, in conference with the head of this department, when applying for admission to this field of teaching. Attention of students interested in teaching vocational agriculture is directed to the footnote on page 205.

Requirements in Agriculture:

- (1) Graduation from a college of agriculture of standard rank.
- (2) 80 term hours, or equivalent, of special work in agriculture are required. The student's choice of courses should depend somewhat on his previous training and experience and the recommendations of the head of the department. The suggested sequence and distribution of courses are given in the major curriculum on page 205.

Requirements in Education and for Certification:

- (1) **Course requirements in Education:** Beginning teachers of agriculture should have a minimum of 18 term hours in education in the four-year curriculum including courses in methods and materials, and supervised teaching. (See courses listed in curriculum, page 205.)
- (2) **Vocational Teaching Certificate:** The curriculum in agricultural education, page 205, or its equivalent, is designed to fulfill the requirements for the vocational teaching certificate. The State Director of Vocational Education will issue this certificate to applicant after he has determined his qualifications for teaching vocational agriculture and after he has been placed in teaching position.
- (3) It is expected that persons who have been employed to teach vocational agriculture, after receiving the vocational certificate and completing the four-year curriculum will continue systematic work in education and agriculture as needed through short summer courses and otherwise during the period of their employment in fulltime teaching. Such work may carry college credit leading to a Master's degree.

Graduate Study and Apprentice Teaching in Agricultural Education. It is expected that some returning veterans and others will wish to continue their studies beyond the four-year curriculum in agricultural education and a bachelor's degree. For such students a program of experience and graduate study leading to a master's degree will be developed to meet individual needs. A portion of such experience may be done for graduate credit in the form of apprentice teaching, whereby students of approved standing are placed in high-school centers and outstanding departments of agriculture under the general supervision of the Department of Agricultural Education and the immediate supervision of the local agriculture instructor who serves also in the capacity of supervising teacher. Apprentice teachers may be employed in some instances as part-time or even full-time teachers of vocational agriculture and may be recognized as regular teachers of vocational agriculture in two-teacher departments.

DESCRIPTION OF COURSES

UPPER-DIVISION COURSES

Ed 341. Rural Education. 3 hours winter.

Utilizing rural, social, and economic environment to vitalize high-school instruction, achieve social objectives of education, and increase farm, home, and town-country efficiencies; continuation and rural extension education. Prerequisite: upper-division standing. Professor Gibson.

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

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

AEd 405. Reading and Conference. Terms and hours to be arranged.

AEd 407. Seminar. Hours to be arranged, two terms.

Ed 408a. Methods and Materials. 3 hours any term.

Ed 415. Supervised Teaching. 3 to 9 hours any term.

(See page 275.)

AEd 417. The Agriculture Curriculum. (G) 3 hours winter or spring.

Determining course content and evaluating types of course organization with reference to the objectives to be attained in the field of agriculture in secondary schools. Prerequisite: Ed 313. Professor Gibson.

AEd 418. Adult Education in Agriculture. (G) 3 hours winter.

Developing programs for young and adult farmer groups. Students participate in recruiting, organizing, and teaching evening classes in the vicinity of Corvallis. Prerequisite: Ed 313; AEd 417. Professor Gibson.

GRADUATE COURSES

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, any term.

Enables agriculture teachers in service to continue their professional improvement; conferences, follow-up instruction, supervision, correspondence, reports. Prerequisite: Ed 311, 312, 313. Professor Gibson.

AEd 533. Rural Survey Methods. 3 hours spring.

Technique of surveys; analyzing, interpreting, and using results in evaluating and formulating programs in agricultural education; field studies. Prerequisite: Ed 311, 312, 313; teaching experience. Professor Gibson.

Agricultural Engineering

THE Department of Agricultural Engineering is a joint department within the School of Engineering and the School of Agriculture. The department offers three types of instruction: (1) a curriculum leading to a Bachelor of Science degree in Engineering (see pages 289-291), (2) a curriculum leading to a Bachelor of Science degree in Agriculture with Agricultural Engineering Emphasis (commonly referred to as the vocational option), and (3) service courses for students majoring in other departments. The vocational option is designed to train the student who is interested in farming, extension work, farm service work in rural electrification, farm implement sales, retailing of lumber and building materials in rural communities, or other work requiring a wider knowledge of agriculture with less emphasis on the technical phases of engineering. Some opportunity is given to elect non-technical courses that may be classified as general education.

The increasing importance of modern machinery and equipment in reducing the cost of production, together with the improvement of rural living conditions, demands in any branch of agriculture a more complete and effective grasp of the principles of agricultural engineering. Students majoring in other departments who recognize the need for a knowledge of farm mechanics, implements, tractor and automobile mechanics, building materials and structures, and modern home conveniences, may elect courses pertaining to these subjects.

Equipment. Facilities are provided in the Agricultural Engineering Building for teaching and experimental work in farm power, farm machinery, farm water supply and irrigation equipment, farm shop, farm building, automobile mechanics, and rural electrification. The farm motors laboratory contains several makes and types of stationary gas engines, sectionalized automobile and tractor motors, and accessories. A Prony brake for determining the power output of stationary engines is also included. Modern equipment and demonstrational material are loaned to the institution by leading manufacturers and distributors for study and operation by the students.

A well-lighted drafting room with modern equipment is available for students studying farm structures. Various samples of building materials, models and several modern farm buildings are available for observation and study.

Courses in farm construction and general farm repairs are taught in laboratories equipped for the purpose. Farm water systems, centrifugal and turbine pumps for irrigation pumping, spray pumps, and similar equipment are available for instruction purposes.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

- AE 101, 102, 103. Agricultural Engineering Problems.** 1 hour each term.
Lectures and problems dealing with the four major fields of agricultural engineering: to train the student in engineering habits of work. One lecture; 1 two-hour computation period. Professor Rodgers, Assistant Professor Wolfe.
- AE 111, 112. Agricultural Engineering Survey.** 3 hours each term.
Principles of mechanics, hydraulics, and electricity applied to farm problems; essential mathematics. Spring term especially for students in fish and game and range management. One lecture; 2 two-hour laboratory periods. Associate Professor Cropsey, Mr. Long.
- AE 115, 116, 117. Food Plant Mechanics.** 2 hours each term.
Mechanical and architectural drawing; blueprint reading; bill of materials; elementary food-plant layouts; motors; controls; wiring; power transmission. For students in food technology. One lecture; 2 two-hour laboratory periods. Assistant Professors Griebeler, Kirk.
- AE 221, 222. Farm Mechanics.** 3 hours winter, spring.
Drawing; reading blueprints; estimating materials and costs; construction of wood and metal farm appliances; equipment repairs. Prerequisite: IE 250 or equivalent. One recitation; 2 three-hour laboratory periods. Assistant Professor Kirk.
- AE 231. Farm Implements.** 3 hours spring.
Principles of construction, operation, and hitching of equipment used for seed-bed preparation, planting, fertilizing, cultivation, and harvesting machinery. Two recitations; 1 three-hour laboratory period. Professor Rodgers.

UPPER-DIVISION COURSES

- AE 311. Farm Motors and Tractors.** 3 hours any term.
Farm motors and accessories, carburetors, magnetos, ignition, governing, cooling, lubricating systems; fuels and oils; testing, timing, trouble hunting. Two recitations; 1 three-hour laboratory period. Associate Professor Lunde.
- AE 312. Automobile Mechanics.** 3 hours fall.
The automobile and its parts; their functions, adjustment and simple repairs; latest developments. Two recitations; 1 three-hour laboratory period. Associate Professor Lunde.
- AE 313. Automobile Mechanics.** 3 hours winter or spring.
Practical repairing and minor overhauling of automobiles, tractors, and trucks, with emphasis on preventive maintenance, lubrication, engine tune-up, brake adjusting, etc. Prerequisite: AE 311 or 312. One lecture; 2 three-hour laboratory periods. Associate Professor Lunde.

AE 314. Automobile Mechanics. 3 hours spring.

Engine rebuilding, advanced electrical testing, repairing and rebuilding of electrical accessories, use of precision equipment of all types commonly found in up-to-date repair shops. Prerequisite: AE 313. Two recitations; one 3-hour laboratory period. Associate Professor Lunde.

AE 321. Pumps and Irrigation Equipment. 3 hours spring.

Operation and testing of pumps, irrigation equipment, farm water systems, spray equipment. Prerequisite: AE 111 or equivalent. Two recitations; 1 three-hour laboratory period. Assistant Professor Wolfe.

AE 331. Farm Electricity. 3 hours winter.

Fundamentals of electricity, wiring, electric motors, and the use of electricity on the farm. Prerequisite: AE 111 or equivalent. Two lectures; 1 three-hour laboratory period. Associate Professor Cropsey.

AE 341. Use of Explosives. 2 hours winter.

Use of explosives in removing stumps and boulders; stump burning and charring; use in ditch and rock blasting. Taught jointly by Agricultural Engineering, Civil Engineering, and Forest Engineering departments. One recitation; 30 hours laboratory and field work arranged during term. Professors Glenn and Patterson, Associate Professor Lunde.

AE 361. Farm Buildings. 3 hours fall.

Building materials, their adaptability and use; concrete, masonry, and frame construction and details; blueprint reading; cost estimating; lighting; ventilation; equipment; water supply and sewage disposal. Individual laboratory problems are given to students majoring in dairy, poultry, or animal husbandry. Prerequisite: junior standing. One lecture; 2 two-hour laboratory periods. Assistant Professor Griebeler.

AE 401. Research. Terms and hours to be arranged.**AE 405. Reading and Conference.** Terms and hours to be arranged.**AE 407. Seminar.** Terms and hours to be arranged.

Prerequisite: fourteen term hours in agricultural engineering or equivalent.

AE 435. Household Utilities. (G) 3 hours fall.

Considerations in selection, installation, and use of major home services including heat, light, water, and sewage disposal; equipment and supplies requisite for major use of services, their placement, operation, and needs; motors for household appliances. For men and women interested in housing and household equipment. Prerequisite: AA 178, AE 451. Two lectures; 1 three-hour laboratory period. Associate Professor Cropsey.

AE 451. Rural House Planning. 3 hours winter.

Structural materials and methods of construction; fundamental design of typical dwellings using planning and building standards developed by Agricultural Experiment Station and other research. One lecture; 2 two-hour laboratory periods. Professor Sinnard.

GRADUATE COURSES**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 507. Seminar.** Terms and hours to be arranged.

Extension Methods

INSTRUCTION in the Department of Extension Methods is intended to supplement that of the subject matter departments in the training of students for positions as county agents, 4-H club agents, extension specialists, and for similar types of work in which extension methods are commonly used.

The extension worker must be well trained not only in the subject matter of his field but also in the methods by which extension work is successfully carried on. He must be able to give or know how to obtain authoritative advice for his community or county on any problems that may arise related to his field of service. He must know and practice the technique of platform speaking and demonstration, radio speaking, how to conduct discussions, and how to support the extension program by effective publicity. Excellent opportunities for 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 training on the part of extension workers.

DESCRIPTION OF COURSES

UPPER-DIVISION COURSES

EM 405. Reading and Conference. Terms and hours to be arranged.

EM 411, 412. Extension Methods. (G) 3 hours each term, two terms.

History and organization of extension work; methods employed by extension specialists, county agricultural and home demonstration agents, 4-H club leaders, etc. Professor Ballard.

GRADUATE COURSES

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

School of Business and Technology

Faculty

CLIFFORD ELGES MASER, Ph.D., Dean of the School of Business and Technology.

GERTRUDE FULKERSON, Secretary to the Dean.

Business Administration

PROFESSORS MASER (department head), LEMASTER.

ASSOCIATE PROFESSORS CAMPBELL, PFANNER, CARLSON.

ASSISTANT PROFESSORS CRAIG, NEWTON, CHRISTIANSEN, BRODERS, HUNDERUP, SHELTON.

INSTRUCTORS GODDARD, ULRICH.

Commercial Education

ASSOCIATE PROFESSOR STUTZ (department head).

PROFESSOR YERIAN.

Secretarial Science

PROFESSOR YERIAN (department head).

ASSOCIATE PROFESSORS STUTZ, FRICK (emeritus), LARSE.

ASSISTANT PROFESSORS CALLARMAN, ORNER, JONES, WINGER.

General Statement

THE rapid and wide-spread industrialization of the United States, and of the Pacific Coast in particular, has created an insistent demand for college-trained men and women not only versed in the techniques of administration and management, but also adequately educated in the basic technology and terminology of specific industrial operations and materials.

As a land-grant institution, Oregon State College is concerned with industry and the production, manufacture, and distribution of materials derived from land, forest, mine, and sea. Located on its campus are some of the outstanding technical schools in the West. Unique preparation to enter a field of administration and management in industry is provided in the School of Business and Technology, through the combination of major work in business with minors offered by these technical schools.

The School of Business and Technology at Oregon State College offers major work in: General Business and Industry, Industrial Accounting and Cost Control, Industrial Finance, Industrial Organization and Operation, Industrial

Relations and Personnel Management, and Industrial Marketing and Selling. The school also offers a major curriculum in Secretarial Science, and in conjunction with the School of Education prepares teachers of Commercial Education.

No graduate work is offered for majors in business and technology. Graduate students majoring in other fields may apply toward their minor requirements courses designated (g), pages 253-255.

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 and Technology. Students majoring in business and technology combine any one of the major business curricula (pages 244-247) with a technical minor of 36 hours of which a maximum of 9 hours may be taken in required prerequisite or related courses (see TECHNICAL MINORS, pages 248-252). All students follow a Common Lower-Division Curriculum (page 244).

Commercial Education. Students preparing to teach commercial education in secondary schools may follow a major curriculum in the School of Business and Technology and meet the requirements for a State Teacher's Certificate. Under SCHOOL OF EDUCATION are printed the state certification requirements, together with approved teaching majors and minors. Advanced work in commercial education may be obtained by taking courses in the Department of Commercial Education for an M.A. or M.S. degree.

Secretarial Science. The secretarial science four-year curriculum (pages 247-248) is planned to meet the needs of students who wish to prepare for responsible secretarial positions or for such positions as office manager, assistant to public officials, and research assistants. Students who major in secretarial science may minor in some other field.

Baccalaureate Degrees. For the Bachelor of Arts degree students must complete 36 hours of arts and letters including two years of work in a foreign language. For the Bachelor of Science degree students must complete 36 hours of either science or social science, or 45 hours in the two fields. (For full requirements for baccalaureate degrees, see page 71.)

Facilities. The classrooms and laboratories of the School of Business and Technology are located in Commerce Hall. Special facilities include the latest office appliances and fixtures, the standard types of typewriters, fluid, gelatin, and stencil duplicators, voice writing machines, illuminated drawing boards, filing cabinets, adding machines, bookkeeping machines, and accounting machines. All appliances and equipment are kept in constant repair. Students are taught how to keep in repair the appliances they use.

Curricula in Business and Technology

B.A., B.S. degrees

LOWER-DIVISION CURRICULUM

	Freshman Year			Term hours		
	F	W	S	F	W	S
Introduction to Business and Industry (BA 111, 112)	3	3	3	3	3	3
Survey of Modern Industry (BA 113)	3	3	3	3	3	3
¹ Mathematics of Business and Industry (Mth 104, 105, 106)	3	3	3	3	3	3
Human Geography (HG 101)	3	3	3	3	3	3
Economic Geography (HG 102)	3	3	3	3	3	3
² Regional Geography, elective	3	3	3	3	3	3
Elective in literature, modern language, or speech	3	3	3	3	3	3
English Composition (Eng 111, 112, 113)	3	3	3	3	3	3
³ Military or Naval Science (men)	2-3	2-3	2-3	2-3	2-3	2-3
⁴ Physical Education	1	1	1	1	1	1
	16-18	16-18	16-18	16-18	16-18	16-18
	Sophomore Year			Term hours		
	F	W	S	F	W	S
Principles of Accounting (BA 211, 212, 213)	3	3	3	3	3	3
Principles of Economics (Ec 201, 202, 203)	3	3	3	3	3	3
Outlines of Psychology (Psy 207, 208)	3	3	3	3	3	3
Industrial Psychology (Psy 215)	3	3	3	3	3	3
American National Government (PS 201)	3	3	3	3	3	3
History of American Civilization (1900 to present) (Hst 226)	3	3	3	3	3	3
General Sociology (Soc 212)	3	3	3	3	3	3
⁵ Technical minor	3	3	3	3	3	3
⁶ Military or Naval Science (Men)	2-3	2-3	2-3	2-3	2-3	2-3
Physical Education	1	1	1	1	1	1
	16-18	16-18	16-18	16-18	16-18	16-18

UPPER-DIVISION CURRICULA

GENERAL BUSINESS AND INDUSTRY

Junior Year						
Production (BA 311)	4	4	4	4	4	4
Finance (BA 312)	4	4	4	4	4	4
Marketing (BA 313)	4	4	4	4	4	4
Business Law (BA 411, 412, 413)	3	3	3	3	3	3
Business and Industrial Statistics (BA 431, 432)	3	3	3	3	3	3
Business Administration elective	3	3	3	3	3	3
Technical minor	3	3	3	3	3	3
Electives	3	3	3	3	3	3
	16	16	16	16	16	16
Senior Year						
Human Relations in Business and Industry (BA 497)	3	3	3	3	3	3
Government Relations in Business and Industry (BA 498)	3	3	3	3	3	3
Business and Industrial Policy (BA 499)	3	3	3	3	3	3
Business Administration electives	3	3	3	3	3	3
Technical minor	3	3	3	3	3	3
Technical minor	3	3	3	3	3	3
Electives	3	3	3	3	3	3
Electives	3	3	3	3	3	3
	18	18	18	18	18	18

¹A mathematics placement test is required of all students to determine eligibility for admission to Mth 104. Those ineligible register for Mth 10, which must be followed by Mth 104.

²HG 103 or HG 201 or HG 202 or HG 203 or HG 211.

³Men taking Naval Science may defer literature, modern language or speech elective from freshman year and PS 201, Hst 226, Soc 212 from sophomore year.

⁴General Hygiene (PE 150), 2 term hours for women, 1 term hour for men, is taken one term in place of physical education.

⁵See pages 248-252.

INDUSTRIAL ACCOUNTING AND COST CONTROL

	Junior Year		
	Term hours		
	F	W	S
Production (BA 311)	4	—	—
Finance (BA 312)	—	4	—
Marketing (BA 313)	—	—	4
Business Law (BA 411, 412, 413)	3	3	3
Advanced Accounting (BA 421, 422, 423)	3	3	3
Technical minor	3	3	3
Electives	3	3	3
	16	16	16

Senior Year			
Industrial Cost Accounting (BA 424, 425, 426)	3	3	3
Analysis of Financial Statements (BA 427)	3	—	—
Industrial Auditing (BA 428, 429)	—	3	3
Human Relations in Business and Industry (BA 497)	3	—	—
Government Relations in Business and Industry (BA 498)	—	3	—
Business and Industrial Policy (BA 499)	—	—	3
Technical minor	3	3	3
Technical minor	3	3	3
Electives	3	3	3
	18	18	18

Related Courses: Business and Industrial Statistics (BA 431, 432)
 Income Tax Procedure (BA 434)
 Money and Banking (Ec 413)
 Office Organization and Management (SS 422)
 Public Finance (Ec 418)
 Business Fluctuations (Ec 421)

INDUSTRIAL FINANCE

Junior Year			
Production (BA 311)	4	—	—
Finance (BA 312)	—	4	—
Marketing (BA 313)	—	—	4
Business Law (BA 411, 412, 413)	3	3	3
Business and Industrial Statistics (BA 431, 432)	3	3	—
Related course	—	—	3
Technical minor	3	3	3
Electives	3	3	3
	16	16	16

Senior Year			
Income Tax Procedure (BA 434)	3	—	—
Investments (BA 435)	—	3	—
General Insurance (BA 436)	—	—	3
Industrial Finance (BA 437, 438)	3	3	—
Case Problems in Industrial Finance (BA 439)	—	—	3
Human Relations in Business and Industry (BA 497)	3	—	—
Government Relations in Business and Industry (BA 498)	—	3	—
Business and Industrial Policy (BA 499)	—	—	3
Technical minor	3	3	3
Technical minor	3	3	3
Electives	3	3	3
	18	18	18

Related Courses: Credits and Collections (BA 433)
 Analysis of Financial Statements (BA 427)
 Money and Banking (Ec 413)
 Public Finance (Ec 418)
 Business Combinations (Ec 420)
 Business Fluctuations (Ec 421)
 Office Organization and Management (SS 422)

INDUSTRIAL ORGANIZATION AND OPERATION

	Junior Year			Term hours		
				F	W	S
Production (BA 311)				4		
Finance (BA 312)					4	
Marketing (BA 313)						4
Business Law (BA 411, 412, 413)				3	3	3
Business and Industrial Statistics (BA 431, 432)				3	3	
Related course						3
Technical minor				3	3	3
Electives				3	3	3
				16	16	16

Senior Year						
Production Management (BA 441, 442)				3	3	
Case Problems in Production Management (BA 449)						3
Industrial Cost Accounting (BA 424, 425)				3	3	
Human Relations in Business and Industry (BA 497)				3		
Government Relations in Business and Industry (BA 498)					3	
Business and Industrial Policy (BA 499)						3
Related course						3
Technical minor				3	3	3
Technical minor				3	3	3
Electives				3	3	3
				18	18	18

Related Courses: Industrial Purchasing (BA 461)
 Labor Problems (Ec 425)
 Safety in Industry (IE 390)
 Methods and Motion Study (IE 361)
 Time Study (IE 392)

INDUSTRIAL RELATIONS AND PERSONNEL MANAGEMENT

Junior Year						
Production (BA 311)				4		
Finance (BA 312)					4	
Marketing (BA 313)						4
Business Law (BA 411, 412, 413)				3	3	3
Business and Industrial Statistics (BA 431, 432)				3	3	
Related course						3
Technical minor				3	3	3
Electives				3	3	3
				16	16	16

Senior Year						
Personnel Management (BA 451, 452)				3	3	
Case Problems in Personnel Management (BA 459)						3
Labor Problems (Ec 425)					4	
Collective Bargaining and Labor Legislation (Ec 426)						4
Human Relations in Business and Industry (BA 497)				3		
Government Relations in Business and Industry (BA 498)					3	
Business and Industrial Policy (BA 499)						3
Related course				3		
Technical minor				3	3	3
Technical minor				3	3	3
Electives				3	3	3
				18	19	19

Related Courses: Courses in Psychology
 Courses in Sociology
 Elementary Physiology (Z 233)
 Family Relationships (HAd 222, 422)
 Courses in Industrial Engineering
 Courses in Education
 Office Organization and Management (SS 422)

INDUSTRIAL MARKETING AND SELLING

Junior Year

Term hours

F W S

Production (BA 311)	4	—	—
Finance (BA 312)	—	4	—
Marketing (BA 313)	—	—	4
Business Law (BA 411, 412, 413)	3	3	3
Business and Industrial Statistics (BA 431, 432)	3	3	—
Related course	—	—	3
Technical minor	3	3	3
Electives	3	3	3
	16	16	16

Senior Year

Industrial Purchasing (BA 461), Ind'l Traffic Management (BA 462, 463), or Advertising (BA 464), Salesmanship (BA 465), Sales Management (BA 466)	3	3	3
Industrial Marketing (BA 467, 468)	3	3	—
Case Problems in Industrial Marketing (BA 469)	—	—	3
Human Relations in Business and Industry (BA 497)	3	—	—
Government Relations in Business and Industry (BA 498)	—	3	—
Business and Industrial Policy (BA 499)	—	—	3
Technical minor	3	3	3
Technical minor	3	3	3
Electives	3	3	3
	18	18	18

Related Courses: Credits and Collections (BA 433)
General Insurance (BA 436)
Office Organization and Management (SS 422)

Curriculum in Secretarial Science

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

Freshman Year

Term hours

F W S

Introduction to Business and Industry (BA 111, 112)	3	3	—
Vocabulary Building (Eng 211)	—	—	3
Stenography (SS 111, 112, 113)	3	3	3
Typing (SS 121, 122, 123)	2	2	2
English Composition (Eng 111, 112, 113)	3	3	3
Group requirement in science or language and literature	3	3	3
Military or Naval Science (men)	2-3	2-3	2-3
¹ Physical Education	1	1	1
	17-18	17-18	17-18

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
Outlines of Psychology (Psy 207, 208)	3	3	—
Industrial Psychology (Psy 215)	—	—	3
History of American Civilization (1900 to present) (Hst 226)	3	—	—
American National Government (PS 201)	—	3	—
Business English (Eng 217)	—	—	3
² Military or Naval Science (men)	2-3	2-3	2-3
¹ Physical Education	1	1	1
	17-18	17-18	17-18

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

²Men taking Naval Science may defer Hst 226, PS 201, and Eng 217 to the junior year.

	Junior Year			Term hours		
	F	W	S	F	W	S
Office Procedure (SS 311, 312, 313)	4	4	4	4	4	4
Production (BA 311)	4	—	—	4	—	—
Finance (BA 312)	—	4	—	—	4	—
Marketing (BA 313)	—	—	4	—	—	4
*Social science electives	3	3	3	3	3	3
Electives	3	3	3	3	3	3
Electives	3	3	3	3	3	3
	17	17	17	17	17	17
Senior Year						
Office Organization and Management (SS 421, 422)	3	3	—	3	3	—
Technical Reporting (SS 321)	—	—	3	—	—	3
Merchandising and Selling (SS 436)	3	—	—	3	—	—
Secretarial Science (SS 411)	—	3	—	—	3	—
*Secretarial Science (SS 412)	(3)	(3)	3	(3)	(3)	3
Business Law (BA 411, 412, 413)	3	3	3	3	3	3
*Seminar (SS 407)	(1)	1	(1)	(1)	1	(1)
Electives	3	3	3	3	3	3
Electives	3	3	3	3	3	3
	15	16	15	15	16	15

Technical Minors

Agriculture:

Agricultural Engineering

Commercial Fisheries

Dairy Manufacturing

Farm Crops

Food Technology

Horticulture—Floriculture

Horticulture—Fruit and Vegetable Production

Engineering and Industrial Arts:

Industrial Arts—Woodworking

Industrial Arts—Metal Option

Industrial Arts—Building Construction

Forestry

Home Economics:

Clothing and Textiles

Science:

Industrial Chemistry

Mining or Petroleum Geology

Applied Physics

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.

AGRICULTURAL ENGINEERING

Dr. J. B. RODGERS, Adviser

	Term hours		
	F	W	S
Sophomore year:			
Elementary Analysis (Mth 101)	4	—	—
Abridged General Physics (Ph 211)	—	3	—
Forging and Welding (IE 250)	—	—	2
Junior year:			
Agricultural Engineering Survey (AE 111)	3	—	—
Farm Mechanics (AE 221)	—	3	—
Engineering Drawing (GE 111)	—	—	3
Senior year:			
Farm Motors and Tractors (AE 311)	3	—	—
Farm Buildings (AE 361)	—	3	—
Automobile Mechanics (AE 313)	—	3	—
*Automobile Mechanics (AE 314)	—	—	3
*Soil Conservation Engineering (AE 471)	3	—	—
*Pumps and Irrigation Equipment (AE 321)	—	—	3
*Farm Electricity (AE 331)	—	3	—
Farm Implements (AE 231)	—	—	3

* Of the four courses starred—AE 314, AE 471, AE 321, AE 331—the student selects two according to his objective.

*Ninety of the hours taken for a baccalaureate degree must be in liberalizing courses.

*Offered each term.

APPLIED PHYSICS

DR. WILLIBALD WENIGER, Adviser

	Term hours		
	F	W	S
Sophomore year:			
Elementary Analysis (Mth 101, 102, 103)	4	4	4
General Physics (Ph 201, 202, 203) or Engineering Physics (Ph 101, 102, 103)	4-3	4-3	4-3
Junior year:			
Introduction to Modern Physics (Ph 311, 312, 313)	3	3	3
Senior year:			
Physical Measurements (Ph 321, 322, 323) or Electronics and Radio (Ph 331, 332, 333) or Fundamentals of Radio (Ph 330), Light (Geometric Options) (Ph 465), Reading and Conference (Acous- tics) (Ph 405) or Photography (Ph 361, 362, 363)	3	3	3

CLOTHING AND TEXTILES

PROFESSOR ALMA FRITCHOFF, Adviser

Sophomore year:			
Color and Composition (AA 160, 161)	3	3	—
Elementary Clothing (CT 111)	—	—	3
Junior year:			
Clothing (Selection) (CT 211)	3	—	—
Clothing (Construction) (CT 212)	—	3	—
Textiles (CT 250)	—	—	3
Senior year:			
Clothing for Children (CT 320)	3	—	—
Costume Design (CT 311)	3	—	—
Clothing (CT 312)	—	3	—
Applied Design (CT 335)	—	3	—
Consumer Buying in Clothing and Textiles (CT 350)	—	—	3
Dress Design (CT 411)	—	—	3

COMMERCIAL FISHERIES

PROFESSOR R. E. DIMICK, Adviser

Sophomore year:			
Biological Science Survey (GS 101, 102, 103)	4	4	4
Junior Year:			
Nutrition (FN 225)	3	—	—
Economic Ichthyology (FG 274, 275, 276)	3	3	3
Senior Year:			
Commercial Fisheries (FG 464, 465, 466)	3	3	3
Principles of Food Preservation (FT 250)	3	—	—
Preservation of Meats and Marine Products (FT 254)	—	—	3

DAIRY MANUFACTURING

DR. G. H. WILSTER, Adviser

Sophomore year:			
General Chemistry (Ch 101, 102, 103)	3	3	3
Dairy Husbandry (AI 122)	—	—	3
Junior year:			
General Bacteriology (Bac 204)	3	—	—
Dairy Products Manufacturing (DH 312, 313, 314)	3	3	3
Dairy Products Laboratory Practice (DH 315, 316)	2	2	—
*Dairy Products Laboratory Practice (DH 317)	—	—	2
Senior year:			
Market Milk and Related Products (DH 410)	3	—	—
Milk Marketing (AEc 444)	—	3	—
Utilization of Dairy Products (DH 430)	—	—	3
Seminar (DH 407)	1	1	—
Dairy Products Standards (DH 318)	—	—	1

* DH 317 is optional.

FARM CROPS

DR. D. D. HILL, Adviser

	Term hours		
	F	W	S
Sophomore year:			
Elementary General Chemistry (Ch 101, 102, 103)	3	3	3
Junior year:			
Soils (SIs 211, 212)	3	3	—
Elements of Agronomy (FC 111)	—	—	3
Senior year:			
Cereal Production Lectures (FC 322)	—	3	—
Seed Production (FC 414)	3	—	—
Crop Inspection (FC 411)	—	4	—
Reading and Conference (FC 405)	—	2	—
Forage and Root Crop Production (FC 211)	—	—	3
Reading and Conference (FC 405)	—	—	3

This minor is planned to provide an understanding of either of the following: (a) the production of cereals, grains, forage, root, and specialty crops (flax, etc.); or (b) the commodities handled in the average feed, seed, and fertilizer business. Work in the latter field should include the courses, Soil Fertility Lectures (SIs 424), 3 hours, and Animal Nutrition II (AI 411), 4 hours.

FOOD TECHNOLOGY

PROFESSOR E. H. WIEGAND, Adviser

Sophomore year:			
General Chemistry (Ch 101, 102, 103)	3	3	3
Junior year:			
General Bacteriology (Bac 204)	3	—	—
Principles of Food Preservation (FT 250)	3	—	—
Principles of Canning Fruits and Vegetables (FT 251)	—	3	—
Food Technology elective	—	—	3
Senior year:			
Food Technology elective	3	3	—
Frozen Foods (FT 413)	—	—	3
Food Technology (FT 321, 322)	3	3	—
Inspection of Processed Food (FT 371)	—	—	3
Suggested electives:			
Preservation of Meats and Marine Products (FT 254), 3 hours			
Dehydration of Food Products (FT 331), 3 hours			
Technology of Beverages (FT 351), 3 hours			
Frozen Foods (FT 412), 3 hours			

FORESTRY

DR. W. F. McCULLOCH, Adviser

Sophomore year:			
Dendrology (F 153)	3	—	—
Forest Administration (F 213)	—	3	—
Wood Utilization (FP 210)	—	—	3
Junior year:			
Wood Utilization (FP 310)	3	—	—
Conservation of Natural Resources (F 360)	—	3	—
Mensuration (F 224)	—	—	5
Senior year:			
Forest Management (F 325)	3	—	—
Industrial Forest Administration (FE 451)	—	3	—
Forest Economics (F 412)	—	—	3
The Lumber Plant (FP 451)	3	—	—
Lumber Manufacturing Problems (FP 452)	—	3	—
Lumber Merchandising (FP 453)	—	—	3

HORTICULTURE—FLORICULTURE

PROFESSOR STANLEY E. WADSWORTH, Adviser

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)	3	3	3
Senior year:			
Handling and Distribution of Florist Crops (Hrt 453)	3	—	—
Flower Shop Operation (Hrt 451)	3	—	—
Greenhouse Construction and Management (Hrt 313)	—	3	—
Plant Propagation (Hrt 311)	—	3	—
Herbaceous Plant Materials (Hrt 355)	—	—	3
Reading and Conference (Hrt 405)	—	—	3

HORTICULTURE—FRUIT AND VEGETABLE PRODUCTION

PROFESSOR HENRY HARTMAN, 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)	4	---	---
Fruit Handling and Distribution (Hrt 431)	---	4	---
Fruit and Nut Production (Hrt 331)	---	---	4
Vegetable Varieties (Hrt 443)	2	---	---
Vegetable Production (Hrt 341)	---	3	---
Reading and Conference (Hrt 405)	---	---	3

**INDUSTRIAL ARTS—WOODWORKING
(INCLUDING FURNITURE CONSTRUCTION)**

PROFESSOR G. B. COX, Adviser

Sophomore year:			
Engineering Drawing (GE 121, 122)	3	3	---
Pattern Making (IE 111)	---	---	3
Junior year:			
Lower-Division Drawing (AA 291)	3	---	---
Lower-Division Decorative Design (Applied Design) (AA 296)	---	3	---
Methods in Woodworking (IA 112, 113)	---	3	3
Senior year:			
Mill Work—Machine Woodwork (IE 311)	3	---	---
Furniture Design (IA 213)	2	---	---
Wood Turning (IA 220)	---	2	---
Furniture Construction (IA 313, 314)	---	2	2
Wood and Metal Finishing (IA 316)	---	---	3
Machine and Tool Maintenance (Wood Shop) (IA 225)	---	---	2

INDUSTRIAL ARTS—METAL OPTION

PROFESSOR WILLIAM F. ENGESSER, Adviser

Sophomore year:			
Engineering Drawing (GE 121, 122)	3	3	---
Pattern Making (IE 111)	---	---	3
Junior year:			
Foundry Practices (IE 240)	2	---	---
Forging and Welding (IE 250)	---	2	---
Machine Shop Practices (IE 260)	---	---	2
Senior year:			
Methods and Motion Study (IE 391)	3	---	---
Time Study (IE 392)	---	3	---
Safety in Industry (IE 390)	---	2	---
Related courses	3	---	6
Related Courses: Brass and Alloy Foundry (IA 343), Automobile Mechanics (AE 312, 313).			

INDUSTRIAL ARTS—BUILDING CONSTRUCTION

PROFESSOR G. B. COX, Adviser

Sophomore year:			
Engineering Drawing (GE 121, 122)	3	3	---
Pattern Making (IE 111)	---	---	3
Junior year:			
Methods in Woodworking (IA 112, 113)	---	3	3
House Planning and Architectural Drawing (AA 178, 179, 180)	3	3	---
Senior year:			
Mill Work—Machine Woodwork (IE 311)	3	---	---
Carpentry and Building Construction (IA 333)	---	3	---
Elementary Analysis (Mth 101)	---	4	---
Plane Surveying (CE 226)	---	---	3

INDUSTRIAL CHEMISTRY

PROFESSORS J. S. WALTON and LEO FRIEDMAN, Advisers

	Term hours		
	F	W	S
Sophomore year:			
General Chemistry (Ch 101, 102, 103)	3	3	3
Junior year:			
Organic and Agricultural Biochemistry (Ch 251, 252)	5	3	—
Elementary Physical Chemistry (Ch 340)	—	—	3
Chemical and Mineral Industry Survey (ChE 111, 112, 113)	1	1	1
Elementary Analysis (Mth 101, 102)	—	4	4
Senior year:			
Industrial Chemistry (ChE 321, 322, 323)	3	3	3

MINING OR PETROLEUM GEOLOGY

DR. I. S. ALLISON, Adviser

Sophomore year:			
General Geology (G 201, 202, 203)	3	3	3
Geology Laboratory (G 204, 205, 206)	1	1	1
Junior year:			
Mineralogy	4	4	—
Lithology or Rock Study	—	—	4
Senior year:			
Mining Geology and Industrial Minerals or Petroleum Geology	3	3	6

Business Administration

CCOURSES in business and industrial administration are offered in the Department of Business Administration. The courses aim in the first two years to orient the student in the field, and in the last two years to provide professional preparation for business and technology. Courses offered in the Department of Economics (pages 127-129) supplement the work of the Department of Business Administration.

DESCRIPTION OF COURSES**LOWER-DIVISION COURSES**

BA 111, 112. Introduction to Business and Industry. 3 hours each term. Survey of business organization, operation, and management intended to orient the student in the field of business and industry and to help him determine a field of major emphasis.

BA 113. Survey of Modern Industry. 3 hours. Principal industries of the United States and Pacific Northwest; dynamic nature and social problems of American industry. Student is helped to choose the technical and scientific fields in which he desires to concentrate.

BA 211, 212, 213. Principles of Accounting. 3 hours each term. An introduction to the field of accounting and business administration. Technique of account construction and preparation of financial statements; application of accounting principles to practical business problems.

UPPER-DIVISION COURSES

BA 311. Production. 4 hours. Principles of management applied to industrial concerns; functional management as applied by Taylor and subsequent industrial managers. Prerequisite or parallel: elementary economics.

BA 312. Finance. 4 hours.

Financial institutions; financial problems in launching a business; expansion; budgetary control; credits and collections; borrowing; management of earnings. Prerequisite or parallel: elementary economics; BA 211, 212.

BA 313. Marketing. 4 hours.

Methods, policies, and problems involved in the marketing of producers' and consumers' goods; middlemen; current trends; legislation in marketing field. Prerequisite or parallel: elementary economics.

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

Opportunity to do supervised individual work in some field of special application and interest. Subjects chosen must be approved by the major professor. Prerequisite: senior or graduate standing. Staff.

BA 411. Business Law. 3 hours.

History of legal systems and legal institutions; source of obligations; interpretation and discharge; bankruptcy; suretyship, and insurance.

BA 412. Business Law. 3 hours.

Agency; negotiable instruments; personal property. Prerequisite: BA 411.

BA 413. Business Law. 3 hours.

Specialized business and business organization; corporations and partnerships; law of real property including estate.

BA 421, 422, 423. Advanced Accounting. 3 hours each term.

Balance sheet valuation and profit determination; handling and interpretation of the principles, balance sheet, and profit and loss items with particular reference to corporations. Prerequisite: BA 213.

BA 424, 425, 426. Industrial Cost Accounting. (g) 3 hours each term.

Basic principles; differences between accounting systems involving and not involving cost system problems and practice sets. Prerequisite: BA 213.

BA 427. Analysis of Financial Statements. 3 hours.

Accounting theory and practice for effective management and control of industrial and trading concerns; emphasis on the preparation, analysis, and interpretation of balance sheets and operating reports. Prerequisite: BA 211, 212, 213.

BA 428, 429. Industrial Auditing. (g) 3 hours each term.

Procedures and practices in verification of industrial accounts, records, and statements; training in preparation of reports analyzing the findings appropriate to the purpose for which industrial audits are made. Prerequisite: BA 421, 422, 423.

BA 431, 432. Business and Industrial Statistics. (g) 3 hours.

Analysis of time series, including secular trends, seasonal and cyclical movements; simple, multiple, partial, and curvilinear correlation; correlation of time series and forecasting. Prerequisite: Mth 100 or 104.

BA 433. Credits and Collections. 3 hours.

Principles and practices of credit management with particular reference to mercantile credit.

BA 434. Income Tax Procedure. 3 hours.

Income, excess profits, and other federal and state taxes as they affect business; technical and accounting phases of the business man's tax problems.

BA 435. Investments. (g) 3 hours.

Markets and the price of securities; demand and supply; computing earnings; governmental and corporation bonds and real estate loans as investment securities; stock exchange. Prerequisite: BA 312.

BA 436. General Insurance. 3 hours.

Aims to familiarize student with the various insurance means at disposal of management for use in shifting, reducing, or eliminating risks; fire, casualty, compensation, fidelity and surety, marine, and other types of insurance.

BA 437, 438. Industrial Finance. (g) 3 hours each term.

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.

BA 439. Case Problems in Industrial Finance. 3 hours.

Financial problems facing business enterprises from the point of view of the business executive. Prerequisite: BA 437, 438.

BA 441, 442. Production Management. 3 hours each term.

An analysis of the problems of production, factory organization, and factory management, studied from the point of view of the production manager. Prerequisite: BA 311.

BA 449. Case Problems in Production Management. (g) 3 hours.

Designed primarily to enable the student to formulate an over-all picture of the interrelationship of major aspects of production. Intensive case study of actual cases drawn from industry. Prerequisite: BA 442.

BA 451, 452. Personnel Management. (g) 3 hours each term.

Scientific management; job analysis; systematic hiring, placing and promoting; wage payments; turnover; labor participation in management; public's concern in such participation; actual procedure followed by a personnel department in its handling of such functions as: hiring, promoting, transferring, training, paying, and taking care of worker health and morale. Prerequisite: senior standing.

BA 459. Case Problems in Personnel Management. 3 hours.

For advanced students in industrial relations and personnel management. Opportunity is given under guidance of a qualified leader to analyze, discuss, and offer solutions. Prerequisite: BA 452.

BA 461. Industrial Purchasing. 3 hours.

Significant managerial problems raised by the purchase and control of materials for industrial use as they affect control of quality of product, maintenance of operating efficiency, and quotation of competitive prices.

BA 462, 463. Industrial Traffic Management. (g) 3 hours each term.

Functions and procedures of traffic departments in industrial enterprises; use of tariffs; choice of agencies; control of transportation costs; activities and procedures peculiar to exporting and importing; obtaining transportation services; packing requirements; custom requirements; insurance. Prerequisite: senior standing.

BA 464. Advertising. 3 hours.

Social and economic aspects of advertising; uses and limitations; effect on consumer; use of research in determining scope, consumer needs, and groups.

BA 465. Salesmanship. 3 hours.

Designed to acquaint student with functions of sales promotion in correlating merchandising and publicity; discovering or making sales opportunities; fundamentals of sound salesmanship.

BA 466. Sales Management. 3 hours.

Selling from point of view of the business executive; distributing and expanding sales; selling organization; principles of salesmanship; training the sales force; market and sales research.

BA 467, 468. Industrial Marketing. (g) 3 hours each term.

Marketing of industrial commodities, including principles, current methods, and practices in terms of problems encountered by individual firms. Prerequisite: elementary economics, BA 313.

BA 469. Case Problems in Industrial Marketing. 3 hours.

Costs of distribution; price determination; appraisal of systems of marketing in view of social and economic changes. Prerequisite: BA 468.

BA 497. Human Relations in Business and Industry. (g) 3 hours.

Fundamental problems in relations between management, supervision, and employees; social structure of industry; application of principles of leadership and cooperation in industrial groups. Prerequisite: senior standing in business and technology or agricultural economics.

BA 498. Government Relations in Business and Industry. (g) 3 hours.

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 harmonious collaboration. Prerequisite: senior standing in business and technology or agricultural economics.

BA 499. Business and Industrial Policy. 3 hours.

A qualified business and industrial leader must be in position to determine and interpret policy, the guide to the operation of business. Only advanced students who have achieved thorough familiarity with business and technology are admitted; required of all major students in business and technology.

GRADUATE SERVICE COURSES

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

Commercial Education

IN CONJUNCTION with the School of Business and Technology, the School of Education meets the demand for well-prepared teachers of commercial branches in secondary schools. In the selection of their courses in business administration, secretarial science, and education, students should advise with the head of the department. For the requirements for certification see SCHOOL OF EDUCATION.

DESCRIPTION OF COURSES**UPPER-DIVISION COURSES**

Ed 408c. Methods and Materials. (See Ed 408, page 274.) Associate Professor Stutz.

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

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

CEd 405. Reading and Conference. Terms and hours to be arranged.

CEd 407. Seminar. Terms and hours to be arranged.

GRADUATE COURSES

CEd 501. Research. Terms and hours to be arranged.

CEd 503. Thesis. Terms and hours to be arranged.

CEd 505. Reading and Conference. Terms and hours to be arranged.

CEd 507. Seminar. Terms and hours to be arranged.

MEASUREMENTS IN BUSINESS EDUCATION.

CURRENT TRENDS IN OFFICE PROCEDURE.

SUPERVISION AND ADMINISTRATION OF COMMERCIAL EDUCATION.

TEACHING SOCIO-BUSINESS SUBJECTS IN THE SECONDARY SCHOOL.

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.

CEd 541. Current Practices in Typewriting. 3 hours fall.

Principles underlying development of typing skills; motivation, supplementary materials, and special devices. Prerequisite: Ed 408c or teaching experience in typing.

CEd 542. Current Practices in Shorthand. 3 hours winter.

Correct writing habits; correlation of sound and symbol response; word and sentence building and transcription technique. Prerequisite: Ed 408c or teaching experience in stenography.

CEd 543. Problems in Commercial Education. 3 hours spring.

Trends in high-school commercial curriculum; evaluation of methods and available research studies. Prerequisite: Ed 408c or teaching experience in commercial subjects.

Secretarial Science

THE major in secretarial science prepares young men and women for secretarial positions. It is often advantageous for the student to elect a minor in an industrial field in which he plans to work. In addition to the courses for students majoring in secretarial science, the department gives service work for students majoring in business and technology and in other major curricula of the College.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

SS 111, 112, 113. Stenography. 3 hours each term.

Theory of shorthand; practical applications in sentence dictation. SS 121, 122, 123 must be taken concurrently unless the student has had the equivalent. Students with one year of shorthand are not permitted to take course SS 111 for credit. Four recitations.

SS 121, 122, 123. Typing. 2 hours each term.

Theory and practice of touch typing; rhythmical drills, dictation exercises; writing paragraphs; punctuation and mechanical arrangement of business

correspondence, legal forms, tabulating, manifolding, speed practice. Students with at least one year of typing are not permitted to take SS 121 for credit. Five periods laboratory work.

SS 131. Business Forms and Reports. 2 hours.

Planning and typing business papers, manuscripts, statistical tables, and reports. Speed typing is emphasized.

SS 211, 212, 213. Applied Stenography. 3 hours each term.

Advanced principles and phrases; dictation and transcripts covering vocabularies of representative businesses; legal forms; newspaper and magazine articles. Prerequisite: SS 113, 123 or equivalent. Three recitations; 3 one-hour laboratory periods.

UPPER-DIVISION COURSES

SS 311, 312, 313. Office Procedure. 4 hours each term.

The most efficient stenographic methods and office practice; filing; advanced dictation; transcripts; reports; modern office appliances. Prerequisite: SS 213 or equivalent. Two lectures; 3 two-hour laboratory periods.

SS 321, 322. Technical Reporting. 3 hours each term winter and spring.

Advanced stenographic training in specialized business fields.

SS 407. Seminar. 1 hour any term.

SS 411. Secretarial Science. 3 hours spring.

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 Science. 3 hours any term.

Continuation of SS 411. Practical office experience. Nine hours laboratory each week in campus offices.

SS 421, 422. Office Organization and Management. 3 hours each term.

Scientific secretarial office management; organization; arrangement; operation; employment and training of office workers; efficiency problems; business ethics. Prerequisite: SS 313 or consent of instructor.

SS 436. Merchandising and Selling. (g) 3 hours fall.

Retail organizations, practices, policies, and problems; stock-control systems; buying; methods of sales promotion; general sales fundamentals and techniques.

GRADUATE COURSES

Courses numbered 400-499 and designated (g) may be taken for graduate credit. For graduate courses in commercial education, see pages 280-281.

School of Education

Faculty

FRANKLIN ROYALTON ZERAN, Ph.D., Associate Dean of the School of Education.
JAMES RALPH JEWELL, Ph.D., LL.D., Dean Emeritus of the School of Education.

CARL WALTER SALSER, Ed.M., Assistant Dean Emeritus of the School of Education.

CLYTIE MAY WORKINGER, Placement Secretary.

PATRICIA CRUTCHER, Secretary, School of Education.

Education

PROFESSORS ZERAN (department head), MITCHELL*, LANGTON, CHAMBERS, LASLETT, WARRINGTON, CLINTON, SEEN, BAKKUM, BERGSTROM, WELLS*, SHERBURNE, WILKINSON*.

ASSOCIATE PROFESSORS REICHART, REID*, READ, WILLIAMSON, BEGELMAN.

ASSISTANT PROFESSOR DIXON.

INSTRUCTOR MILLIKEN.

Agricultural Education

PROFESSOR GIBSON (department head).

STATE SUPERVISOR AND TEACHER TRAINER MORGAN.

Commercial Education

ASSOCIATE PROFESSOR STUTZ (department head).

PROFESSOR YERIAN.

Home Economics Education

PROFESSOR BLAZIER (department head).

STATE SUPERVISOR AND TEACHER TRAINER KOHLHAGEN.

ASSOCIATE PROFESSOR DUBOIS.

INSTRUCTOR COLEMAN.

Industrial Education

PROFESSOR COX (department head).

ASSOCIATE PROFESSORS PAULSON, MEYER.

ASSISTANT PROFESSOR HAHN.

Science Education

ASSOCIATE PROFESSOR WILLIAMSON (department head).

PROFESSOR ATWOOD*.

ASSOCIATE PROFESSOR MORRIS.

* Associate Faculty. Teacher training is an enterprise in which many different departments have a share. The President of the College, at the request of the School of Education, appoints each year certain faculty members from other schools on the campus to serve also as associate and advisory members of the School of Education faculty.

Supervising Teachers

- BETTY ARNEST, B.S., Home Economics, Philomath High School.
CARMELITA BARQUIST, M.A., Biology, Salem High School.
FRANK BEER, M.S., Biology, Salem High School.
HOWARD BENNETT, B.S., Agriculture, Newberg High School.
GEORGE BIRRELL, B.A., Chemistry, Salem High School.
ANN BOENTJE, B.S., Mathematics, Salem High School.
R. L. BUCHANAN, M.S., Biology, Albany High School.
MAURICE BULLARD, B.S., Industrial Arts, Corvallis High School.
GLADYS CHANDLER, B.S., Science, Milwaukie High School.
MERLE BONNEY DAVIS, B.S., Home Economics, Silverton High School.
TOM DRYNAN, B.S., Physical Education, Albany High School.
WARREN EWING, B.A., Science, Hillsboro High School.
R. D. GOFF, M.S., Industrial Arts, Corvallis High School.
LEO GOODMAN, M.A., Mathematics, Oregon City High School.
STANLEY GREEN, B.S., Agriculture, Redmond High School.
MARJORIE HERR, B.A., Physical Education, Albany High School.
HELEN HOLLANDSWORTH, B.S., Home Economics, Albany High School.
IRENE HOLLENBECK, M.S., Biology, Salem High School.
BERYL HOLT, B.A., Mathematics, Salem High School.
LEONARD HUDSON, B.S., Agriculture, Silverton High School.
REX HUNSAKER, B.S., Algebra, Albany High School.
LUCILLE HUTCHINSON, B.S., Home Economics, Oregon City High School.
NELLIE JOHNSON, B.S., Commercial, Hillsboro High School.
DAVE LEGER, B.S., Mathematics, Hillsboro High School.
HELEN McDOWELL, B.S., Home Economics, Oregon City High School.
HENRY MASCALL, B.S., General Science, Albany Junior High School.
HENRY OTTO, B.A., Chemistry, Albany High School.
GRACE PALMER, B.A., Commercial, Hillsboro High School.
MABEL PATTON, B.A., Biology, Corvallis High School.
MABEL PENLAND, B.A., Typing, Albany High School.
PERCE SPELBRINK, B.A., Algebra, Physics, Corvallis High School.
HENRY TENPAS, B.S., Agriculture, Amity High School.
CLARA VOYEN, Behnke-Walker, Commerce, Albany High School.
VERNA WEEMAN, B.S., Biology, Albany High School.
PATRICIA WHITTAKER, M.S., General Science, Corvallis Junior High School.
MARIE WILLIS, B.S., Home Economics, Roosevelt Junior High School, Eugene.

General Statement

ALL professional preparation for teaching within the State System of Higher Education, except preparation for strictly elementary school teaching, is organized under the School of Education. The school is concerned especially with the preparation of teachers for the high schools of Oregon and with the promotion of high standards of secondary education. The School of Education operates on both the University and the State College campuses. Preparation for high-school teaching in the various fields is divided between the two institutions in accordance with the allocation of major curricula.

At the State College are given major curricula preparing for teaching of biological science, general science, physical science, mathematics, agriculture, home economics, industrial arts, commercial education, and approved combinations of subjects, and for educational and vocational guidance.

At the University are given general education courses, professional work in educational administration, and major curricula preparing for teaching of literature, languages, social sciences, biological science, general science, physical science, mathematics, arts, business administration, music, physical education, and approved combinations of subjects. The University also offers training to prepare teachers for work with atypical children.

In planning its curricula the School of Education has recognized three qualifications for a good teacher: (1) mastery of subject matter; (2) an understanding of child and adolescent psychology, and of professional problems and techniques; (3) a broad and liberal education.

Admission. 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, proper teaching fields will be chosen, and the most valuable supporting courses will be selected and worked into the student's program. This means the best possible basis for recommendation and placement at graduation. Junior-college graduates from accredited institutions enter the School of Education as juniors and may complete the work in two years for the B.A., B.S., or Ed.B. degree. Students having had one year in junior college enter as sophomores in the School of Education. Lower-Division students who complete the first two years of college work at the State College or the University, or at other accredited institutions, enter the School of Education as juniors. These students ordinarily will have one or two of their teaching fields under way and will experience little difficulty in selecting a major and a minor. Graduates of colleges of education who have completed two years of work will enter the School of Education as third-year students; those who have completed three years of work will ordinarily enter as seniors. Such students ordinarily receive full credit for all work taken in other colleges except that not more than 9 hours of credit are allowed for supervised teaching from the colleges of education. Graduates of two-year colleges of education are likely to be deficient one or two terms in English and occasionally one or more terms in science. As soon as these courses have been made up the student receives the Junior Certificate and full junior standing.

Baccalaureate Degrees. Students majoring in education may become candidates for the following baccalaureate degrees: Bachelor of Arts, Bachelor of Science, and Bachelor of Education. For each of these degrees the student must fulfill all State College requirements for these degrees, besides major requirements. For the B.A. degree 36 term hours in arts and letters, including

a minor in one of the modern languages, must be completed; for the B.S. degree 36 term hours of science or 36 term hours of social science, or 45 term hours in both, are required. One year of biological science, physical science, or mathematics, to be chosen by the student, is required for the B.S. or Ed.B. degree. Elementary Psychology (Psy 201, 202, 203) with laboratory 3 hours will not be accepted in the School of Education as a substitute for science.

A student with a minor in a modern language may, upon application to the dean's office, be excused from taking literature.

Candidates for a bachelor's degree in the School of Education must submit 36 term hours in education and psychology, of which at least 24 term hours must be in upper-division or graduate education courses. One major and a minor must be submitted in teaching fields (see pages 264-271).

Outlines of Psychology (Psy 221, 222, or Psy 201, 202, 203, or equivalent) is prerequisite to all upper-division education courses, and may be counted as a part of the education major of 36 term hours.

A scholarship average within the upper 50 per cent of the State College grade range ordinarily is prerequisite to registration for upper-division teacher training courses. In admitting students into these courses, the faculty of the School of Education gives additional consideration to psychological rating, teaching personality, and in doubtful cases to marked improvement in scholarship during the sophomore or junior year.

Graduate Work. Graduate work in education, leading to the Master of Arts, Master of Science, Master of Education, and Doctor of Education degrees, is offered at the State College through the Graduate School. 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 a graduate minor in the field of education or a subject-matter field. Candidates for the Ed.D. degree must have a record of successful teaching experience. They will ordinarily include in their programs intensive work in statistics and research. Reading knowledge of French, German, or other languages may be required if it is regarded as essential to the student's program. The program of study for each candidate for the Ed.D. degree is carefully planned and integrated with the aim of preparing men and women for immediate, effective, professional service in administrative, supervisory, and advanced teaching positions in the fields allocated at the State College. The regulations governing graduate study are stated under GRADUATE SCHOOL in this Catalog.

Supervised Teaching. The School of Education provides an opportunity for supervised high-school and junior high-school teaching in all the major fields allocated at Oregon State College. Supervised teaching cannot be done at the State College in fields in which the State College does not offer major work, except that students minoring in physical education may do their supervised teaching in physical education when approved by the director of supervised teaching. Student teachers observe teaching by expert instructors, work out lesson plans under the guidance of the supervisors, and teach high-school classes under supervision. Credit for supervised teaching is granted only on the approval of the director of supervised teaching.

Guidance Clinic, Testing and Advisory Service. Members of the education faculty, together with several members from other schools on the campus, constitute a guidance clinic and give much of their time to individual work with students. Frequent meetings of the clinic are held throughout the

academic year. The services of the clinic are open and easily available to students in any school on the campus. The testing and advisory service conducted by the Guidance Clinic enables students to take various tests of interest, aptitude, and ability and to have expert assistance in interpreting results. At present this work is closely connected with the Veterans Guidance Center.

Educational and Vocational Guidance. Under the organization plan of the State System of Higher Education, training for educational and vocational guidance is allocated to the State College. The major curriculum in guidance, counseling, and personnel work (see pages 271-273) extending through five or more years leads to baccalaureate and advanced degrees and prepares students for service as counselors, deans of girls, deans of boys, teachers of occupations courses, and for other phases of personnel work. Experience in fields of work other than teaching is desirable for all counselors and personnel workers.

Teacher Placement Service. A Placement Service is maintained by the School of Education for the placement of graduates of the State College who are prepared and qualified to teach in the secondary schools. The Placement Service compiles and makes available to school officials full information concerning the preparation and experience of graduates who desire teaching positions. The Placement Service also furnishes students information concerning the certification requirements and school laws of other states, and will recommend graduates for certification in other states, on the endorsement of the Dean of the School of Education and the State College Registrar. The following fees are charged by the Placement Service:

Registration fee	\$3.00
Charge for late registration	1.00
Charge for late payment of registration fee	1.00
Credential fee .....	.25
Credential fee for out-of-state certification	2.00

State Teacher's Certificate

ALL teachers in the high schools of the state of Oregon must hold a high-school teacher's certificate, issued by the State Superintendent of Public Instruction. To be eligible for a one-year certificate graduates of the State College must satisfy the following requirements:

(1) A total of 45 term hours of college work after meeting the requirements for the baccalaureate degree.

(2) A minimum of 40 term hours of work in education, 15 term hours of which must be in upper-division or graduate courses taken after meeting the requirements for the baccalaureate degree. This work must be distributed as follows:

	<i>Term hours</i>
Secondary Education (Ed 311)	3
Educational Psychology (Ed 312)	3
Principles of Teaching (Ed 313)	3
Methods and Materials (Ed 408)	3
Supervised Teaching (Ed 415)	6
Oregon School Law and Oregon System of Education (Ed 316)....	2
One of the following: Ed 511, Ed 543, Ed 546	3
Electives in education, including 9 term hours at the graduate level	17

(3) History of Oregon (Hst 377), 3 term hours.

(4) Elementary Psychology (Psy 201, 202, 203), 9 term hours; or Psy 207, 208, and Ed 312; or Psy 207, Ed 312, Ed 461.

Ed 311, 312, 313, and 415 must be taken in residence—they cannot be taken by correspondence.

Under regulations adopted by the Oregon State Board of Education in January 1941, new teachers employed in approved high schools may be assigned to teach only in those subject fields in which they have completed adequate college preparation. The State Board of Education has set the following minimum standards of subject preparation:

ENGLISH: 36 term hours, including at least 9 term hours in composition and rhetoric (it is recommended that a substantial amount of work in speech be included in this training). LANGUAGES: the equivalent of 30 term hours of college preparation in each language taught (high-school credits evaluated in terms of college hours may be accepted in meeting the minimum requirements). SOCIAL STUDIES: 36 term hours, including at least 18 term hours in American and European or world history, and a total of at least 10 term hours in two or more of the following subjects—government, economics, sociology, geography. MATHEMATICS: 15 term hours of college mathematics. COMMERCE: *Shorthand*, 18 term hours (may include high-school or business-college work evaluated in terms of college hours or equivalent performance standards); *Typing*, 6 term hours (may include high-school or business-college work); *Bookkeeping*, *Business Training*, *Commercial Law*, 24 term hours in accounting and business administration. NATURAL SCIENCE: *Elementary Science*, 24 term hours in the natural sciences, including at least 9 term hours in physical science and 9 term hours in biological science; *Biology*, 18 term hours; *Physics*, 12 term hours; *Chemistry*, 12 term hours. PHYSICAL EDUCATION AND HEALTH EDUCATION: 12 term hours in physical education and 12 term hours in health education. INDUSTRIAL ARTS: 24 term hours. HOME ECONOMICS: 24 term hours. AGRICULTURE: 24 term hours.

To be recommended by the State College for a teaching position, a student in satisfying the minimum subject requirements in the fields in which he intends to teach must take certain specified courses. These courses are listed on pages 264-271.

Believing that a broad knowledge in the fields of English, social studies, mathematics, natural science, and the fine arts should be a part of the equipment of every teacher, whatever his subject field, the State Board of Education has recommended that, beginning with the school year 1943-44, the college preparation of all new teachers employed in state-approved high schools should include the following:

ENGLISH: 24 term hours in literature, composition, speech, dramatics. SOCIAL STUDIES: 24 term hours in history, political science, economics, sociology, geography, philosophy. (A maximum of 6 term hours in library science may be applied toward satisfying the recommendation in English or social studies.) SCIENCE AND MATHEMATICS: 17 term hours, including 9 hours in biological science and 8 hours in physical science and mathematics or in either of these fields. ARTS AND CRAFTS: 6 term hours in music, or in plastic, graphic, or industrial arts (equivalent performance standards may be accepted if approved by the teacher-training institution).

Students wishing to qualify for certification and placement should confer with the members of the faculty of the School of Education not later than the end of the second term of their sophomore year.

Application for certification must be made to the State Superintendent of Public Instruction. An official record of the applicant's preparation, required as a basis for certification, will be submitted to the State Superintendent by the State College Registrar, on request.

The holder of a one-year state certificate, or a five-year state certificate, or a state life certificate, is authorized to act as city superintendent of the schools of any city.

The following fees are payable to the State Superintendent of Public Instruction at the time the application for certification is made:

One-year certificate	\$2.00
Five-year certificate	2.00
Renewal of five-year certificate	2.00

Subject Preparation

IN ORDER to be recommended by Oregon State College for a teaching position a graduate must have prepared himself, through suitable college courses, for the teaching of at least two subjects. To insure better opportunities for placement, it is desirable that students intending to teach qualify for the supervision of at least one extracurricular activity and, if possible, for teaching in a third subject field.

One of the student's subject fields must be a field in which State College offers supervised teaching, namely: science education (general biology, health education, human biology, general science, mathematics, physical science), agriculture, commercial education, home economics, or industrial arts. Exception to this requirement may be made in the case of students transferring from other institutions, who have completed courses in special methods and supervised teaching before entering Oregon State College.

Listed below are courses which the State College requires for minimum subject preparation in the several teaching fields; these requirements satisfy the subject-preparation standards of the State Board of Education (see pages 262-263). It is important to note, however, that they satisfy the *minimum* requirements only. Where majors are outlined the major (including upper-division work) should be chosen in preference to the minor, particularly by students who plan to teach in other states. *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 subject-matter courses that do not satisfy major or minor requirements are of great help to teachers (for example, work in oral English, extempore speaking, journalism, library, economics, sociology, and political science). Students preparing to teach in junior or senior high schools are advised and urged to take J 111, Elementary Journalism, and J 313, Public Information Methods. All high-school teachers will find these courses valuable in connection with high-school newspaper work and in connection with school news in the newspapers of the local community. Students should consult members of the faculty of the School of Education concerning such supplementary training that would be of particular value in relation to their individual training programs. Attention is called to the Camp Education minor (page 268).

The approved majors and minors in teaching fields are classified in two groups. Students must include either a major or a minor in the first of these groups.

Group I. Majors and Minors

A student seeking a high-school teacher's certificate must select either a major or a minor in this group.

Science Education

*Biological Science: General Biology

	Term hours	
	For major	For minor
General Zoology	9	9
General Botany	9	9
Principles of Entomology (Ent 419) (or Elementary Entomology).....	3-9	3
Bacteriology (Elementary or Principles)	3-6	3
Electives in field of biology (6-9 hours in upper division)	12-6	—
	36	24

* See footnote on next page.

***Biological Science: Health Education**

	Term hours	
	For major	For minor
Introduction to Health Education (SEd 123)	3	3
Health Education (SEd 441, 442, 443)	9	9
School Health Problems (SEd 431, 432, 433)	9	9
Advanced Hygiene (PE 250)	3	3
Nutrition (FN 225)	3	3
Nine hours selected from the following with approval of adviser:		
Community Health Problems (Bac 425, 426), 6 hours	9	---
First Aid (PE 358), 2 hours		
Safety Education (Ed 358), 3 hours		
Health Education Seminar (Bac 407 or SEd 507), 3 hours		
Epidemiology (Bac 453), 3 hours		
	36	27

***Biological Science: Human Biology**

Human Biology (Z 101, 102, 103)	9	
General Chemistry (Ch 101, 102, 103)	9	
Elementary Human Anatomy (Z 321, 322)	6	
Applied Human Anatomy (Z 323)	3	
Physiology (Z 331, 332)	6	
Applied Human Physiology (Z 336)	3	
General Bacteriology (Bac 204)	3	
Pathogenic Bacteriology (Bac 332)	3	
Elective Biology	3	
Courses selected with approval of adviser	---	27
	45	27

General Science

Biological Science Survey	12	12
Physical Science Survey	12	12
Electives in biological or physical science	9	9
Biological or physical science (upper-division)	9	---
	42	33

Specific courses or areas covered by survey courses may be substituted in either major or minor. Desirable electives are: Elementary Entomology, Principles of Bacteriology, Photography, Astronomy, Geology of Oregon, Field Geology, Ornithology, Evolution.

Mathematics

Elementary Analysis (Mth 101, 102, 103) or equivalent	12	12
Differential and Integral Calculus or equivalent	12	12
Upper-division approved mathematics courses	12	---
	36	24

For the last term of calculus any courses in mathematics from Mth 410 to 416 inclusive may be substituted.

Physical Science

General Chemistry	15	12-15
General Physics	12	12
Geology (Oregon)	---	3
Geology (Oregon or General)	3-9	---
Electives in the field of physical science (upper-division)	6-3	---
	36-39	27-30

Biological Science Survey is recommended to accompany a physical-science major, and Physical Science Survey is recommended to accompany a biological-science major, unless the student is minoring in the opposite field. Suggested electives for major are: Photography, Astronomy.

* Physical Science Survey is recommended to accompany a biological-science major, and Biological Science Survey is recommended to accompany a physical-science major, unless the student is minoring in the opposite field. Health Education must be accompanied by adequate science preparation.

Agriculture

	Term hours	
	For major	For minor
Physical Science	12	9
Biological Science	12	9
Electives in Agriculture	12	9
	<u>36</u>	<u>27</u>

The major and minor in agriculture are for prospective teachers of general agriculture and are designed to serve the following purposes: (1) to provide high schools of moderate size with teachers prepared to teach a combination of courses in the fields of agriculture and natural science; (2) to familiarize prospective teachers of the natural sciences with concrete situations, materials, and problems in agriculture and rural life valuable in vitalizing the instruction; (3) to prepare teachers who can offer a separate course in agriculture for farm boys mainly for its vocational and vocational-guidance values.

Commercial Education

Stenography (SS 111, 112, 113)	9	9
Typing (SS 121, 122, 123)	6	6
Principles of Accounting (BA 211, 212, 213)	9	—
Applied Stenography (SS 211, 212, 213)	9	9
Office Procedure (SS 311)	4	4
Business Law (BA 411)	4	—
Merchandising and Selling (SS 436)	3	—
	<u>44</u>	<u>28</u>

Students who have had one year or more of typing or shorthand will receive advanced standing according to ability shown in placement test provided by the Department of Secretarial Science.

Students, on approval, may take BA 111, 112, 113, 311, and other courses in place of some of the courses listed in either the major or the minor, but see page 263.

Home Economics

Foods (FN 220, 221, 222 for students electing chemistry; FN 211, 212, 213 for those not electing chemistry)	9	9
Nutrition (FN 225)	3	3
Clothing (CT 250, 211, 212 for students electing specified art courses; CT 250, 217, 218, 219 for those not electing specified art courses)	9	9
Child Development (HAd 311, 312)	6	6
Home Management (HAd 340)	3	3
Electives from at least two of the following groups totaling 15 hours:		

A. Foods

Food Purchasing (FN 411), 3 hours
 Experimental Cookery (FN 435), 3 hours
 Quantity Cookery and Catering (IEc 311), 3 hours
 Cafeteria Management (IEc 320), 3 hours
 Feeding the Family (FN 325), 2 hours
 Food Management (FN 412), 3 hours
 Food Demonstrations (FN 413), 3 hours

B. Clothing

Home Furnishing (CT 231), 3 hours
 Costume Design (CT 311), 3 hours
 Clothing (CT 312), 3 hours
 Applied Design (CT 335), 3 hours
 Home Furnishing (CT 331), 3 hours
 Home Furnishing (CT 431), 3 hours
 Consumer Buying in Clothing and Textiles (CT 350), 3 hours

C. Household Administration

All courses in the Department of Household Administration are open to those who have completed a minor in home economics, but the following are particularly recommended in the order named:

Home Management House (HAd 450), 5 hours
 Family Relationships (HAd 422), 2 hours
 Nursery School Procedures (HAd 425), 3 hours

15

45

30

Industrial Arts

	Term hours	
	For major	For minor
Methods in Woodworking (IA 112, 113)	6	6
Engineering Drawing (GE 111, 112, 113)	6	6
Lower-Division Drawing (AA 291)	3	3
Wood Turning (IA 220)	2	2
Machine and Tool Maintenance (Wood Shop) (IA 225)	2	2
Fiber Furniture Weaving (IA 326)	2	2
Millwork—Machine Woodwork (IA 311)	3	3
Wood and Metal Finishing (IA 316)	3	3
Industrial Arts Organization (Ed 330)	2	2
The General Shop and Its Problems (IEd 473)	2-3	---
Furniture Construction (IA 313) or Carpentry and Building Construction (IA 333)	3	---
Occupational Analysis (IEd 472)	3	---
Written and Visual Teaching Aids (IEd 474)	3	---
Shop Planning and Organization (IA 411)	3	---
Electives in general metal work, or additional courses in woodwork and drawing subjects	6	5
	46-47	37

See page 283 for a statement of objectives controlling the major and minor. The major outlined is a basic major with woodworking emphasis. Students desiring a different combination, or help on individual problems, should confer with the head of the Department of Industrial Arts. See page 283 for statement of the three types of program offered. Students who wish to teach industrial arts in states that demand additional certification requirements should refer to the professional-technical curriculum for industrial-arts education (pages 301-302) and should confer with the head of the Department of Industrial Arts.

Military Science**Air Corps**

First-Year Elementary Course (MS 141, 142, 143)	6
Second-Year Elementary Course (MS 241, 242, 243)	6
First-Year Advanced Course (MS 341, 342, 343)	9
Advanced Summer Camp (MS 344)	6
Second-Year Advanced Course (MS 441, 442, 443)	9
	36

Infantry

First-Year Elementary Course (MS 111, 112, 113)	6
Second-Year Elementary Course (MS 211, 212, 213)	6
First-Year Advanced Course (MS 311, 312, 313)	9
Advanced Summer Camp (MS 314)	6
Second-Year Advanced Course (MS 411, 412, 413)	9
	36

Field Artillery

First-Year Elementary Course (MS 121, 122, 123)	6
Second-Year Elementary Course (MS 221, 222, 223)	6
First-Year Advanced Course (MS 321, 322, 323)	9
Advanced Summer Camp (MS 324)	6
Second-Year Advanced Course (MS 421, 422, 423)	9
	36

Military Engineering

First-Year Elementary Course (MS 131, 132, 133)	6
Second-Year Elementary Course (MS 231, 232, 233)	6
First-Year Advanced Course (MS 331, 332, 333)	9
Advanced Summer Camp (MS 334)	6
Second-Year Advanced Course (MS 431, 432, 433)	9
	36

Signal Corps

First-Year Elementary Course (MS 151, 152, 153)	6
Second-Year Elementary Course (MS 251, 252, 253)	6
First-Year Advanced Course (MS 351, 352, 353)	9
Advanced Summer Camp (MS 354)	6
Second-Year Advanced Course (MS 451, 452, 453)	9
	36

Naval Science

	Term hours	
	For major	For minor
Naval Orientation and Seamanship (NS 111)	3	
Seamanship and Communications (NS 112)	3	
Ship Control and Naval Justice (NS 113)	3	
Ordnance (NS 211)	3	
Fire Control (NS 212)	3	
Applied Naval Electronics (NS 213)	3	
Piloting (NS 311)	3	
Navigation (NS 312)	3	
Tactics (NS 313)	3	
Third-Year Cruise, First Period (NS 331)	3	
Third-Year Cruise, Second Period (NS 332)	3	
Naval Machinery (NS 411)	3	
Internal Combustion Engines (NS 412)	3	
Ship Construction and Stability (NS 413)	3	
	42	

Marine Corps

In place of NS 312, 313, 411, 412, 413, Marine Corps students take the following:

- Military History (NS 322), 3 hours.
- Military Principles (NS 323), 3 hours.
- Marine Tactics (NS 421), 3 hours.
- Combat Technique (NS 422), 3 hours.
- Amphibious Operations (NS 423), 3 hours.

Group II. Minors**Art**

	Term hours for minor
<i>Drawing and Painting</i>	
Basic Design (AA 195)	6
Visual Arts: History and Appreciation (AA 114, 115, 116)	6
Lower Division Drawing (AA 291)	6
Lower Division Painting (AA 290)	9
	27
<i>Art Crafts</i>	
Basic Design (AA 195)	6
Visual Arts: History and Appreciation (AA 114, 115, 116)	6
Lower Division Decorative Design (Applied Design) (AA 296)	9
Electives in art	6
	27

Business Administration

Principles of Accounting (BA 211, 212, 213)	9
Marketing (BA 313)	4
Business Law (BA 411)	4
Production (BA 311)	4
Finance (BA 312)	4
	25

Camp Education

Camp Education (Ed 361, 362, 363)	9
School and Community Club Work (Ed 425)	3
Leadership of Party Games (PE 240)	2
Nature, Function, and Organization of Play (PE 435)	3
Electives approved by adviser chosen from: arts and crafts, music, drama, nature studies, geology, astronomy, industrial arts, design, photography, physical education, forest management, recreation	9
	26

***English**Term hours
for minor

Literature Survey (Eng 101, 102, 103) or Introduction to Literature (Eng 104, 105, 106)	9
Two terms of Shakespeare	6
American Literature (Eng 163)	3
English Composition for Teachers (Eng 324)	3
Electives	6
	<u>27</u>

French

RL 1, 2, 3 (first year), or equivalent, and the following courses:

Second-Year French (RL 4, 5, 6)	12
French Literature (RL 311, 312, 313)	9
Second-Year French (RL 4, 5, 6) (b, conversational drill), Directed Reading in French (RL 211, 212, 213)	9
	<u>27</u>

German

GL 1, 2, 3 (first year), or equivalent, and the following courses:

Second-Year German (GL 4, 5, 6)	12
German Literature (GL 311, 312, 313)	9
Second-Year German (GL 4, 5, 6) (b, conversational drill), Scientific German (GL 320, 321, 322)	9
	<u>27</u>

Music*Vocal*

†Theory (Mus 111, 112, 113)	9
Appreciation of Music (Mus 121, 122, 123)	3
Individual Instruction (Mus 190) or Group Instruction (Mus 191) as directed	5
*Theory (Mus 211, 212, 213)	6
College Chorus (Mus 290)	3
Glee Club Conducting (Mus 433)	1
	<u>27</u>

Instrumental

†Theory (Mus 111, 112, 113)	9
Appreciation of Music (Mus 121, 122, 123)	3
Individual Instruction (Mus 190) or Group Instruction (Mus 192, 193) as directed	5
*Theory (Mus 211, 212, 213)	6
Band Organization (Mus 331, 332) or Orchestral Conducting (Elementary) (Mus 291, 292)	4
	<u>27</u>

†Physical Education**MEN**

Introduction to Physical Education (PE 121, 122)	6
Technique of Physical Education (PE 174, 175, 176)	6
Technique of Physical Education (PE 274, 275, 276)	6
Coaching of Football (PE 347)	} Three courses selected from this group
Coaching of Basketball (PE 346)	
Coaching of Baseball (PE 348)	
Coaching of Track and Field (PE 349)	} 6
Minimum hours for recommendation to coach one or more sports in connection with other teaching work	
	<u>24</u>

All teachers of physical education in Oregon are also required to have at least 12 hours in health education. Courses in health education include: PE 221; PE 358; SEd 431, 432, 433; SEd 441, 442, 443; Bac 204, 205, 206; Bac 261; Bac 425, 426; FN 225; HAd 225. Students interested in teaching Physical Education or Biological Science, or both, may include a minor in health education.

* Six term hours of Speech may be counted in the English minor and 6 term hours of English may be counted in the Speech minor.

† Theory credit is applied on the music minor only when the three-term sequence is completed.

The minor curricula in vocal and instrumental music prepare the student to teach music in the high school. Some knowledge of piano is necessary to the student in a music minor curriculum and unless he has had this training additional work in piano may be needed. If the student is competent in accompanying, this can be adjusted.

The subject for individual and group instruction (voice, piano, violin, or other) will be determined by the student with the guidance of his adviser in the department.

Additional study in the various upper-division service courses in music is recommended for those who wish to augment the minimum requirements of the minor.

‡ See Camp Education minor, page 268.

WOMEN

Term hours
for minor

Introduction to Physical Education (PE 121, 122)	6
Physical Education Technique (Women) (PE 343, 344, 345)	9
Electives approved by the department, chosen from the following:	
Organization and Administration (PE 423), 3 hours	9
Supervised Teaching (Ed 415), 3 hours	
Tests and Measurements in Physical Education (PE 422), 3 hours	
School and Community Club Work (Ed 425), 3 hours	
Principles of Physical Education (PE 421), 3 hours	
Nature, Function, and Organization of Play (PE 435), 3 hours	
Seminar in Summer Camp Leadership (Ed 407), 1 or 2 hrs.	
Leadership of Party Games (PE 240), 2 hours	

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RECREATION

Community Recreation (Ed 426)	3
School and Community Club Work (Ed 425)	3
Leadership of Party Games (PE 240)	2
Nature, Function, and Organization of Play (PE 435)	3
Junior Physical Education (PE 314)	1
Electives, approved by adviser, chosen from fields of social sciences, arts and crafts, music, and drama	12

24

Social Science

Any three of the following sequences or any two of the following sequences accompanied by an upper-division sequence in any one of these fields:

History of Western Civilization (Hst 201, 202, 203)	9	27*
History of American Civilization (Hst 224, 225, 226)	9	
Principles of Economics (Ec 201, 202, 203)	9	
American National Government (PS 201), State and Local Gov- ernment (PS 202), European Governments (PS 203)	9	
Elements of Sociology (Soc 201, 202, 203)	9	
Human Geography (HG 101), Economic Geography (HG 102), Geography of North America (HG 103)	9	

Spanish

RL 11, 12, 13 (first year), or equivalent, and the following courses:

Second-Year Spanish (RL 14, 15, 16)	12
Spanish Literature (third year) (RL 341, 342, 343)	9
Electives approved by department	6
	27

†Speech

Extempore Speaking (Sp 111, 112)	6
Voice and Diction (Sp 120)	3
Interpretation I (Sp 121)	3
Community Drama (Sp 247)	3
Electives	12
	27

General Speech

Extempore Speaking (Sp 111)	3
Voice and Diction (Sp 120)	3
Interpretation (Sp 121, 122)	6
Speech Science (Sp 291)	3
Argumentation (Sp 220)	3
Speech Composition (Sp 221)	3
†Community Drama (Sp 247)	3
†Radio Speaking (Sp 334)	3

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* A student planning to teach social science in Oregon must complete 36 hours in these fields.

† Six term hours of speech may be counted in the English minor and six term hours of literature may be counted in the Speech minor.

‡ Electives in dramatics and radio speaking recommended.

	Term hours for minor
*Radio Speech	
Extempore Speaking (Sp 111)	3
Voice and Diction (Sp 120)	3
Interpretation I (Sp 121)	3
Radio Speaking (Sp 334, 335, 336)	9
Electives	9
	<hr/> 27
Dramatics	
Extempore Speaking (Sp 111)	3
Voice and Diction (Sp 120)	3
Interpretation (Sp 121, 122)	6
Community Drama (Sp 247, 248, 249)	9
Electives	6
	<hr/> 27
Speech Correction	
Extempore Speaking (Sp 111)	3
Voice and Diction (Sp 120)	3
Interpretation I (Sp 121)	3
Speech Science (Sp 291)	3
Speech Defects (Sp 392)	3
Speech Clinic (Sp 393)	3
Electives	9
	<hr/> 27
Forensics	
Extempore Speaking (Sp 111, 112)	6
Voice and Diction (Sp 120)	3
Speech Science (Sp 291)	3
Argumentation (Sp 220)	3
Speech Composition (Sp 221)	3
†Squad or electives	9
	<hr/> 27

Professional Curricula in Education

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

STUDENTS BASIC PROGRAM

THE following program of study shows the work that should be followed by students who are intending to become high-school teachers or whose special interest lies in the field of guidance, counseling, and personnel.

MAJORS	MAJOR IN GUIDANCE, COUNSELING, AND PERSONNEL WORK	MINORS	MINORS
<i>In which observation, supervised teaching, and apprentice teaching may be done at the State College</i>	<i>Including observation and supervised practice at the State College.</i>	<i>In which observation, supervised teaching, and apprentice teaching may be done at the State College.</i>	<i>In which observation is provided at the State College</i>
Science Education	The major in Guidance, Counseling, and Personnel Work should be accompanied by a major or one minor in teaching fields.	Science Education	Agriculture
Biology		Biology	Art
Health Education		Health Education	Business Administration
Human Biology		Human Biology	Camp Education
General Science		General Science	English
Mathematics		Mathematics	(Journalism)
Physical Science		Physical Science	French
Agriculture		Commercial Education	German
Commercial Education		Physical Education	Home Economics
Home Economics			Industrial Arts
Industrial Arts			Military Science
Military Science			Music
Naval Science			Naval Science
Physical Education			Social Science
			Spanish
			Speech

* All students taking Radio Speech must be able to type.

† Parliamentary Procedure (Sp 231) recommended.

	Freshman Year ¹		
	F	W	S
Required:			
English Composition (Eng 111, 112, 113)	3	3	3
Laboratory Science or Mathematics	3	3	3
Military or Naval Science (men)	1	1	1
Physical Education	1	1	1
Recommended electives:			
*Courses in teaching fields	3	3	3
Methods of Study (Ed 101)	3 or (3)	3 or (3)	3 or (3)
Mental Hygiene (Ed 102)	(3) or 3	3 or 3	(3) or 3
History of Western Civilization (Hst 201, 202, 203)	3	3	3
Art, Foreign Language, Music, Speech, etc.	2	2	3
	16	16	17

	Sophomore Year ¹		
	F	W	S
Required:			
Outlines of Psychology (Psy 207, 208)	3	3	3
Literature	3	3	3
Extempore Speaking (Sp 111)	(3) or 3	3 or 3	(3) or 3
History of Oregon (Hst 377)	(3)	3	3
Military or Naval Science (men)	1	1	1
Physical Education	1	1	1
Recommended electives:			
*Courses in teaching fields	3	3	3
History of American Civilization (Hst 224, 225, 226), Art Appreciation, Debate, Dramatics, Family Relationships, Journalism, Music Appreciation, Political Science, Religion, Sociology, etc.	5	2	5
	16	16	16

	Junior Year ¹		
	F	W	S
Required:			
Secondary Education (Ed 311)	3	---	---
Educational Psychology (Ed 312)	---	3	---
Principles of Teaching (Ed 313)	---	---	3
Outlines of Economics (Ec 211 or 212)	4-3	---	---
General Sociology (Soc 212)	---	3	---
American National Government (PS 201)	---	---	3
Recommended electives:			
*Courses in teaching fields	6	6	6
Educational Sociology, Economics, Health Education, Secondary School Library, Marketing Organizations, Military Science, Public Information Methods, etc.	3-4	3-4	4
	16	16	16

¹GENERAL NOTES

- 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 major subject and one or two minor subjects, chosen from the lists of available majors and minors. (The courses required for the various majors and minors are listed on pages 264-271.) Some preparation in an additional field should be included if possible and also one or more extracurricular activities. The School of Education provides a large number of electives in each term of the four-year program for the bachelor's degree. The fifth year required for the master's degree or High School Teacher's Certificate, or both, is practically all elective.
- In the freshman year General Hygiene (PE 150), 1 term hour for men, 2 term hours for women, is taken one term in place of physical education.
- Emphasis in the junior year should continue on subject-matter preparation. Each subject included in the student's program should be carefully planned with a faculty adviser. By the student's senior year most of the subject-matter preparation should have been completed and special attention should be given to the professional courses in education.
- Students who decide to take a B.S. or B.A. degree without a High School Teacher's Certificate may complete the requirements for graduation in four years, omitting Supervised Teaching and all Methods courses. Summer session attendance may be used to reduce the time or the term load. Students who plan carefully may complete the regular work for the bachelor's degree and also the additional credits for a High School Teacher's Certificate in four years time by using one or two summer sessions.
- Students looking forward to work as counselors, deans of girls, deans of boys, teachers of occupations courses, and to other phases of personnel and guidance work in connection with the public schools and other social agencies and organizations should include the following courses: Ed 416, 461, 485, 486, 487, 517, 527; Soc 314.

* Consult advisers as early as possible.

	Senior Year ¹	Term hours		
		F	W	S
Required:				
Methods and Materials (Ed 408)	3	or 3	or 3
Supervised Teaching (Ed 415)	3-9	3-9	3-9
Oregon School Law and Oregon System of Education (Ed 316) (may be taken fifth year)	2	or 2	or 2

Recommended electives:

Measurement in Secondary Education (Ed 416); School Health Problems (SEd 431, 432, 433); School and Community Club Work (Ed 425); Construction and Use of Visual Aids (Ed 431); History of Education (Ed 440); Health Education (SEd 441, 442, 443); Psychology of Childhood (Ed 460); Adolescence: Growth and Development of the Individual (Ed 461); The Junior High School (Ed 470); Guidance and Personnel Practices (Ed 485); Current Occupational Trends (Ed 486); Civic Education (Ed 489); Character Education (Ed 490); Group Thinking (Ed 491); Organization and Supervision for High-School Teachers (Ed 498); Military Science	.....	4-10	4-10	4-10
		16	16	16

Fifth Year

See pages 262-263 for requirements for a State Teacher's Certificate. Fifth-year students meeting certification requirements are not required to qualify for a master's degree. In some cases such students may qualify for a second bachelor's degree. For most high-school positions, however, a master's degree is desirable. Students preparing to enter counseling, guidance, and personnel work should qualify for a master's degree. See GRADUATE STUDY below.

GRADUATE STUDY

Students may pursue graduate study in the School of Education 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 the State College, or for counseling, guidance, and personnel work in secondary schools or in colleges. The programs of graduate students are worked out on an individual basis, according to needs and objectives of the student and the regulations of the Graduate School.

Education

I NSTRUCTION given in education covers the principles and the technique of teaching at the secondary and college levels, educational psychology, special methods in teaching the various major subjects in which the State College gives teacher training, the history and philosophy of education, guidance, counseling, and personnel work.

DESCRIPTION OF COURSES**LOWER-DIVISION COURSES**

Ed 101. **Methods of Study.** 3 hours any term.

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.

Ed 102. **Mental Hygiene.** 3 hours any term.

The conditions of healthy mental development and normal reactions to life and the college environment; the habits, attitudes, and proper functioning of a normal mind. Professor Chambers.

UPPER-DIVISION COURSES

See BACCALAUREATE DEGREES, pages 260-261.

Ed 311. **Secondary Education.** 3 hours any term.

Problems of the high school from the standpoint of the teacher; aims, functions, and characteristics. Prerequisite: Psy 201, 202, 203, or Psy 207, 208.

¹See GENERAL NOTES on page 272.

Ed 312. Educational Psychology. 3 hours any term.

Laws of learning and application to classroom; motivation; transfer of training; memory; forgetting; psychology of secondary school subjects. Prerequisite: Psy 201, 202, 203, or Psy 207, or equivalent. Professor Laslett, Associate Professor Reichart.

Ed 313. Principles of Teaching. 3 hours any term.

Different methods of presentation of subject-matter, values, and weaknesses of each method; individual and group differences; extracurricular activity programs; measuring the results of teaching. Prerequisite: Ed 311, 312. Professor Clinton, Associate Professor Williamson.

Soc 314. Educational Sociology. 3 hours spring.

Analysis of contributions of sociology to educational problems and practices. School of Education students may count this course toward the 36 required hours in education. Prerequisite: elementary sociology. Professor Bakkum.

Ed 316. Oregon School Law and Oregon System of Education. 2 hours any term.

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. Professor Clinton.

Ed 330. Industrial Arts Organization. 3 hours winter.

Selection and organization of subject matter for shop work and drawing courses in secondary schools; evaluation of jobs, projects, and class problems; teaching plans. Prerequisite: Ed 313 and junior standing. Assistant Professor Hahn.

Ed 341. Rural Education. 3 hours winter.

Utilizing rural, social, and economic environment to vitalize high-school instruction, and increase farm, home, and town-country efficiencies; continuation education. Prerequisite: upper-division standing. Professor Gibson.

Ed 358. Safety Education. 3 hours.

Background and knowledge of all phases of safety; home, fire, industrial, water, rural, school, and traffic safety; elementary, secondary, and adult levels. Prerequisite: Ed 311, 312, 313. Assistant Professor Dixon.

Ed 361, 362, 363. Camp Education. 3 hours each term.

Camp activities including handicrafts, camp crafts, nature, safety, waterfront, music, and dramatics with practical experience; counselor training including history, camp program, and problems; camp management, organization, and administration. Miss Milliken.

Ed 401. Research. Terms and hours to be arranged.**Ed 403. Thesis.** Terms and hours to be arranged.**Ed 405. Reading and Conference.** Terms and hours to be arranged.**Ed 407. Seminar.** 1 or 2 hours any term.

Prerequisite: Ed 311, 312, 313. Staff.

Ed 408. Methods and Materials. 3 hours any term.

Problems and methods in selecting and organizing materials for instruction; comparison and evaluation of methods, laboratory techniques, supplies, equipment; economy of time and materials. Courses include: (a) agriculture, (b) biological science, (c) commerce, (d) home economics, (e) industrial arts, (f) mathematics, and (g) physical science. Prerequisite: Ed 311, 312, 313. (Six hours maximum allowed toward certification.)

- Ed 414. **Supervised Nursery School Experience.** (G) 8 hours any term.
Full participation in the program of the nursery school with supervision.
Prerequisite: HAd 425. Three laboratory periods; 1 recitation. Professor Read, Miss Rea.
- Ed 415. **Supervised Teaching.** 3 to 9 hours.
Experience in classroom procedures along the lines of the student's academic preparation and interests. Prerequisite: Ed 311, 312, 313. Associate Professor Williamson and others.
- Ed 416. **Measurements in Secondary Education.** (G) 3 hours fall or spring.
Construction and desirable uses of standard tests and scales for measuring achievement in secondary-school subjects; elements of statistical method. Professors Clinton, Laslett.
- Ed 425. **School and Community Club Work.** (G) 3 hours winter.
A cooperative effort to prepare for effective club work and community leadership. (Students may work in a chosen field under specialists, such as 4-H Club, Boy Scouts.) Prerequisite: Ed 311, 312, 313. Professor Seen.
- Ed 426. **Community Recreation.** (G) 3 hours.
Aims to give an understanding of the developing philosophy of recreation, trends, problems in organization and administration of a recreation program in large, small, and rural communities. Prerequisite: senior or graduate standing or consent of instructor. Professor Seen.
- Ed 431. **Construction and Use of Visual Aids.** (G) 3 hours winter.
Film, slide, chart, and other visual materials; selection and use to best advantage; operation of projectors and other equipment. One lecture; 1 two-hour laboratory period. Prerequisite: Ed 311, 312, 313, or equivalent. Assistant Professor Hahn.
- Ed 440. **History of Education.** (G) 3 hours fall.
Growth and development of education; Plato, Aristotle, Renaissance educators, Comenius, Locke, Rousseau, Pestalozzi, Froebel, Herbart, Herbert Spencer, and Dewey. Prerequisite: Ed 311, 312, 313. Professor Warrington.
- Ed 460. **Psychology of Childhood.** (G) 3 hours fall or spring.
Mental development; native responses; play, self-assertion, instinctive social attitudes; speech, emotions; simple, complex mental processes; mental organization. Prerequisite: Ed 311, 312, 313. Professor Laslett, Associate Professor Reichart.
- Ed 461. **Adolescence: Growth and Development of the Individual.** (G) 3 hours winter.
Processes through which normal human being reaches maturity, effective use of his bodily equipment and learning capacity, and satisfactory personal and social adjustments; recent studies. Prerequisite: Ed 311, 312, 313. Professor Laslett, Associate Professor Reichart.
- Ed 464. **Vocational Legislation and Administration.** (G) 3 hours.
For students with teaching experience and training in industrial subjects to qualify for administrative or supervisory service. Prerequisite: Ed 488 or equivalent. Extramural or summer quarter. Associate Professor Paulson.
- Ed 470. **The Junior High School.** (G) 3 hours fall or winter.
Junior high school and guidance movement; purposes and opportunities of junior high school years. Outstanding junior high schools are studied. Prerequisite: Ed 461 or equivalent.

Ed 474. Written and Visual Teaching Aids. (G) 3 hours winter or spring.

Making of visual aids for more efficient teaching in large and diversified classes: diagrams, charts, models, and instruction sheets. Prerequisite: Ed 311, 312, 313. Assistant Professor Hahn.

Ed 480. The Conference Method in Vocational Education. (G) 3 hours.

Designed to develop ability in conference leading. Technique; practice in conducting conferences. Prerequisite: Ed 408e or consent of instructor. Two two-hour conference periods. Extramural or summer quarter.

Ed 485. Guidance and Personnel Practices. (G) 3 hours fall.

An introduction to the field of guidance and counseling. Means and methods of assisting students with personal and vocational problems; necessary school policies. Professor Zeran.

Ed 486. Current Occupational Trends. (G) 3 hours winter.

Materials available in occupational world; interpretations of present trends; sources of such material; value and usefulness for high-school and college students. Prerequisite: Ed 485 or equivalent. Professor Zeran.

Ed 487. Counseling. (G) 3 hours spring.

Mental, achievement, trade, and other tests; administration of such tests; classification; methods in educational and vocational counseling. Prerequisite: Ed 416, 485, or 486, or equivalent. Professor Zeran.

Ed 488. Philosophy of Vocational Education. (G) 3 hours winter.

Place and need of vocational education in a democracy; evolution of philosophy of vocational education as a phase of the general education program. Prerequisite: Ed 311, 312, 313, or equivalent.

Ed 489. Civic Education. (G) 3 hours fall or spring.

School as transmitter of social inheritance; contribution of school organization, subjects, methods, extra-school activities, and discipline to citizenship training. Prerequisite: Ed 313 or equivalent.

Ed 490. Character Education. (G) 3 hours any term.

Character in social purposes of education; dynamic function of feelings; conditioning of interests; ideals; habit formation; integration of habits and attitudes. Prerequisite: Ed 311, 312, 313. Professor Warrington.

Ed 491. Group Thinking. (G) 3 hours spring.

Reasoned judgment on public affairs; how diversified groups may cooperate in discovering new roads to new and better goals; technique of leadership in group thinking. Prerequisite: Ed 311, 312, 313. Professor Warrington.

Ed 492. Character Education Problems. (G) 3 hours.

Bearing of social change on conduct; democratic participation in group thought-life; successful plans; program building. Prerequisite: Ed 490. Professor Warrington.

Ed 497. Adult Education. (G) 3 hours fall.

Development, methods, and results; public schools, extension instruction, industrial and commercial organizations, radio, and other agencies of adult learning. Prerequisite: Ed 311, 312, 313. Professor Warrington.

Ed 498. Organization and Supervision for High-School Teachers. (G) 3 hours winter.

Administrative organization, methods, and purposes of supervision as they involve the classroom teacher. Prerequisite: Ed 311, 312, 313. Professor Clinton.

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 the 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, CEEd 501, HEEd 501, IEd 501, SEEd 501.

Problems in Adult Education—Professor Warrington.

Problems in Curriculum and Instruction—Professor Clinton.

Problems in Educational Psychology—Professors Reichart and Laslett.

Problems in Guidance—Professor Zeran.

Problems in History or Philosophy of Education—Professor Warrington.

Problems in Measurements—Professor Clinton.

Problems in Secondary Education—Professors Williamson and Stutz.

Problems in Higher Education—Professor Goode.

Problems in Social or Moral Education—Professor Warrington.

Ed 503. Thesis. Terms and hours to be arranged. Staff.

Ed 505. Reading and Conference. Terms and hours to be arranged. Staff.

Ed 507. Seminar. Terms and hours to be arranged. Staff.

Ed 508. Curriculum Workshop. Terms and hours to be arranged.

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. Associate Professor Williamson.

Ed 511. Recent Educational Trends and Problems. 3 hours.

Trends, problems, and developments in all fields of education with particular reference to high schools. Prerequisite: 24 hours of upper-division Education including supervised teaching. Professor Clinton.

Ed 512. Introduction to Thesis Writing. 2 hours fall.

Open to graduate students in education and other schools. Finding materials; thesis organization; types of research suited to problems; bibliography. Prerequisite: graduate standing. Professor Clinton.

Ed 517. Statistical Methods in Education. 3 hours fall.

Elements of statistical method; methods of treating collective facts, average facts, and correlated facts, as applied to giving and scoring tests, finding costs, etc. Prerequisite: Ed 416. Professor Clinton.

Ed 522. Foreign School Systems. 3 hours winter.

Comparative study of education in France, Germany, Great Britain, and Denmark; effectiveness of liberal and vocational education in the countries studied. Prerequisite: Ed 440.

Ed 524. Curriculum Construction. 3 hours winter.

Building junior and senior high-school curricula; theories and policies since 1900; selecting and organizing subject matter; courses of study; curriculum organization. Prerequisite: Ed 311, 312, 313, or equivalent.

Ed 526. Construction and Use of Objective Examinations. 3 hours winter or spring.

Principles and statistics involved in the selection of test items; types of examinations; validity; reliability; administering, scoring, grouping results. Prerequisite: Ed 416. Professor Laslett.

- Ed 527. Tests and Their Social Uses.** 3 hours spring.
Application to cultural, moral, social, and educational problems; basic principles leading to improvement; adjustment of students in scholastic and personal activities. Prerequisite: Ed 416. Professor Laslett.
- Ed 535. Psychological Aspects of Vocations.** 3 hours.
Psychological principles applied to: (1) choice of occupations, (2) adjusting or aiding others in adjusting, and (3) alteration of occupational conditions and demands to meet needs. Prerequisite: Ed 311, 312. Professor Chambers.
- Ed 543. History of American Education.** 3 hours spring.
Intellectual development of America with special reference to education. Prerequisite: knowledge of American history; Ed 311, 312, 313, or equivalent. Professor Warrington.
- Ed 546. Philosophy of Education.** 3 hours winter.
Fundamental problems of education, with some attempt at their solution; meaning of philosophy; philosophy of education; value for teacher and administrator. Prerequisite: Ed 311, 312, 313. Professor Warrington.
- Ed 555. College and University Teaching.** 3 hours spring.
Aims, procedures, and evaluation in college teaching; professional relationships and interests; individual studies according to student's field. (*See also* College Curriculum Studies.) Prerequisite: graduate standing. Professor Goode.
- Ed 561. Advanced Educational Psychology.** 3 hours.
Experimental material that seems most useful and relevant to educational psychology. Prerequisite: graduate standing in education. Professor Laslett.

Agricultural Education

THE Department of Agricultural Education is responsible for the training of teachers and supervisors of agriculture in high schools and other secondary schools, teachers and supervisors of schools and classes for adult farmers and young men not enrolled in the regular day schools. Special consideration is given to the provisions of the federal laws for vocational education commonly known as the Smith-Hughes Act and the George-Barden Act. Included within the scope of this department are certain field activities including follow-up service for new teachers and involving the preparation of instructional material for use by agricultural instructors in cooperation with staff members of the School of Agriculture.

The Department of Agricultural Education is a joint department within the School of Agriculture and the School of Education.

Opportunities and Demand for Agricultural Teachers. The strong demand for teachers of vocational agriculture in Oregon, in states of the Pacific Region including Hawaii, and throughout the United States as a whole, is expected to continue for a number of years, if not indefinitely. The George-Barden Act, recently passed by Congress, approximately doubles the federal funds previously provided for vocational-agricultural education. Publications explaining the work and opportunities in teaching vocational agriculture are available on request.

Requirements for Teaching Agriculture. Teachers of agriculture need fundamental knowledge and a high level of doing ability in most of the departmental fields of the School of Agriculture. At the beginning of his

college course the prospective teacher should advise with the head of the Department of Agricultural Education regarding the courses he should select in each of the fields of agriculture. Certain qualifications essential in teaching vocational agriculture should be considered by the student, in conference with the head of this department, when applying for admission to this field of teaching. Attention of students interested in teaching vocational agriculture is directed to the footnote on page 205.

Requirements in Agriculture:

- (1) Graduation from a college of agriculture of standard rank.
- (2) 80 term hours, or its equivalent, of special work in agriculture are required. The student's choice of courses should depend somewhat on his previous training and experience and the recommendations of the head of the department. The suggested sequence and distribution of courses are given in the major curriculum on page 205.

Requirements in Education and for Certification:

- (1) Course requirements in Education: Beginning teachers of agriculture should have a minimum of 18 term hours in education and psychology in the four-year curriculum including courses in educational psychology, methods and materials, and supervised teaching. (See courses listed in curriculum, page 205.)
- (2) Vocational Teaching Certificate: The curriculum in agricultural education, page 205, or its equivalent, is designed to fulfill the requirements for the vocational teaching certificate. The State Director of Vocational Education will issue this certificate to applicant after he has determined his qualifications for teaching vocational agriculture and after he has been placed in teaching positions.
- (3) It is expected that persons who have been employed to teach vocational agriculture, after receiving the vocational certificate and completing the four-year curriculum, will continue systematic work in education and agriculture as needed through short summer courses and otherwise during the period of their employment in fulltime teaching. Such work may carry college credit leading to a master's degree.

Graduate Study and Apprentice Teaching in Agricultural Education. It is expected that some returning veterans and others will wish to continue their studies beyond the four-year curriculum in agricultural education and a bachelor's degree. For such students a program of experience and graduate study leading to a master's degree will be developed to meet individual needs. A portion of such experience may be done for graduate credit in the form of apprentice teaching, whereby students of approved standing are placed in high-school centers and outstanding departments of agriculture under the general supervision of the Department of Agricultural Education and immediate supervision of the local agriculture instructor who serves also in the capacity of supervising teacher. Apprentice teachers may be employed in some instances as part-time or even full-time teachers of vocational agriculture and may be recognized as regular teachers of vocational agriculture in two-teacher departments.

DESCRIPTION OF COURSES*

UPPER-DIVISION COURSES

- AEd 401. **Research.** Terms and hours to be arranged.
- AEd 403. **Thesis.** Terms and hours to be arranged.
- AEd 405. **Reading and Conference.** Terms and hours to be arranged.
- AEd 407. **Seminar.** Hours to be arranged, two terms.
- Ed 408a. **Methods and Materials.** 3 hours any term.
- (See Ed 408, page 274). Professor Gibson.

* See also courses in the Department of Education, especially Ed 341, page 274.

- AEd 417. The Agricultural Curriculum.** (G) 3 hours, winter or spring.
Determining course content and evaluating types of course organization with reference to the objectives to be attained in the field of agriculture in secondary schools. Prerequisite: Ed 313. Professor Gibson.
- AEd 418. Adult Education in Agriculture.** (G) 3 hours winter.
Developing programs for young and adult farmer groups. Students participate in recruiting, organizing, and teaching evening classes in the vicinity of Corvallis. Prerequisite: Ed 313, AEd 417.

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, any term.
Vocational agriculture teachers in service may use this course to continue their professional improvement; conferences, follow-up instruction, supervision, correspondence, reports. Prerequisite: Ed 311, 312, 313. Professor Gibson.
- AEd 533. Rural Survey Methods.** 3 hours spring.
Technique of surveys; analyzing, interpreting, and using results in evaluating and formulating programs in agricultural education; field studies. Prerequisite: Ed 311, 312, 313; teaching experience. Professor Gibson.

Commercial Education

IN conjunction with the School of Business and Technology the School of Education meets the demand for well-prepared teachers of commercial branches in secondary schools. In the selection of their courses in business administration, secretarial science, and education, students should advise with the head of the department. For the requirements of certification see pages 262-263.

DESCRIPTION OF COURSES*

- CEd 401. Research.** Terms and hours to be arranged.
- CEd 403. Thesis.** Terms and hours to be arranged.
- CEd 405. Reading and Conference.** Terms and hours to be arranged.
- CEd 407. Seminar.** Terms and hours to be arranged.
- Ed 408c. Methods and Materials.** (See Ed 408, page 274.) Associate Professor Stutz.

GRADUATE COURSES

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

* See also courses in the Department of Education, pages 262-263.

CEd 507. Seminar. Terms and hours to be arranged.

MEASUREMENTS IN BUSINESS EDUCATION.

CURRENT TRENDS IN OFFICE PROCEDURE.

SUPERVISION AND ADMINISTRATION OF COMMERCIAL EDUCATION.

TEACHING SOCIO-BUSINESS SUBJECTS IN THE SECONDARY SCHOOL.

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.

CEd 541. Current Practices in Typewriting. 3 hours fall.

Principles underlying the development of typing skills; motivation, supplementary materials, and special devices. Prerequisite: Ed 408c or teaching experience in typing. Associate Professor Stutz.

CEd 542. Current Practices in Shorthand. 3 hours winter.

Correct writing habits; correlation of sound and symbol response; word and sentence building and transcription technique. Prerequisite: Ed 408c or experience in teaching stenography. Associate Professor Stutz.

CEd 543. Problems in Commercial Education. 3 hours spring.

Trends in high school commercial curriculum; evaluation of methods and research studies. Prerequisite: Ed 408c or teaching experience in commercial subjects. Associate Professor Stutz.

Home Economics Education

PROFESSIONAL training for prospective teachers of home economics is afforded by the Department of Home Economics Education, which is a joint department within both the School of Home Economics and the School of Education. Any student in the School of Home Economics having a scholarship record below average should confer with the Dean of the School of Home Economics before registering for teacher-training work. (For information regarding the specific requirements for the State Teacher's Certificate see pages 262-263.)

Instruction in home-economics extension methods is offered for students preparing for home-demonstration, extension specialist, or other work in the home-economics fields in which extension methods are commonly used. The extension worker must be well trained, not only in the subject matter of her field but also in the methods by which extension work is successfully carried on. She must be able to give or know how to obtain authoritative advice for her community or county on any problem that may arise related to her field of service. She must know and practice the techniques of platform speaking and demonstration, radio speaking, and discussion leadership, and must support the extension program by effective publicity. Excellent opportunities for combining a major in home economics with training in journalism, speech and dramatics, economics, sociology, and other departments, supplemented by work in extension methods, and assist materially in meeting the need for better training on the part of extension workers.

DESCRIPTION OF COURSES*

UPPER-DIVISION COURSES

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

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

* See also courses in the Department of Education, pages 273-278.

- HEd 405. Reading and Conference.** Terms and hours to be arranged.
- HEd 407. Seminar.** Terms and hours to be arranged.
- Ed 408d. Methods and Materials.** (See Ed 408, page 274.) Professor Blazier.
- HEd 413. The Supervision of Home Projects.** (G) 2 hours spring.
The use of home projects in home economics instruction with field work in supervision of home projects. Prerequisite: Ed 408d. One recitation; 1 two-hour laboratory period.
- HEd 420. Community Problems in Nutrition.** (G) 3 hours winter.
Nutrition problems of high-school teacher in community; field work in co-operation with agencies interested in nutrition-health program. Prerequisite: FN 321, Ed 313. Two recitations; 1 laboratory period. Assistant Professor Garrison.
- HEd 422. Organization and Administration of Homemaking Education.** (G) 3 hours any term.
Typical organizations of homemaking departments on both the vocational and nonvocational basis with particular attention to equipment and management. Prerequisite: Ed 408d. Professor Blazier.
- HEd 428. Program Building in the Nursery School.** (G) 2 hours fall.
Methods of relating literature, art, music, and science activities to child interests; projects for nursery school. Prerequisite or parallel: HAd 425. Assistant Professor Wiggenhorn.
- HEd 429. Nursery School Administration.** (G) 2 hours spring.
Problems of equipping a nursery school; planning schedules; record keeping; personal and community relations. Prerequisite: HAd 425. Assistant Professor Wiggenhorn, Miss Rea.
- HEd 440. Adult Education in Home Economics.** (G) Hours to be arranged, winter.
Problems in adult-education program authorized under Smith-Hughes Act; field work in promoting, organizing, observing, and teaching adult classes. Prerequisite: HEd 422. Professor Blazier.
- HEd 451, 452. Extension Methods.** (G) 3 hours each term.
History and organization of extension work; methods employed by extension specialists, county agricultural and home demonstration agents, 4-H club leaders, etc. Professor Sager.
- HEd 453. Field Work in Home Economics Extension.** (G) Hours to be arranged, winter or spring.
Field practice in home demonstration work in selected counties under supervision of professor of extension methods and county extension agents. Prerequisite: HEd 451, 452. Professor Sager and others.

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.

Industrial Education

JOINTLY with the Department of Industrial Arts, the Department of Industrial Education trains teachers and supervisors in industrial-arts education and in trade and industrial (Smith-Hughes vocational) education. While the department is organized as a 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 curricula for teacher training in industrial-arts education and in vocational trade and industrial education. The Department of Industrial Engineering and Industrial Arts (School of Engineering) is responsible for the general curricula and technical training, while the Department of Industrial Education (School of Education) is responsible for the professional teacher-training courses and applied pedagogy.

Three Programs Available. Three intensities of training are open to those interested in industrial-arts education:

(1) The four-year professional-technical program, leading to the degree of Bachelor of Science or Bachelor of Industrial Arts, meets certification requirements of any state in the Union 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. (See pages 301-302.)

(2) The teaching major in industrial arts affords an opportunity for approximately half the training in technical industrial-arts subject matter that is available to the student in the four-year professional-technical program. It provides a program suited to the needs of teachers in the smaller schools of the state. It is also adapted to the needs and interests of those who transfer to Oregon State College from normal schools, teachers colleges, and universities with two years of nontechnical training. (See page 267.)

(3) The minor is intended as a background for superintendents, principals and others who desire acquaintance with industrial arts techniques and objectives and for those who plan to teach industrial arts under very limited conditions. Recommendation as a teacher on the basis of an industrial arts minor will be limited accordingly, usually embracing only elementary woodworking and drawing instruction in schools not qualified for more extensive programs. (See page 267.)

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 more exacting each year, graduate work in industrial education brings its proportional rewards and is usually necessary for those who desire to enter the fields of supervision, administration, or teacher-education. Programs of study leading to the degree of Master of Arts, Master of Science, or Master of Education are outlined by this department for industrial-arts or industrial-education students and teachers with approved graduate standing.

Extramural Courses. Through cooperation with the State Board of Vocational Education and through the establishment of extension centers, provision is made whereby certain courses of this department are offered as extramural courses. Classes are taught in Portland on occasion, and other extension

centers may be established as need warrants. This is especially true of those courses for the training of journeymen as vocational-industrial teachers, for the training of teachers in general continuation subjects, and for graduates or undergraduate courses adaptable to the professional advancement of the teacher in service. For further information concerning extramural courses consult the head of the Department of Industrial Education.

DESCRIPTION OF COURSES*

UPPER-DIVISION COURSES

- 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.
- Ed 408e. Methods and Materials.** (See Ed 408, page 274.)
- IEd 470. History of Manual and Industrial Education.** (G) 3 hours winter.
Historical developments to present; Socrates, Plato, Rousseau, Pestalozzi, Froebel, John Dewey; present-day aims of industrial-arts and vocational-industrial education. Prerequisite: Ed 313, 408e. Associate Professor Meyer.
- IEd 471. Teaching Supplementary Subjects.** (G) 3 hours.
Content and methods in mathematics, drawing, and science, for Smith-Hughes program. Prerequisite: mathematics, drawing, and science, and consent of instructor. Extramural or summer quarter. Associate Professor Paulson and staff.
- IEd 472. Occupational Analysis.** (G) 3 hours fall.
Analysis of an occupation, trade, or job into its component subdivisions, blocks, operations, and teaching units; occupational analysis in teaching procedure. Prerequisite: Ed 313, 408e. Associate Professor Meyer.
- IEd 473. The General Shop and Its Problems.** (G) 2 hours fall.
The "general shop" type of organization; advantages and limitations; probable future; content, organization, and methods of presenting subject matter; class control. Prerequisite: Ed 311, 312, 313, 330. Professor Cox, Assistant Professor Hahn.
- Ed 474. Written and Visual Teaching Aids.** (G) 3 hours winter or spring.
Making of visual aids for more efficient teaching in large and diversified classes: diagrams, charts, models, and instruction sheets. Prerequisite: Ed 311, 312, 313. Assistant Professor Hahn.
- IEd 475. Project Analysis and the Contract Plan.** (G) 2 hours.
Projects suitable for various types of shop teaching; contract plan; technique of preparing contracts; suggestions for use in industrial-arts classes. Prerequisite: IEd 473 or equivalent. Professor Cox.
- IEd 478. Cooperative Part-Time Education.** (G) 3 hours.
Laws affecting part-time schools; types of pupils; teachers; the coordinator; cooperation with outside organizations. Prerequisite: Ed 488 or equivalent. Extramural or summer quarter. Associate Professor Paulson and staff.

* See courses in the Department of Education, especially Ed 330, and courses in technical subject matter in the Department of Industrial Engineering and Industrial Arts, pages 319-325.

- IEd 482. Supervision of Industrial Education.** (G) 2 hours.
Specific problems of supervision in trade and industrial and the industrial-arts education groups. Prerequisite: extended teaching experience; Ed 464, 488. Extramural or summer quarter. Associate Professor Paulson and staff.
- IEd 484. Industrial Education and Changing Conditions.** (G) 3 hours.
Developments in industry; trends in state and federal programs; vocational-industrial education under George-Deen Act. Prerequisite: Ed 488 or equivalent. Extramural or summer quarter. Associate Professor Paulson.
- IEd 485. Labor, Industry, and the Apprenticeship Program.** (G) 3 hours.
Problems of labor and industry as reflected in federal and state apprenticeship program and regulations related thereto. Prerequisite: Ed 488 or equivalent. Extramural or summer quarter. Associate Professor Paulson.
- IEd 494. Problems of Coordination.** (g) 3 hours.
Selection of trainees; selection of industrial shops; vocational memorandums and apprentice indentures; adjusting class work and work experience. Prerequisite: IEd 478 and Ed 488, or their equivalent. Associate Professor Paulson.

GRADUATE COURSES

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.

Science Education

PROFESSIONAL preparation for prospective teachers of biological and physical science and mathematics is afforded by the Department of Science Education, which is 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 or science education, or in education, according to the degree of emphasis on subject matter or professional preparation. The combination of subjects to be taught and the scope of preparation desired influence the choice of major school.

The requirements for State High-School Teacher's Certificate are printed on pages 262-263. Approved teaching majors and minors in science are printed on pages 264-271; these are minimum requirements and may be supplemented by additional courses in the several fields. The teaching majors in general biology, general science, mathematics, and physical science provide electives that permit flexibility in selection of courses. The majors in health education and human biology are 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.

DESCRIPTION OF COURSES*

LOWER-DIVISION COURSES

SEd 123. Introduction to Health Education. 3 hours spring.

Historical background and underlying philosophy of health education; study of statistical facts that indicate need for health education; survey of modern practices in, and organization for, health education; opportunities for professional work in field. Associate Professor Morris.

UPPER-DIVISION COURSES

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 408b. Methods and Materials. (See Ed 408, page 274.) Professor Williamson.

Ed 408f. Methods and Materials. (See Ed 408, page 274.) Professor Williamson.

Ed 408g. Methods and Materials. (See Ed 408, page 274.) Professor Williamson.

SEd 431, 432, 433. School Health Problems. (G) 3 hours each term.

Maintenance of health of school children; communicable diseases; school sanitation; planning of school buildings; health of school child; hygiene of instruction. Prerequisite: Ed 311, 312, 313, and one year of upper-division biology. Professor Langton.

SEd 441, 442, 443. Health Education. (G) 3 hours each term.

Philosophy and principles of health education; organization and administration; health instruction and its use in secondary schools and in adult health education. Prerequisite: Ed 311, 312, 313, and one year of upper-division biology. Associate Professor Morris.

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.

* See also courses in the Department of Education.

School of Engineering and Industrial Arts

Faculty

GEORGE WALTER GLEESON, Ch.E., Dean of the School of Engineering and Industrial Arts.

JEAN OGLESBY, B.S., Secretary to the Dean.

General Engineering

ASSOCIATE PROFESSORS WANLESS (chairman), WILLEY.

ASSISTANT PROFESSORS HAITH, RICHARDSON.

INSTRUCTORS PARKINSON, RICE, ROOK, VIGGERS.

Agricultural Engineering

PROFESSORS RODGERS (department head), SINNARD.

ASSOCIATE PROFESSORS LUNDE, CROUSEY.

ASSISTANT PROFESSORS GRIEBELER, KIRK, WOLFE.

Chemical and Metallurgical Engineering

PROFESSORS WALTON (department head), CALDWELL.

ASSOCIATE PROFESSOR SCHULEIN.

ASSISTANT PROFESSORS ROSS, CLAPP.

Civil Engineering

PROFESSORS MOCKMORE (department head), GLENN, HOLCOMB, MERRYFIELD.

ASSOCIATE PROFESSORS WATERMAN, O. KOFOID.

ASSISTANT PROFESSOR COOPEY.

INSTRUCTORS WHITSELL, KACHELHOFFER, MATREJEK, CLAYTON, LYMAN, SATTER, BASKAM, SHORT, DE GRACE.

Electrical Engineering

PROFESSORS MCMILLAN (department head), WOOSTER, ALBERT, STARR.

ASSOCIATE PROFESSORS NICHOLS, COCKERLINE, M. J. KOFOID, FEIKERT.

ASSISTANT PROFESSORS WITTKOPF, MAGNUSSON, SHIRLEY, STONE.

INSTRUCTORS BALLARD, MICHAEL, ARMSTRONG, ENGLE.

Industrial Engineering and Industrial Arts

PROFESSOR COX (department head).

ASSOCIATE PROFESSORS MEYER, ENGESSER, SHEELY.

ASSISTANT PROFESSORS ROBLEY, JOHNSON, DAHLBERG, WILLIAMSON, ROBERTS.

INSTRUCTORS TURNER, SMITH, HARTER, FRAZIER.

Mechanical Engineering

PROFESSORS GRAF (department head), MARTIN, THOMAS, RUFFNER, PAUL, SLEGEL, HUGHES.

ASSOCIATE PROFESSORS BAKER, HEATH.

ASSISTANT PROFESSORS PAASCHE, POPOVICH, SMITH.

INSTRUCTORS BAILEY, ANDERSON, CHRISTENSEN, LOWY, MILLER.

Curricula in Engineering and Industrial Arts

B.A., B.S., B.I.A., M.A., M.S.,

A.E., Ch.E., C.E., E.E., M.E., Met.E., Min.E., Ph.D. Degrees.

*Agricultural Engineering
Civil Engineering
Electrical Engineering
Industrial Engineering
Chemical Engineering*

*Mechanical Engineering
Metallurgical Engineering
Mining Engineering
Industrial Administration
Industrial Arts Education*

CURRICULA leading to baccalaureate and advanced degrees are offered in the School of Engineering as follows: in Agricultural Engineering, with options in Power and Machinery, Farm Structures, Soil and Water; in Chemical Engineering; in Civil Engineering with options in Structural Engineering, Highway Engineering, and Sanitary Engineering; in Electrical Engineering with options in Power, Communication, and Business; in Industrial Engineering; in Mechanical Engineering with a general option and options in Aeronautical Engineering, Automotive Engineering, and Business; in Mining Engineering and in Metallurgical Engineering; in Industrial Administration with options in Metal Industries, Tool Design, and Wood Industries, and in Industrial Arts Education.

Requirements for B.S. or B.A. Degree. In each of the four-year curricula offered in the School of Engineering the fulfillment of the group requirements for professional schools is prescribed. The student must complete the upper-division work as outlined or elected in the Engineering School with the approval of the department head and the dean.

For a bachelor's degree, a total of 204 term hours including work in physical education and military science is required. For the degree of Bachelor of Science at least 36 term hours of science are required, or 45 term hours of science and social science. For the degree of Bachelor of Arts a minimum of 36 hours of arts and letters, including two years of a foreign language, is required. It is not possible, as a rule, for engineering students to meet the requirements for a Bachelor of Arts degree in engineering in four years. Students who spend more than four years for their undergraduate work may qualify for the Bachelor of Arts degree. Students who meet the requirements for both degrees and submit a total of 237 term hours may, on approval, receive both the Bachelor of Arts and the Bachelor of Science degrees.

Requirements for Advanced Degrees. In the curricula outlined on the following pages suggested graduate programs are included in the several fields leading to the degree of Master of Science or Master of Arts. Modifications of these programs are permitted. Programs for the degree of Doctor of Philosophy are in all cases worked out for each candidate. Requirements for professional engineer degrees and the general regulations governing advanced degrees are printed under GRADUATE SCHOOL.

Curricular Organization. The curricula offered in the Engineering School are organized into the following curricular groups:

- A. Agricultural Engineering, Chemical Engineering, Metallurgical Engineering, and Mining Engineering as four-year sequence curricula.
- B. Civil, Electrical, Industrial, and Mechanical Engineering including a common freshman curriculum and differentiated sophomore and upper-division curricula.
- C. Industrial Administration and Industrial Arts Education.

Engineering curricula are organized about four general fields of knowledge or training, and the sequence of courses in each curriculum is determined for the purpose of developing strong continuity in the various fields. The four fields are: (1) general engineering science and technology; (2) mathematics and physical science; (3) language, literature, English, and social science; and (4) military education, physical education, and free electives.

Exploratory Contacts. The curricula insofar as possible have been arranged to afford early contact with engineering training for those who are undetermined in the selection of a major engineering field.

Curricular groups A and B are differentiated by the first year requirements. An undecided student who desires exploratory contact with Group A subject matter should register at once in the appropriate department, for should he decide after the first term to investigate curricular group B, he may do so without increasing his undergraduate period of training. One who, on the contrary, explores curricular group B and decides at the end of his freshman year to transfer to curricular group A will find his training necessarily extended beyond four years.

As one and one-half years of algebra and one year of geometry are required for entrance to the engineering curricula (industrial administration and industrial-arts education excepted), students who have not completed these requirements and desire a degree in engineering must spend more than four years for graduation. The freshman-year program for deficient students includes the mathematics that they lack, together with other freshman courses excepting those technical courses for which mathematics is prerequisite.

A. Agricultural, Chemical, Metallurgical, and Mining Engineering

AGRICULTURAL ENGINEERING

Freshman Year

	Term hours		
	F	W	S
Agricultural Engineering Problems (AE 101, 102, 103)	1	1	1
Engineering Drawing (GE 111, 112)	2	2	
House Planning and Architectural Drawing (AA 178)			3
Elementary Analysis (Mth 101, 102, 103)	4	4	4
Engineering Physics (Ph 101, 102, 103)	3	3	3
English Composition (Eng 111, 112, 113)	3	3	3
Military or Naval Science	2-3	2-3	2-3
*Physical Education	1	1	1

16-17 16-17 17-18

¹General Hygiene (PE 150), 1 term hour, is taken one term in place of physical education.

	Term hours		
	F	W	S
Sophomore Year			
Differential and Integral Calculus (Mth 201, 202, 203)	4	4	4
General Chemistry (Ch 201, 202, 203)	3	3	3
Mechanics (ME 212, 213, or CE 212, 213)	2	3	3
Forging and Welding (IE 250)	2	2	---
Machine Shop Practices (IE 260)	---	---	---
Plane Surveying (CE 226)	3	---	---
Farm Mechanics (AE 221, 222)	---	3	3
Military or Naval Science	2-3	2-3	2-3
Physical Education	1	1	1
	15-16	17-18	16-17

Junior Year			
NORM			
Strength of Materials (ME 314, 315, or CE 351, 352)	3	3	---
Materials Testing Laboratory (ME 316)	---	---	3
Farm Motors and Tractors (AE 311)	3	---	---
Soils (Sls 211, 212)	3	3	---
Industrial Electricity (EE 356)	3	---	---
Social Science or Foundations of National Power (SSc 441, 442, 443)	3	3	3
Military or Naval Science or electives	3	3	3
	18	12	9

SOIL AND WATER OPTION			
Junior Year Norm	18	12	9
Structural Analysis (CE 382)	---	4	---
Reinforced Concrete (CE 383)	---	---	4
Soil Drainage and Irrigation (Sls 213)	---	---	3
Plane Surveying (CE 223)	---	---	3
	18	16	19

POWER AND MACHINERY OPTION			
Junior Year Norm	18	12	9
Automobile Mechanics (AE 313, 314)	---	3	3
Steam, Air, and Gas Power (ME 346)	---	---	3
Mechanism (ME 312)	---	3	---
Extempore Speaking (Sp 111)	---	---	3
	18	18	18

FARM STRUCTURES OPTION			
Junior Year Norm	18	12	9
Structural Analysis (CE 382)	---	4	---
Reinforced Concrete (CE 383)	---	---	4
Automobile Mechanics (AE 313)	---	3	---
Extempore Speaking (Sp 111)	---	---	3
	18	19	16

Senior Year			
NORM			
Farm Structures (AE 461, 462)	3	3	---
Rural Electrification (AE 431)	---	---	3
Pumps and Irrigation Equipment (AE 321)	---	---	3
Contracts and Specifications (CE 427)	3	---	3
Business Law (BA 411)	3	---	---
Military or Naval Science or electives	3	3	3
	9	6	12

SOIL AND WATER OPTION			
Senior Year Norm	9	6	12
Soil Conservation Engineering (AE 471)	3	---	---
Soil Conservation (Sls 413)	---	3	---
Power Farming Machinery (AE 491)	---	3	---
Auto Mechanics (AE 313)	---	---	3
Fluid Mechanics (CE 311)	3	---	---
Hydraulics (CE 312)	3	3	---
Hydrology (CE 314)	3	---	---
Reading and Conference (AE 405)	---	2	1
Seminar (AE 407)	---	1	1
	18	13	17

¹Not taken by Naval Science students.

²Regular or R.O.T.C. only.

³Regular or R.O.T.C. only, winter term.

POWER AND MACHINERY OPTION

	Term hours		
	F	W	S
Senior Year Norm	9	6	12
Agricultural Machine Design (AE 481)	—	3	—
Power Farming Machinery (AE 491)	—	3	—
Soil Conservation Engineering (AE 471)	3	—	—
Fluid Mechanics (CE 341)	3	—	—
Hydraulic Machinery (CE 342)	—	3	—
¹ Reading and Conference (AE 405)	2	1	1
Seminar (AE 407)	1	1	1
² Elective	—	—	3
	18	17	17

FARM STRUCTURES OPTION

Senior Year Norm	9	6	12
Farm Structures (AE 463)	—	—	3
Masonry and Foundations (CE 472)	—	4	—
Modern Construction Methods (CE 362)	—	2	—
Structural Design (CE 482)	—	4	—
Fluid Mechanics (CE 341)	3	—	—
¹ Reading and Conference (AE 405)	1	1	2
Seminar (AE 407)	1	1	1
² Elective	3	—	—
	17	18	18

CHEMICAL AND METALLURGICAL ENGINEERING

Common Freshman Year

(Chemical, Mining, and Metallurgical Engineering)

	Term hours		
	F	W	S
Chemical and Mineral Industry (ChE 111, 112, 113)	1	1	1
General Chemistry (Ch 204, 205, 206)	4	4	5
Elementary Analysis (Mth 101, 102, 103)	4	4	4
English Composition (Eng 111, 112, 113)	3	3	3
Engineering Drawing (GE 111, 112)	2	2	—
Military or Naval Science	2-3	2-3	2-3
³ Physical Education	1	1	1
	17-18	17-18	16-17

CHEMICAL ENGINEERING

Sophomore Year

Chemical Technology (ChE 211)	2	—	—
Industrial Stoichiometry (ChE 212, 213)	—	2	2
Chemical Theory (Ch 241)	4	—	—
Quantitative Analysis for Chemical Engineering Students (Ch 242)	—	4	—
Commercial Methods of Analysis (Ch 243)	—	—	4
Engineering Physics (Ph 101, 102, 103)	3	3	3
Differential and Integral Calculus (Mth 201, 202, 203)	4	4	4
Military or Naval Science	2-3	2-3	2-3
Physical Education	1	1	1
	16-17	16-17	16-17

Junior Year

Industrial-Chemical Calculations (ChE 311)	3	—	—
Chemical Engineering Thermodynamics (ChE 312)	—	3	—
Elementary Unit Operations (ChE 313)	—	—	3
Organic Chemistry (Ch 430, 431, 432)	4	4	4
Physical Chemistry (Ch 440, 441, 442)	4	4	4
Mechanics (Statics) (ME 212)	3	—	—
Strength of Materials (ME 311)	—	3	—
Materials Testing Laboratory (ME 316)	—	—	3
Military or Naval Science	3	3	3
	17	17	17

¹Regular or R.O.T.C. only.²Not required of naval science students spring term.³One hour credit for N.R.O.T.C. in spring term.⁴General Hygiene (PE 150), 1 term hour, is taken one term in place of physical education.

	Senior Year		
	Term hours		
	F	W	S
Unit Operations (ChE 411, 412, 413)	3	3	3
Elements of the Process Industries (ChE 441, 442, 443)	2	2	2
Chemical Engineering Laboratory (ChE 414, 415, 416)	3	3	3
Industrial Electricity (EE 354, 355)	3	3	—
Chemical Plant Design (ChE 432)	—	—	3
Social Science or Foundations of National Power (SSc 441, 442, 443)	3	3	3
Military or Naval Science	3	3	3
	17	17	17

METALLURGICAL ENGINEERING

Sophomore Year			
Chemical Technology (ChE 211)	2	—	—
Industrial Stoichiometry (ChE 212, 213)	—	2	2
Chemical Theory (Ch 241)	4	—	—
Quantitative Analysis for Chemical Engineering Students (Ch 242)	—	4	—
Assaying (Met 263)	—	—	3
Engineering Physics (Ph 101, 102, 103)	3	3	3
Differential and Integral Calculus (Mth 201, 202, 203)	4	4	4
Military or Naval Science	2-3	2-3	2-3
Physical Education	1	1	1
	16-17	16-17	15-16

Junior Year

Metallurgy (Met 431, 432, 433)	3	3	3
Fire Assaying (MiE 471, 472)	2	2	—
Metallurgy (Met 441)	—	—	3
Mining (MiE 431)	—	3	—
Plane Surveying (CE 226)	3	—	—
Mechanics (Statics) (ME 212)	3	—	—
Strength of Materials (ME 311)	—	3	—
Materials Testing Laboratory (ME 316)	—	—	3
Geology (G 201, 202, 203)	3	3	3
Social Science or Foundations of National Power (SSc 441, 442, 443)	—	—	3
Military or Naval Science or electives	3	3	3
	17	17	18

Senior Year

Mineral Dressing Laboratory (MiE 483)	—	—	3
Mineral Dressing (MiE 481, 482)	3	3	—
Mineralogy (G 312, 313)	4	4	—
Extractive Metallurgy (Met 442, 443)	—	3	3
Mineral Industry Economy (MiE 461)	—	—	3
Industrial Electricity (EE 354, 355)	3	3	—
Engineering Metallurgy (ME 416) or elective	3	—	—
Social Science or Foundations of National Power (SSc 441, 442, 443)	—	—	6
Military or Naval Science or electives	3	3	3
	16	16	18

MINING ENGINEERING

Sophomore Year

Geology (G 201, 202, 203)	3	3	3
Chemical Theory (Ch 241)	4	—	—
Quantitative Analysis for Chemical Engineering Students (Ch 242)	—	4	—
Assaying (Met 263)	—	—	3
Engineering Physics (Ph 101, 102, 103)	3	3	3
Differential and Integral Calculus (Mth 201, 202, 203)	4	4	4
Military or Naval Science	2-3	2-3	2-3
Physical Education	1	1	1
	17-18	17-18	16-17

	Term hours		
	F	W	S
Junior Year			
Mining (MiE 431, 432)	—	3	3
Fire Assaying (MiE 471, 472)	2	2	—
Mine Surveying (MiE 453)	—	—	3
Metallurgy (Met 431, 432)	3	3	—
Mineralogy (G 312, 313)	4	4	—
Mechanics (Statics) (ME 212)	3	—	—
Strength of Materials (ME 311)	—	3	—
Materials Testing Laboratory (ME 316)	—	—	3
Plane Surveying (CE 226)	3	—	—
Forging and Welding (IE 250) or Machine Shop Practices (IE 260)	—	—	2
Mineral Industry Economy (MiE 461)	—	—	3
Military or Naval Science or electives	3	3	3
	18	18	17
Senior Year			
	F	W	S
Mineral Dressing (MiE 481, 482)	3	3	—
Mineral Dressing Laboratory (MiE 483)	—	—	3
Mining (MiE 441, 442, 443)	3	3	3
Social Science or Foundations of National Power (SSc 441, 442, 443)	3	3	3
Electives (a geology sequence is recommended)	4	4	4
Military or Naval Science or electives	3	3	3
	16	16	16

B. Civil, Electrical, Industrial, and Mechanical Engineering

COMMON FRESHMAN YEAR

	Term hours		
	F	W	S
Engineering Problems (GE 101, 102, 103)	2	2	2
Engineering Drawing (GE 111, 112, 113)	2	2	2
Elementary Analysis (Mth 101, 102, 103)	4	4	4
Engineering Physics (Ph 101, 102, 103)	3	3	3
English Composition (Eng 111, 112, 113)	3	3	3
Military or Naval Science	2-3	2-3	2-3
¹ Physical Education	1	1	1
	17-18	17-18	17-18

CIVIL ENGINEERING

Sophomore Year

² Introduction to Civil Engineering (CE 201, 202, 203)	2	2	2
Plane Surveying (CE 221, 222, 223)	3	3	3
Mechanics (CE 212, 213)	—	3	3
Differential and Integral Calculus (Mth 201, 202, 203)	4	4	4
General Chemistry (Ch 201, 202, 203)	3	3	3
Military or Naval Science	2-3	2-3	2-3
Physical Education	1	1	1
² Electives	3	—	—
	18-16	18-17	18-17

Junior Year

Fluid Mechanics (CE 311)	3	—	—
Structural Analysis (CE 382)	—	4	—
Reinforced Concrete (CE 383)	—	—	4
Strength of Materials (CE 351, 352)	3	3	—
Hydraulics (CE 312)	—	3	—
Hydraulic Machinery (CE 313)	—	—	3
Materials Testing Laboratory (ME 316)	3	—	—
Industrial Electricity (EE 356)	3	—	—
Curves and Earthwork (CE 332)	—	—	3
³ Social Science or Foundations of National Power (SSc 441, 442, 443)	3	3	3
Military or Naval Science	3	3	3
	18	16	16

¹General Hygiene (PE 150), 1 term hour, is taken one term in place of physical education.

²Naval Science omit CE 202, CE 203, and elective.

³American National Government (PS 201), General Sociology (Soc 212), Outlines of Economics (Ec 212).

Senior Year		Term hours		
NORM		F	W	S
Structural Engineering (CE 481)	.....	4	---	---
Structural Design (CE 482)	.....	---	4	---
Sanitary Engineering (CE 412)	.....	3	---	---
Estimating and Cost Analysis (CE 460)	.....	---	---	3
Contracts and Specifications (CE 427)	.....	---	---	3
Masonry and Foundations (CE 472)	.....	---	4	---
Hydrology (CE 411)	.....	3	---	---
Steam, Air, and Gas Power (ME 346)	.....	---	---	3
Military or Naval Science or elective	.....	3	3	3
		13	11	12
STRUCTURAL OPTION				
Senior Year Norm	.....	13	11	12
Indeterminate Structures (CE 485)	.....	3	---	---
Structural Analysis (CE 486)	.....	---	3	---
Building Design (CE 483)	.....	---	---	4
Structural Materials Laboratory (ME 415)	.....	---	3	---
		16	17	16
HIGHWAY OPTION				
Senior Year Norm	.....	13	11	12
Highway Engineering (CE 421, 422)	.....	4	3	---
Highway Materials Laboratory (ME 414)	.....	---	3	---
Economics of Highway Transportation (CE 425)	.....	---	---	3
		17	17	15
SANITARY OPTION				
Senior Year Norm	.....	13	11	12
Sanitary Engineering Laboratory (CE 413)	.....	---	3	---
Water Supply (CE 452)	.....	---	3	---
Sewage Disposal (CE 454)	.....	---	---	3
Sanitary Bacteriology (Bac 261)	.....	3	---	---
Elective	.....	---	---	1
		16	17	16

Graduate Year (M.A., M.S. degrees)

MAJOR IN STRUCTURAL ENGINEERING:		Term hours	
Structural Stresses (CE 530)	.....	2	2
Mechanical Methods of Stress Analysis (CE 531)	.....	3	3
Bridge Design (CE 532)	.....	3	3
Analysis and Design of Concrete Structures (CE 533)	.....	3	3
Research (CE 501)	.....	9	9
Thesis (CE 503)	.....	5	5
Reading and Conference (CE 505)	.....	3	3
Seminar (CE 507)	.....	30	30
Minor:			
Mathematics in Engineering and Physics (Mth 561, 562, 563)	.....	9	9
Experimental Elasticity (ME 516, 517)	.....	6	6
		15	15
MAJOR IN SANITARY ENGINEERING:			
Sanitary Engineering Design (CE 540)	.....	3	3
Stream Purification (CE 541)	.....	3	3
Water and Sewage Treatment Processes (CE 542)	.....	3	3
Treatment Plant Operation and Control (CE 543)	.....	3	3
Research (CE 501)	.....	9	9
Thesis (CE 503)	.....	5	5
Reading and Conference (CE 505)	.....	3	3
Seminar (CE 507)	.....	30	30
Minor:			
Mathematics in Engineering and Physics (Mth 561, 562, 563)	.....	9	9
Approved electives	.....	6	6
		15	15

MAJOR IN HIGHWAY ENGINEERING:

	Term hours
Highway Administration and Finance (CE 550)	3
Municipal Engineering and City Planning (CE 551)	3
Transportation Engineering (CE 552)	3
Street and Highway Traffic Control (CE 553)	3
Research (CE 501)	3
Thesis (CE 503)	9
Reading and Conference (CE 505)	3
Seminar (CE 507)	3
	<hr/> 30

Minor:

Mathematics in Engineering and Physics (Mth 561, 562, 563)	9
Soil Mechanics (ME 519)	3
Approved elective	3
	<hr/> 15

MAJOR IN HYDRAULIC ENGINEERING:

Measurement of Water (CE 520)	3
Fluid Mechanics (CE 521)	3
Water-Power Engineering (CE 522)	3
River Control and Utilization (CE 523)	3
Research (CE 501)	3
Thesis (CE 503)	9
Reading and Conference (CE 505)	3
Seminar (CE 507)	3
	<hr/> 30

Minor:

Mathematics in Engineering and Physics (Mth 561, 562, 563)	9
Stream Purification (CE 541)	3
Soil Mechanics (ME 519)	3
	<hr/> 15

ELECTRICAL ENGINEERING

Sophomore Year

	Term hours		
	F	W	S
Introduction to Electrical Engineering (EE 201, 202, 203)	4	4	4
Differential and Integral Calculus (Mth 201, 202, 203)	4	4	4
General Chemistry (Ch 201, 202, 203)	3	3	3
Plane Surveying (CE 226)			3
*American National Government (PS 201)	3		
Social Science elective		3	
*Machine Shop (IE 260)	2		
*Extempore Speaking (Sp 111)		3	
*Principles of Accounting (BA 211)			3
Military or Naval Science	2-3	2-3	2-3
Physical Education	1	1	1
	<hr/> 17	<hr/> 17-18	<hr/> 17-18

Junior Year

Electric Circuits and Equipment (EE 311, 312, 313)	3	3	3
Electronics (EE 321, 322, 323)	3	3	3
Differential Equations (Mth 421, 422)	3	3	
Electrical Engineering Analysis (EE 331)			3
Mechanics (ME 212, 213)	3	3	
Fluid Mechanics (CE 341)			3
*Heat Power Engineering (ME 331, 332)	3	3	
*Outlines of Economics (Ec 212)			3
*Foundations of National Power (SSc 441, 442, 443)	3	3	3
Military or Naval Science or electives	3	3	3
	<hr/> 18	<hr/> 18	<hr/> 18

Senior Year

	Term hours		
	F	W	S
Electrical Engineering Economy (EE 411, 412, 413)	3	3	3
Electrical Measurements and Analysis (EE 414, 415, 416)	3	3	3
Transmission Lines and Networks (EE 421, 422, 423)	3	3	3
Seminar (EE 407)	1	1	1
Military or Naval Science or electives	3	3	3
	<hr/> 13	<hr/> 13	<hr/> 13

*Not required in Naval Science.

*Not required in Military Science.

*Not required in Military or Naval Science.

POWER OPTION		Term hours		
		F	W	S
Senior Year Norm		13	13	13
Transformers and Rotating Electrical Machinery (EE 431, 432, 433)		3	3	3
		16	16	16
COMMUNICATION OPTION				
Senior Year Norm		13	13	13
Wire Communication (EE 461, 462)		3	3	—
Radio Communication (EE 463)		—	—	3
		16	16	16
BUSINESS OPTION		F	W	S
Senior Year Norm		13	13	13
Principles of Personnel Management (BA 451)		3	—	—
Finance (BA 312)		—	4	—
Business Law (BA 411)		—	—	3
		16	17	16
Graduate Year (M.A., M.S. Degrees)				

MAJOR IN ELECTRICAL ENGINEERING:

Power Engineering		
Communication Engineering (Wire and Radio)		
Electronic Engineering		
Control Engineering		
Illumination Engineering		
Other fields as approved		Term hours
Courses in major field (500 numbers and G courses) as approved		15-21
Thesis (EE 503)		6-12
Seminar (EE 507)		3
		30
MINOR:		
Electives as approved		15

INDUSTRIAL ENGINEERING

Sophomore Year		Term hours		
		F	W	S
Introduction to Scientific Management (IE 290)		3	—	3
Pattern Making (IE 111)		3	—	—
Foundry Practices (IE 240)		2	—	—
Forging and Welding (IE 250)		—	2	—
Machine Shop Practices (IE 260)		—	—	2
Descriptive Geometry (GE 123)		3	—	—
Mechanics (Statics) (ME 212)		—	3	—
Mechanics (Dynamics) (ME 213)		—	—	3
Differential and Integral Calculus (Mth 201, 202, 203)		4	4	4
General Chemistry (Ch 201, 202, 203)		3	3	3
American National Government (PS 201)		—	3	—
Military or Naval Science		2-3	2-3	2-3
*Physical Education		1	1	1
		18-19	18-19	18-19
Junior Year				
Methods and Motion Study (IE 391)		3	—	—
Time Study (IE 392)		—	3	—
Production Planning and Control (IE 393)		—	—	3
Mill Work—Machine Woodwork (IE 311)		3	—	—
Machine Shop Practices (IE 261), Machine Shop (IE 362)		—	2	2
Strength of Materials (ME 311)		—	3	—
Welding Practices (IE 354)		—	—	2
Mechanism (ME 312)		3	—	—
Materials of Engineering (ME 216)		—	3	—
Materials Testing Laboratory (ME 316)		—	—	3
Industrial Electricity (EE 356)		3	—	—
Outlines of Economics (Ec 212)		3	—	—
Business Law (BA 411)		—	3	—
Industrial Psychology (Psy 215)		—	—	3
Military or Naval Science or electives		3	3	3
		18	17	16

	Senior Year		
	Term hours		
	F	W	S
Tool Design (IE 364)	---	3	---
Production Planning and Control (IE 491)	3	---	---
Industrial Supervision Principles (IE 490)	---	3	---
Safety in Industry (IE 390)	---	---	2
Production Machine Work (IE 363)	3	---	---
Machine Design (ME 411, 412, 413)	3	3	3
Principles of Accounting (BA 211, 212)	3	3	---
Industrial Cost Accounting (BA 421)	---	---	3
Applied Statistics (Mth 341, 342)	---	3	3
Military or Naval Science or electives	3	3	3
Elective	---	---	1
	15	18	15

MECHANICAL ENGINEERING

Sophomore Year

Descriptive Geometry (GE 123)	3	---	---
Mechanics (Statics) (ME 212), Mechanics (Dynamics) (ME 213)	---	3	3
Materials of Engineering (ME 216)	---	---	3
Differential and Integral Calculus (Mth 201, 202, 203)	4	4	4
*Foundry Practices (IE 240)	2	---	---
Machine Shop Practices (IE 260)	---	2	---
Forging and Welding (IE 250)	---	---	2
Plane Surveying (CE 226)	3	---	---
Principles of Accounting (BA 211)	---	3	---
General Chemistry (Ch 201, 202, 203)	3	3	3
Military or Naval Science or electives	2-3	2-3	2-3
Physical Education	1	1	1
	18-19	18-19	18-19

Junior Year

NORM

Heat Engineering (ME 321, 322, 323)	4	4	4
*Heat Power Engineering (ME 331, 332)	3	3	---
Mechanical Laboratory (ME 351, 352, 353)	2	2	2
*Strength of Materials (ME 314, 315)	3	3	---
*Strength of Materials (ME 311)	3	---	---
Materials Testing Laboratory (ME 316)	---	---	3
Mechanism (ME 312)	---	3	---
Fluid Mechanics (CE 341)	3	---	---
Military or Naval Science or electives	3	3	3
	15-18	15-18	12

GENERAL OPTION

Junior Year Norm	15-18	15-18	12
Fuels and Lubricants (ME 325)	3	---	---
Hydraulic Machinery (CE 342)	---	3	---
Engineering Metallurgy (ME 416)	---	---	3
*Elective	---	---	3
	18-21	18-21	18

AERONAUTICAL OPTION

Junior Year Norm	15-18	15-18	12
Aerodynamics (ME 342)	---	3	---
Aeropropulsion (ME 343)	---	---	3
Differential Equations (Mth 421)	3	---	---
*Elective	---	---	3
	18-21	18-21	18

BUSINESS OPTION

Junior Year Norm	15-18	15-18	12
Methods and Motion Study (IA 391)	3	---	---
Principles of Accounting (BA 212)	---	3	---
Industrial Cost Accounting (BA 424)	---	---	3
*Elective	---	---	3
	18-21	18-21	18

*Not required of naval science students.

*Required of naval science students.

	Senior Year		
	NORM		
	Term hours		
	F	W	S
Machine Design (ME 411, 412)	3	3	3
Industrial Engineering (ME 473)			3
Approved Social Science or Foundations of National Power (SSc 441, 442, 443)	3	3	3
Military or Naval Science or elective	3	3	3
	9	9	9
GENERAL OPTION			
Senior Year Norm	9	9	9
Machine Design (ME 413)			3
Power Plant Engineering (ME 431, 432)	3	3	---
Mechanical Laboratory (ME 451, 452, 453)	2	2	2
Industrial Electricity (EE 351, 352, 353)	3	3	3
	17	17	17
AERONAUTICAL OPTION			
Senior Year Norm	9	9	9
Airplane Design (ME 441, 442, 443)	3	3	3
Aeronautical Laboratory (ME 456, 457)	2	2	---
Airplane Structural Analysis (ME 447, 448, 449)	3	3	3-0
Air Transportation (ME 471)			2
Electricity in Aeronautics (EE 358)		3	---
Airway Communication Systems (EE 359)		---	3
	17	20	20
AUTOMOTIVE OPTION			
Senior Year Norm	9	9	9
Machine Design (ME 413)			3
Automotive Engineering (ME 491, 492, 493)	3	3	3
Mechanical Laboratory (ME 451, 452)	2	2	---
Industrial Electricity (EE 351, 352, 353)	3	3	3
	17	17	18
BUSINESS OPTION			
Senior Year Norm	9	9	9
Mechanical Laboratory (ME 451, 452)	2	2	---
Industrial Electricity (EE 351, 352, 353)	3	3	3
Safety in Industry (IA 390)			2
Business Law (BA 411, 412, 413)	3	3	3
Merchandising and Selling (SS 436)		3	---
Investments (BA 435)		---	3
	17	20	20-18

Graduate Year (M.A., M.S. degrees)

MAJORS IN MECHANICAL ENGINEERING:

General Mechanical Engineering, Automotive Engineering, Air Conditioning, Refrigeration, Gas Engineering, or Engineering Materials.

Offerings in major field as approved by department head.

	Term hours
Selected from 500-number and (G) courses	18
Thesis (ME 503)	6-12
Approved electives	6-0

Minor (suggested program):

Mathematics in Engineering and Physics (Mth 561, 562, 563)	9
Approved electives	6

15

MAJORS IN AERONAUTICAL ENGINEERING:

Aerodynamics (ME 546, 547, 548)

Dynamics of Aircraft (ME 541, 542, 543) or Experimental Elasticity

(ME 516, 517, 518)

Thesis (ME 503)

Approved electives

30

Minor (suggested program):

Mathematics in Engineering and Physics (Mth 561, 562, 563)

Approved electives

15

¹Not required of naval science students.

C. Industrial Administration and Industrial Arts Education¹

INDUSTRIAL ADMINISTRATION

Freshman Year

Term hours
F W S

NORM

Pattern Making (IE 111)	3	---	---
Methods in Woodworking (IA 112)	---	3	---
Foundry Practices (IE 240)	2	---	---
Machine Shop Practices (IA 260)	---	---	2
Forging and Welding (IE 250)	---	2	---
Engineering Drawing (GE 111, 112, 113)	2	2	2
English Composition (Eng 111, 112, 113)	3	3	3
Physical Education	1	1	1
Military or Naval Science	2-3	2-3	2-3
	13-14	13-14	10-11

METAL INDUSTRIES OPTION

Freshman Year Norm	13-14	13-14	10-11
Intermediate Algebra (Mth 100)	4	---	---
Elementary Analysis (Mth 101)	---	4	---
Elementary Statistics (Mth 109)	---	---	4
Extempore Speaking (Sp 111)	---	---	3
	17-18	17-18	17-18

TOOL DESIGN OPTION

Freshman Year Norm	13-14	13-14	10-11
Elementary Analysis (Mth 101, 102, 103)	4	4	4
Extempore Speaking (Sp 111)	---	---	3
	17-18	17-18	17-18

WOOD INDUSTRIES OPTION

Freshman Year Norm	13-14	13-14	10-11
Intermediate Algebra (Mth 100)	4	---	---
Elementary Analysis (Mth 101)	---	4	---
Elementary Statistics (Mth 109)	---	---	4
Methods in Woodworking (IA 113)	---	---	3
	17-18	17-18	17-18

Sophomore Year

NORM

Abridged General Physics (Ph 211, 212)	3	3	---
Descriptive General Chemistry (Ch 130)	---	---	3
Lower-Division Drawing (Construction) (AA 291)	---	3	---
Introduction to Scientific Management (IE 290)	---	---	3
Business English (Eng 217)	3	---	---
American National Government (PS 201)	---	---	3
Physical Education	1	1	1
Military or Naval Science	2-3	2-3	2-3
	9-10	9-10	12-13

METAL INDUSTRIES OPTION

Sophomore Year Norm	9-10	9-10	12-13
Machine Shop Practices (IE 261)	2	---	---
Brass and Alloy Foundry (IA 343)	---	2	---
Machine Shop (IE 362)	---	---	2
Machine and Tool Maintenance (Machine Shop) (IE 265)	2	---	---
Welding Practices (IE 354)	2	---	---
Sheet Metal Work (IA 380)	---	3	---
Technical electives	3	3	3
	18-19	17-18	17-18

TOOL DESIGN OPTION

Sophomore Year Option	9-10	9-10	12-13
Machine Shop Practices (IE 261), Machine Shop (IE 362)	2	---	2
Welding Practices (IE 354)	2	---	---
Mechanics (Statics) (ME 212)	---	3	---
Mechanics (Dynamics) (ME 213)	---	---	3
Differential and Integral Calculus (Mth 201, 202)	4	4	---
	17-18	16-17	17-18

¹See page 320.

²General Hygiene (PE 150), 1 term hour, is taken one term in place of physical education.

		WOOD INDUSTRIES OPTION			Term hours		
					F	W	S
					9-10	9-10	12-13
Sophomore Year Norm					2	---	---
Machine and Tool Maintenance (Wood Shop) (IA 225)					2	---	---
Welding Practices (IE 354)					2	---	---
House Planning and Architectural Drawing (AA 178, 179, 180)					3	3	3
Extempore Speaking (Sp 111)					---	3	---
Technical electives					2	2	2
					18-19	17-18	17-18
Junior Year							
NORM							
Methods and Motion Study (IE 391)					3	---	---
Time Study (IE 392)					---	3	---
Production Planning and Control (IE 393)					---	---	3
Outlines of Economics (Ec 211)					4	---	---
Economic Development of the United States (Ec 215)					---	4	---
Military or Naval Science or electives					3	3	3
					10	10	6
METAL INDUSTRIES OPTION							
Junior Year Norm					10	10	6
Production Machine Work (IE 363)					3	---	---
Materials of Engineering (ME 216)					---	3	---
Business Law (BA 411, 412)					3	3	---
Materials Testing Laboratory (ME 316)					---	---	3
Technical electives					2	---	7
					18	16	16
TOOL DESIGN OPTION							
Junior Year Norm					10	10	6
Machine and Tool Maintenance (Machine Shop) (IE 265)					2	---	---
Production Machine Work (IE 363)					3	---	---
Strength of Materials (ME 311)					---	3	---
Materials of Engineering (ME 216)					---	3	---
Mechanism (ME 312)					3	---	---
Materials Testing Laboratory (ME 316)					---	---	3
Technical electives					---	---	7
					18	16	16
WOOD INDUSTRIES OPTION							
Junior Year Norm					10	10	6
Mill Work—Machine Woodwork (IE 311)					3	---	---
Carpentry and Building Construction (IA 333)					---	3	---
Business Law (BA 411, 412)					3	3	---
Technical electives					---	2	11
					16	18	17
Senior Year							
NORM							
Industrial Supervision Principles (IE 490)					---	---	3
Principles of Accounting (BA 211, 212)					3	3	---
Industrial Cost Accounting (BA 424)					---	---	3
Money and Banking (Ec 413)					4	---	---
Industrial Psychology (Psy 215)					---	---	3
Safety in Industry (IE 390)					---	2	---
Military or Naval Science or electives					3	3	3
					10	8	12
METAL INDUSTRIES OPTION							
Senior Year Norm					10	8	12
Mechanism (ME 312)					3	---	---
Tool Design (IE 364)					---	3	---
Labor Problems (Ec 425)					---	4	---
Technical electives					4	2	5
					17	17	17
TOOL DESIGN OPTION							
Senior Year Norm					10	8	12
Machine Design (ME 411, 412)					3	3	---
Tool Design (IE 364)					---	3	---
Jigs, Fixtures, and Die Design (IE 369)					---	2	2
Seminar (IA 405)					---	---	2
Business Law (BA 411)					---	3	---
Technical electives					5	---	---
					18	19	16

WOOD INDUSTRIES OPTION

	Term hours		
	F	W	S
Senior Year Norm	10	8	12
Labor Problems (Ec 425)	—	4	—
Technical electives	6	5	5
	16	17	17

INDUSTRIAL-ARTS EDUCATION¹

Freshman Year

Pattern Making (IE 111)	3	—	—
Methods in Woodworking (IA 112, 113)	—	3	3
Foundry Practices (IA 141)	3	—	—
Forging and Welding (IA 152)	—	3	—
Machine Shop Practices (IA 163)	—	—	3
Engineering Drawing (GE 111, 112, 113)	2	2	2
² Group requirement in science group	4	4	4
English Composition (Eng 111, 112, 113)	3	3	3
³ Physical Education	1	1	1
Military or Naval Science	1	1	1
	17	17	17

Sophomore Year

Machine and Tool Maintenance (IA 225 or IE 265)	2	—	—
House Planning and Architectural Drawing (AA 178)	3	—	—
House Planning and Architectural Drawing (AA 179) or Tool Design (IE 364)	—	3	—
House Planning and Architectural Drawing (AA 180) or Descriptive Geometry (GE 123)	—	—	3
Lower-Division Drawing (AA 291)	3	—	—
Lower-Division Decorative Design (AA 295)	—	3	—
Sheet-Metal Work (IA 380) or Lower-Division Decorative Design (AA 295)	—	—	3
⁴ Social Science	4	4	—
Outlines of Psychology (Psy 207)	—	—	3
Business English (Eng 217) or Elementary Journalism (J 111)	3	—	—
Extempore Speaking (Sp 111)	—	3	—
Extempore Speaking (Sp 112) or Parliamentary Procedure (Sp 231)	—	—	3
Military or Naval Science	2-3	2-3	2-3
Physical Education	1	1	1
Technical electives	—	2	3
	18-19	16-17	17-18

Junior Year

Millwork—Machine Woodworking (IE 311) or Production Machine Work (IE 363)	3	—	—
Carpentry and Building Construction (IA 333) or Materials of Engineer- ing (ME 216)	—	3	—
Automobile Mechanics (AE 312, 313, 314)	3	3	3
Secondary Education (Ed 311)	3	—	—
Educational Psychology (Ed 312)	3	—	—
Adolescence: Growth and Development of the Individual (Ed 461)	—	3	—
Principles of Teaching (Ed 313)	—	3	—
Measurement in Secondary Education (Ed 416)	—	—	3
Industrial Arts Organization (Ed 330)	—	—	3
Technical electives	2	2	5
Military or Naval Science or electives	3	3	3
	17	17	17

¹Students interested in nonteaching fields (see pages 319-320) should consult the department head regarding substitutions for courses listed.

²Candidates for the Oregon High School certificate should present a total of 17 hours in the science group, at least nine of which must be in biological science.

³General Hygiene (PE 150), 1 term hour, is taken one term in place of physical education.

⁴Candidates for the Oregon certificate should elect Hst 377, and should present a total of 24 hours in the social studies group.

	Senior Year	Term hours		
		F	W	S
Practical Electricity (IA 370)		3	---	---
Stagecraft and Lighting (Sp 244)		---	3	---
¹ Shop Planning and Organization (IA 411)		---	---	3
² The General Shop and Its Problems (IEd 473)		2	---	---
² Written and Visual Teaching Aids (Ed 474)		---	3	---
Methods and Materials (Ed 408e)		3	---	---
Supervised Teaching (Ed 415)		---	3	6
³ Occupational Analysis (IEd 472)		3	---	---
Oregon School Law and Oregon System of Education (Ed 316)		---	---	2
Technical electives		3	5	3
Military or Naval Science or electives		3	3	3
		17	17	17

General Engineering

ENGINEERING courses required in the common freshman year for civil, electrical, industrial, and mechanical engineering are grouped in the Department of General Engineering. Staff members from all departments of the school work as a committee to plan, coordinate, and unify instruction. Certain service courses that are available by election to all students of the College are administered and supervised by departments of the School of Engineering as indicated under the course descriptions.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

GE 101, 102, 103. **Engineering Problems.** 2 hours each term.

Lectures and elementary problems dealing with the general fields of civil, electrical, industrial, and mechanical engineering; to train the student in engineering habits of work. One lecture; 2 two-hour computation periods.

GE 111, 112, 113. **Engineering Drawing.** 2 hours each term.

Fundamental principles and the rules of composition of the graphic language of engineering. Three two-hour periods.

GE 114. **Elementary Production Illustration.** 2 hours.

Study and application of special techniques of perspective drawing to make accurate pictorial drawings; now used in industry to supplement or replace regular engineering drawing. Prerequisite: GE 113. Two three-hour periods.

GE 115. **Engineering Drawing.** 3 hours.

Fundamental principles and rules of composition of the graphic language of industry. For forestry students only. One lecture; 3 two-hour periods.

GE 121, 122. **Engineering Drawing.** 3 hours each term.

Fundamentals of graphic composition with particular emphasis on reading and interpretation of line drawings, charts, and diagrams. Two-term course for students in Business and Technology. One lecture; 3 two-hour periods.

GE 123. **Descriptive Geometry.** 3 hours.

Theory and problems on the projection of points, lines, surfaces, and solids; applications of graphical solution of engineering problems. Prerequisite: GE 111, 112. One lecture; 3 two-hour periods.

¹Candidates for the Oregon High School credential may postpone these courses until the fifth (graduate) year.

GE 241, 242, 243. Pilot Training I. 2 hours each term.

History of aviation; laws governing flight; navigation; meteorology; theory of flight; individual flying instruction. Prerequisite: consent of instructor. Two lectures; one hour flight instruction. Special course fee of \$105.00 per term to cover flight instruction cost. Courses administered under Department of Mechanical Engineering.

UPPER-DIVISION COURSES

GE 341, 342, 343. Pilot Training II. 2 hours each term.

Operation and uses of aircraft in specialized industrial applications; methods of flight testing; advanced flying instruction. Two lectures; one hour flying per week. Prerequisite: private or commercial pilot certificate. Special fee of \$105.00 per term to cover flight instruction costs. Administered under Department of Mechanical Engineering.

GE 444. Technological Patents. (g) 2 hours.

The various phases of the patent system with emphasis on factors pertinent to development of technical processes and equipment. Administered under Department of Chemical Engineering.

Agricultural Engineering

THE curricula in agricultural engineering are planned to prepare young men for positions in the four major fields of Agricultural Engineering: power and machinery, farm structures, rural electrification, and soil and water conservation. The curricula are also planned to give the student general training in agriculture since a sympathetic understanding of the problems of agriculture are essential to anyone going into work in the agricultural engineering field. The Department of Agricultural Engineering is a joint department within the School of Engineering and the School of Agriculture.

Equipment. Facilities are provided in the Agricultural Engineering Building for teaching and experimental work in the four major fields. The farm motors laboratory contains several makes and types of stationary gas engines, sectionalized automobile and tractor motors, and accessories. A Prony brake for testing the power output of stationary engines is also provided. Modern equipment and demonstration material is loaned to the institution by leading manufacturers and distributors, for study and operation by the student. The tractors and automobile repair laboratory is well equipped with modern tools and testing equipment for complete instruction in repair work of all kinds. Tractors of both wheel and crawler types are loaned annually to the department for instruction purposes. A well-lighted drafting room with modern equipment is available for students studying farm structures. Various samples of building materials, models, and modern farm buildings are available for study and observation.

Courses in farm construction and general farm repairs are taught in laboratories equipped for the purpose. Farm water systems, centrifugal and turbine pumps for irrigation pumping, spray pumps, and similar equipment are available for instruction purposes.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

AE 101, 102, 103. Agricultural Engineering Problems. 1 hour each term.

Lectures and problems dealing with the four major fields of agricultural engineering: to train the student in engineering habits of work. One lecture; 1 two-hour computation period.

AE 221, 222. Farm Mechanics. 3 hours winter, spring.

Drawing; reading blueprints; estimating materials and costs; construction of wood and metal farm appliances; equipment repairs. Prerequisite: IE 250 or equivalent. One recitation; 2 three-hour laboratory periods.

UPPER-DIVISION COURSES

AE 311. Farm Motors and Tractors. 3 hours any term.

Farm motors and accessories, carburetors, magnetos, ignition, governing, cooling, lubricating systems; fuels and oils; testing, timing, trouble hunting. Two recitations; 1 three-hour laboratory period.

AE 313. Automobile Mechanics. 3 hours winter or spring.

Practical repairing and minor overhauling of automobiles, tractors, and trucks, with emphasis on preventive maintenance, lubrication, engine tune-up, brake adjusting, etc. Prerequisite: AE 311 or 312. One lecture; 2 three-hour laboratory periods.

AE 314. Automobile Mechanics. 3 hours spring.

Engine rebuilding, advanced electrical testing, repairing and rebuilding of electrical accessories, use of precision equipment of all types commonly found in up-to-date repair shops. Prerequisite: AE 313. Two recitations, 1 three-hour laboratory period.

AE 321. Pumps and Irrigation Equipment. 3 hours spring.

Operation and testing of pumps, irrigation equipment, farm water systems, spray equipment. Prerequisite: AE 111 or equivalent. Two recitations; 1 three-hour laboratory period.

AE 401. Research. Terms and hours to be arranged.**AE 405. Reading and Conference.** Terms and hours to be arranged.**AE 407. Seminar.** Terms and hours to be arranged.

Prerequisite: fourteen term hours in agricultural engineering or equivalent.

AE 431. Rural Electrification. (g) 3 hours spring.

Fundamentals of alternating currents, code and wiring, electric motors and principles of using electricity profitably on the farm. Prerequisite: EE 356 or equivalent. Two lectures, 1 three-hour laboratory period.

AE 461, 462, 463. Farm Structures. (g) 3 hours each term.

Farmstead building arrangements; functional and structural requirements of farm structures; principles of wood and masonry framing and construction; appraisals and cost construction estimates. Prerequisite: AA 178; ME 316; CE 213 or ME 213. One lecture; 2 three-hour laboratory periods.

AE 471. Soil Conservation Engineering. (g) 3 hours fall.

Agricultural-engineering phases of soil-erosion control; dams and terraces; terracing machinery; mapping; measurement of run-off. Prerequisite: CE 223; SIs 213. One lecture; 1 recitation; 1 three-hour laboratory period.

AE 481. Agricultural Machine Design. (g) 3 hours winter.

Application of principles of mechanism, mechanics, and strength of materials to design of agricultural machinery. Prerequisite: ME 315 or CE 352. One recitation; 2 three-hour laboratory periods.

AE 491. Power Farming Machinery. 3 hours spring.

Modern power farming equipment, its design, operation, maintenance, and adjustment. Prerequisite: AE 311; ME 312. Two recitations; 1 three-hour laboratory period.

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 507. Seminar. Terms and hours to be arranged.

Chemical and Metallurgical Engineering

THE curricula in chemical, metallurgical, and mining engineering are designed to give a broad training in the principles fundamental to these industries. They aim to lay a foundation for responsible work in laboratory and plant and to prepare the student for graduate work. The courses are applicable for preparation of students for research, design, control, operation, or technical sales.

Chemical, metallurgical, and mining engineering students have a common curriculum in the freshman year. The curricula provide broad training in fundamentals rather than specialized instruction in a narrow field, and a corresponding breadth of opportunity is presented. 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 the proper qualifications are advised to pursue graduate work leading to advanced degrees.

Equipment. The administrative offices for the department are located in Chemistry Hall, where modern laboratories and classrooms are provided for instruction and experimentation. Other offices, laboratories, and equipment are maintained in the Industrial Building and in the Mines Building. The laboratories contain the necessary apparatus for pilot plant studies and for smaller scale investigations of problems and techniques encountered in industrial plants. The assaying and metallurgical laboratories are equipped to conduct experimental metallurgical operations, ore-dressing, and physical tests of metals and their ores. The chemical engineering laboratory facilities provide for instruction in the unit operations and numerous manufacturing processes. A wide variety of instruments is available for securing engineering data, and the laboratories contain a complete stock of chemical reagents and chemical apparatus. Special laboratories are available for advanced research projects.

COURSES IN CHEMICAL ENGINEERING

LOWER-DIVISION COURSES

ChE 111, 112, 113. Chemical and Mineral Industry. 1 hour each term.

The professions of chemical, mining and metallurgical engineering; engineering procedures and methods. One lecture; 1 two-hour computation period.

ChE 211. Chemical Technology. 2 hours.

Fundamentals of chemical engineering; graphical analysis; instrumentation; control of process variables; applications in the solution of typical problems. Two lectures; one recitation.

ChE 212, 213. Industrial Stoichiometry. 2 hours each term.

Quantitative interpretation and application of physical and chemical data to various industrial chemical processes. Two lectures; one recitation.

UPPER-DIVISION COURSES

ChE 311. Industrial-Chemical Calculations. 3 hours.

Continuation of stoichiometry and application of physical and chemical principles to industrial problems. Quantitative treatment of selected industrial processes. Three lectures; 1 two-hour computation period.

ChE 312. Chemical Engineering Thermodynamics. 3 hours.

Principles and relationships of thermodynamics as applied to typical problems encountered in the field of chemical engineering. Three lectures; 1 two-hour computation period. Prerequisite: Ch 440.

ChE 313. Elementary Unit Operations. 3 hours.

Introduction to unit operations of chemical engineering; operations of flow of fluids and flow of heat. Three lectures; 1 two-hour computation period.

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 407. Seminar.** 1 hour any term.**ChE 411, 412, 413. Unit Operations.** (g) 3 hours each term.

Quantitative treatment of the unit operations of chemical engineering; application of the fundamental principles of the operations to typical engineering problems. Three lectures; 1 two-hour computation period.

ChE 414, 415, 416. Chemical Engineering Laboratory. (g) 3 hours each term.

Quantitative laboratory study of the unit operations of chemical engineering; emphasis placed on preparation of technical reports. One lecture; 1 four-hour laboratory period. Prerequisite or parallel: ChE 411.

ChE 421, 422, 423. Industrial Chemistry. (g) 2 hours each term.

For nonchemical-engineering majors. Treatment is quantitative but restricted to chemical engineering principles as applied to industrial chemical processes. Prerequisite: consent of instructor.

ChE 432. Chemical Plant Design. (g) 3 hours.

Problems in the design of a chemical plant and chemical-engineering equipment; design-room procedures emphasized. Reports required. Two lectures; 1 two-hour computation period. Prerequisite or parallel: ChE 413.

ChE 441, 442, 443. Elements of Process Industries. (g) 2 hours each term.

Inorganic and organic chemical technology with emphasis on the development and economic aspects of commercial operations. Two lectures; 1 recitation.

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

ChE 511. Industrial Plastics. 3 hours.

Classification of modern plastics, their preparation, properties, and special fields of application; commercial processes of manufacture; fabrication. Prerequisite: Ch 430, 431, 432, or equivalent.

ChE 512. Economic Balance. 3 hours.

Solution of typical chemical engineering and applied chemistry problems from the standpoint of economic considerations; optimum conditions of design and operation.

ChE 513. Petroleum Refining. 3 hours.

Processes by which crude petroleum is converted into commercial products; special attention to application of fundamental operations of absorption, distillation, cracking, etc. Not offered 1948-49.

ChE 514. Fluid Flow. 2 hours.

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. One lecture; 1 two-hour recitation.

ChE 515. Unit Processes. 2 hours.

Advanced studies of typical processes such as hydrogenation, halogenation, alkylation, and nitration. Prerequisite: Ch 432, ChE 413. One lecture; 1 two-hour recitation. Professor Walton.

ChE 521. Diffusional Operations. 3 hours.

Study of unit operations of evaporation, distillation, absorption, and extraction at an advanced level. Methods of solution of problems dealing with multicomponent mixtures are stressed. Two lectures; 1 two-hour computation period. Prerequisite: ChE 413.

ChE 522. Heat Transmission. 3 hours.

The mechanisms of transference of heat energy and its engineering applications. Two lectures; 1 two-hour computation period.

ChE 523. Process Laboratory. 3 hours.

Laboratory study of selected unit processes. Designed to emphasize the fundamentals of the subject. Prerequisite: organic chemistry. One lecture; 1 four-hour laboratory period.

ChE 531, 532, 533. Electrochemical Engineering. 3 hours each term.

A study of present-day electrochemical and electrometallurgical industrial practices with emphasis upon processes, efficiencies, operation, and cell or furnace design. Two lectures; 1 two-hour computation period.

COURSES IN METALLURGICAL ENGINEERING**LOWER-DIVISION COURSE****Met 263. Assaying. 3 hours.**

Commercial methods of wet and dry assay of ores, metallurgical products. Prerequisite: Ch 232 or equivalent. One recitation; 2 three-hour laboratory periods.

UPPER-DIVISION COURSES**Met 401. Research. Terms and hours to be arranged.****Met 403. Thesis. Terms and hours to be arranged.****Met 405. Reading and Conference. Terms and hours to be arranged.**

Met 407. Seminar. (g) 1 hour each term.

Met 431, 432, 433. Metallurgy. (g) 3 hours each term.

General operations and principles of extractive metallurgy; study of production of common, precious, and rare metals; metallurgical calculations. Prerequisite: Ch 206, Mth 103, or their equivalent. Three lectures; 1 three-hour computation period.

Met 441. Metallurgy. (g) 3 hours.

Constitution and structure of metals. Prerequisite: Met 431. Two lectures; 1 three-hour laboratory period.

Met 442, 443. Extractive Metallurgy. (g) 3 hours each term.

Application of metallurgical processes to a particular ore or product; metallurgical plant design. Prerequisite: Met 433. One recitation; 2 three-hour laboratory periods.

GRADUATE COURSES

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

Met 501. Research. Terms and hours to be arranged.

Met 503. Thesis. Terms and hours to be arranged.

Met 505. Reading and Conference. Terms and hours to be arranged.

Met 507. Seminar. Terms and hours to be arranged.

Met 531, 532, 533. Metallurgy. 3 hours each term.

Practice, principles, and problems of metallurgical industry at advanced level. Prerequisite: Met 443. Two conferences; 1 three-hour laboratory period. Professor Caldwell, Associate Professor Schulein, Assistant Professor Clapp.

Met 541. Metallurgy of Rare Metals. 3 hours fall.

Prerequisite: Met 443. Three conferences. Professor Caldwell.

Met 542, 543. Metallurgy Laboratory. 2 hours each term.

Special investigations applying pyrometallurgical, hydrometallurgical, and electrometallurgical processes. Prerequisite: Met 541. Two three-hour laboratory periods. Professor Caldwell.

COURSES IN MINING ENGINEERING

UPPER-DIVISION COURSES

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

MiE 403. Thesis. (g) Terms and hours to be arranged.

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

MiE 407. Seminar. (g) 1 hour each term.

MiE 431, 432. Mining. (g) 3 hours each term winter and spring.

General consideration of the elements of mining and methods used; study of specific mining operations. Prerequisite: ChE 113.

MiE 441, 442. Mining. (g) 3 hours each term fall and winter.

Mine development; problems of transportation, ventilation, drainage, etc.; mine organization, sampling, valuation, etc. Prerequisite: MiE 432.

- MiE 443. Mining.** (g) 3 hours spring.
Individual problem study of mine design. Prerequisite: MiE 442. One recitation; 2 three-hour laboratory periods.
- MiE 453. Mine Surveying.** (g) 3 hours spring.
Surveying problems met with in mining-engineering practice; determination of true meridian. Prerequisite: CE 226. One lecture; 2 three-hour laboratory periods.
- MiE 461. Mineral Industry Economy.** (g) 3 hours spring.
Political, social, and individual objectives in mineral production; historical and statistical aspect of mineral production. Prerequisite: junior standing in mining or metallurgical engineering.
- MiE 471, 472. Fire Assaying.** (g) 2 hours each term fall and winter.
Fire assaying of ores and metallurgical products; sampling; slag calculations; oxidation and reduction; special methods; principles of pyrometallurgy demonstrated by fire assaying. Prerequisite or parallel: Ch 204. One lecture; 2 three-hour laboratory periods.
- MiE 481, 482. Mineral Dressing.** (g) 3 hours each term fall and winter.
Principles of comminution, concentration, and related processes; methods of treatment and machinery used. Prerequisite or parallel: Met 263, G 312, or equivalents.
- MiE 483. Mineral Dressing Laboratory.** (g) 3 hours spring.
Quantitative experiments to demonstrate principles and teach practice of mineral dressing methods; procedures for ore testing; technical reports. Prerequisite: MiE 482. One lecture; 2 three-hour laboratory periods.

GRADUATE COURSES

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

- MiE 501. Research.** Terms and hours to be arranged.
- MiE 503. Thesis.** Terms and hours to be arranged.
- MiE 505. Reading and Conference.** Terms and hours to be arranged.
- MiE 507. Seminar.** Terms and hours to be arranged.
- MiE 531, 532, 533. Mining.** 3 hours each term.
Study of specific mining enterprises pertaining to their economics, mining method, mine haulage, handling of explosives, equipment, power needs, etc. Two conferences; 1 three-hour laboratory period. Prerequisite: MiE 443. Professor Caldwell.

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.

Highway, structural, and sanitary engineering are offered as options in the civil-engineering curriculum in the senior year. The aim in these courses is to meet the demand in this state and throughout the Northwest for men equipped to take charge of construction, operation, and maintenance work.

Thorough theoretical instruction is accompanied by as much laboratory and field practice as possible. In the study of highways, special reference is made to the conditions and needs of Oregon.

Equipment. The department is provided with quarters and equipment for performing its work adequately and thoroughly. The third floor of Apperson Hall is devoted to classrooms and drawing rooms. A large room on the ground floor of Industrial Arts Building houses the surveying instruments, and the middle third of the Engineering Laboratory is occupied by hydraulic and sanitary equipment. The surveying equipment of the instrument room consists of 40 transits, 35 levels, 7 plane tables and telescopic alidades, 2 theodolites, together with the necessary auxiliary supply of stadia, level, and line rods, hand levels, tapes, and other minor equipment, a 25-passenger surveying truck, and a 30-passenger mobile surveying bus.

The equipment of the hydraulic laboratory is adequate for the execution of all basic experimental work in the field of hydraulic engineering. The machinery installed is modern and complete. It is extensive enough so that all the theoretical studies of the classroom may be verified by the performance of machines in the laboratory. Classified on the factors of quantity of water, pressure under which water is available, square feet of floor space, and value of equipment, it ranks among the leading hydraulic laboratories of the United States. The major items of the equipment are two direct-connected 8-inch centrifugal pumps operated by 40-horsepower motors; a 35-inch Pelton impulse wheel with oil-pressure governor; a 14-inch spiral-cased Francis-type reaction turbine with Pelton governor; a large pressure tank five feet in diameter by twenty feet high; and two 16,000-pound capacity weighing tanks mounted on direct reading scales.

The department is equipped with modern testing laboratories, including the best cement and highway-testing machinery, thus affording students in civil engineering the opportunity of studying by direct observation and experiment the strength and properties of the various engineering materials.

The structural division is equipped with the most modern apparatus for the mechanical analysis of statically indeterminate structures including a twelve-gage, three-microscope Beggs Deformeter set, a Gottschalk Continostat, a 4½-inch photoelastic polariscope, and two structural testing machines.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

CE 201, 202, 203. Introduction to Civil Engineering. 2 hours each term.

Fundamentals of graphic analysis, descriptive geometry, structural and topographic drafting, including field curves, in relation to the practice of structural, hydraulic, highway, and sanitary engineering. Three two-hour laboratory periods for CE 201, 202; 2 three-hour laboratory periods for CE 203.

CE 212. Mechanics (Statics). 3 hours.

Applied mechanics for engineering students. Prerequisite: differential calculus. One recitation; 2 two-hour computing periods.

CE 213. Mechanics (Dynamics). 3 hours.

Continuation of CE 212. Principles and problems in kinetics; force as a factor causing motion; work, energy, friction, and impact. Prerequisite: CE 212. One recitation; 2 two-hour computing periods.

CE 221. Plane Surveying. 3 hours.

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: GE 111; Mth 101. One recitation; 2 three-hour periods field work.

CE 222. Plane Surveying. 3 hours.

Surveying problems relating to construction and land surveying; special computation problems in map projections; control surveys; and earthwork; tests and adjustment of engineer's transit and level. Prerequisite: CE 221. One recitation; 2 three-hour periods field and computation.

CE 223. Plane Surveying. 3 hours.

Control surveys; computation of statewide coordinates; topographic mapping; theory and use of stadia and plane table; field astronomy. Prerequisite: CE 222. One recitation; 1 six-hour field period.

CE 224, 225. Surveying for Landscape Architecture Students. 3 hours each term.

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. One recitation; 2 three-hour laboratory periods.

CE 226. Plane Surveying. 3 hours.

Theory and use of engineer's transit, tape, and level; application of surveying methods to problems in construction and area survey. Prerequisite: Mth 101. One recitation; 2 three-hour periods field work.

UPPER-DIVISION COURSES**CE 311. Fluid Mechanics. 3 hours.**

Application of mechanics to compressible and incompressible fluids; laboratory measurements. Prerequisite: CE 212; Mth 203. Two recitations; 1 three-hour laboratory period.

CE 312. Hydraulics. 3 hours.

Continuation of CE 311. Special hydraulic problems, including the laws of hydraulic similitude. Prerequisite: CE 311. One recitation; 2 two-hour laboratory periods.

CE 313. Hydraulic Machinery. 3 hours.

Operation, characteristics, efficiency, theory, design, and installation of pumps and turbines; laboratory studies. Prerequisite: CE 311. Two recitations; 1 three-hour laboratory period.

CE 321. Advanced Surveying. 3 hours.

Precise leveling, triangulation, base-line measurement, stellar and solar observations, aerial mapping. Prerequisite: CE 223. One recitation; 2 three-hour periods field work.

CE 322. Elementary Hydraulics. 3 hours.

Principles underlying pressure and flow of water; laboratory measurements. For agricultural-engineering students. Prerequisite: Mth 103. Two recitations; 1 three-hour laboratory period.

CE 331. Navigation. 3 hours.

Fundamental laws of navigation; longitude, latitude, spherical trigonometry; commercial flight routes; flight instruments.

- CE 332. Curves and Earthwork.** 3 hours.
Easement; parabolic curves as related to railroads, highways, and canals; surveys; complete survey of a transportation line; estimates of quantities. One recitation; 2 three-hour periods field work.
- CE 341. Fluid Mechanics.** 3 hours any term.
For students in electrical, mining, and mechanical engineering. Prerequisite: CE 212 or ME 212; Mth 203. Two recitations; 1 three-hour laboratory period.
- CE 342. Hydraulic Machinery.** 3 hours.
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 311 or 341. Two recitations; 1 three-hour laboratory period.
- CE 351, 352. Strength of Materials.** 3 hours each term.
General principles of mechanics applied to the elements of engineering structures to determine their strength and fitness. Prerequisite: CE 212 or ME 212; Mth 203. One recitation; 2 two-hour periods.
- CE 362. Modern Construction Methods.** 2 hours.
Modern methods of earth moving; economic haul for various types of equipment; use of explosives. Prerequisite: CE 351. One lecture; 30 hours laboratory arranged during the term.
- CE 382. Structural Analysis.** 4 hours.
Graphical and algebraic analysis of statically determinate structures. Prerequisite: CE 212 or ME 212. Two recitations; 2 two-hour laboratory periods.
- CE 383. Reinforced Concrete.** 4 hours.
Study and design of the elements of reinforced concrete including beams, slabs, girders, and columns. Prerequisite: CE 351, 382. Two recitations; 2 two-hour laboratory periods.
- CE 401. Research.** Terms and hours to be arranged.
- CE 403. Thesis.** Any term, hours to be arranged.
- CE 405. Reading and Conference.** Terms and hours to be arranged.
- CE 407. Seminar.** 1 hour.
- CE 411. Hydrology.** 3 hours fall.
Precipitation, storage, and run-off; field studies in standard methods of measurement. Two recitations; 1 three-hour laboratory period.
- CE 412. Sanitary Engineering. (g)** 3 hours.
Fundamental processes and operations of the conditioning of water as applied to water supply and sewage disposal. Prerequisite: CE 311. Two recitations; 1 three-hour laboratory period.
- CE 413. Sanitary Engineering Laboratory. (g)** 3 hours.
Laboratory practice in standard methods of water and sewage analysis. Prerequisite: senior standing. One recitation; 2 three-hour laboratory periods.
- CE 421. Highway Engineering. (g)** 4 hours.
Highway and street design; theory of structural design for rigid slab and flexible type pavement; subgrade stabilization; drainage design. Prerequisite: senior standing. Two recitations; 2 three-hour laboratory periods.

- CE 422. Highway Engineering. (g) 3 hours.
Traffic surveys; methods of modern traffic control; safety; motor-vehicle laws; pedestrian control. Two recitations; 1 three-hour laboratory period.
- CE 425. Economics of Highway Transportation. (g) 3 hours.
Highway economics; cost, benefit, and revenue factors; motor vehicle operation costs; economic theory of highway development and extensions.
- CE 427. Contracts and Specifications. (g) 3 hours.
General principles and laws of contracts as applied to engineering.
- CE 433. Roads and Pavements. (g) 3 hours.
Fundamental principles of location, construction, and maintenance of roads; materials used in road and street building.
- CE 452. Water Supply. (g) 3 hours any term.
Quality and quantity of water necessary for a municipal supply and of works for its collection, purification, and distribution. Two recitations; 1 three-hour laboratory period.
- CE 454. Sewage Disposal. (g) 3 hours.
Disposal and treatment of sewage; design and operation of sewage-treatment plants. Prerequisite: CE 311. Two recitations; 1 three-hour laboratory period.
- CE 460. Estimating and Cost Analysis. (g) 3 hours.
Quantity surveying; general and detailed considerations in establishing unit prices; subcontracts, overhead cost, and profits; estimates. Two recitations; 1 three-hour laboratory period.
- CE 472. Masonry and Foundations. (g) 4 hours.
Study and design of masonry foundations, walls, piers, dams, and arches. Prerequisite: CE 383. Two recitations; 2 three-hour laboratory periods.
- CE 481. Structural Engineering. (g) 4 hours.
Study and design of elements of riveted steel; design and detail of riveted-steel structures. Prerequisite: CE 351, 382. Two recitations; 2 three-hour laboratory periods.
- CE 482. Structural Design. (g) 4 hours.
Study and design of timber members in tension, compression, and flexure, with their connections; design and details of simple timber structures. Prerequisite: CE 351, 382. Two recitations; 2 three-hour laboratory periods.
- CE 483. Building Design. (g) 4 hours.
Study and design of building elements constructed of welded steel and reinforced-brick masonry; fabrication and construction. Prerequisite: CE 472, 481. Two recitations; 2 three-hour laboratory periods.
- CE 485. Indeterminate Structures. (g) 3 hours.
Elastic deflections and methods of analysis of statically indeterminate stresses. Prerequisite: CE 382. Two recitations; 1 three-hour laboratory period.
- CE 486. Structural Analysis. (g) 3 hours.
Study and stress analysis of statically indeterminate structures such as continuous beams and rigid frames; methods of analysis. Prerequisite: CE 382. One recitation; 2 three-hour laboratory periods.

GRADUATE COURSES

Courses numbered 400-499 and designated (p) 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 507. **Seminar.** Terms and hours to be arranged.
- CE 520. **Measurement of Water.** 3 hours.
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. Prerequisite: CE 311.
- CE 521. **Fluid Mechanics.** 3 hours.
Dimensional analysis; principles of energy, continuity, and momentum; hydraulic jump and wave motion; hydrodynamics. Prerequisite: CE 311. Two recitations; 1 three-hour laboratory period.
- CE 522. **Water-Power Engineering.** 3 hours.
Development of water power; storage and load; characteristics of modern turbines; selection of turbines; problems in design. Prerequisite: CE 313 or 342. One recitation; 2 three-hour laboratory periods.
- CE 523. **River Control and Utilization.** 3 hours.
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.
- CE 530. **Structural Stresses.** 2 hours.
Stress analysis of space frames and continuous frames; use of tension coefficients and distributed moments. Prerequisite: senior standing. One lecture; 1 three-hour laboratory period.
- CE 531. **Mechanical Methods of Stress Analysis.** 2 hours.
Theory and use of Beggs Deformeter, wire models, Gottschalk Continostat and Photoelastic Polariscope as applied to the solution of stresses in continuous frames. Prerequisite: senior standing. Two three-hour laboratory periods.
- CE 532. **Bridge Design.** 3 hours.
Problems in location, economic selection, and design of steel bridges. Prerequisite: CE 483, 485.
- CE 533. **Analysis and Design of Concrete Structures.** 3 hours.
Problems in analysis and design of elastic concrete structures. Prerequisite: CE 483, 485.
- CE 540. **Sanitary Engineering Design.** 3 hours.
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.
A study of stream pollution, oxygen sag, reaeration, and their effects.
- CE 542. **Water and Sewage Treatment Processes.** 3 hours.
Critical review of recent and current researches in the field of water and sewage treatment.
- CE 543. **Treatment Plant Operation and Control.** 3 hours.
Field analysis of water and sewage treatment plant operations and methods of control. Prerequisite: CE 413.

CE 550. Highway Administration and Finance. 3 hours.

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.

Modern city streets, boulevards, and transportation systems; drainage and sanitation; water supply; lighting.

CE 552. Transportation Engineering. 3 hours.

Study of related engineering factors pertaining to movement of freight by rail, water, air, and highways. Prerequisite: CE 422.

CE 553. Street and Highway Traffic Control. 3 hours.

Study of various factors affecting operation of streets and highways from standpoint of efficiency and safety. Prerequisite: CE 422.

Electrical Engineering

THE curricula in electrical engineering are designed to train the student in the fundamental principles of the field and in those collateral subjects needed by a well-trained engineer. Both electrical theory and application are presented by means of lectures, recitations, computations, laboratory courses, and inspection trips.

The undergraduate curricula are designed to emphasize the fundamentals of electrical engineering and related subjects in science and engineering. Because of this fact specialized courses have been kept to a relatively small number in the undergraduate curricula. Three options are offered in the senior year: Power, Communication, and Business. The student selects the program in which his interests lie. The Power Option deals with the generation, transmission, distribution, and utilization of electric energy. The Communication Option is for students interested in wire communication, radio, and related work such as television and radar. The Business Option offers supplementary courses for those students whose interests lie in the fields of management and sales rather than in the more technical fields.

Facilities. At the beginning of the academic year 1948-49 the Electrical Engineering Department will occupy the Electrical Engineering Building, now under construction and scheduled for completion September 15, 1948. This building will provide 56,500 square feet of floor space for classrooms, laboratories, offices, and other miscellaneous space requirements.

Laboratory equipment is available for demonstrating and verifying the fundamental electrical principles and theory and also for original research in some of the important fields. Laboratories are provided for experimental work in electric circuits, electric-power machinery, wire communications, radio, electromagnetic radiation, electronics, industrial electronics, electrical measurements, high voltage, illumination, servomechanisms, and standardization of instruments.

The machinery laboratory is equipped with alternating- and direct-current machinery, and transformers of various types. It is also equipped with power supply sources making available d-c and a-c power over a wide range of voltages and currents.

The communications laboratory is well provided with equipment and instruments for making studies involving currents, voltages, and frequencies of the magnitudes used in communications and electroacoustics.

Experimental and laboratory facilities in radio, television, radar, and related electromagnetic radiation phenomena are provided in the radio and radiation laboratories. The facilities of Radio Station KOAC, including the 5,000 watt Western Electric transmitter, with directional antenna array, are also available for instructional and experimental purposes.

The circuits laboratory has adequate facilities for the laboratory work in basic electrical theory given during the sophomore year.

The high-voltage laboratory is equipped with apparatus for 60-cycle potentials up to 200,000 volts and impulse or "lightning" voltage waves of adjustable shape and magnitude up to 600,000 volts. This laboratory is also provided with a high-voltage Dufour cathode-ray oscillograph, sphere gap voltmeters, surge-voltage recorders, high-voltage rectifiers, and other apparatus necessary for the usual high-voltage tests.

A measurements laboratory is equipped for an advanced course in electrical measurements and the study of the electrical and magnetic characteristics of materials used in electric circuits and equipment.

The standardizing laboratory is provided with instruments for the precise measurement of potential, current, and power and for the standardization and calibration of electrical measuring instruments and meters.

Two laboratories are provided for experimental and research work in electronics. One is devoted to fundamental work and the other to the industrial aspects.

The control laboratory provides facilities for experimental work in control, automatic control, and servomechanisms.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

EE 201, 202, 203. Introduction to Electrical Engineering. 4 hours each term.

Fundamentals of magnetic and electrical fields and associated circuits and electric circuit theory. Prerequisite: Mth 103, Ph 103, GE 103, or instructor's approval. Two lectures; 2 two-hour recitations; 1 three-hour laboratory period.

UPPER-DIVISION COURSES

EE 311, 312, 313. Electric Circuits and Equipment. 3 hours each term.

Single and polyphase electric circuits; direct and alternating current machines and equipment, their theory and characteristics. Two lectures; 1 three-hour laboratory period.

EE 321, 322, 323. Electronics. 3 hours each term.

Fundamental theory of electronics including thermionic and emission, cold cathode emission, photoelectric emission, space charge and discharges in gases; principles of vacuum, gas, and vapor tubes and their basic associated circuits. Two lectures; 1 three-hour laboratory period.

EE 331. Electrical Engineering Analysis. 3 hours.

Electrical engineering problems with special emphasis on the derivation of empirical equations for experimental data, Fourier Series, symmetrical components, and Vector analysis.

EE 351, 352, 353. Industrial Electricity. 3 hours each term.

Fundamental electrical principles and electrical equipment emphasizing the applications to industry. Prerequisite: Junior Certificate. Two lectures; 1 three-hour laboratory period.

- EE 354, 355. **Industrial Electricity.** 3 hours each term.
Direct and alternating current circuits and machines. Especially for chemical and metallurgical engineering students. Prerequisite: Junior Certificate. Two lectures; 1 three-hour laboratory period.
- EE 356. **Industrial Electricity.** 3 hours.
Abbreviated course covering direct and alternating current circuits and machines. For civil and industrial engineering students. Prerequisite: Junior Certificate. Two lectures; 1 three-hour laboratory period.
- EE 358. **Electricity in Aeronautics.** 3 hours.
Fundamentals of electrical engineering as applied to aircraft and aerial navigation. Prerequisite: Junior Certificate. Two lectures; 1 three-hour laboratory period.
- EE 359. **Airway Communication Systems.** 3 hours.
Systems of electrical communication used in air transportation. Prerequisite: Junior Certificate. Two lectures; 1 three-hour laboratory period.
- 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 407. **Seminar.** 1 hour each term.
Presentation of abstracts and discussion of articles in the current engineering literature.
- EE 411, 412, 413. **Electrical Engineering Economy.** (g) 3 hours each term.
Power and communication utility economy including plant investment; system of accounts; service tariffs; operation, regulation, and public relations problems. Two lectures; 1 three-hour laboratory period.
- EE 414, 415, 416. **Electrical Measurements and Analysis.** (g) 3 hours each term.
Theory and techniques of d-c and a-c electrical measurements and measuring devices. Two lectures; 1 three-hour laboratory period.
- EE 421, 422, 423. **Transmission Lines and Networks.** (g) 3 hours each term.
Generalized theory of transmission over circuits with distributed constants and with lumped constants for power and communication frequencies. Power limits of transmission lines, steady state and transient stability of transmission systems. Two lectures; 1 three-hour laboratory period.
- EE 431, 432, 433. **Transformers and Rotating Electrical Machinery.** (g) 3 hours each term.
Theory, design features, and characteristics of transformers and rotating electrical machinery with special emphasis on a-c machinery. Two lectures; 1 three-hour laboratory period.
- EE 461, 462. **Wire Communication.** (g) 3 hours each term.
Fundamental theory of wire communication including telephone and telegraph equipment and systems. Two lectures; 1 three-hour laboratory period.
- EE 463. **Radio Communication.** (g) 3 hours.
Fundamental theory of radio communication including radio equipment and systems at broadcast frequencies and at high and ultra-high frequencies. Two lectures; 1 three-hour laboratory period.

- EE 481, 482, 483. Radio Engineering Practices.** 1 hour each term.
Engineering and operating practices employed in modern radio broadcasting. Radio Station KOAC is used; instruction is given by engineer-in-charge. One lecture; 1 two-hour laboratory period.

GRADUATE COURSES

Courses numbered 400-499 and designed (D) 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 507. Seminar.** Terms and hours to be arranged.
- EE 511, 512, 513. Electronics.** 3 hours each term.
Advanced electronics. Theory of emission of electrons; their behavior in electric and magnetic fields; conduction of electricity through gases; application of electronic principles to high-vacuum tubes, gas and vapor tubes, and other special electronic devices such as klystrons, magnetrons and x-ray tubes; construction of electronic devices and high-vacuum technique. Two lectures; 1 three-hour laboratory period.
- EE 521, 522, 523. High-Voltage Engineering.** 2 hours each term.
Experimental investigation and study of dielectric phenomena in high-voltage engineering. One lecture; 1 three-hour laboratory period.
- EE 525, 526, 527. Industrial Electronics.** 2 hours each term.
Advanced study of industrial applications of electronics. Vacuum tubes such as kenotrons, mercury-arc rectifiers, ignitrons, thyratrons, and phototubes; application of these tubes and devices as power rectifiers, converters, and their use in electrical control; x-ray applications in industry. One lecture; 1 three-hour laboratory period.
- EE 531. Materials in Electrical Engineering.** 3 hours.
Properties of conductors, insulators and magnetic materials used in electrical engineering. Two lectures; 1 three-hour laboratory period.
- EE 535. Tensor Analysis in Electrical Engineering.** 3 hours.
Methods used in matrix algebra and tensor analysis with special attention to use in problems involving electric phenomena.
- EE 537. Electric Transients.** 3 hours.
Direct and alternating current single-energy and double-energy transients in circuits and machines having both fixed and variable circuit parameters. Two lectures; 1 four-hour laboratory period.
- EE 541, 542, 543. Electric Power Systems.** 3 hours each term.
Advanced study of electric power generation, transmission, distribution, and utilization. Two lectures; 1 three-hour laboratory period.
- EE 545. Electrical Problems.** 3 hours.
Advanced problems in electrical engineering, unbalanced circuits, and equivalent networks.
- EE 554, 555, 556. Control Engineering.** 3 hours each term.
Study of manual, semiautomatic, and fully automatic control systems as used in industry; fundamental principles of control engineering; devices used to produce specific results. Two lectures; 1 three-hour laboratory period.

EE 561, 562, 563. Wire Communication. 3 hours each term.

Advanced engineering study of theory and applications of electrical transmission of information and other signals over wire lines and networks. Two lectures; 1 three-hour laboratory period.

EE 571, 572, 573. Radio Communication. 3 hours each term.

Advanced engineering study of modern radio communication including facsimile and television in both broadcast and point-to-point service; design and testing of modern transmitters, receivers, antenna systems, and associated equipment; detailed study of radiation and propagation of electromagnetic waves including theory of wave guides. Two lectures; 1 three-hour laboratory period.

EE 575. Engineering of Sound Systems. 3 hours.

Electroacoustic equipment such as microphones, amplifiers, and loud speakers and their engineering application to sound amplification and distribution both in buildings and in the open. Two lectures; 1 three-hour laboratory period.

EE 581, 582, 583. Illumination. 2 hours each term.

Light sources and their application to exterior and interior illumination.

EE 591, 592, 593. Electrical Transportation. 2 hours each term.

Application of electricity to street and interurban transportation; traffic conditions; rolling stock; speed time curves.

Industrial Engineering and Industrial Arts

THE industrial arts occupy a place of constantly increasing importance in the modern world. Artisans of today are dependent upon industrial design as the product of applied art, but no industrial designer is likely to be efficient in the production of plans acceptable to industry without an integral and intimate knowledge of industrial processes, the skills, and the machine applications necessary to the products that he and the artisans of industry will create. The Department of Industrial Arts trains industrial managers, industrial engineers, industrial teachers for the public schools, and industrial designers and artisans.

In meeting the aims and purposes set forth above, the work of the department is properly classified under four major headings:

- (1) Industrial Arts Education: preparing—
 - a. Industrial-arts teachers in secondary schools.
 - b. Trade and industrial instructors.
 - c. Industrial designers.
- (2) Industrial Administration: preparing for service as junior technical executives in industrial technology for—
 - a. Technical operations, inspection, testing, and research.
 - b. Production management, maintenance, service, safety, and improvement.
- (3) Industrial Engineering: preparing for service in the profession of industrial engineering, including the functions of plant layout cost analysis, safety engineering, and scientific management in industries.
- (4) Service courses in shop work for chemical engineering, electrical engineering, and mechanical engineering students.

The Curriculum in Industrial Arts Education (pages 301-302) is planned to train industrial arts teachers for the public schools or to prepare for college teaching; to train trade and industrial instructors; and, in cooperation with the art and other departments, to train industrial designers. The advanced courses are based upon and interpreted through the technical background formed during the first two years. While a strong motivating thread of technical training is present throughout the four-year curriculum, during the junior and senior years notable opportunity is provided for election of both technical and nontechnical subjects that will meet needs of students following different avenues of training. For teaching, at least one minor must be elected in another field.

The Industrial Administration Curriculum (pages 299-301) is designed to meet the ever-increasing demand in industry for men with basic skills and technical knowledge, supplemented with studies in scientific management and some business administration. The program of studies includes those accepted principles and practices by which the manufacturing industries have evolved a system of production control, giving optimum results to the community, the consumer, the worker, and the manufacturer. Correlation of the technical studies, manufacturing processes, and management principles is emphasized to the extent that graduates of this curriculum can progress rapidly into supervisory and junior executive positions. Options (Metal Industries, Wood Industries, Tool Design) and electives enable the student to specialize in the particular phases of industry consistent with his interests and aptitudes. The program affords a rich opportunity to combine technical training and business applications, in industrial, maintenance, improvement, or service occupations, such as technicians in industry, assistant managers, radio station operators and managers, time-study men, and assistants to industrial engineers.

The Industrial Engineering Curriculum (pages 296-297) is designed to train students for the engineering, production, or the technological administrative departments of industry. Technical knowledge in the manufacturing processes is supplemented with studies in business and industry, economics, safety engineering, and scientific management. Particular emphasis is placed on engineering and management principles as applied to operation analysis, labor problems, work simplification, plant layout, production planning and control. Students are prepared for those positions in industry that require a combination primarily 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 gaining satisfactory experience in engineering practice, graduates of this curriculum should be qualified for the highest executive positions in industry.

Facilities. The Department of Industrial Engineering and Industrial Arts is housed in modern, well-lighted structures, with a combined floor space of approximately twenty-five thousand square feet. The principal sub-departments include Drafting, Woodwork and Furniture Construction, Millwork in Wood, Wood and Metal Finishing, Pattern Making, Foundry, Forging and Welding, Machine Shop, and Sheet Metal. Each of these sub-departments is provided with individual shops of ample size and is equipped along modern and approved lines. In addition the facilities and equipment of other departments, such as Art and Architecture, Agricultural Engineering (Farm and Automobile Mechanics), Technical Forestry, Mechanical Engineer-

ing, the School of Science, and cooperating high schools contribute toward the enrichment of curricular opportunities for industrial-arts students. The supervised teaching for those majoring in industrial education is done in cooperating high schools. The program for the last two years of work in industrial education is administered jointly with the School of Education.

COURSES IN INDUSTRIAL ARTS*

LOWER-DIVISION COURSES

- *IA 112, 113. Methods in Woodworking.** 3 hours each term.
Woodworking, with special reference to tool techniques, applied design, and craftsmanship in new and individual projects. Prerequisite: IE 111 or approval of the department. One lecture; 6 laboratory hour-periods.
- *IA 141. Foundry Practices.** 3 hours.
Constitution, properties, and design limitations of casting in gray iron, malleable iron, and steel; methods used in the production of castings. One lecture; 2 three-hour laboratory periods.
- *IA 152. Forging and Welding.** 3 hours.
Forging, forming and heat-treating of steel, followed by gas and electric-arc welding, flame cutting, brazing, and resistance welding operations. Attention is given throughout the course to care of equipment and to organization and use of instructional materials. One lecture; 2 three-hour laboratory periods.
- *IA 163. Machine Shop Practices.** 3 hours.
Use of basic machine tools; suggestions for courses of study and teaching. One lecture; 2 three-hour laboratory periods.
- IA 213. Furniture Design.** 2 hours.
Study of types and periods of furniture; application of design principles of furniture and cabinet drawing. Prerequisite: GE 112, AA 295 or equivalent. One lecture; 5 laboratory hour-periods.
- IA 220. Wood Turning.** 2 hours.
Tool processes and lathe technique; designing, turning, and finishing of individual projects of merit. Prerequisite: IE 111 or IA 112, or equivalent. One lecture, 5 laboratory hour-periods.
- IA 225. Machine and Tool Maintenance (Wood Shop).** 2 hours.
Methods of care and maintenance of woodworking tools, machines, and supplementary equipment. Prerequisite: IE 111 or IA 112 or equivalent. Two lectures; 4 laboratory hour-periods.

UPPER-DIVISION COURSES

- IA 313, 314. Furniture Construction.** 2 hours each term.
The designing and construction of furniture and cabinet work, according to the needs and ability of the individual student. Prerequisite: IE 311 or approval of department. Five laboratory hour-periods; 1 lecture.
- IA 315. Upholstering and Seat Weaving.** 2 hours.
Typical upholstering processes including construction of frames and foundations with and without springs; seat and panel weaving. Prerequisite: IA 112 or equivalent. One lecture; 5 laboratory hour-periods.

* In courses designated by asterisks, in addition to the regularly scheduled meetings, the student attends three general lectures to be arranged during the term.

IA 316. Wood and Metal Finishing. 3 hours.

Materials and processes for old and new work for both wood and metal surfaces; brush and spray application of all types of finishing materials. Prerequisite: IA 112 or equivalent. One lecture; 6 laboratory hour-periods.

IA 321. Wood Turning. 1 hour.

Continuation of IA 220. Emphasis on more intricate cuts and turning processes, special chucking devices, and fancy turning. Prerequisite: IA 220. One three-hour laboratory period.

IA 326. Fiber Furniture Weaving. 2 hours.

The construction of frames and the weaving of art-fiber furniture, with suggestions for the use of this material in public-school teaching. Prerequisite: IA 112 or equivalent. Six laboratory hour-periods, including 1 lecture hour.

IA 333. Carpentry and Building Construction. 3 hours.

Application of carpentry fundamentals including actual construction in miniature from architect's plans, all with particular reference to the "Building Boy Builders" program as a core project in secondary education. Laboratory work also includes framing of rafters and selected architectural sections with full-size lumber. Prerequisite: IA 112. One lecture; 6 laboratory hour periods.

IA 342. Foundry Practices. 2 hours.

A study of equipment used in school and home work shops, and of processes and projects suited to public-school applications in industrial-arts classes. Prerequisite: IA 141 or IE 240. One lecture; 1 four-hour laboratory period.

IA 343. Brass and Alloy Foundry. 2 hours.

Making ornamental casting of brass, bronze, and aluminum; molding, melting, pouring, cleaning, polishing, and coloring. Prerequisite: IA 141 or IE 240. One lecture; 1 four-hour laboratory period.

IA 352. Blacksmithing. 3 hours.

Farm blacksmithing problems, including the usual basic operations in forging and welding. Intended primarily for students majoring in Vocational Agriculture. One lecture; 2 three-hour laboratory periods.

IA 353. Ornamental Iron Work. 2 hours.

Craftsmanship in wrought-iron work; designing and making of wrought-iron furnishings, lamps, light fixtures, etc. Prerequisite: IA 152 or IE 250. Five laboratory hour-periods; 1 lecture.

IA 387. Metal Crafts. 3 hours.

Diversified metal crafts; advanced sheet-metal work, metal spinning, and craft work in iron, copper, and Britannia metal. Prerequisite: AA 295; IA 343, 353, or 380. One lecture; 6 laboratory hour-periods.

IA 370. Practical Electricity. 3 hours.

Basic instruction in practical electricity, covering principles of electrical circuits and controls, with possible application in fields of light and power wiring, stagecraft and lighting, communications including radio. Intended primarily for prospective teachers. Prerequisite: junior standing. One lecture; 6 laboratory periods.

IA 380. Sheet-Metal Work. 3 hours.

Projects in sheet-metal work and pattern drafting involving the fundamental machine and hand-tool operations. Prerequisite: GE 112. One lecture; 6 laboratory hour-periods.

IA 405. Reading and Conference. Terms and hours to be arranged.

IA 407. Seminar. 2 hours.

Prerequisite: senior standing.

IA 411. Shop Planning and Organization. (G) 3 hours.

Planning and organizing the physical plant for different types of school shops. Prerequisite: Ed 408e and senior standing. One lecture; 6 laboratory hour-periods.

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

IA 505. Reading and Conference. Terms and hours to be arranged.

IA 507. Seminar. Terms and hours to be arranged.

COURSES IN INDUSTRIAL ENGINEERING*

LOWER-DIVISION COURSES

*IE 111. Pattern Making. 3 hours.

Fundamentals of pattern making; relation of pattern making to drafting, design, foundry and machine-shop operation. One lecture; 6 laboratory hour-periods.

*IE 240. Foundry Practices. 2 hours any term.

Introductory course covering constitution, properties, and design limitations of castings in iron and steel; foundry methods. Not open to students majoring in industrial arts. One lecture; 1 four-hour laboratory period.

IE 250. Forging and Welding. 2 hours any term.

Forging, forming and heat-treating of steel, followed by gas and electric-arc welding, flame cutting, brazing, and resistance welding operations. Attention is given throughout the course to practical applications of these processes in engineering construction and industrial fabrication. One lecture; 1 four-hour laboratory period.

*IE 260. Machine Shop Practices. 2 hours any term.

Manipulation of basic machine tools, with prescribed projects; correlation of engineering, managerial, and manufacturing problems. Not open to students majoring in industrial arts. One lecture; 1 four-hour laboratory period.

IE 261. Machine Shop Practices. 2 hours.

Manipulation of basic machine tools with individual projects. Survey of machines used for quantity production. Prerequisite: IA 163 or IE 260. One lecture; 1 four-hour laboratory period.

IA 265. Machine and Tool Maintenance (Machine Shop). 2 hours.

Maintenance and repair problems for mechanical equipment. Methods and procedures in tool and cutter sharpening. Prerequisite: IA 163 or IE 260. Two lectures; 4 laboratory hour-periods.

IE 290. Introduction to Scientific Management. 3 hours.

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 attends three general lectures to be arranged during the term.

UPPER-DIVISION COURSES

IE 311. Mill Work—Machine Woodwork. 3 hours.

A production course in machine woodworking. Prerequisite: IE 111 or IA 112 or equivalent. One lecture; 2 three-hour laboratory periods.

IE 332. Pattern Making. 2 hours.

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. Six laboratory hour-periods, including 1 lecture hour.

IE 345. Foundry Practices. 2 hours.

Study of melting furnaces and practices in production of steel, malleable, and gray-iron castings; open-hearth and electric steel-melting furnaces, air furnace, cupola, and others; effects of slag and deoxidation; sand testing and chemical specifications in foundry; casting design and methods of production; precision casting processes. Inspection trip to Portland foundries. Prerequisite: IA 141 or IE 240.

IE 346. Magnesium-Aluminum Foundry Practices. 2 hours.

Study of aluminum and magnesium alloys and methods of fabrication; Dural and its age-hardening characteristics; practices in sand casting and permanent-mold casting of Al-Cu and Al-Mg alloys; study of die casting, welding, extruding, forging, and machining; magnesium foundry practices and methods of fabrication of light metals. Prerequisite: IA 141 or IE 240. One lecture; 1 three-hour laboratory period.

IE 354. Welding Practices. 2 hours.

Advanced study and practice in the welding processes. Further study of the proper fields of application for these processes and of the economy factors involved. Inspection trips will be made when possible. Prerequisite: IA 152 or IE 250 or IA 353. One lecture; 1 three-hour laboratory period.

IE 405. Reading and Conference. Terms and hours to be arranged.**IE 407. Seminar. 2 hours.**

Prerequisite: senior standing.

IE 505. Reading and Conference. Terms and hours to be arranged.**IE 507. Seminar. Terms and hours to be arranged.****IE 362. Machine Shop. 2 hours.**

Manipulation of basic machine tools and operations requiring accomplished skills; individual projects; application of jigs, fixtures, and dies. Prerequisite: IE 261. Five laboratory hour-periods; 1 lecture.

IE 363. Production Machine Work. 3 hours.

Application of tools, jigs, fixtures, and dies in relation to quantity production; individual problems and projects. Prerequisite: IE 261 and 362. One lecture; 6 laboratory periods.

IE 364. Tool Design. 3 hours.

Fundamentals of tool design applied to production tools, jigs, fixtures, and power machines, all correlated with general shop practice. Prerequisite: IE 362. One lecture; 6 drafting periods.

IE 369. Jigs, Fixtures, and Die Design. 2 hours.

Design and application of jigs, fixtures, and dies; sequence of operation analysis, dimensional control in machining operations; economics of tool engineering. Prerequisite: IE 364. One lecture; 5 laboratory hour-periods.

IE 390. Safety in Industry. 2 hours.

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.

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: IE 290 or consent of instructor. One lecture; 2 three-hour laboratory periods.

IE 392. Time Study. 3 hours.

Theory and application of time study techniques; job analysis and standardization; construction of standard data and formula application; synthetic determination of time standards; wage payment systems and merit rating. Prerequisite: junior standing and consent of instructor. One lecture; 6 laboratory periods.

IE 393. Production Planning and Control. 3 hours.

Departmental organization and types of production control techniques; codification and symbolization; forecasting, materials control, routing, scheduling, dispatching, and inspecting. Prerequisite: IE 391, 392. One lecture; 2 three-hour laboratory periods.

IE 490. Industrial Supervision Principles. (G) 3 hours.

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, or consent of instructor.

IE 491, 492. Production Planning and Control. (G) 3 hours each term.

Quantitative analysis and economic optimum selection of machines, equipment, and labor; quantitative control in inverse relationships, least-cost combinations in purchasing quantities and season production. Prerequisite: calculus and IE 391, 392, 393.

GRADUATE COURSES

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

Mechanical Engineering

THE curricula in mechanical engineering are 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.

Equipment. 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 on engineering materials. This equipment is located in the Engineering Laboratory, Mines Building, the old power house and at the Corvallis Airport.

The steam laboratory contains two turbines and four engines of different types, installed in such a way that complete tests for economy and efficiency can be made. Other steam engines, permanently installed, are used for the more elementary work. A horizontal water-tube boiler furnishes the steam for laboratory purposes and for heating the building, and is provided with the necessary facilities for testing. The college heating plant, consisting of three 5,000-square-foot boilers and necessary auxiliaries, is also provided with testing facilities.

A special laboratory has been equipped for tests on domestic heating, ventilating, and air-conditioning apparatus. Several small boilers fired by oil burner, coal stoker, and sawdust burner have been provided and fitted for experimental tests and research. A gas-fired air-conditioning unit is also available.

The internal-combustion engine laboratory contains gas and two gasoline engines, six full Diesel engines connected to generators, automotive-type Diesels with dynamometers, all fully equipped for testing, three 100-horsepower electric dynamometers, and automobile engines installed with necessary facilities for complete tests for economy and efficiency. Several other gasoline engines are available for the more elementary work, together with the usual accessories, auxiliaries, and instruments for testing and analysis of tests; also a standard ASTM-CFR fuel test unit equipped for both gasoline and Diesel oil rating.

The aeronautical laboratory includes a selection of aircraft engines, both air and liquid cooled; two complete airplanes, a B-17 and a P-51; and numerous wing panels, tail surfaces, instruments, and miscellaneous airplane parts. A Packard test cell for engine tests and two small smoke tunnels for the study of air flow are also available.

Approximately 14,000 square feet of floor space is devoted to engineering materials affording separate laboratories for structural materials, cement and concrete, bituminous and nonbituminous highway materials, soil mechanics, photoelasticity, oils, fuels, and the microscopic examination, radiography, spectrum analysis, and heat treatment of metals. The equipment is modern and is well arranged for the work of instruction and research.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

ME 212. Mechanics (Statics). 3 hours.

Forces and force systems with reference to the equilibrium of rigid bodies; numerous problems. Prerequisite: differential calculus. Two recitations; 1 two-hour period.

ME 213. Mechanics (Dynamics). 3 hours.

Continuation of ME 212. Principles and problems in kinetics; numerous problems. Prerequisite: ME 212. Two recitations; 1 two-hour period.

ME 216. Materials of Engineering. 3 hours.

Production, mechanical properties, and shop processes applying to materials of machine and building construction. Corrosion resistance and other service requirements; fuels, lubricants, and water for industrial use. Two recitations; 1 laboratory demonstration period.

ME 241. Introduction to Aeronautics. 2 hours.

Brief descriptive survey of principles of flight, engine and propeller operations; navigation and meteorology; governmental aeronautical aids and regulations. Prerequisite: consent of instructor.

UPPER-DIVISION COURSES

ME 311. Strength of Materials. 3 hours.

General principles of mechanics applied to the elements of engineering structures to determine their strength and fitness. Prerequisite: ME 212. Two recitations; 1 two-hour computing period.

ME 312. Mechanism. 3 hours.

Mechanical movements; velocity ratios; transmission of motion by link works; gearing, cams, and belting. One recitation; 2 three-hour laboratory periods.

ME 314, 315. Strength of Materials. 3 hours each term.

Similar to ME 311 with addition of stresses in curved beams, impact stresses, eccentric loading, and theories of failure. Prerequisite: ME 213. Two recitations; 1 two-hour laboratory period.

ME 316. Materials Testing Laboratory. 3 hours any term.

Materials of engineering construction; testing methods and specifications adopted by the American Society for Testing Materials, etc.; preparation of reports. One lecture; 1 three-hour laboratory period.

ME 321, 322, 323. Heat Engineering. 4 hours each term.

Combustion and boilers; thermodynamic processes involved in the transformation of heat energy into work. Prerequisite: Mth 202; Ph 103; Ch 103. Three recitations; 1 three-hour computation or laboratory period.

ME 325. Fuels and Lubricants. 3 hours.

Preparation and processing of solid and liquid fuels; production of motor fuels and lubricants; tests on bearings and lubricants. Prerequisite: junior standing. Two lectures; 1 three-hour laboratory period.

ME 331, 332. Heat Power Engineering. 3 hours each term.

Brief descriptive survey of the heat power plant and principal auxiliaries; physical properties and laws of gases and their application to power equipment. Prerequisite: Mth 202, Ph 103. Two recitations; 1 three-hour computation or laboratory period.

ME 342. Aerodynamics. 3 hours.

Elementary aerodynamic theory and phenomena; characteristics of airfoils and airfoil combinations; factors affecting stability, control, and performance. Prerequisite: junior standing.

ME 343. Aeropropulsion. 3 hours.

Screw propeller theories; selection of engines, propellers, and power-plant accessories for specific airplanes; power-plant installation. Prerequisite: ME 342. Two recitations; 1 three-hour laboratory period.

ME 346. Steam, Air, and Gas Power. 3 hours.

Elementary thermodynamics; properties of steam; fuels and their combustion; boilers; auxiliaries. Prerequisite: GE 101, 102; Mth 202. Two recitations; 1 three-hour computation or laboratory period.

ME 347. Heat Engines. 3 hours.

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. Two recitations; 1 three-hour laboratory period.

- ME 351, 352, 353. Mechanical Laboratory.** 2 hours each term.
Basic sequence in machine testing. Proper application of instruments; tests of common machines and interpretation of results; preparation of engineering reports. Must parallel ME 321, 322, 323. One recitation; 1 three-hour laboratory period.
- ME 363. Refrigeration and Cold Storage.** 3 hours.
Principles and practice of refrigeration and cold storage. For students in dairy manufacturing, horticulture, food industries, etc. Prerequisite: algebra and elementary physics. Two recitations; 1 three-hour computation or laboratory period.
- 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 407. Seminar.** 1 hour.
- ME 411, 412, 413. Machine Design.** (g) 3 hours each term.
Application of the principles of mechanism, mechanics, and strength of materials to design of machine elements. Prerequisite: ME 315. One recitation; 2 three-hour drafting periods.
- ME 414. Highway Materials Laboratory.** (g) 3 hours.
For students specializing in highway engineering. Road and paving materials and binders tested and their properties determined; sheet-asphalt mixtures and bituminous mortars; types of roads and pavements analyzed for density, composition, and grading. One lecture; 1 four-hour laboratory period.
- ME 415. Structural Materials Laboratory.** (g) 3 hours.
Plain and reinforced concrete beams and columns; reinforcing; concrete mixtures; unsymmetrical loads; riveted and welded joints; thermal conductivity; stresses in structures by strain gage. Prerequisite: ME 316. One lecture; 1 four-hour laboratory period.
- ME 416. Engineering Metallurgy.** 3 hours.
Survey of metallurgy and properties of ferrous products and nonferrous alloys from utilization standpoint; metallographic and other inspection techniques; principles of heat treatment and of machining and forming operations. Prerequisite: ME 316. Two recitations; 1 two-hour laboratory period.
- ME 431, 432. Power-Plant Engineering.** (g) 3 hours each term.
Performance of steam and internal-combustion engine power plants from design standpoint; heat transfer; selection of equipment. Prerequisite: ME 323. Two recitations; 1 three-hour computation period.
- ME 441, 442, 443. Airplane Design.** (g) 3 hours each term.
Design of airplanes for specific duties. Prerequisite: ME 342. One recitation; 2 three-hour laboratory periods.
- ME 447, 448, 449. Airplane Structural Analysis.** (G) 3 hours each term.
Theory and practice of analyzing stresses in structural components of modern airplanes. Prerequisite: ME 315, 342.
- ME 451, 452. Mechanical Laboratory.** (g) 2 hours each term.
Testing of steam turbines, heating and ventilating equipment, a two-stage air compressor, a complete boiler plant, and internal-combustion engines; reports. Prerequisite: ME 353. One four-hour laboratory period.

- ME 453. Mechanical Laboratory.** (g) 2 hours.
Special problems selected on basis of interest of student and equipment available. Prerequisite: ME 452. Periods arranged according to project.
- ME 456, 457. Aeronautical Laboratory.** (g) 2 hours each term.
Visual studies of flow about wings, fuselages, and other bodies; calibration of instruments; aerodynamic and structural tests; wind tunnel testing. Special studies in aircraft engine construction, operation, and testing. Prerequisite: ME 342, 353. One four-hour laboratory period.
- ME 471. Air Transportation.** (G) 2 hours.
Effect of design fundamentals, government and international regulations, length of trip, and operational factors on economics of air transportation. Prerequisite: senior standing in aeronautical subjects.
- ME 473. Industrial Engineering.** (G) 3 hours.
Especially arranged for mechanical engineering students. Various industrial organization systems and their methods of operation.
- ME 491, 492, 493. Automotive Engineering.** (G) 3 hours each term.
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 321, 322, 323. Two lectures; 1 three-hour laboratory period.

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 507. Seminar.** 1 hour each term.
- ME 511, 512, 513. Engineering Materials.** 3 hours each term.
Critical study of specifications and testing techniques. Metals; ceramic materials; plastics, electrical insulating materials, rubber, and fabrics. Any term may be taken independently. Prerequisite: ME 316. One lecture; 1 four-hour laboratory period.
- ME 516, 517, 518. Experimental Elasticity.** 3 hours each term.
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. Soil Mechanics.** (g) 3 hours.
Evaluation and utilization of soil materials for engineering applications; highway subgrades, earth-dam construction, and foundation support. Prerequisite: ME 316, CE 351, ME 311 or 314. One lecture, 1 four-hour laboratory period.
- ME 521. Mechanical Vibrations.** 3 hours.
Vibration as applied to mechanical engineering. General theory of systems having one or more degrees of freedom; applications to internal combustion engines, airplanes, vehicles, rotating machinery; vibration isolation and absorption; vibration measuring instruments and balancing machines. Prerequisite: ME 213, ME 312, 353. Two lectures; 1 three-hour laboratory period.

ME 534. Gas Turbines and Jet Engines. 3 hours.

Gas turbines as applied to power generation, process industries, and aircraft; study of various cycles and component equipment, including compressors, combustion chamber, gas turbines, heat exchangers, jets and ducts; properties of gases, fuels, and high-temperature materials. Prerequisite: ME 316, 325, 321, 322, 323, or equivalent. Two lectures; 1 three-hour laboratory period.

ME 541, 542, 543. Dynamics of Aircraft. 3 hours each term.

Static and dynamic stability of airplanes, vibration of elastic structures, theory of flutter of wings and control surfaces.

ME 546, 547, 548. Aerodynamics. 3 hours each term.

Theories of flow of perfect, viscous, and compressible fluids; theory of wings of finite and infinite spans.

ME 561. Heating and Air Conditioning. 3 hours.

Modern methods of heating, ventilating, and air conditioning; computing radiating surface; effective methods of ventilation; general design, construction, and operation of plants. Prerequisite: ME 323. One recitation; 2 three-hour computation or laboratory periods.

ME 562. Refrigeration. 3 hours.

Thermodynamics of refrigeration; systems in use and principal characteristics of each; fundamentals of design; principal applications. Prerequisite: ME 323. Two recitations; 1 three-hour laboratory period.

ME 563. Gas Technology. 3 hours.

Manufactured and natural gas production, transmission, and distribution; industrial applications; problems of the industry including some reference to rate making and regulation. Prerequisite: ME 321, 322, 323 and ME 451, 452, or equivalent.

ME 576. Industrial Instrumentation. 3 hours.

Analysis of apparatus for measurement and control of pressure, temperature, speed, process duration, dimensional tolerances, fluid flow, liquid level, moisture content, gas composition, and solution concentration. Lectures and demonstrations. Prerequisite: ME 431, 432, 453, or equivalent.

ME 581. Metallography and Pyrometry. 3 hours.

Alloy systems, microstructure, thermal analysis, photomicrography, x-ray diffraction; techniques and application to industrial problems and research. Prerequisite: ME 316. One lecture; 1 four-hour laboratory period.

ME 582. Metallography. 3 hours.

Alloy equilibrium diagrams; difficult specimens; high-power photomicrography; correlation of properties of metals with microstructure; dilatometry; structure and treatment of special steels; metal radiography. Prerequisite: ME 581. One lecture; 1 four-hour laboratory period.

ME 583. Industrial Radiology. 3 hours.

Radiographic inspection of castings, welds, and other metallic as well as nonmetallic engineering materials; x-ray diffraction applications; generating equipment, films, and protection; other nondestructive tests, including magnaflux, brittle lacquers, and similar methods. Prerequisite: ME 316, 581, or equivalent.

School of Forestry

Faculty

PAUL MILLARD DUNN, M.S.F., Dean of the School of Forestry; Professor of Forestry.

GEORGE WILCOX PEAVY, M.S.F., Sc.D., LL.D., Dean Emeritus of the School of Forestry; Professor Emeritus of Forestry.

CLARA HOMYER, Secretary to the Dean.

Forest Engineering

PROFESSOR PATTERSON (department head).

ASSOCIATE PROFESSOR DAVIES.

ASSISTANT PROFESSOR DE MOISY.

Forest Management

PROFESSOR McCULLOCH (department head).

ASSOCIATE PROFESSORS BARNES, NETTLETON.

ASSISTANT PROFESSORS DILWORTH, KENISTON, ROBINSON.

INSTRUCTORS HAYES, RANDALL.

Forest Products

ASSOCIATE PROFESSOR GRANTHAM (acting department head).

ASSISTANT PROFESSOR WEST.

INSTRUCTOR SNODGRASS.

Forest Extension

EXTENSION FORESTER C. R. ROSS.

General Statement

OREGON has an interest in forestry greater than any other state in the Union. Within the state an area of 28,000,000 acres, because of peculiarities of soil, topography, and climate, appears to be permanently classified as forest land. Oregon has the largest amount of standing timber possessed by any state and it produces more lumber annually than any other. The Oregon State School of Forestry is obligated to train men to manage these great properties for continuous maximum production and economical and efficient distribution of the products.

Forest Engineering. The logging engineer is the product of the Pacific Northwest. The Department of Forest Engineering was organized in response to the request of farsighted men in the industry, who realized the peculiar engineering requirements of their business. The four-year curriculum in forest engineering was prepared in consultation with some of the ablest timbermen in the state. The logging engineer is trained in timber appraising, in topographic surveying in rough country, in the preparation of topographic and relief maps from field data, in the location and construction of logging roads, in bridge design, and in making logging plans.

Forest Management. In forest management the school has a dual responsibility: to the public agencies in educating men to be of service in helping to manage the national and state forests and other publicly owned forest lands; and to the forest industry in educating men to aid in solving the forestry problems that confront private forest management in the Northwest.

Forest Products. The utilization of products of the forests now includes a wide variety of manufacturing processes. The problems involve efficient plant design, organization and management of the plant, quality control, product improvement and development, human efficiency, and scientific merchandising. A carefully chosen group of courses is offered with these problems in mind and in response to demands of the lumber industry for men trained in wood products.

Four-Year and Five-Year Curricula. In the freshman year all students in forestry pursue substantially the same studies, following which they may elect one of the three majors on either a five-year or a four-year basis.

FOUR-YEAR CURRICULUM (B.S., B.F. DEGREES). For the bachelor's degree the student is required to complete 204 term hours of collegiate work. Every student before graduation must have completed at least 9 term hours in each of three groups in liberal arts and sciences. For the Bachelor of Science degree the student must present 36 term hours of science. The School of Forestry requires a minimum of 70 professional hours and at least six months of practical field work satisfactory to the faculty of the School.

FIVE-YEAR CURRICULUM (B.S., M.F. DEGREES). The forester is being called upon more and more to serve as planner and coordinator in the use of wild land. It is not enough to determine merely the kind of use for which the land is inherently best suited. An appropriate balance must be sought between farm, pasture, forest, range, recreation, wildlife, watershed, and other uses, in the light of sound national requirements for products and services. Hence the forester must be better prepared in the basic and social sciences. To meet the demand for men trained in the broader field, the five-year curriculum is strongly recommended, including four years of undergraduate work leading to the degree of Bachelor of Science and a graduate year leading to the degree of Master of Forestry.

Advanced Degrees. The degrees of Master of Forestry and Master of Science are offered to graduates of Oregon State College, or other colleges of equal rank, who have met the State College requirements for graduate study. The graduate program and thesis for the Master of Forestry degree are designed to fit the student for administrative or professional work in forest management, forest engineering, or forest products. The work for the Master of Science degree develops the student for research work in his particular field.

The degree of Forest Engineer is offered to graduates of the School of Forestry who have had at least five years of successful forestry practice following graduation and present a satisfactory thesis. Application for the degree must be made not later than January 1 preceding the commencement at which the degree is conferred.

The requirements for advanced degrees are given under GRADUATE SCHOOL.

Minors. Graduates of the School of Forestry often are employed in work that combines forestry with related fields. Students desiring training for such work may take a minor in the field of their choice. Minors most commonly selected by students majoring in forest-management are fish and game manage-

ment, grazing, soil conservation, recreation, entomology, science, industrial forest management, and pathology; students majoring in forest products may take minors in pulp and paper and business administration.

Field Instruction. Actual field work, essential in preparing men for work in forest management and engineering is made possible by the close proximity to many large timbered areas easily accessible from the State College in addition to the college-owned timber areas. Some of the largest lumber, plywood, pulp and paper plants in the Northwest are within one to three hours ride from Corvallis. In addition to the scheduled laboratory and field classes, occasional unscheduled trips are made under the supervision of the school staff.

Summer Employment. The principal operations of the lumber industry of the United States are in the Pacific Northwest. Students who are physically fit find employment in the logging camps and in sawmills. The United States Forest Service, the State Forestry Department, and the forest industry have adopted a definite policy of employing forestry students during vacation periods. Students expecting to engage in forestry work are thus enabled to obtain valuable field experience at reasonable pay without traveling long distances.

Buildings and Equipment. The Forestry Building (1917), three stories high, 80 by 136 feet, constructed of brick, contains roomy laboratories well equipped with appropriate instruments and apparatus. Lumber-manufacturing concerns have supplied the school with wood products made from various species of Oregon trees. Many publications dealing with general forestry, logging, or utilization are provided. The Industrial Building (1947), two stories, 60 by 300 feet, devoted to forest products and chemical engineering research, contains a small modern dry kiln, fiber board and plywood equipment, and wood chemistry laboratories. Pilot plant testing facilities for wood carbonization and preservation also are available.

Forest Products Research. By special act of the legislature in 1941 the State of Oregon inaugurated a research program in utilization of forest products and associated it with the School of Forestry. Cooperative arrangements have been made for the full use of college facilities and staff. Full scale experimentation in all phases of physical and chemical use of forest products will be carried on under the guidance of the Oregon Forest Products Laboratory; the Dean of the School is the director of the laboratory. Considerable opportunity is given for the training of graduate students specializing in the many industrial problems relating to forest products utilization.

Lands. A state forest of 75,000 acres, located within 75 miles of the campus, has been placed, by law, at the disposal of the School of Forestry for scientific management. An area of 160 acres of logged and second-growth fir, presented to the school by the Spaulding Logging Company, lies within ten miles of the campus. Mrs. Mary J. L. McDonald of San Francisco gave the school for demonstration purposes 640 acres of timbered land lying near Prospect in the Crater Lake region. Mrs. McDonald also made possible the acquisition of 5,221 acres of second-growth Douglas fir, lying within seven miles of the campus and known as the McDonald Forest; this area is devoted to experimental work in reforestation, and also serves as a base for laboratory work in surveying, mapping, timber estimating, logging road location, forest protection, and tree and shrub identification. A tract of cut-over land, 180 acres in extent, is devoted to arboretum and experimental planting purposes. A forest nursery

on the arboretum tract, financed by the United States Forest Service and the State Board of Forestry, is operated in cooperation with the school; here the student has an opportunity to do actual nursery work. A full-time nurseryman and assistant are required for this project.

Through the generosity of Mr. John W. Blodgett, prominent timberman, a tract of 2,400 acres of cut-over land in Columbia County has been presented to the School of Forestry for research in reforestation. In 1947 the Federal Government offered the College title to 6,200 acres of Camp Adair Military Reservation for the use of the schools of Agriculture and Forestry. Approximately 4,000 acres are in timber and are located just north of the McDonald Forest.

Curricula in Forestry

Forest Engineering
Forest Management

Forest Products
Production Option
Wood Technology Option

COMMON FRESHMAN YEAR

	Term hours		
	F	W	S
Biological Science Survey (GS 101)	3	—	—
Physical Science Survey (Chemistry) (GS 105)	—	3	—
Physical Science Survey (Geology) (GS 106)	—	—	3
General Forestry (F 111)	2	—	—
Forest Orientation (F 110)	2	—	—
Dendrology (F 153)	—	—	3
Forest Engineering (FE 123)	—	—	3
Elementary Analysis (Mth 101, 102, 103)	4	4	4
English Composition (Eng 111, 112, 113)	3	3	3
Engineering Drawing (GE 115)	—	3	—
Military or Naval Science	2-3	2-3	2-3
Physical Education, General Hygiene	1	2	1
	17-18	17-18	19-20

FOREST ENGINEERING

B.S., B.F. Degrees

Sophomore Year

Mensuration (F 224)	5	—	—
Abridged General Physics (Ph 211, 212)	3	3	—
Forest Engineering (FE 223)	—	—	4
American National Government (PS 201), State and Local Government (PS 202)	3	3	—
Wood Utilization (FP 210)	—	3	—
Forest Protection (F 231)	—	3	—
Outlines of Economics (Ec 212)	—	—	3
Extempore Speaking (Sp 111)	—	—	3
Wood Utilization (FP 310)	—	—	3
Literature	3	—	—
Military or Naval Science	2-3	2-3	2-3
Physical Education	1	1	1
	17-18	15-16	16-17

Junior Year

Forest Valuation (F 321)	—	3	—
Forest Engineering (FE 323)	4	—	—
Logging Engineering (FE 360)	—	—	4
Bridge Design (FE 381)	—	3	—
Silviculture: Forest Practices (F 342)	—	4	—
Timber Mechanics (FP 321)	3	—	—
Principles of Accounting (BA 211, 212)	3	3	—
Literature	3	—	—
Seminar (FE 307)	—	—	1
Forest Management (F 325)	—	—	3
Heat Engines (ME 347)	—	—	3
Technical Report Writing (Eng 118)	—	—	3
Electives	4	4	3
	17	17	17

	Senior Year			Term hours		
	F	W	S	F	W	S
Logging Engineering (FE 461, 462, 463)	5	5	5			
Business Law (BA 411)	3	---	---			
Forest Economics (F 412)	3	---	---			
Industrial Forest Administration (FE 451)	---	3	---			
Forest Administration (F 415)	---	---	3			
Seminar (FE 407)	1	---	1			
Fire Control (F 431)	3	---	---			
Literature	---	3	---			
Electives	2	6	8			
	17	17	17			

FOREST MANAGEMENT
B.S., B.F. Degrees

Sophomore Year						
Mensuration (F 224)	5	---	---			
Abridged General Physics (Ph 211, 212)	3	3	---			
Forest Engineering (FE 223)	---	---	4			
American National Government (PS 201), State and Local Government (PS 202)	---	3	3			
Wood Utilization (FP 210)	---	---	3			
Forest Protection (F 231)	3	---	---			
General Botany (Bot 201, 202)	3	3	---			
Outlines of Economics (Ec 212)	---	---	3			
Literature	---	3	---			
Extempore Speaking (Sp 111)	---	3	---			
Soils for Forestry Students (Sls 214)	---	---	3			
Military or Naval Science	2-3	2-3	2-3			
Physical Education	1	1	1			
	17-18	18-19	19-20			

Junior Year						
Sociology (Soc 212)	---	3	---			
Wood Utilization (FP 310)	---	---	3			
Mensuration: Timber Growth (F 323)	---	4	---			
Logging Methods (FE 392)	3	or 3	---			
Silviculture: Forest Ecology (F 341)	4	---	---			
Silviculture: Forest Practices (F 342)	---	4	---			
Silviculture: Forestation (F 343)	---	---	4			
*Range and Range Livestock Management (AH 220)	---	3	---			
Forest Engineering (FE 323)	4	---	---			
Forest Valuation (F 321)	---	3	---			
Seminar (F 307)	---	---	1			
Literature	---	---	3			
Forest Land Use (F 311)	3	---	---			
Technical Report Writing (Eng 118)	---	---	3			
Electives	3	---	3			
	17	17	17			

Senior Year						
Logging Engineering (FE 461)	---	---	5			
*Forest Management (F 424)	3	---	---			
Timber Management (F 425)	---	5	---			
*Dendrology (F 453)	3	---	---			
Forest Administration (F 415)	---	---	3			
Industrial Forest Administration (FE 451)	---	3	---			
Forest Economics (F 412)	3	---	---			
Fire Control (F 431)	3	---	---			
Literature	---	3	---			
Seminar (F 407)	1	---	1			
Electives	4	6	8			
	17	17	17			

*Recommended electives: Typing (SS 121), 2 hours; Camp Cookery (FN 250), 2 hours; Machine Shop Practices (IE 260, 261), 2 hours each; First Aid (PE 358), 2 hours; Community Hygiene (PE 221), 2 hours; Forest Management (F 424), 3 hours; Silviculture: Forestation (F 343), 4 hours; Engineering Geology (G 324), 3 hours; Contracts and Specifications (CE 427), 3 hours; Industrial Purchasing (BA 461), 3 hours; Time Study (IE 392), 3 hours; General Insurance (BA 436), 3 hours; Labor Problems (Ec 425), 4 hours; Collective Bargaining and Labor Legislation (Ec 426), 4 hours; Use of Explosives (AE 341), 2 hours; Safety in Industry (IE 390), 2 hours.

*Students taking an industrial minor take Forest Production (F 231) in place of Range and Range Livestock Management (AH 220), add Principles of Accounting (BA 211, 212).

*Students taking an industrial minor take Business Law (BA 411) in place of Dendrology (F 453). Heat Engines (ME 347) in place of Forest Management (F 325), and add Principles of Accounting (BA 211, 212).

*Recommended electives: Forest Recreation (F 421), Regional Forestry (F 417, 418), and courses listed under various minors.

		MINORS			Term hours		
					F	W	S
Entomology							
Principles of Forest Entomology (Ent 321), Forest Entomology (Ent 322, 323)					3	3	3
Advanced Forest Entomology (Ent 423)					3 or 3	(3) or (3)	(3)
Entomological Nomenclature and Literature (Ent 352)					3	—	—
Aquatic Entomology (Ent 341)					—	—	4
Fish and Game Management							
Forest Wildlife Management (FG 310, 311, 312)					3	3	3
Range and Pasture Botany (Bot 314)					—	—	3
Range Livestock Management (AH 419, 420)					—	3	3
Management of Game Fish (FG 454)					—	3	—
Management of Big Game (FG 457)					3	—	—
Grazing							
General Botany (Bot 203)					—	—	3
Stock Judging I (AI 111)					—	3	—
Range and Pasture Botany (Bot 314)					—	—	3
Forest Wildlife Management (FG 310, 311, 312)					3	3	3
Systematic Botany (Bot 313)					4	—	or 4
Principles of Plant Ecology (Bot 341)					—	4	or 4
Range Livestock Management (AH 419, 420)					—	3	3
Range Survey Methods (AH 333)					—	—	3
Range Improvement and Maintenance (FC 319)					—	3	—
Pathology							
General Chemistry (Ch 101, 102, 103)					3	3	3
Systematic Botany (Bot 313)					4	—	or 4
Principles of Plant Pathology (Bot 351)					4	—	—
Plant Pathological Technique (Bot 451)					3	—	—
Microtechnique (Bot 469)					—	4	—
Science							
Engineering Geology (G 324)					—	3	—
Principles of Forest Entomology (Ent 321)					3	—	or 3
Forest Pathology (Bot 315)					—	3	—
Principles of Plant Ecology (Bot 341)					—	4	—
Soils for Forestry Students (Sls 214)					—	—	3
Soil Conservation							
Range Improvement and Maintenance (FC 319)					—	3	—
Cover Crop and Soil-Erosion Prevention Plants (FC 320)					—	2	—
Soil Conservation Engineering (AE 471)					3	—	—
Soil Conservation (Sls 413)					—	3	—
Soils for Forestry Students (Sls 214)					—	—	3
Climatology (Sls 319)					—	—	2
Recreation							
Forest Wildlife Management (FG 310, 311, 312)					3	3	3
Home-Ground Planning (LA 279)					(2-3)	2-3	(2-3)
Plant Materials (LA 326)					3	—	—
Landscape Architecture (LA 379)					—	—	3
Forest Recreation (F 421)					3	—	—
Park Forestry (F 361)					—	4	—
Industrial Forest Management							
Business Law (BA 411)					3	—	—
Principles of Accounting (BA 211, 212)					—	3	or 3
Heat Engines (ME 347)					—	3	—
Recommended electives: Contracts and Specifications (CE 427), Industrial Purchasing (BA 461), Labor Problems (Ec 425), Collective Bargaining and Labor Legislation (Ec 426), Use of Explosives (AE 341), Safety in Industry (IE 390), Forest Management (F 424).							
FOREST PRODUCTS							
B.S., B.F. Degrees							
Sophomore Year							
Mensuration (F 224)					—	—	5
Abridged General Physics (Ph 211, 212)					3	3	—
Forest Engineering (FE 223)					—	—	4
American National Government (PS 201), State and Local Government (PS 202)					3	3	—
Outlines of Economics (Ec 212)					—	—	3
Wood Utilization (FP 210)					—	3	—
General Chemistry (Ch 101, 102, 103)					3	3	3
Literature					3	—	—
General Botany (Bot 201, 202)					3	3	—
Military or Naval Science					2-3	2-3	2-3
Physical Education					1	1	1
					18-19	18-19	18-19

PRODUCTION OPTION

Junior Year

	Term hours		
	F	W	S
Wood Identification (FP 311)	3	—	—
Timber Mechanics (FP 321, 322)	—	3	3
Production (BA 311)	—	4	—
Forest Economics (F 412)	3	—	—
Silviculture: Forest Practices (F 342)	—	—	4
Logging Methods (FE 392)	3	—	—
Principles of Accounting (BA 211, 212)	3	3	—
Wood Properties (FP 413)	—	3	—
Extempore Speaking (Sp 111)	—	—	3
Heat Engines (ME 347)	3	—	—
Finance (BA 312)	—	—	4
Literature	—	3	—
Seminar (FP 307)	—	—	1
*Electives	3	3	3
	18	19	18

Senior Year

Insects Injurious to Forest Products (Ent 324)	3	—	—
Technical Report Writing (Eng 118)	—	3	—
Lumber Seasoning (FP 441)	—	—	3
The Lumber Plant (FP 451)	3	—	—
Lumber Manufacturing Problems (FP 452)	—	3	—
Lumber Merchandising (FP 453)	—	—	3
Wood Preservation (FP 431)	—	—	3
Ply and Laminated Products (FP 461)	4	—	—
Forest Management (F 325)	—	3	—
Seminar (FP 407)	1	—	1
Literature	—	3	—
*Electives	6	4	6
	17	16	16

TECHNOLOGY OPTION

Junior Year

Wood Identification (FP 311)	3	—	—
Timber Mechanics (FP 321, 322)	—	3	3
Wood Properties (FP 413)	—	3	—
Forest Economics (F 412)	3	—	—
Principles of Plant Physiology (Bot 331)	—	—	4
Extempore Speaking (Sp 111)	—	3	—
Organic Chemistry (Ch 226, 227)	5	5	—
Quantitative Analysis (Ch 232)	—	—	4
Seminar (FP 307)	—	—	1
Literature	—	—	3
*Electives	3	3	3
	17	17	18

Senior Year

Lumber Seasoning (FP 441)	—	—	3
The Lumber Plant (FP 451)	3	—	—
Lumber Manufacturing Problems (FP 452)	—	3	—
Wood Preservation (FP 431)	—	—	3
Technical Report Writing (Eng 118)	—	3	—
Wood Chemistry (Ch 470, 471)	2	2	—
Chemical Analysis of Wood and Related Products (Ch 472)	—	—	2
Ply and Laminated Products (FP 461)	4	—	—
Forest Pathology (Bot 315)	—	—	3
Insects Injurious to Forest Products (Ent 324)	3	—	—
Seminar (FP 407)	1	—	1
Literature	—	3	—
*Electives	4	7	6
	17	18	18

*Recommended electives: BA 411, 412, 413, BA 433, BA 435, BA 436, Ec 413, AA 178, 179, 180, IA 112, 113, IA 225, IE 311, IA 316, EE 356, IE 393, IE 290, IE 392, CE 426, BA 461, AE 461, 462, 463, Military or Naval Science.

*Recommended electives: Pulp and Paper Chemistry (Ch 460, 461, 462), 3 hours each term. Pulp and Fiber Identification (FP 414), 3 hours, Wood Anatomy (FP 515), hours to be arranged. Differential and Integral Calculus (Mth 201, 202, 203), 4 hours each term. Foreign language in senior year for students planning graduate work. Military or Naval Science.

FIVE-YEAR UNDERGRADUATE AND GRADUATE CURRICULUM

B.S., M.F. Degrees

	Term hours		
	F	W	S
Junior Year			
Wood Identification (FP 311)	3	---	---
Mensuration: Timber Growth (F 323)	---	---	4
Dendrology (F 453)	3	---	---
Fire Control (F 431)	---	3	---
Logging Methods (FE 392)	---	---	3
Forest Pathology (Bot 315)	---	3	---
Soils for Forestry Students (Sls 214)	---	---	3
Range and Range Livestock Management (AH 220)	3	---	---
Principles of Plant Ecology (Bot 341)	---	4	---
Wood Utilization (FP 310)	---	3	---
Electives	8	4	7
	17	17	17
Senior Year			
Forest Land Use (F 311)	3	---	---
Silviculture (F 341, 342, 343)	4	4	4
Forest Administration (F 415)	---	3	---
Forest Wildlife Management (FG 310, 311, 312)	3	3	3
Home Ground Planning (LA 279)	3	---	---
Landscape Architecture (LA 379)	---	---	3
Literature	---	3	---
Electives	4	5	7
	17	18	17
Graduate Year			
Forest Management (F 521, 522, 523)	3	3	3
Forest Economics (F 511)	3	---	---
Fire Control (F 531)	---	---	3
Silviculture (F 541)	---	3	---
Thesis (F 503)	3	3	3
Seminar (F 507)	3	3	3
Electives	3	3	3
	15	15	15

Forest Engineering

COURSES in forest engineering are designed to prepare men to deal with the woods problems peculiar to the lumber 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.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

FE 123. Forest Engineering. 3 hours any term.

Measurement of distance, direction, and elevation. Prerequisite: Mth 101. Two recitations; 1 four-hour laboratory period.

FE 223. Forest Engineering. 4 hours fall or spring.

Theory and use of engineer's transit and level; topographic surveying; direct and indirect leveling; computing and plotting of field data; theory of photographic surveying. Prerequisite: FE 123; engineering drawing. Two recitations; 1 two-hour laboratory period; 1 four-hour field period.

UPPER-DIVISION COURSES

FE 307. Seminar. 1 hour spring.

FE 323. Forest Engineering: Forest Surveys. 4 hours fall or winter.

Public land surveys; stadia; plane table; polar and solar observation; curves and earthwork; drafting of field data. Prerequisite: FE 223. Two recitations; 1 two-hour laboratory period; 1 four-hour field period.

FE 360. Logging Engineering. 4 hours spring.

A basic course in logging methods and equipment with particular application to the Pacific Northwest. Prerequisite: Mth 103; F 224; FE 323. Three lectures; 1 four-hour field period.

FE 370. Field Work. 1 to 6 hours.

Practical field work between the sophomore and junior years or the junior and senior years; report based on an approved outline. (See Section 18, Academic Regulations pamphlet.)

FE 381. Bridge Design. 3 hours winter.

Design of wood structures as applied to logging transportation systems; details, specifications, and cost estimates. Prerequisite: Ph 212; FP 321. One recitation; 2 two-hour laboratory periods.

FE 392. Logging Methods. 3 hours.

Relation between logging and forest production; felling and bucking; skidding, loading, hauling; relative merits of various methods. Prerequisite: FE 223; F 224. Two lectures; 1 three-hour field period.

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 407. Seminar.** 1 hour fall and spring.**FE 451. Industrial Forest Administration.** 3 hours winter.

The principles and methods employed in the operation of private forest properties in the Northwest. Prerequisite: F 325 or equivalent. Three lectures.

FE 461. Logging Engineering. (g) 5 hours fall.

Basic logging plans; analysis of timbered areas for development of logging operations; preliminary transportation plans. Prerequisite: FE 323; FE 360 or 392. Three lectures; laboratory periods to be arranged.

FE 462. Logging Engineering. (g) 5 hours winter.

Working plans from data obtained in FE 461; development of transportation systems. Prerequisite: FE 461. Two lectures; 1 three-hour laboratory period; 1 eight-hour field period.

FE 463. Logging Engineering. (g) 5 hours spring.

Management control; economic theory of location and construction; costs of surveys, construction, operation, and maintenance. Prerequisite: FE 462. Two lectures; 1 three-hour laboratory period; 1 eight-hour field period.

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

Seminars: Timber Transportation, Logging Methods, Logging Plans.

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 scientific and administrative measures which are necessary to produce the greatest values from all forest resources.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

F 110. Forest Orientation. 2 hours fall.

Survey of vocational opportunities and requirements in forest engineering, forest products, and forest management; orientation of the student to the profession. One lecture; 1 recitation.

F 111. General Forestry. 2 hours winter or spring.

Preliminary survey of the entire field of forestry including the development of forestry in the United States and the origin and distribution of our public domain. Restricted to forestry students.

F 153. Dendrology. 3 hours fall or spring.

Principal Pacific Coast timber trees; range, occurrence, size, growth, form; climate, soil, and moisture requirements; resistance; reproduction. One lecture; 2 two-hour laboratory periods.

F 213. Forest Administration. 3 hours fall or winter.

Administration and operation of various forest agencies in the United States. Not open to forestry students.

F 224. Mensuration. 5 hours any term.

Measurement of standing and felled timber and timber products. Three lectures; 2 three-hour field periods. Prerequisite: FE 123; F 153; F 231 (for forestry students, not required for business and technology students).

F 231. Forest Protection. 3 hours any term.

Survey of the major causes of forest damage and their application in forest management. Recognition of major inimical factors, methods of salvage, preventive measures, control of damage. Two lectures; 1 three-hour field period.

UPPER-DIVISION COURSES

F 307. Seminar. 1 hour spring.

F 311. Forest Land Use. 3 hours fall or winter.

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 321. Forest Valuation. 3 hours.

Valuation as a tool of management in forest enterprises; methods of valuing various types of assets, including land, stumpage, capital equipment, and the going operation. Two lectures; 1 three-hour laboratory period.

F 323. Mensuration: Timber Growth. 4 hours winter or spring.

Growth of even-aged stands; growth of many-aged stands; growth of individual trees. Prerequisite: F 224. Three recitations; 1 three-hour field period.

F 325. Forest Management. 3 hours.

A comprehensive course in the general principles of forest management for students majoring in other fields. Multiple use of forest resources and planning sustained yield programs. Prerequisite: F 213, 224 for business and technology students; F 231, 224 for forestry students. Two lectures; 1 three-hour laboratory period.

F 341. Silviculture: Forest Ecology. 4 hours any term.

Influence of environmental factors on the development, distribution, and succession of forest vegetation. Three lectures; 1 three-hour field period.

F 342. Silviculture: Forest Practices. 4 hours fall or spring.

Treatment of stands to insure perpetuation of forest resources. Three lectures; 1 three-hour field period.

F 343. Silviculture: Forestation. 4 hours fall or spring.

Forest land examination and classification; reproduction surveys; planting plans; establishment and maintenance of plantations; nursery practice. Three lectures; 1 three-hour field period.

F 344. Farm Forestry. 3 hours fall or spring.

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 agriculture students; not open to forestry students. Two recitations; 1 three-hour laboratory period.

F 360. Conservation of Natural Resources. 3 hours winter.

Nature, extent, and importance of organic resources of United States and methods of conserving them; forest, forage, recreation, wildlife, soil, water aspects. Not open to forestry students.

F 361. Park Forestry. 4 hours winter.

Trees and their treatment for park and recreational purposes. Three recitations; 1 three-hour laboratory period.

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 18 of Academic Regulations pamphlet.) Staff.

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 407. Seminar. 1 hour fall and spring.****F 412. Forest Economics. (g) 3 hours winter or spring.**

Application of economic principles to forestry; socio-economic usefulness of forests; economics of forest production.

F 415. Forest Administration. 3 hours winter.

Administrative organization and personnel work of public and private forest agencies.

F 417, 418. Regional Forestry. 2 hours each term fall and winter.

Survey of the field of technical forestry. Of special interest to those who plan to enter the Federal or State Forest Service.

- F 421. Forest Recreation.** (g) 3 hours fall or spring.
Forest recreation, its importance and nature; planning forest use for recreational purposes in relation to other forest uses. Two lectures; 1 three-hour laboratory period. Elective for all but recreation minors.
- F 424. Forest Management.** 3 hours fall or winter.
Principles of forest management applied to multiple use of all forest resources. Prerequisite: F 231, 341, 342, 343.
- F 425. Timber Management.** 5 hours any term.
Principles and practices in the regulation of forest properties for sustained yield; timber inventories and management plans. Four lectures; 1 three-hour laboratory period. Prerequisite: F 224, 323, 424.
- F 431. Fire Control.** 3 hours any term.
Scientific basis for fire control. Fire control planning, and administration. Two 1-hour lectures; 1 three-hour field period. Prerequisite: F 231.
- F 441. Forest Influences.** (g) 3 hours.
Influence of forests on climate; water supply and soil, with applications to watershed management and erosion control. Prerequisite: F 341.
- F 453. Dendrology.** 3 hours fall or spring.
Classification and identification of forest trees of the United States; silvical characteristics and distribution; life history and requirements. One lecture; 2 two-hour laboratory periods. Prerequisite: F 153.

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 507. Seminar.** Terms and hours to be arranged.
Seminars: Forest Mensuration, Forest Administration, Forest Protection, Dendrology, Municipal Forestry, Recreational Forestry, Forest Economics, Forest Ecology.
- F 511. Forest Economics.** 3 hours.
Taxation of forest lands, the effects of taxation on lumbering and sustained yield. Prerequisite: graduate standing and consent of instructor.
- F 512. Forest Economics.** 3 hours.
Forest fire damage appraisal; insurance of timberlands. Prerequisite: graduate standing and consent of instructor.
- F 521, 522, 523. Forest Management.** 3 hours each term.
Administration of forest lands for recreational purposes; managing even-aged and many-aged stands for timber production. Prerequisite: F 323; F 343. Two recitations; 1 three-hour period.
- F 531. Fire Control.** 3 hours.
Forest fire plans, their preparation and execution. Prerequisite: graduate standing and consent of instructor.
- F 541, 542, 543. Silviculture.** 3 hours each term.
Advanced approach in treatment of stands; research methods. Prerequisite: graduate standing and consent of instructor. One lecture; 1 four-hour laboratory period.

Forest Products

CCOURSES in forest products are designed to meet the needs of those who plan a career in the field of wood utilization. In meeting student objectives it is often desirable to build a study program in cooperation with courses offered in chemistry, physics, and engineering. Special emphasis is given to the practical aspects of the existing and expanding manufacturing techniques in the Pacific Northwest.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

FP 210. Wood Utilization. 3 hours any term.

Adaptation to commercial uses; chief wood-using industries; relative amounts of commercial species used annually; substitutes; byproducts.

UPPER-DIVISION COURSES

FP 307. Seminar. 1 hour spring.

FP 310. Wood Utilization. 3 hours winter or spring.

Mechanical and physical properties; basis for lumber grades; lumber seasoning; wood treating and finishing. Abbreviated course for students not majoring in forest products. Prerequisite: F 111, 153, or 213; FP 210.

FP 311. Wood Identification. 3 hours fall.

Identification of commercial woods with a hand lens with a brief introduction to their microscopic structure. Prerequisite: F 153; Bot 201, 202. One lecture; 2 three-hour laboratory periods.

FP 312. Wood Anatomy. 3 hours winter.

Minute anatomy of wood; microscopic identification of tree species. Prerequisite: FP 311. One lecture; 2 three-hour laboratory periods.

FP 321. Timber Mechanics. 3 hours fall or winter.

Elementary statics as applied to wooden structural elements; concepts of stress, strain, and strength; application of technical data and structural lumber grades to the design of simple timber structures. Prerequisite: Mth 103, FP 310 or 311. Two lectures; 1 three-hour laboratory period.

FP 322. Timber Mechanics. 3 hours spring.

Timber testing; factors affecting the strength of wood; collection and analysis of testing data; timber fasteners; mechanical strength characteristics of modified and treated wood; design problems. Prerequisite: FP 321. Two lectures; 1 three-hour laboratory period.

FP 370. Field Work. 1 to 6 hours.

Practical work in the mill or industrial plant between sophomore and junior years or junior and senior years, carried on with private concerns or public agencies; report based on an approved outline. (See Section 18 of Academic Regulations pamphlet.) Staff.

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 407. Seminar. Terms and hours to be arranged.

- FP 413. Wood Properties.** 3 hours winter.
Physical and chemical properties of wood; relation to uses. Prerequisite: FP 311. Two lectures; 1 two-hour laboratory period.
- FP 414. Pulp and Fiber Identification.** (G) 3 hours.
Preparation and staining techniques for identification of pulp fibers from various raw materials. Prerequisite: senior standing. One lecture; 2 three-hour laboratory periods.
- FP 431. Wood Preservation.** (G) 3 hours spring.
Agencies of wood deterioration; principal preservatives; preparation of wood for treatment; wood preserving processes; properties of treated wood; treating plants and equipment; economic aspects of wood preservation. Prerequisite: FP 413. Two lectures; 1 three-hour laboratory period.
- FP 441. Lumber Seasoning.** (g) 3 hours spring.
Air seasoning; kiln-drying methods and their merits; effect of kiln-drying on wood structures; types of kilns; recording instruments; field trips. Prerequisite: FP 310 or 413. Two lectures; 1 three-hour laboratory period.
- FP 451. The Lumber Plant.** (G) 3 hours fall.
Survey of physical plants and facilities of the several types of lumber manufacturing plants; equipment selection, operation, and maintenance and power requirements. Two lectures; 1 three-hour laboratory period. Prerequisite: FP 310 or consent of instructor.
- FP 452. Lumber Manufacturing Problems.** (G) 3 hours winter.
Manufacturing problems in the lumber industry including grades, values and types of products; problems of production methods, costs, waste utilization and administration. Two lectures; 1 three-hour laboratory period. Prerequisite: FP 451.
- FP 453. Lumber Merchandising.** (g) 3 hours spring.
Trade practices and customs of the lumber industry. Lumber wholesaling and retailing with major emphasis on retail distribution. Three lectures. Prerequisite: FP 452.
- FP 461. Ply and Laminated Products.** (G) 4 hours fall.
Factors affecting gluing of wood; production and properties of glues, veneers, ply and laminated products; modified wood; techniques applied in gluing industry; fabrication methods and equipment used. Prerequisite: FP 311, 413. Three lectures; 1 three-hour laboratory period.

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 507. Seminar.** Terms and hours to be arranged.
Seminars: Wood Utilization, Wood Properties, Sawmill Management.
- FP 515. Wood Anatomy.** Term and hours to be arranged.
Specific knowledge and techniques required for specialization in various fields of forest products; laboratory training in sectioning, staining, and preparation of slides of woody material for microscopic studies related to advanced wood anatomy. Prerequisite: FP 415 or equivalent.

FP 522. Mechanical Properties of Wood. 3 hours.

Properties of wood as affecting factors of strength in relation to specific uses for which wood may be suitable. Prerequisite: FP 322, 413.

FP 531. Wood Preservation. 3 hours.

Advanced work in wood preservation designed to meet needs of individual students, with special attention to theoretical considerations and factors that control efficiency of treating processes. Prerequisite: FP 431 or equivalent.

FP 541. Lumber Seasoning. 3 hours.

Studies in research technique in seasoning; advanced studies in technical problems. Prerequisite: FP 441.

FP 551, 552, 553. Lumber Industry Problems. 3 hours each term.

Sawmill planning; production control; waste utilization; management, personnel, marketing, and merchandising problems related to lumber industry. Prerequisite: FP 452.

FP 561. Ply and Laminated Products. 3 hours.

Investigations of 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. Prerequisite: FP 461 or equivalent.

School of Home Economics

Faculty

AVA BERTHA MILAM, M.A., Dean of the School of Home Economics.

JACQUELYN FRETWELL, B.S., Secretary and Assistant to the Dean.

Clothing, Textiles, and Related Arts

PROFESSOR FRITCHOFF (department head).

ASSOCIATE PROFESSORS GATTON*, PATTERSON*, STRICKLAND.

ASSISTANT PROFESSORS DIEDESCH, EDABURN, TAPSCOTT.

INSTRUCTORS MOSER, LEDBETTER, DETER, BEASLEY, HUFFSMITH, SMITH.

Foods and Nutrition

PROFESSORS FINCKE (department head), WILLIAMS (emeritus).

ASSOCIATE PROFESSORS KOLSHORN, STORVICK, HADJIMARKOS, OVERMAN.

ASSISTANT PROFESSORS GARRISON, CHARLEY, MACPHERSON, SULLIVAN.

INSTRUCTORS MORGAN, WARE, RIEDESEL, HAWTHORNE, MERKLIN.

RESEARCH ASSISTANT DAVEY.

Home Economics Education

PROFESSOR BLAZIER (department head).

STATE SUPERVISOR AND TEACHER-TRAINER KOHLHAGEN.

ASSOCIATE PROFESSOR DUBOIS.

INSTRUCTOR COLEMAN.

Home Economics Research

PROFESSOR WILSON (in charge).

ASSOCIATE PROFESSORS OVERMAN, STORVICK.

Household Administration

PROFESSORS PRENTISS (department head), BRANDON, WARRINGTON, READ (director of nursery schools).

ASSOCIATE PROFESSOR VAN HORN.

ASSISTANT PROFESSORS WISE (director of home management houses), WIGGENHORN, WELLS, BRASHEAR.

INSTRUCTORS REA, KENNEN, MILLER, ALLER.

* On leave of absence.

Institution Economics

PROFESSOR BIBEE (department head, director of dormitories).

ASSISTANT PROFESSORS MULHERN (manager of Memorial Union dining service), CLEVELAND (manager of Dormitory Cafeteria).

INSTRUCTOR MARTILLA (manager of Waldo dining service).

*Home Economics Extension**

PROFESSORS SAGER (state leader of home economics extension), CLINTON (assistant state home demonstration leader), MACK (assistant state home demonstration leader).

ASSOCIATE PROFESSORS GRUETZMACHER (extension nutritionist), LANE (extension specialist in clothing and textiles), TULLER (extension specialist in housing).

ASSISTANT PROFESSORS CARTER (extension specialist in clothing and home furnishings), MINDEN (extension specialist in home management).

General Statement

UNDERGRADUATE and graduate work is offered in the School of Home Economics leading to degrees of Bachelor of Arts, Bachelor of Science, Master of Arts, Master of Science, and Doctor of Philosophy.

All problems of home and family life fall within the field of home economics. The School of Home Economics seeks to serve, directly or indirectly, every Oregon home. The school contributes directly to the life of the commonwealth; students are prepared for the responsibilities of homemaking and parenthood, for teaching, administration and management, and for other work in home economics and allied fields. The true homemaker not only must be trained in the science, the art, and the economics of the household, but also must have a well-rounded personality, with intelligent interests, disciplined judgment, and discriminating tastes, enabling her to deal with the problems of the changing modern home with its complex social and civic relationships. Hence the home-economics curriculum must be both liberal and technical.

Through research and extension, closely coordinated with the resident teaching, effort is constantly directed toward the solution of home problems.

Undergraduate Curricula. Education in homemaking is fundamental in all the work of the school. In order to provide for differing backgrounds and interests of students, three curricula are offered for baccalaureate degrees as follows:

CURRICULUM A provides especially for those whose main object in attending college is preparation for home life; students in this curriculum may also prepare for teaching and other earning fields related to home economics. Pages 349-350.

CURRICULUM B, termed the professional curriculum, provides an excellent background for students who wish to enter the earning fields; in the junior and senior years the student may specialize in home-economics teaching, home-economics extension, hospital dietetics, institutional management, nutrition, nursery school teaching, farm security, or commercial fields of home economics. Pages 350-351.

In both Curriculum A and Curriculum B, courses in the arts and sciences supplement the home-economics courses.

* Extension work in home economics is a part of the Federal Cooperative Extension Service. The resident-instruction and extension staffs cooperate closely in the upbuilding of Oregon home and family life.

CURRICULUM C is planned for students who enter the School of Home Economics after lower-division work in liberal arts; the student's four-year program is thus divided into two distinct parts, two years devoted to general studies and two years devoted largely to home economics. Students in this curriculum must fulfill the same requirements in biological and physical sciences and social sciences as in the other curricula. Pages 351-352.

For homemakers, special students, and students registered in other schools on the campus, the school offers service and special courses. Minors in home economics may be outlined for students in other schools.

One-Year and Two-Year Curricula. Students who plan to spend only a year or two in college find it desirable to select courses that will be of the greatest practical use in homemaking or whatever other occupation may be followed. For students who do not plan to become candidates for a degree, programs of study are outlined covering one year or more of work and including those subjects of most value to the individual, rather than courses preparing for advanced study. (See pages 354-355.)

Requirements for Graduation. For the B.A. or B.S. degree in home economics a minimum of 192 term hours must be completed. The work should be distributed as listed in the curricula. At least 45 term hours in upper-division courses are required. Transfers from other institutions are required to complete at least 18 term hours in home economics at this institution. Curricula A and B as printed include the required hours of science and social science for the B.S. degree. For the B.A. degree 36 term hours in arts and letters must be completed, including requirements in a foreign language. Students in Curriculum C may have completed 36 hours in science, social science, or arts and letters as part of their freshman and sophomore work; if not they must elect sufficient work in their junior and senior years to meet the specific requirements for the degree (B.A. or B.S.) desired.

Advanced Degrees. All departments of the School of Home Economics offer graduate work leading to the master's degree (M.A., M.S.). The fields include clothing, textiles, and related arts; foods and nutrition; home management; child development, family relationships, and related fields; and institution economics. The degree of Doctor of Philosophy is offered in the fields of foods and nutrition and household administration. The regulations and procedures governing graduate study are printed under GRADUATE SCHOOL.

Home-Economics Research. The School of Home Economics co-operates with the Agricultural Experiment Station of Oregon State College and with the United States Department of Agriculture in conducting research on home problems. In foods and nutrition, studies are under way on the culinary value of fats; factors affecting the palatability of foods; nutritional status of children; human requirements of vitamins and the relation of nutrition to teeth. Studies are also under way in problems of housing and of the extent and kind of use of frozen-food lockers in Oregon. In addition to the co-operative research the School of Home Economics conducts investigations financed by special state appropriations and by foundation grants.

Training in methods of research is included in graduate courses offered in the several departments of the School of Home Economics.

Home-Economics Extension. The School of Home Economics co-operates with the Federal Cooperative Extension Service of Oregon State College and with the United States Department of Agriculture in the upbuilding of Oregon home and family life. Special courses in home-economics extension are

offered in the Department of Home Economics Education to prepare home-economics students for home-demonstration work.

Members of the home-economics faculty prepare correspondence courses in home-economics subjects that form a part of the program of the divisions of Federal Cooperative Extension and General Extension.

Facilities. 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 Service. Food laboratories, a nutrition laboratory, and animal laboratories are maintained, together with facilities for instruction in family cookery and table service. Seven laboratories are equipped for instruction in clothing selection and construction, textiles, home furnishings, and crafts. The dormitory dining-room facilities afford opportunity for training in food service for large groups. The central kitchen and cold-storage rooms are equipped with modern labor-saving and power equipment. The halls of residence for men and for women are available for study of housing problems. Orchard Street Nursery School and Park Terrace Nursery School and the two home-management houses, Kent and Withycombe, are located on the campus.

The supervised teaching is carried on in high schools of the state. The Home Economics Extension Department, through which the School of Home Economics maintains direct relationship with the homemakers and the 4-H club girls of the state, provides guidance to undergraduate and graduate students who wish to specialize in this field. The department supervises apprenticeship training in counties located near Oregon State College.

Undergraduate Curricula in Home Economics

B.A., B.S. Degrees

Curriculum A

Freshman Year

	Term hours		
	F	W	S
Color and Composition (AA 160, 161)	3	3	(3)
¹ Physical or Biological Science	3-4	3-4	3-4
Introduction to Home Economics (HAD 101)	1	—	—
Appreciation of Music (Mus 121)	1	(1)	(1)
English Composition (Eng 111, 112, 113)	3	3	3
Nutrition (FN 225)	3	(3)	(3)
Foods (FN 211)	(3)	(3)	3
Textiles (CT 250)	(3)	3	(3)
Clothing (Selection) (CT 211)	(3)	(3)	3
² Elementary Clothing (CT 111)	(3)	(3)	3
³ Physical Education	1	2	1
	15-16	14-15	16-17

Sophomore Year

Foods (FN 212, 213)	3	3	(3)
⁴ Clothing (Construction) (CT 212)	(3)	(3)	3
House Planning and Architectural Drawing (AA 178)	(3)	(3)	3
Family Relationships (HAD 222)	(2)	(2)	2
⁵ Elementary Psychology (Psy 201, 202, 203)	3	3	3
Literature	3	3	(3)
History of Western Civilization (Hst 201, 202, 203)	3	3	3
Physical Education	1	1	1
Electives	3	3	(3)
	16	16	15

¹If 9 hours instead of 12 hours of science are taken in the freshman year, the student must include 3 hours of science or social science in her electives during later years.

²A student who passes the placement test in clothing construction given during registration week may be exempt from taking CT 111.

³General Hygiene (PE 150), 2 term hours, is taken one term in place of physical education.

⁴Students not placing sufficiently high in the placement test should take CT 111 as prerequisite to CT 212.

⁵Or Psy 207, 208.

FOR JUNIORS AND SENIORS

	Term hours		
	F	W	S
Junior Year			
Outlines of Economics (Ec 212)	3	(3)	(3)
General Sociology (Soc 212)	(3)	3	(3)
Home Furnishing (CT 331)	3	(3)	(3)
Home Management (HAD 340)	(4)	4	(4)
Child Development (HAD 311, 312)	3	3	(3)
Physiology (Z 331, 332)	3	3	—
Feeding the Family (FN 325)	—	—	2
Costume Design (CT 311) or Consumer Buying in Clothing and Textiles (CT 350) or Clothing (Draping) (CT 310), or Clothing for Children (CT 320), or Applied Design (CT 335)	(3)	(3)	3
¹ Literature	(3)	(3)	3
Electives	4	4	7
	16	17	15
Senior Year			
Nursery School Procedures (HAD 425)	3	(3)	(3)
Home Management House (HAD 450)	(5)	5	(5)
Political Science	(3)	3	(3)
Food Purchasing (FN 411)	3	(3)	(3)
Electives	12	8	16
	18	16	16

Curriculum B

Freshman Year			
Color and Composition (AA 160, 161)	3	3	(3)
General Chemistry (Ch 101, 102, 103)	3	3	3
English Composition (Eng 111, 112, 113)	3	3	3
² Appreciation of Music (Mus 121)	1	(1)	(1)
Introduction to Home Economics (HAD 101)	1	—	—
Nutrition (FN 225)	(3)	(3)	3
Foods (FN 211)	3	(3)	(3)
Textiles (CT 250)	(3)	3	(3)
Clothing (Selection) (CT 211)	—	—	3
³ Physical Education	1	2	1
⁴ Elementary Clothing (CT 111)	—	—	3
	15	14	16
Sophomore Year			
Foods (FN 221, 222)	3	3	(3)
⁵ Clothing (Construction) (CT 212)	(3)	(3)	3
Organic Chemistry (Ch 221)	4	—	—
Elements of Biochemistry (Ch 250)	—	—	—
Physiology (Z 331, 332)	3	3	—
Literature	3	(3)	(3)
⁶ Outlines of Psychology (Psy 207, 208)	(3)	3	3
History of Western Civilization (Hst 201, 202, 203)	3	3	3
House Planning and Architectural Drawing (AA 178)	(3)	(3)	3
Family Relationships (HAD 222)	(2)	(2)	2
Physical Education	1	1	1
	17	17	15

¹Students who have already taken three terms of Literature may substitute any elective.

²Mus 122, 123 are recommended electives.

³General Hygiene (PE 150), 2 term hours, is taken one term in place of physical education.

⁴A student who passes the placement test in clothing construction given during registration week may be exempt from taking CT 111.

⁵A student not placing sufficiently high in the placement test should take CT 111 as prerequisite to CT 212.

⁶Or Psy 201, 202, 203.

FOR JUNIORS AND SENIORS

	Term hours		
	F	W	S
Junior Year			
Any two subjects in this grouping: Costume Design (CT 311), or Clothing (Draping) (CT 310), or Clothing (Tailoring) (CT 312), or Clothing for Children (CT 320), or Applied Design (CT 335), or Consumer Buying in Clothing and Textiles (CT 350)	3	3	(3)
Home Furnishing (CT 331)	(3)	3	(3)
General Bacteriology (Bac 204)	(3)	(3)	3
Home Management (HAD 340)	(4)	(4)	4
Nutrition (FN 321)	4	(4)	(4)
General Sociology (Soc 212)	(3)	(3)	3
Child Development (HAD 311, 312)	3	3	(3)
Extempore Speaking (Sp 111) or Elementary Journalism (J 111)	(3)	(3)	3
Outlines of Economics (Ec 212)	3	(3)	(3)
¹ Literature	(3)	3	3
Electives	3	3	—
	16	15	16
Senior Year			
Nursery School Procedures (HAD 425)	3	(3)	(3)
Home Management House (HAD 450)	(5)	5	(5)
Political Science	(3)	(3)	3
² Electives	13	11	13
	16	16	16

Curriculum C

A minimum of 45 term hours in home economics is required. See statement on page 71 regarding the science, social science, or arts and letters requirement for B.S. or B.A. degree.

During the freshman and sophomore years the student must take an approved program in arts and sciences leading to the Junior Certificate or equivalent. Courses in home economics need not have been taken, but students who find it possible to take a year (9 term hours) of foods or of clothing and textiles, or both, will be enabled to elect a wider range of advanced courses in home economics during their junior and senior years.

	Term hours		
	F	W	S
Junior Year			
Nutrition (FN 225)	3	(3)	(3)
Foods (FN 211, 212, 213) or (FN 220, 221, 222)	3	3	3
³ Textiles (CT 250), Clothing (CT 211, 212)	3	3	3
Home Furnishing (CT 331 or 231)	(3)	3	(3)
Outlines of Economics (Ec 212)	(3)	3	(3)
⁴ Outlines of Psychology (Psy 207, 208)	3	3	(3)
Color and Composition (AA 160)	3	—	—
Electives	1	1	10
	16	16	16
Senior Year			
Electives in Home Economics courses (upper division)	3	—	3
Home Management (HAD 340)	4	(4)	(4)
Child Development (HAD 311, 312)	3	3	(3)
Feeding the Family (FN 325)	—	—	2
Home Management House (HAD 450)	(5)	(5)	5
General Sociology (Soc 212)	(3)	3	(3)
Political Science	(3)	3	(3)
Nursery School Procedures (HAD 425)	(3)	(3)	3
Family Relationships (HAD 422)	—	(2)	2
Electives	7	7	1
	16	16	16

¹Students who have already taken three terms of Literature may substitute an elective.

²Mus 122, 123 are recommended electives.

³A placement test in clothing construction is given during registration week. Entering students not placing sufficiently high in the test should take CT 111 as prerequisite to CT 212.

⁴Or Psy 201, 202, 203.

Suggested Elective Combinations

Home Economics students wishing to prepare for certain earning phases of home economics may elect any of the following groups of courses.

HOME ECONOMICS IN BUSINESS

CLOTHING, TEXTILES, AND RELATED ARTS

For students interested in commercial work in the fields of clothing, textiles, and related arts the following courses are suggested:

	Term	hours
French	12	
Organic Chemistry	4	
Survey of Visual Arts (History and Appreciation) (AA 114, 115, 116)	6	
Lower-Division Drawing	6	
Clothing (Draping) (CT 310)	3	
Clothing for Children (CT 320)	3	
Consumer Buying in Clothing and Textiles (CT 350)	3	
Dress Design (CT 411)	3	
Commercial Clothing (CT 412)	3	
Home Furnishing (CT 431)	3	
Applied Design (CT 435)	3	
Textiles (CT 450)	3	
Effective Selling and Promotion (BA 465)	3	
Educational Psychology (Ed 312)	3	
Elementary Journalism (J 111)	3	
Extempore Speaking (Sp 111)	3	
Radio Speaking (Sp 334)	3	

FOODS AND NUTRITION

For students in Curriculum B preparing for commercial positions, such as journalism, radio, or food demonstration work, the following courses are suggested:

	Term	hours
Extempore Speaking (Sp 111)	3	
Elementary Journalism (J 111)	3	
Experimental Cookery (FN 435)	3	
Food Purchasing (FN 411)	3	
Food Management (FN 412)	3	
Food Demonstrations (FN 413)	3	
Household Equipment (HAD 330)	3	
Educational Psychology (Ed 312)	3	
General Bacteriology (Bac 204, 205)	6	
Voice and Diction (Sp 120)	3	
Radio Speaking (Sp 334)	3	
Child Nutrition (FN 421)	3	
Quantity Cookery and Catering (IEc 311)	3	
Economics of the Family (HAD 441)	2	
Home Food Preservation (FN 331)	3	

HOUSING AND EQUIPMENT

For students interested in commercial work with utility and equipment companies, in house planning institutes, and consultant services, the following courses are suggested:*

	Term	hours
Household Equipment (HAD 330)	3	
Organization and Use of Home Space (HAD 335)	3	
Economics of the Family (HAD 441)	2	
Management Problems in Home Community Relations (HAD 445)	2	
Family Housing (HAD 439)	3	
Problems of the Consumer-Buyer (HAD 442)	2	
House Planning in Relation to Function (HAD 435)	3	
The Functional Design of Dwellings (HAD 436)	3	
Household Utilities (AE 435)	3	
House Planning for Farm and Suburb (AE 451)	3	
Household Physics (Ph 214)	4	
House Planning and Architectural Drawing (AA 179)	2 or 3	
House Planning and Architectural Drawing (AA 180)	2 or 3	
Food Management (FN 412)	3	

* Students preparing for work in this field should consult with staff members teaching housing courses and plan their programs with their guidance as this is a new field of emphasis and courses recommended may be in several schools outside of Home Economics.

CHILD DEVELOPMENT AND NURSERY SCHOOL

Students are advised to plan their undergraduate and graduate programs as a unit, including special courses in biology, psychology, and sociology, as well as the usual home economics requirements. The following courses are suggested for students in this field:

	Term hours
First Aid (PE 358)	2
Child Development (HAD 413)	3
Parent Education (HAD 423)	2
Nursery School Procedures (HAD 426) or Supervised Nursery School Experience (Ed 414)	3-8
Program Building in the Nursery School (HEd 428)	2
Nursery School Administration (HEd 429)	2
Economics of the Family (HAD 441)	3
Studies in Child Development and Family Relationships (HAD 511)	3
Statistical Methods in Education (Ed 517)	3
Individual Differences (Psy 471, 472, 473)	9
Clothing for Children (CT 320)	3
Food Management (FN 412) or Quantity Cookery and Catering (IEc 311)	3
Social Psychology (Soc 474) or Social Problems (Soc 411, 412)	4-6
Family Relationships (HAD 422)	2

Desirable electives: Child Nutrition (FN 421), Organization and Use of House Space (HAD 335), House Planning in Relation to Function (HAD 435), Group Thinking (Ed 491), Management Problems in Home-Community Relations (HAD 445), Speech Defects (Sp 292), Sociology of the Family (Soc 312), Lower Division Decorative Design (AA 295).

HOME ECONOMICS TEACHING

For students preparing to teach home economics the following sequence is suggested. Additional electives should be taken to meet the requirements for certification (see pages 262-263 for requirements). These requirements for certification are not requirements for graduation in home economics. For those who wish to teach in reimbursed vocational departments, Curriculum A or B is required including Sp 111 and CT 312.

	Term hours		
	F	W	S
Secondary Education (Ed 311)	3	—	—
Educational Psychology (Ed 312)	—	3	—
Principles of Teaching (Ed 313)	—	3	—
Oregon School Law and Oregon System of Education (Ed 316)	2 or 2	or 2	or 2
History of Oregon (Hst 377)	—	—	3
Methods and Materials (Ed 408d)	3 or 3	or 3	or 3
Supervised Teaching (Ed 415) (hours to be arranged)	—	—	—
Organization and Administration of Homemaking Education (HEd 422)	3 or 3	or 3	or 3

INSTITUTION ECONOMICS AND DIETETICS

For students in Curriculum B preparing for positions as dietitians in hospitals, dormitories, cafeterias, hotels, and tearooms, the following courses are required:

	Term hours		
	F	W	S
General Bacteriology (Bac 204, 205)	3	3	—
Principles of Accounting (BA 211)	3	—	—
Educational Psychology (Ed 312)	3	—	—
Principles of Teaching (Ed 313)	—	3	—
Quantity Cookery and Catering (IEc 311)	3	—	—
Physiological Chemistry (Ch 330, 331)	—	2	3
Nutrition in Disease (FN 420)	—	—	3
Institutional Organization and Administration (IEc 430)	2	—	—
Institutional Equipment and Marketing (IEc 440)	—	3	—
Institution Experience (IEc 450)	—	—	4

Students in institution economics and dietetics will be excused from taking one of group requirement in upper-division clothing.

Suggested electives: Food Purchasing (FN 411), Food Management (FN 412), Food Demonstrations (FN 413), Experimental Cookery (FN 435), Child Nutrition (FN 421), Readings in Nutrition (FN 481), Principles of Personnel Management (BA 451).

HOME ECONOMICS EXTENSION

For students preparing for positions in the field of home-economics extension as county home-demonstration agents, 4-H Club agents, or similar types of work, either curriculum A or B is required including HEd 451, 452, Extension Methods, and HEd 453, Field Work in Home Economics Extension. The following sequences are suggested:

	Term hours		
	F	W	S
Junior Year			
Organization and Use of House Space (HAd 335)	3	3	(3)
Elementary Journalism (J 111)	3	(3)	(3)
Sociology of Rural Life (Soc 364)	3	—	—
Adult Education in Home Economics (HEd 440)	—	—	3
Radio Speaking (Sp 334)	3	(3)	(3)
Senior Year			
Extension Methods (HEd 451, 452)	3	3	—
Field Work in Home Economics Extension (HEd 453)	—	9	(9)
Home Furnishing (CT 431)	3	(3)	(3)
Home-Ground Planning (LA 279)	—	3	—
Educational Psychology (Ed 312)	3	—	—
House Planning in Relation to Function (HAd 435)	—	—	3
Home Food Preservation (FN 331)	3	—	—

Additional electives: Economics of the Family (HAd 441), Management of Problems in Home-Community Relations (HAd 445), Family Housing (HAd 439), Leadership in Party Games (PE 240), Child Nutrition (FN 421), Parent Education (HAd 423), Food Demonstration (FN 413).

SUGGESTED MINORS

Suggested outlines of minors in various fields, such as arts and sciences, physical education, journalism, speech and dramatics, languages, business administration and secretarial science are supplied on request. See also SUBJECT PREPARATION for teaching on pages 264-271.

ONE YEAR OF HOME ECONOMICS

Students who plan to spend only one year in college should usually take the following home-economics courses:

	Term hours		
	F	W	S
Introduction to Home Economics (HAd 101)	1	—	—
Nutrition (FN 225)	(3)	3	(3)
Food Preparation (FN 218)	—	3	—
Clothing Selection (CT 217)	3	(3)	(3)
Clothing Construction (CT 218, 219)	(3)	3	3
Family Relationships (HAd 222)	2	—	—
Child Care (HAd 225)	(3)	(3)	3
Home Furnishing (CT 231)	3	(3)	(3)
Home Management (HAd 239)	(3)	(3)	3
English Composition (Eng 111)	3	(3)	(3)
Extempore Speaking (Sp 111)	(3)	(3)	3
Literature or Directed Recreational Reading (Eng 231)	1-2	(1-2)	(1-2)
Mental Hygiene (Psy 111)	(3)	3	(3)
*Physical Education	1	1	1
*Electives	—	3	3
	14-15	16	16

TWO YEARS OF HOME ECONOMICS

Students who plan to spend not more than two years in college should usually take the following home-economics and allied courses:

	Term hours		
	F	W	S
First Year			
Introduction to Home Economics (HAd 101)	1	—	—
Color and Composition (AA 160)	3	(3)	(3)
Textiles (CT 250)	(3)	(3)	3
Family Relationships (HAd 222)	(2)	2	(2)
Foods (FN 211)	3	(3)	(3)
Nutrition (FN 225)	(3)	(3)	3
Biological or Physical Science or Psychology with laboratory	3	3	3
*Physical Education	1	2	1
Electives	5	9	6
	16	16	16

*General Hygiene (PE 150), 2 term hours, is taken one term in place of physical education.

*Suggested electives: Nur 230, PS 231.

Second Year

	Term hours		
	F	W	S
Foods (FN 212, 213)	3	3	(3)
Clothing (CT 211, 212)	3	3	(3)
Home Furnishing (CT 231)	3	---	---
Home Management (HAD 239)	---	---	3
Child Care (HAD 225)	---	(3)	3
English Composition (Eng 111), Speech, Literature	3	3	3
Literature or History or Political Science or Sociology	3	3	3
Physical Education	1	1	1
Electives	---	3	3
	16	16	16

Clothing, Textiles, and Related Arts

OFFICES, classrooms, and laboratories of the Department of Clothing, Textiles, and Related Arts are located in the Home Economics Building. All necessary furnishings and equipment are available for thorough instruction in textiles, clothing, tailoring, costume design, house decoration, and applied design.

DESCRIPTION OF COURSES

REQUIRED

- Curriculum A: CT 211, 212, 250, 331, 311 or 310 or 320 or 350.
 Curriculum B: CT 211, 212, 250, 331, 311, 312 or 310 or 320 or 350 or 335.
 Curriculum C: CT 211, 212, 250, 331 or 217, 218, 219, 231.

ELECTIVE

- Curriculum A: CT 310, 312, 320, 335, 350, 411, 412, 431, 435, 450, 460.
 Curriculum B: CT 310, 320, 335, 350, 411, 412, 431, 435, 450.
 Curriculum C: CT 235, 310, 311, 312, 320, 335, 411, 412, 431, 435, 450.
 For students in education, secretarial science, etc.: CT 217, 218, 219, 231, 235, 250.

Students planning to register for clothing sequence CT 111, 212, 312 should keep in mind, when planning their wardrobes for the college year, that these courses require a certain amount of clothing construction. Students in clothing and textiles courses who do not wish to make garments for themselves may be furnished material through orders given the department.

LOWER-DIVISION COURSES

*CT 111. Elementary Clothing. 3 hours any term.

Fundamental processes of hand and machine sewing; selection and construction of simple garments and household articles. Six periods laboratory work.

CT 211. Clothing (Selection). 3 hours any term.

Artistic and economic factors in the selection of adult clothing; wardrobe needs of college girl. Prerequisite: AA 160. Two lectures; 1 two-hour laboratory period.

*CT 212. Clothing (Construction). 3 hours any term.

Pattern study; commercial patterns and their adaptation; fitting and construction principles applied to cotton and wool garments. Prerequisite: CT 111 (or its equivalent); CT 211. Three two-hour laboratory periods.

CT 217. Clothing Selection. 3 hours any term.

Elective for students in other schools. Aims to develop good taste in dress and to give an appreciation in selection of clothing from standpoint of beauty, health, and economy.

CT 218. Clothing Construction. 3 hours any term.

Elective for those of other schools. Principles of selection and construction applied in the planning and making of cotton and wool garments. Prerequisite or parallel: CT 217. Three two-hour laboratory periods.

*A home project in clothing construction is required of all students who have completed CT 111 before enrolling for CT 212.

CT 219. Clothing Construction. 3 hours spring.

Continuation of CT 218. Planning and construction of silk garment and children's clothing. Prerequisite: C 218. Three two-hour laboratory periods.

CT 231. Home Furnishing. 3 hours fall.

Elective for students other than home economics. Aims to develop appreciation of beauty and suitability in home furnishings; materials and processes involved. Three two-hour laboratory periods.

CT 235. Applied Design. 3 hours spring.

For students in other schools. Decorative art involving a consideration of line, form, and color as applied to problems in weaving, block printing, stenciling, etc. Three two-hour laboratory periods.

CT 250. Textiles. 3 hours any term.

Properties, uses, selection and care of textile fibers and fabrics. No prerequisite, but chemistry is desirable. Two lectures; 1 two-hour laboratory period.

UPPER-DIVISION COURSES

CT 310. Clothing (Draping). 3 hours.

Fundamental principles of draping with practical application of principles to the construction of various types of garments. Prerequisite: CT 212, 250. Three two-hour laboratory periods. Associate Professor Strickland.

CT 311. Costume Design. 3 hours any term.

Art principles applied in selection and design of appropriate costumes; historic costume and relation to modern dress. Prerequisite: CT 212, 250; AA 161. One lecture; 2 two-hour laboratory periods. Professor Fritchoff.

CT 312. Clothing. 3 hours any term.

Principles of tailoring; independence, initiative, originality in designing, planning, and constructing coats and suits. Prerequisite: CT 311. Six laboratory periods. Associate Professor Strickland.

CT 320. Clothing for Children. 3 hours fall.

Selection and construction of clothing for children from the standpoint of health, beauty, and cost. Prerequisite: CT 212, 250. One lecture; 2 two-hour laboratory periods. Associate Professor Strickland.

CT 331. Home Furnishing. 3 hours any term.

Furnishing a small home from standpoint of comfort, beauty and economy; influence of historic design. Prerequisite: CT 212, 250; AA 161, 178. One recitation; 2 two-hour laboratory periods. Associate Professor Patterson.

CT 335. Applied Design. 3 hours any term.

Line, form, and color; original designs executed in various media for clothing and house-furnishing accessories; weaving, block printing, etc. Prerequisite: CT 212, 250; AA 161. Three two-hour periods. Associate Professor Patterson.

CT 350. Consumer Buying in Clothing and Textiles. 3 hours winter or spring.

Problems in the production and consumption of textiles and clothing, with emphasis on the economic principles involved. Prerequisite: CT 212, 250; Ec 211. Assistant Professor Diedesch.

- 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 411. Dress Design. (G) 3 hours.
Designing, modeling, and creative work; historic costume and its relation to modern fashions. Prerequisite: CT 312. One lecture; 2 two-hour laboratory periods. Professor Fritchhoff.
- CT 412. Commercial Clothing. (G) 3 hours.
Selecting, designing, and constructing garments for different types of figures; organization from trade standpoint; speed, economy, effectiveness, selling features. Prerequisite: CT 312. Three two-hour laboratory periods. Associate Professor Strickland.
- CT 431. Home Furnishing. (G) 3 hours.
Further study of interior decoration as applied to the small home, with practical application of skills and practices. Prerequisite: CT 331. One lecture; 2 two-hour laboratory periods. Associate Professor Patterson.
- CT 435. Applied Design. (G) 3 hours.
For students desiring advanced work in applied design. Prerequisite: CT 331, 335. Three two-hour laboratory periods. Associate Professor Patterson.
- CT 450. Textiles. (G) 3 hours fall.
Survey of the literature on recent research and new developments in the textile field. A research problem in the field of the student's special interest. Prerequisite: CT 331, 350, one year chemistry. Two lectures; 1 two-hour laboratory period. Associate Professor Gatton.
- CT 460. Historic Textiles. (G) 3 hours.
Study of textiles from ancient times to present, from an appreciative and historical point of view. Prerequisite: CT 312, 331.

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. Professor Fritchhoff and staff.

Foods and Nutrition

FIVE laboratories for food instruction, accommodating twenty students each, are provided. Two dining rooms and small kitchens are used in meal service in the department and for occasions by the school. For work in nutrition a chemical laboratory and laboratories for animal experimentation are provided.

DESCRIPTION OF COURSES

REQUIRED

- Curriculum A: FN 211, 212, 213, 225, 325, 411.
 Curriculum B: FN 211 or 220, 221, 222, 225, 321.
 Curriculum C: FN 211, 212, 213 or 220, 221, 222, and 225, 325.

ELECTIVE

- Curriculum A: FN 331, 412, 413.
 Curriculum B: FN 331, 411, 412, 413, 420, 421, 435, 481, HEd 420.
 Curriculum C: FN 331, 411, 412, 413.
 For students in education, pharmacy, etc.: FN 211, 212, 213, 218, 225, 240, 250.

LOWER-DIVISION COURSES

- FN 211. Foods.** 3 hours any term.
 Selection, preparation, and service. Two recitations; 2 two-hour laboratory periods.
- *FN 212, 213. Foods.** 3 hours each term.
 Selection, preparation, and service. Prerequisite: FN 211. Prerequisite or parallel: one year of biological or physical science. FN 225 should parallel or precede FN 212. Two recitations; 2 two-hour laboratory periods.
- FN 218. Food Preparation.** 3 hours any term.
 For women students not majoring in home economics. Basic principles of food preparation, menu making, and meal service. One recitation; 2 two-hour laboratory periods.
- *FN 220, 221, 222. Foods.** 3 hours each term.
 Foods in scientific and economic aspects; selection, preparation, and service. Prerequisite: Ch 101, 102, 103, FN 211; FN 225 and Ch 221 prerequisite or parallel. Two recitations; 2 two-hour laboratory periods.
- FN 225. Nutrition.** 3 hours any term.
 Nutritive value of foods from the standpoint of newer scientific investigations; selection of an optimal diet for health; present-day problems in nutrition; recent trends in American dietary habits.
- FN 240. Food Selection and Preparation (For Men).** 2 hours any term.
 Open to men in all schools interested in food preparation, meal planning and serving. Aids men who are acting as managers of living groups or are preparing their own meals. One lecture; 1 three-hour laboratory period.
- FN 250. Camp Cookery (For Men).** 2 hours spring.
 Preparation of palatable and nutritious products from foods available in camps; outdoor food preparation involving the use of reflectors and improvised camping utensils. One lecture; 1 three-hour laboratory period.

UPPER-DIVISION COURSES

- FN 321. Nutrition.** 4 hours any term.
 Application of principles of nutrition to individual and family group; projects in animal experimentation. Prerequisite: FN 225; Ch 221; Z 331; Z 332 may be taken parallel. Two lectures; 2 two-hour laboratory periods.
- FN 325. Feeding the Family.** 2 hours any term.
 Feeding of infants and children through the period of growth, including pre-natal period; planning family meals to meet the requirements of all members. Prerequisite: FN 225, 213.

* Home practice in food preparation is required of students who have completed FN 213 and FN 222, the character and amount of practice being arranged with the instructors in charge.

- FN 331. Home Food Preservation.** 3 hours fall.
Common home methods of preserving foods with special attention to freezing, canning, and dehydration. Six periods. Prerequisite: FN 213 or 222, FN 225, Bac 204.
- 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 411. Food Purchasing.** (g) 3 hours any term.
Standards, grades, and qualities of food products; factors governing cost; food laws; ethics of buying and selling. Prerequisite: FN 213 or 222; Ec 212. Two lectures; 2 two-hour laboratory periods. Associate Professor Kolshorn.
- FN 412. Food Management.** (g) 3 hours fall or winter.
Includes complete responsibility in purchasing, menu making, meal management. Prerequisite: FN 213 or 222, 225. Six periods. Assistant Professor Macpherson.
- FN 413. Food Demonstrations.** (g) 3 hours spring.
Principles and techniques for commercial and classroom demonstration; practical experience with channels of publicity; demonstrations before classes and other audiences. Prerequisite: FN 213, 225, 411; or FN 222. Six periods. Assistant Professor Macpherson.
- FN 420. Nutrition in Disease.** (G) 3 hours spring.
Dietary adjustments for abnormal conditions. For students who plan to become hospital dietitians or nutrition specialists or desire to broaden their training in nutrition. Two lectures; 1 two-hour laboratory period. Prerequisite: FN 321. Associate Professor Storvick.
- HEd 420. Community Problems in Nutrition.** (G) 3 hours spring.
Nutrition problems of the high-school teacher and others in contacts with community. Individual and group field projects in a nutrition-health program. Prerequisite: FN 321, Ed 313. Assistant Professor Garrison.
- FN 421. Child Nutrition.** (G) 3 hours.
Nutritional needs from prenatal life through childhood; maternal dietary requirements. Prerequisite: FN 321. Professor Fincke.
- FN 435. Experimental Cookery.** (G) 3 hours.
Development of experimental methods; application to investigations in cookery; skills involved; literature in field; preparation for independent investigations. Prerequisite: Ch 221, FN 222. Associate Professors Kolshorn and Overman.
- FN 481. Readings in Nutrition.** (G) 3 hours.
Research studies in nutrition reviewed; interpretations and significance. Fundamental course for graduate work in nutrition. Prerequisite: FN 321. Professor 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. Professor Fincke and staff.
- FN 522, 523. Methods in Nutrition Research. 3 hours each term. Students may register for one or two terms.
Laboratory problems in energy metabolism; vitamin studies; calcium and phosphorus studies; surveys of dietaries; balance studies; blood studies. Prerequisite: FN 321. Associate Professor Storvick, Miss Hawthorne.
- FN 531, 532. Food Preparation Investigation. 3 or 5 hours each term.
Independent investigations. Prerequisite: FN 435. Associate Professor Kolshorn.
- FN 541, 542. Food Economics. 3 hours each term.
Economic problems of food supply in relation to nutrition. Prerequisite: FN 411. Associate Professor Kolshorn.

Home Economics Education

PROFESSIONAL training for prospective teachers of home economics is afforded by the Department of Home Economics Education, which is a joint department within both the School of Home Economics and the School of Education. Any student in the School of Home Economics having a scholarship record below average should confer with the Dean of the School of Home Economics before registering for teacher-training work. (For information regarding the specific requirements for the State Teacher's Certificate see pages 262-263.)

Instruction in home-economics extension methods is offered for students preparing for home-demonstration, extension specialist, or other work in the home-economics field in which extension methods are commonly used. The extension worker must be well trained not only in the subject matter of her field but also in the methods by which extension work is successfully carried on. She must be able to give or know how to obtain authoritative advice for her community or county on any problem that may arise related to her field of service. She must know and practice the technique of platform speaking and demonstration, radio speaking, how to conduct discussions, and how to support the extension program by effective publicity. Excellent opportunities for combining a major in 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 training on the part of extension workers.

DESCRIPTION OF COURSES

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.
- Ed 408d. Methods and Materials.** (See Ed 408, page 274). Professor Blazier.
- Hed 413. The Supervision of Home Projects.** (G) 2 hours spring.
Use of home projects in home-economics instruction with field work in supervision of home projects. Prerequisite: Ed 408d. One recitation; 1 two-hour laboratory period.
- Hed 420. Community Problems in Nutrition.** (G) 3 hours spring.
Nutrition problems of the high-school teacher in community; field work in cooperation with agencies interested in nutrition-health program. Prerequisite: FN 321, Ed 313. Two recitations; 1 laboratory period. Assistant Professor Garrison.
- Hed 422. Organization and Administration of Homemaking Education.** (G) 3 hours any term.
Typical organizations of homemaking departments on both vocational and nonvocational basis with special attention to equipment and management. Prerequisite: Ed 408d. Professor Blazier.
- Hed 428. Program Building in the Nursery School.** (G) 2 hours spring.
Methods of relating literature, art, music, and science activities to child interests; projects for nursery school. Prerequisite or parallel: HAd 425. Assistant Professor Wiggernhorn.
- Hed 429. Nursery School Administration.** (G) 2 hours spring.
Problems of equipping a nursery school, planning schedules, record keeping, personal, community relations. Prerequisite: HAd 425. Miss Rea.
- Hed 440. Adult Education in Home Economics.** (G) Hours to be arranged.
Problems in the adult-education program authorized under the Smith-Hughes Act; field work in promoting, organizing, observing, and teaching adult classes. Prerequisite: HEd 412. Professor Blazier.
- Hed 451, 452. Extension Methods.** (G) 3 hours each term.
History and organization of extension work; methods employed by extension specialists, county agricultural and home demonstration agents, 4-H club leaders, etc. Professor Sager.
- Hed 453. Field Work in Home Economics Extension.** (G) Hours to be arranged, winter or spring.
Field practice in home demonstration work in selected counties under supervision of professor of extension methods and county extension agents. Prerequisite: HEd 451, 452. Professor Sager and others.

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.
Problems in home economics education. Professor Blazier.
- 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. Professor Blazier.

Household Administration

IN THE Department of Household Administration instruction is offered in home management, economics of the family, problems of the consumer-buyer, household equipment, housing, child development, nursery school, parent education, and family life. Offices and classrooms are located in the Home Economics Building. Two well-equipped Home Management houses and two Nursery Schools are located on the campus.

DESCRIPTION OF COURSES

REQUIRED

Curriculum A and B: HAd 101, 222, 311, 312, 340, 425, 450.
Curriculum C: HAd 222, 311, 312, 340, 425, 450.

ELECTIVE

Curriculum A and B: HAd 330, 335, 401, 403, 405, 407, 413, 422, 423, 426, 435, 436, 439, 441, 442, 445, 451; Nur 230; HEd 428, 429; Ed 415.
Curriculum C: HAd 330, 401, 403, 405, 407, 413, 422, 423, 425, 426, 435, 436, 439, 441, 442, 445, 451; Nur 230; HEd 428, 429; Ed 415.
For students in secretarial science, education, pharmacy, etc.: HAd 101, 222, 225, 239, Nur 230, and any other courses for which prerequisites have been taken.

LOWER-DIVISION COURSES

HAd 101. Introduction to Home Economics. 1 hour fall.

Aims to orient beginning students in the field of home economics and to assist them in adjusting themselves to college life.

HAd 222. Family Relationships. 2 or 3 hours any term.

To give a better understanding of present-day family life and some of the problems existing. Open to both men and women. Prerequisite: sophomore standing. Two recitations.

HAd 225. Child Care. 3 hours fall or spring.

Growth, development, and care of the young child; observations in the nursery school. For students not in home economics degree curricula.

HAd 239. Home Management. 3 hours spring.

Problems in management of home; management of money, time, and energy in relation to family living. For students not in home-economics degree curricula.

UPPER-DIVISION COURSES

HAd 311, 312. Child Development. 3 hours each term, fall and winter or winter and spring.

Growth and development of normal preschool child; observations in nursery school. Prerequisite: Psy 203 or 208. Three recitations; 1 one-hour observation period. Professors Brandon and Prentiss.

HAd 330. Household Equipment. 3 hours spring.

Selection, operation, care, and arrangement of household equipment. Prerequisite: one term of foods. Two 2-hour lecture-and-laboratory periods; 1 hour to arrange. Assistant Professor Brashear.

HAd 335. Organization and Use of Home Space. 3 hours winter or spring.

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. Two lectures, 1 two-hour laboratory period. Assistant Professor Wise.

- HAd 340. Home Management.** 4 hours any term.
Problems arising in management of a home; management of money, time, and energy. Prerequisite: Junior standing. Three recitations; 1 two-hour laboratory period. Associate Professor 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 413. Child Development.** (G) 3 hours fall or spring.
Growth and development in middle and late childhood and early adolescence. Prerequisite: HAd 311, 312. Professor Brandon.
- HAd 422. Family Relationships.** (G) 2 hours winter.
Factors entering into adjustments within modern family group. Prerequisite: HAd 222, 312, 340. Professors Prentiss and Warrington.
- HAd 423. Parent Education.** (G) 2 hours winter.
Methods and content in parent education. Prerequisite: HAd 222, 312. Professors Read, Warrington.
- HAd 425. Nursery School Procedure.** (G) 3 hours any term.
Developing insight into child behavior; promoting growth through enrichment of environment. Participation in the nursery school. Prerequisite: HAd 311, 312. One 4-hour laboratory period; 2 recitations; 2 laboratory hours to be arranged. Professor Read, Assistant Professor Wiggenhorn, Miss Rea.
- HAd 426. Nursery School Procedures.** (G) 3 hours fall or winter.
Additional participation in the nursery school. Six hours of laboratory to be arranged; 2 recitations. Prerequisite: HAd 425. Professor Read, Miss Rea.
- HAd 435. House Planning in Relation to Function.** (G) 3 hours.
Basic considerations in planning a dwelling; variations among families and regions in housing requirements; application of principles of functional design to the dwelling and its surroundings; appraisal of floor plans from the standpoint of suitability to family requirements; evaluation of housing attributes and features as the basis for planning dwellings limited in cost. Prerequisite: AA 178; HAd 312, 335, 340. Professor Wilson.
- 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. Not offered 1947-48. Prerequisite: AA 178, HAd 335, 435.
- HAd 439. Family Housing.** (G) 3 hours spring.
Economic aspects of housing in relation to family living. Prerequisite: Ec 211; Soc 212; senior or graduate standing. Associate Professor Van Horn and others.
- HAd 441. Economics of the Family.** (G) 2 hours fall.
Problems of family life in relation to standards and levels of living. Prerequisite: senior or graduate standing. Associate Professor Van Horn.

- HAd 442. Problems of the Consumer-Buyer.** (G) 2 hours spring.
Problems of the consumer in buying goods and services to satisfy wants and needs; methods of improving consumer buying. Prerequisite: senior or graduate standing. Associate Professor Van Horn.
- HAd 445. Management Problems in Home-Community Relations.** (G) 3 hours winter.
Managerial functions and problems arising from relations of the family to other institutions in society, particularly where change has been rapid or institutions only recently have assumed one-time home functions. Prerequisite: HAd 340, Soc 212. Associate Professor Van Horn.
- HAd 450. Home Management House.** 5 hours any term.
Principles underlying management of a home are put into practice during six weeks residence in a house. Prerequisite: HAd 311, 312, 340; home project in foods. Assistant Professor Wise and assistants.
- HAd 451. Home Management House Supervision.** (G) 3 hours any term.
Practice in supervision, given in residence in home management house. Study of problems and principles of administering and supervising students and infant in house. Prerequisite: HAd 450, Ed 408d. Assistant Professor Wise.

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.
- HAd 511. Studies in Child Development and Family Relationships.** 3 hours winter.
Methods and techniques used in experimental investigations of child development and family relationships. Prerequisite: HAd 222, 311, 312, and a course in statistics. Professor Brandon.

Institution Economics

CCOURSES in institution economics are planned to meet the needs of students who desire to prepare for positions in the field of institutional management. Two halls of residence for women and five for men are used as laboratories. The facilities are adequate for thorough training in this field.

DESCRIPTION OF COURSES

UPPER-DIVISION COURSES

- IEc 311. Quantity Cookery and Catering.** 3 hours fall.
Standardization of formulas, cost; use of equipment; menu planning; preparation and service of foods in quantity. Prerequisite: FN 213 or 222. One lecture; 2 two-hour periods. Mrs. Martilla.
- IEc 320. Cafeteria Management.** 3 hours.
For prospective teachers who will manage a school cafeteria. Menu study, cafeteria plans, accounting, quantity cookery. At present offered summer quarter only. Prerequisite: FN 213 or 222. Mrs. Martilla.

- IEc 401. Research. Terms and hours to be arranged. Professor Bibee.
- IEc 403. Thesis. Terms and hours to be arranged. Professor Bibee.
- IEc 405. Reading and Conference. Terms and hours to be arranged. Professor Bibee.
- IEc 407. Seminar. Terms and hours to be arranged. Professor Bibee.
- IEc 430. Institutional Organization and Administration. (g) 2 hours fall.
Principles of organization and administration as applied to various types of institutions; discussion of employment problems and training, labor laws, office records. Prerequisite: HAd 340. Assistant Professor Mulhern.
- IEc 440. Institutional Equipment and Marketing. (g) 3 hours.
Equipment for bedrooms, living rooms, dining rooms, and kitchens in different types of institutions; design, materials; construction, cost, and arrangement; food purchasing; production and distribution of food commodities; marketing costs; factors influencing prices; marketing of meats, vegetables, fruits, eggs. Prerequisite: HAd 340. Assistant Professor Cleaveland.
- IEc 450. Institution Experience. (G) 4 hours spring.
Practice work in halls of residence, Memorial Union Dining Service, and office of director of dormitories. Prerequisite: IEc 311, 430, 440. One lecture; 3 two-hour laboratory periods. Assistant Professor Mulhern.

GRADUATE COURSES

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

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

School of Pharmacy

Faculty

GEORGE EDWARD CROSSEN, Ph.D., Dean of the School of Pharmacy.

ADOLPH ZIEFLE, M.S., Phar.D., Dean Emeritus of the School of Pharmacy.

JEAN FRANCES FARRELL, Secretary to the Dean.

Pharmacy

PROFESSORS CROSSEN (department head), ZIEFLE (emeritus).

ASSISTANT PROFESSOR GRILL.

INSTRUCTORS CRANE, SISSON.

Pharmaceutical Analysis

ASSISTANT PROFESSOR FORSLUND.

Pharmacology and Pharmacognosy

ASSISTANT PROFESSOR SCIUCHETTI.

General Statement

PHARMACY was first established as a separate department of Oregon State College in 1898 as a result of petition by the pharmacists of the state. The purpose of the department was to provide for a more thorough theoretical and practical training of the pharmacy apprentice than could be obtained in the average drug store, in which, up to that time, most of the training for the profession had been given. The department grew steadily from its inception, and in 1917 it was raised to the rank of school.

The school continued to develop, making it necessary that larger quarters and better facilities be placed at its disposal. As a consequence, the Pharmacy Building was erected and occupied by the school in 1924. This building affords all modern facilities for the work of the school, including special laboratories and lecture rooms, a model drug store, the pharmacy museum, and a library and reading room. The building also houses the laboratory of the Oregon Board of Pharmacy, in which drugs and drug products are subjected to analytical procedures for control purposes in order that the citizens of the state may be assured of receiving only those materials of highest quality.

Recognition of the School. The School of Pharmacy is accredited by the American Council on Pharmaceutical Education and holds membership in the American Association of Colleges of Pharmacy. The purpose of these organizations is to promote the interests of pharmaceutical education and to establish and maintain minimum requirements for the member institutions. The curriculum of this school exceeds the minimum requirements of the Council and the Association, in recognition of which its diploma is accepted in fulfillment of the educational requirement for pharmacy examination and registration in all of the states.

Requirements for Pharmacy Licensure. Under the Oregon Pharmacy Law, the Oregon Board of Pharmacy is charged with the duty of examining candidates for pharmacy license. Certain requirements are set forth in the Law as prerequisites to such examination by the Board. Thus, in order to be eligible for license as REGISTERED PHARMACIST, the candidate must:

- (1) Be a citizen of the United States and at least twenty-one years of age.
- (2) Be a graduate of a school or college of pharmacy recognized by the Oregon Board of Pharmacy.
- (3) Have completed one year (not less than 2,400 hours) of practical experience in pharmacy, under the immediate supervision of a registered pharmacist. This experience must have been gained subsequent to the applicant's sixteenth birthday, and must have been in the nature of full-time employment.

Reciprocity. As the Oregon Board of Pharmacy is a member of the National Association of Boards of Pharmacy, graduates who are registered by this Board are privileged to reciprocate without further examination with all states except California and New York.

Admission. Applicants for admission as freshmen, special, or graduate students in Pharmacy must meet the general requirements for such admission as stated in the current catalog of the College.

Appropriate advanced standing is granted to those students 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 the previous academic status of the applicant.

Attendance Requirement. In order to be eligible for final examination for credit, students in Pharmacy are required to be in attendance on at least seven-eighths of the total work of any course for which they have matriculated. Excessive absences incurred because of illness or other unavoidable circumstance may be cancelled by special arrangement with the instructor concerned and completion of all work missed during such absence.

Graduation Requirements. Completion of the prescribed curriculum and satisfaction of all College requirements are prerequisite to the granting of the bachelor's degree. All candidates for the baccalaureate degree must complete the work of the senior year in residence.

Advanced degrees are granted through and in accordance with the regulations of the Graduate School of the College.

Major Curricula

FOUR-YEAR curricula leading to degrees of Bachelor of Arts or Bachelor of Science, and graduate work leading to degrees of Master of Arts or Master of Science are offered by the School of Pharmacy.

Undergraduate Curricula. During the freshman and sophomore years all students pursue substantially the same curriculum. In the junior and senior years the student is permitted to diversify his study program by selection of certain professional and nonprofessional electives judged as being most valuable to him in preparation for the area of practice which he plans to enter. The number of credits accumulated by the student prior to his graduation will depend on the field of study chosen, a minimum total of 192 term hours being required for a degree.

PREPARATION FOR PRACTICAL PHARMACY: The student in this field studies pharmacy, chemistry, biology, accounting, business law, and related subjects; to prepare him not only to pass the examinations of state boards of pharmacy but to serve efficiently in all branches of practical drug-store work. As the commercial phases of pharmacy are rapidly becoming a dominant feature of the modern drug store, the student is encouraged to elect such courses as will best equip him for these activities.

PREPARATION FOR SCIENTIFIC PHARMACY: Students wishing to enter positions demanding intensive preparation in scientific subjects, together with basic training in pharmacy and related subjects, may prepare for technical positions in industry or for entry upon graduate study toward an advanced degree. In addition, they will be fully prepared for registration as pharmacists.

PHARMACY PREMEDICAL:¹ As Oregon State College is listed as an approved institution by the American Medical Association, a student by proper selection of electives can qualify in the period of four years for admission to a Class A medical school and for the degree of Bachelor of Arts or Bachelor of Science.

For admission to the study of dentistry the preliminary educational requirements are two years (ninety term hours) of preparation in liberal arts and sciences, including one year of English, general chemistry, biology or zoology, and physics, and one-half year of organic chemistry. The regular premedical program as explained above is recommended. If a student is interested in any specific medical or dental school, he should study current catalogs and other requirements of that institution.

Graduate Work. Candidates for the master's degree must hold a bachelor's degree in pharmacy from Oregon State College or its equivalent from another accredited institution. In addition, candidates must have attained a creditable scholastic average in their undergraduate work and must have determined upon a definite objective to be attained through the advanced work. Institutional requirements for the degrees of Master of Arts and Master of Science will be found under GRADUATE SCHOOL.

Four-Year Curriculum in Pharmacy

B.A., B.S. Degrees²

Freshman Year

	Term hours		
	F	W	S
English Composition (Eng 111, 112, 113) _____	3	3	3
General Chemistry (Ch 204, 205, 206) _____	5	5	5
Introduction to Pharmacy (Phr 115, 116, 117) _____	2	2	2
General Zoology (Z 201, 202, 203) or elective _____	3	3	3
Military Science _____	2	2	2
*Physical Education _____	1	1	1
	16	15	16

¹Programs are planned specifically to fit the needs of students who desire such combined training. Those who wish only to prepare for entry to a medical or dental school should register for the preprofessional program offered in the School of Science.

²The curriculum as outlined includes the necessary 36 term hours of science for a B.S. degree. If desired, the student may qualify for the B.A. degree by proper selection of elective courses in arts and letters and foreign language.

*General Hygiene (PE 150), 1 term hour for men, 2 term hours for women, is taken one term in place of physical education.

	Term hours		
	F	W	S
Sophomore Year			
Organic Chemistry (Ch 226, 227)	5	5	5
Quantitative Analysis (Ch 234)	4	—	—
Pharmaceutical Calculations (Phr 213)	—	4	4
Pharmaceutical Preparations (Phr 214, 215)	3	—	—
General Botany (Bot 201)	—	3	3
Pharmacognosy (PhP 332, 333)	3	3	3
Social science electives	2	2	2
Military Science	1	1	1
Physical Education	18	18	18
Junior Year			
Inorganic Pharmaceuticals (Phr 311)	4	—	—
Organic Medicinal Products (Phr 312, 313)	—	4	4
Pharmaceutical Preparations (Phr 321)	3	—	—
History of Pharmacy (Phr 322)	—	3	—
Prescription (Phr 323)	—	—	2
General Bacteriology (Bac 204)	3	—	—
Pharmaceutical Qualitative Analysis (PhA 321)	—	3	—
Elementary Physiology (Z 233)	—	—	5
Pharmaceutical Quantitative Analysis (PhA 327)	4	—	—
Professional electives	—	3	3
Nonprofessional electives	3	3	3
	17	16	17
Senior Year			
Prescription Compounding (Phr 454)	4	—	—
Prescription Compounding (Phr 455, 456)	—	3	3
Pharmacology (PhP 491, 492, 493)	3	3	3
First Aid (PE 358)	2	—	—
Toxicology (PhA 441)	—	3	—
Pharmacological Standardization (PhP 494)	—	—	3
Biological Products (PhP 495)	3	—	—
Proprietary Specialty Products (Phr 451)	—	3	—
Pharmacy Law (Phr 450)	—	—	3
Electives	3	3	3
	15	15	15

Pharmacy

IN THE Department of Pharmacy are offered elementary, basic, and advanced courses in theoretical pharmacy, pharmaceutical processes, and commercial pharmacy.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

Phr 115, 116, 117. **Introduction to Pharmacy.** 2 hours each term.

General survey of field of pharmacy, with emphasis on professional literature and fundamental principles and practices.

Phr 213. **Pharmaceutical Calculations.** 4 hours fall.

Weights and measures used in pharmacy; percentage and stock solutions; specific gravity; thermometers; etc. Three lectures; 1 three-hour laboratory period.

Phr 214, 215. **Pharmaceutical Preparations.** 4 hours each term, winter and spring.

Preparations of U. S. Pharmacopoeia and National Formulary. Prerequisite: Phr 213; Ch 205 or 103. Three lectures; 1 three-hour laboratory period.

UPPER-DIVISION COURSES

Phr 311. **Inorganic Pharmaceuticals.** 4 hours fall.

Inorganic chemicals and their preparations used in medicine. Students

- make samples of chemicals; test for impurities. Prerequisite: Ch 206. Three lectures; 1 three-hour laboratory period.
- Phr 312, 313. **Organic Medicinal Products.** 4 hours winter and spring.
Organic chemicals and their preparations used in medicine; correlation between chemical constitution and physiological action. Prerequisite: Phr 311, 321; PhP 333; Ch 227. Three lectures; 1 three-hour laboratory period.
- Phr 321. **Pharmaceutical Preparations.** 3 hours fall.
Continuation of Phr 215 which is prerequisite. Two lectures; 1 three-hour laboratory period.
- Phr 322. **History of Pharmacy.** 3 hours winter.
Evolution and development of profession from earliest times to present.
- Phr 323. **Prescription.** 2 hours spring.
The prescription as a document; methods of receiving, interpreting, compounding, and dispensing; ambiguities and incompatibilities. Prerequisite: Phr 311, 321; PhP 333; PhA 321; Ch 227.
- Phr 350, 351. **Manufacturing Pharmacy.** 3 hours winter and spring.
Problems involved in manufacturing drug and related products on industrial scale. Prerequisite: Phr 311, 321. One lecture; 2 three-hour laboratory periods.
- Phr 447, 448, 449. **Drug-Store Practices.** 3 hours each term.
Establishing a store, arrangement, salesmanship, showcase and window trimming, inventory, narcotic and poison records, taking prescriptions over telephone, etc. Prerequisite: Phr 313. Two lectures; 1 three-hour period.
- Phr 450. **Pharmacy Law.** 3 hours spring.
Oregon Pharmacy Law; promulgations of Oregon State Board of Pharmacy; Federal Food, Drug, and Cosmetic Act; Harrison Narcotic Act; other laws.
- Phr 451. **Proprietary Specialties Products.** 3 hours winter.
Preparations of pharmaceutical manufacturers; composition and therapeutic use. Text, *New and Nonofficial Remedies*, supplemented by literature and reports. Prerequisite: Phr 313.
- Phr 454. **Prescription Compounding.** 4 hours fall.
Theories of prescription compounding; management of prescription department. Prerequisite: Phr 323. Two lectures; 2 three-hour laboratory periods.
- Phr 455, 456. **Prescription Compounding.** 3 hours winter and spring.
Supervised compounding of a wide variety of prescriptions selected from current files of practicing pharmacists. Prerequisite: Phr 454. One lecture; 2 three-hour laboratory periods.

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

CCOURSES in drug analysis, qualitative and quantitative, are offered through the Department of Pharmaceutical Analysis. All the work is of upper-division or graduate character.

DESCRIPTION OF COURSES

UPPER-DIVISION COURSES

- PhA 321. Pharmaceutical Qualitative Analysis.** 3 hours winter.
Composition and identification of natural products, alkaloids, synthetic drugs, and newer remedies. Prerequisite: Ch 206, 227. Two lectures; 1 three-hour laboratory period.
- PhA 327. Pharmaceutical Quantitative Analysis.** 4 hours fall.
Quantitative determination of purity of more common official and unofficial drugs. Prerequisite: Ch 227, 234. Two lectures; 2 three-hour laboratory periods.
- PhA 361, 362, 363. Advanced Drug Analysis.** 3 hours each term.
Advanced quantitative methods, both chemical and physical. Students showing proficiency in this course may do special work in State Drug Laboratory. Prerequisite: Phr 311; PhA 327. One lecture; 2 three-hour laboratory periods.
- PhA 441. Toxicology. (G)** 3 hours.
Detection of common inorganic and organic poisons; emphasis on alkaloids and synthetics. Prerequisite: PhP 333, PhA 321, Ch 227. One lecture; 2 three-hour laboratory periods.

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 and PhP 507.

Pharmacology and Pharmacognosy

CCOURSES in the identification of medicinal plants, together with all courses dealing with the physiological action of drugs and their therapeutic value, are included in the Department of Pharmacology and Pharmacognosy. All the work is of upper-division or graduate character.

DESCRIPTION OF COURSES

UPPER-DIVISION COURSES

- PhP 331, 332, 333. Pharmacognosy.** 3 hours each term.
Official botanical, animal, and synthetic drugs; macroscopic identification.
- PhP 354, 355. Advanced Pharmacognosy.** 3 hours winter and spring.
Microscopy of vegetable and animal drugs; cultivation of drug plants. Prerequisite: PhP 333. One lecture; 2 three-hour laboratory periods.

PhP 454. Commercial Poisons. 3 hours.

Substances and materials used as commercial poisons; their composition, characteristics, and toxicities. Prerequisite: Ch 227, PhA 441.

PhP 491, 492, 493. Pharmacology. 3 hours each term.

Physiological action of drugs on human organism; toxicological aspects of poisonous drugs. Prerequisite: Phr 313, 321, PhP 333. Two lectures; 1 three-hour laboratory period.

PhP 494. Pharmacological Standardization. (G) 3 hours spring.

Biological assaying; methods of U. S. P.; certain unofficial but well-recognized procedures. Prerequisite: PhP 492, Ch 227, Bac 204, Z 233. One lecture; 2 three-hour laboratory periods.

PhP 495. Biological Products. 3 hours.

Official vaccines, serums, antitoxins, hormones, endocrine products, and other materials of biological origin. Prerequisite: Bac 204, Ch 227, Z 233.

GRADUATE COURSES

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

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

Conducted jointly with Phr 507 and PhA 507.

Military Science and Tactics

(Personnel Detailed from United States Army)

PROFESSOR SCOTT (Colonel, Field Artillery), Commandant.

ASSOCIATE PROFESSORS MURRAY (Lieutenant Colonel), Director of Artillery Unit; UTTERBACK (Major), Director of Engineer Unit; REYNOLDS (Lieutenant Colonel), Director of Infantry Unit; NANCE (Lieutenant Colonel), Director of Air Force Unit; OSTERMEIER (Lieutenant Colonel), Director of Signal Corps Unit.

ASSISTANT PROFESSORS BAILEY (Captain), Air Force Unit; REQUARTH (Lieutenant Colonel), Infantry Unit; FREED (Captain), Infantry Unit; SMITH (Captain), Infantry Unit; LUTZ (Captain), Artillery Unit; PAINTER (Major), Artillery Unit; BLODGETT (First Lieutenant), Signal Corps Unit; BRYAN (Major), Artillery Unit.

INSTRUCTORS HOLMES (Master Sergeant); KOEBRICK (Master Sergeant); JONES (Master Sergeant); SLOAN (Master Sergeant); SPRING (Master Sergeant); STAPLES (Master Sergeant); COX (First Sergeant); RIDGE (First Sergeant); WILSON (First Sergeant); WRIGHT (First Sergeant); ANDERSON (Master Sergeant); FORCE (Master Sergeant); CARLSON (Technical Sergeant); GWINN (Technical Sergeant); CONWAY (Technical Sergeant); YAEGER (Staff Sergeant); ROGINSON (Sergeant); DREIS (Master Sergeant); JOHNSON (Master Sergeant); WYNNE (Master Sergeant).

General Statement

INSTRUCTION in military tactics was started at Oregon State College about 1872 in conformity with a requirement of the Federal Land-Grant Act of 1862, under which the State College was established in 1868 as the land-grant institution of Oregon. History has shown that the average male between the ages of 18 and 60, at some time during his lifetime, regardless of the career for which he was trained and educated, has become a member of the military profession. The College has continued to agree to meet prescribed standards of training in order that its graduates might receive commissions as Reserve Officers in the Army of the United States who would be available as trained leaders and that its nongraduates might receive training that would be of benefit to them in the event of a national emergency. During World Wars I and II, the number of nongraduates and graduates who served with distinction in our armed forces gave proof of the high quality of their preparation for public service and of the value to the nation of such military instruction.

Reserve Officers' Training Corps. Oregon State College qualified under the provisions of the Act of Congress passed in 1916 which gave a greater measure of federal aid and recognition to military training at this institution. Civil colleges and universities, which are not essentially military, but which grant degrees to students at an average age of not less than 21 years, at which R.O.T.C. units are established, are classified as Senior Division R.O.T.C. institutions. The Senior Division R.O.T.C. program consists of two parts: (1) the *Basic Course*, and (2) the *Advanced Course*. Five branches of military training are offered at Oregon State College: Signal Corps, Infantry, Engineers, Air Force, and Field Artillery. An excellent R.O.T.C. band affords instruction in band practice.

Requirements. Military instruction is required in the freshman and sophomore years of all men students who are citizens of the United States, between the ages of 14 and 22 years inclusive at the time of enrollment in the R.O.T.C., physically qualified, and who successfully complete such general survey or screening tests as may be prescribed. Exemptions from military training are granted in the following cases: men who are 23 years of age or older; men who have served six months or more in the Army, Navy, Marine Corps, Air Force or Coast Guard; and transfer students who have had no previous military training and who have sufficient hours of credit accepted at Oregon State College so that they are within three years of graduation. R.O.T.C. band students enrolled in Mus 295, Band, are excused from the one hour weekly period scheduled for drill in order to free them for band rehearsals.

Objectives. The mission of the R.O.T.C. program is to produce, under a system of training based on appropriate Department of the Army or Department of the Air Force programs of instruction, junior officers who have the qualities and attributes essential to their progressive development as officers in the Army or Air Force of the United States. In general, the objectives of this mission are:

1. Qualification of selected students for appointment as junior officers in the Army or Air Force of the United States.
2. Education that will benefit the students who do not complete the entire course and at a later date become a member of the military service.
3. Education of all students in becoming better citizens and their part to be played in National security.

Basic Course. The first two years of military instruction requiring four hours a week constitute what is known as the Basic Course of the R.O.T.C. at Oregon State College. For each term 2 hours of academic credit is allowed. While students are assigned to the Infantry, Air Force, Signal Corps, Engineer, or Field Artillery unit, the major portion of their instruction is of a general type applicable to the Army as a whole and not specialized by Arm, Service, or Major Force. Students in the basic course receive no monetary allowances. Basic-course students are furnished a service type uniform which includes such items as shirts, shoes, socks, necktie, rain coat, etc. The uniform is worn one of the four hours of instruction per week and on other special occasions. The professor of military science and tactics may grant certificates of eligibility for entrance to an officer candidate school course to those especially qualified who have:

1. Completed the basic course.
2. Completed 2 years of college studies.
3. Do not intend to pursue their college studies further.

Such certificates are valid for a period of two years only.

Advanced Course. The third and fourth years of military instruction requiring five hours a week plus a summer camp constitute the Advanced Course of the R.O.T.C. Instruction is principally of a specialized type applicable to the Arm, Service, or Major Force concerned. The advanced camp consists of practical and theoretical military instruction of a specialized type and is of 6 weeks duration. Students will normally attend the camp between the two years of the advanced course.

Conditions for Enrollment in the Advanced Course. All students formally enrolled in the advanced course of the Senior R.O.T.C. must—

- a. Be selected by the professor of military science and tactics and the President of Oregon State College.

- b. Not have reached 27 years of age.
- c. Successfully complete such survey and general screening tests as may be prescribed.
- d. Have completed the basic course or received credit in lieu thereof for having had twelve months or more previous honorable active service in World War II, in the Army, Navy, Marine Corps, Coast Guard, or Air Force.
- e. Be a citizen of the United States.
- f. Be physically qualified under standards prescribed by the Department of the Army or 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.
- g. Be accepted by the College as a regularly enrolled student.
- h. Execute a written agreement with the Government to complete the Advanced Course, contingent upon remaining in school, and to attend the Advanced Camp at the time specified.

Utilization of Graduates of Scientific and Technical Curricula.

Though it is not practicable to maintain units of all the many branches at most colleges and universities, there will be students in scientific and technical courses whose services will be needed and who will wish to be commissioned in branches not represented by units on their campuses. The Department of the Army or the Department of the Air Force will make provisions for such advanced students to attend an R.O.T.C. camp of the appropriate branch and will tender them, if otherwise qualified, a commission in the appropriate branch within quota limitations.

Emoluments, Advanced Course. Students in the advanced course are paid at a daily rate equal to the value of the commuted ration (present value 79¢) for a total period not to exceed 570 days. It is proposed, if necessary legislation is enacted, to pay students in the Advanced Course the value of the commuted ration (79¢) per day plus an allowance in lieu of quarters and uniform at the rate of \$1.00 per day (total \$1.79). Any emoluments are in addition to benefits received through the G. I. Bill of Rights. Until the uniform legislation is passed, advanced students will be issued a complete officer type uniform. Students attending camp will be messed and quartered and will be paid at the rate prescribed for soldiers of the 7th grade (\$75.00 per month). A travel allowance from Oregon State College to camp and return to Oregon State College at the rate of 5 cents a mile will be authorized students attending the summer camp.

Academic Credit, Advanced Course. Three hours of academic credit is allowed for each term of the Advanced Course plus 6 credit hours for work done while at the Advanced Summer Camp. This will give a student 24 hours of academic credit earned in upper-division work which becomes a major and upon graduation he will have two co-majors, one of which will be military science.

Minimum Nonmilitary Requirements for a Commission. For a commission a student must meet the following minimum requirements:

1. He must have attained the age of 21 years.
2. He must have successfully completed 4 years of education at the college level.
3. In addition to his major in military science, he must have a co-major as follows:

- (a) For commission in the Engineer Corps, he must have a co-major in engineering (undergraduate engineering curriculum accredited at the institution by the Engineering Council for Professional Development).
- (b) For commission in the Air Force, he must have a co-major in any school or department at Oregon State College granting an academic degree.
- (c) For commission in the Field Artillery or Infantry, he must have a co-major in any school or department at Oregon State College granting an academic degree.
- (d) For commission in the Signal Corps, he must have a co-major in electrical, electronic or mechanical engineering, or physics.

COURSES IN INFANTRY

LOWER-DIVISION COURSES

MS 111, 112, 113. First-Year Basic Course. 2 hours each term.

Leadership, drill and exercise of command; world military situation; military organization; hygiene and first aid; individual weapons and marksmanship; maps and aerial photographs; National Defense Act and R.O.T.C.; scouting and patrolling; defense against chemical attack; orientation in naval operations; military courtesy and discipline.

MS 211, 212, 213. Second-Year Basic Course. 2 hours each term.

Leadership, drill and exercise of command; world military situation; maps and aerial photographs; scouting and patrolling; physical development methods; military administration; evolution of warfare; military law and boards; basic tactics of infantry squad crew served weapons of rifle company.

UPPER-DIVISION COURSES

MS 311, 312, 313. First-Year Advanced Course. 3 hours each term.

Leadership, drill, exercise of command; military leadership; psychology and personnel management; military problems of the United States; occupied territories; military law and boards; tactics and technique. (Communications, gunnery, technique of fire, fire control, motors and transportation, organization, tactics, the military team, troop movements.)

MS 314. Advanced Summer Camp. 6 hours.

Practical and theoretical instruction of a specialized type. Prerequisite: MS 313.

MS 411, 412, 413. Second-Year Advanced Course. 3 hours each term.

Command and staff; military teaching methods; psychological warfare; geographical foundation of national power; leadership, drill and exercise of command; combined and joint operation; military mobilization and demobilization; tactics and technique. (Communications, gunnery, technique of fire and fire control, new developments, supply and maintenance, tactics, troop movements.)

COURSES IN FIELD ARTILLERY

LOWER-DIVISION COURSES

MS 121, 122, 123. First-Year Basic Course. 2 hours each term.

World military situation; military organization; hygiene and first aid; drill, leadership and exercise of command; individual weapons and marksmanship; maps and aerial photos; National Defense Act and R.O.T.C.; tactics and technique of field artillery.

MS 221, 222, 223. Second-Year Basic Course. 2 hours each term.

World military situation; leadership, drill and exercise of command; physical development methods; maps and aerial photographs; military administration; evolution of warfare; military law and boards; tactics and technique of field artillery.

UPPER-DIVISION COURSES**MS 321, 322, 323. First-Year Advanced Course. 3 hours each term.**

Military leadership; psychology and personnel management; leadership, drill and exercise of command; military problems of the United States, occupied territories; military law and boards; tactics and technique. (Characteristics of materiel, barrel and breach mechanism, carriages, recoil mechanism, sighting and laying equipment, communications, firing battery, motors and transportation, observed fires, reconnaissance, selection and occupation of positions, gunnery, the military team, troop movements.)

MS 324. Advanced Summer Camp. 6 hours.

Prerequisite: MS 323.

MS 421, 422, 423. Second-Year Advanced Course. 3 hours each term.

Command and staff; military teaching methods; psychological warfare; geographical foundation of national power; leadership, drill and exercise of command; combined and joint operations; military mobilization and demobilization; tactics and technique. (Fire direction, infantry regiment, new developments, observed fires, special operations, supply and maintenance, tactics of field artillery, target location, troop movements, unobserved fires, reconnaissance, selection and occupation of positions.)

COURSES IN MILITARY ENGINEERING**LOWER-DIVISION COURSES****MS 131, 132, 133. First-Year Basic Course. 2 hours each term.**

World military situation; military organization; hygiene and first aid; leadership, drill and exercise of command; individual weapons; marksmanship; maps and aerial photographs; National Defense Act and R.O.T.C.; tactics and technique of the engineer corps; defense against chemical attack.

MS 231, 232, 233. Second-Year Basic Course. 2 hours each term.

World military situation; leadership, drill and exercise of command; maps and aerial photographs; military administration and supply; military law and boards; naval operations; evolution of warfare; tactics and technique of the Corps of Engineers.

UPPER-DIVISION COURSES**MS 331, 332, 333. First-Year Advanced Course. 3 hours each term.**

Military leadership, psychology and personnel management; leadership, drill and exercise of command; military problems of the United States, occupied territories; military law and boards; tactics and technique. (Bridge design, camouflage, combat principles, reconnaissance, explosives and demolitions, job management, roads, sketching, field fortifications, organization of engineer units, place of engineers in a military team.)

MS 334. Advanced Summer Camp. 6 hours.

Prerequisite: MS 333.

MS 431, 432, 433. Second-Year Advanced Course. 3 hours each term.

Command and staff; military teaching methods; psychological foundation of national power; leadership, drill and exercise of command; combined and joint operations, military mobilization and demobilization; tactics and technique. (Airborne and amphibious operations, construction and utilities, combat principles, estimate and orders, reconnaissance, communications, supply, river crossings, water supply.)

COURSES IN AIR FORCE

LOWER-DIVISION COURSES

MS 141, 142, 143. **First-Year Basic Course.** 2 hours each term.

Hygiene and first aid; individual weapons and marksmanship; military organization; world military situation; maps and aerial photographs; national defense act and R.O.T.C.; tactics and technique of the Air Corps; leadership, drill, and exercise of command.

MS 241, 242, 243. **Second-Year Basic Course.** 2 hours each term.

Physical-development methods; world military situation; maps and aerial photographs; military administration; evolution of warfare; military law and boards; tactics and technique of the Air Corps; leadership, drill, and exercise of command.

UPPER-DIVISION COURSES

MS 341, 342, 343. **First-Year Advanced Course.** 3 hours each term.

Military law and boards; occupied territories; military leadership; psychology and personnel management; military problems of United States; leadership, drill, and exercise of command; tactics and technique; communications; guided missiles; camouflage; aeronautics; transportation; supply; intelligence and combat orders; navigation; history of Air Corps; inspection systems; chemical warfare.

MS 344. **Advanced Summer Camp.** 6 hours. Prerequisite: MS 343.

MS 441, 442, 443. **Second-Year Advanced Course.** 3 hours each term.

Military teaching methods; psychological warfare; military mobilization and demobilization; command and staff; geographical foundations of national power; combined and joint operations; leadership, drill, and exercise of command; tactics and technique; communications; transportation.

COURSES IN SIGNAL CORPS

LOWER-DIVISION COURSES

MS 151, 152, 153. **First-Year Basic Course.** 2 hours each term.

Hygiene and first aid; individual weapons and marksmanship; military organization; world military situation; maps and aerial photographs; National Defense Act and R.O.T.C.; tactics and technique; leadership, drill and exercise of command.

MS 251, 252, 253. **Second-Year Basic Course.** 2 hours each term.

Physical development methods; world military situation; maps and aerial photographs; military administration; evolution of warfare; military law and boards; tactics and technique; leadership; drill and exercise of command.

UPPER-DIVISION COURSES

MS 351, 352, 353. **First-Year Advanced Course.** 3 hours each term.

Military law and boards; occupied territories; military leadership; psychology and personnel management; military problems of the United States; leadership, drill and exercise of command; tactics and technique; Signal Corps subjects.

MS 354. **Advanced Summer Camp.** 6 hours.

Practical and theoretical instruction of a specialized type. Prerequisite: MS 353.

MS 451, 452, 453. **Second-Year Advanced Course.** 3 hours each term.

Military teaching methods; psychological warfare; military mobilization and demobilization; command and staff; geographical foundations of natural power; combined and joint operations; leadership, drill and exercise of command; tactics and technique; Signal Corps subjects.

Naval Science

(Personnel detailed from the United States Navy)

PROFESSOR CAREY (Captain), Commanding Officer.

ASSOCIATE PROFESSOR CLAUDIUS (Commander), Executive Officer.

ASSISTANT PROFESSORS BRINKMAN (Captain, U.S.M.C.), KALEN (Lieutenant Commander), VAN ORDEN (Lieutenant).

INSTRUCTORS CLARK (Master Sergeant, U.S.M.C.), DUCKETT (Chief Boatswain's Mate), PARSONS (Chief Gunner's Mate), PILGRAM (Chief Quartermaster).

General Statement

UNDER the authority of a Federal Act on March 4, 1925, and amendments thereto, the Naval Reserve Officers' Training Corps was established as a college-training program for prospective Naval officers. The first units were established in 1926, and during the succeeding fifteen years 27 units were activated at major colleges and universities throughout the nation. During 1945, 25 additional units were commissioned, bringing the total to 52 Naval R.O.T.C. units. A unit is the total student enrollment in the Corps at any one civil educational institution. Average enrollment in each unit will be 270 students but will not be limited to this number. Instruction given at an institution in accordance with programs prescribed by the Navy Department is conducted or supervised by a Department of Naval Science. Instruction in Naval subjects is given by naval officers and men.

Oregon State College qualified for a Naval Reserve Officers' Training Corps unit under existing laws and regulations, and its unit was commissioned September 17, 1945.

Objectives. The mission of the Naval Reserve Officers' Training Corps at civil educational institutions is to develop the student morally, mentally, and physically, and to provide him with a basic knowledge of the naval profession, in order that he may become a capable junior officer in the U. S. Navy or Marine Corps, or be qualified for a commission in the Naval Reserve or Marine Corps Reserve on graduation. In general the objectives of the Department of Naval Science at a civil educational institution in carrying out the foregoing mission are:

1. To provide the student with a well-rounded course in basic naval subjects, which, in conjunction with a baccalaureate degree, will qualify him for a commission in the United States Naval Service.
2. To develop a knowledge of, and an interest in, Naval customs and traditions.
3. By precept and example, to develop a capacity for leadership.
4. To supplement the academic work of the school year by summer training cruises.

The program is designed to operate within the established educational framework of Oregon State College. The general objective is to provide basic naval education together with a relatively broad general education. Curricula leading to first baccalaureate degrees in the various schools are integrated within the scope of the N.R.O.T.C. as an agency to increase naval officer strength.

Types of Students. The N.R.O.T.C. Unit is composed of two types of students:

Regular students: These students are appointed Midshipmen, U.S.N.R. 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 two years after receiving commission, unless earlier released by the Navy Department. At the beginning of the third year after receiving commission, 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 nation-wide examination, which will be 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 College.

Contract students: These students are enrolled under the provisions of the prewar legislation, which remains in effect. They are uniformed at Government expense, and during their junior and senior years are paid one commuted ration a day (currently 80¢) while under instruction. They obligate themselves to complete the prescribed Naval Science curriculum, to make one summer cruise of approximately three weeks and to accept a commission on graduation as Ensign, U.S.N.R., or Second Lieutenant, U.S.M.C. They are not obligated to serve on active duty on receiving a commission.

Students in this group are selected by the Department of Naval Science at the College.

Requirements. *Every acceptable candidate*, whether applying as a regular or contract student, will:

1. Be a male citizen of the United States.
2. Be a regularly enrolled student in good standing at a college of which the N.R.O.T.C. 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 N.R.O.T.C. 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 N.R.O.T.C. 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 5½ inches, maximum 6 feet 4 inches. *Vision*, 20/20 each eye; color perception normal. *Weight*, in proportion to height. *Teeth*, a minimum

of 20 vital. Other physical requirements as prescribed by the Manual of the 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.

Every candidate for regular student and appointment as Midshipman, U.S.N.R., will, in addition to the requirements listed above, meet the following additional requirement: Agree, with the consent of his parent or legal guardian, to serve on active duty in the Navy or Marine Corps, after receiving commission, for a period of two years, unless sooner released by the Navy Department.

Status of Students. Students enrolled in the program will not be on active duty. They will be required to wear the uniform only for drills (one hour per week), on special occasions, and during the summer training cruises. They will be subject to naval discipline only at these times.

Academic Credit. Three hours of academic credit is granted each term for all naval science courses.

Curriculum. The program of study covers four years and fits into curricula leading to first baccalaureate degrees. It includes the following academic requirements:

1. Thirty-six term hours of Naval Science. Each N.R.O.T.C. student must be enrolled in at least one three-hour course in Naval Science each term until graduation.

2. One year of college physics, to be completed by the end of the sophomore year. This course is a necessary background for the courses in naval engineering (NS 411, 412, 413).

3. Mathematics courses through trigonometry, to be completed by the end of the sophomore year. This requirement is a necessary background for the courses in navigation (NS 311, 312, 313).

4. Proficiency in written and oral expression. (One year of English is considered adequate.)

5. Two years of physical education. Each student must qualify as a swimmer and should be instructed in lifesaving and resuscitation.

Recommended electives are:

1. A sequence in mathematics, extending through calculus, and including spherical trigonometry.

2. A second year of physical science, such as advanced electricity and elementary electronics, for other than engineering students.

3. A year sequence in Personnel Management.

4. A year sequence in the Foundations of National Power, or a comparable sequence approved by the academic authorities.

5. Two years of a foreign language (modern Romance, Germanic, Slavic, or Oriental), or demonstration to the academic authorities by examination that he possesses a good reading knowledge and can make an acceptable translation of one of the languages.

Naval science (including summer cruise) pursued for four years in one of the undergraduate curricula constitutes a co-major with many of the majors offered in degree-granting divisions or schools. In addition, the De-

partment of Naval Science and Tactics offers a four-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 need complete a major only in naval science. See curriculum below.

Information. Any additional information desired can be obtained through the office of the Professor of Naval Science either in person or by letter.

Curriculum in Naval Science

B.A., B.S. Degrees

Freshman Year

	Term hours		
	F	W	S
Naval Orientation and Seamanship (NS 111)	3	—	—
Seamanship and Communications (NS 112)	—	3	—
Ship Control and Naval Justice (NS 113)	—	—	3
Elementary Analysis (Mth 101, 102, 103)	4	4	4
Engineering Physics (Ph 101, 102, 103)	3	3	3
English Composition (Eng 111, 112, 113)	3	3	3
*Approved courses	3	3	3
Physical Education and General Hygiene	1	1	1
	17	17	17

Sophomore Year

Ordnance (NS 211)	3	—	—
Fire Control (NS 212)	—	3	—
Applied Naval Electronics (NS 213)	—	—	3
Differential and Integral Calculus (Mth 201, 202, 203)	4	4	4
English literature electives	3	3	3
*Approved courses	6	6	6
Physical Education	1	1	1
	17	17	17

Junior Year

Piloting (NS 311)	3	—	—
*Navigation (NS 312)	—	3	—
*Tactics (NS 313)	—	—	3
*Approved courses	10	10	10
Electives	3	3	3
	16	16	16

CRUISE

	Summer
*Third-Year Cruise (First Period) (NS 331)	3
*Third-Year Cruise (Second Period) (NS 332)	3

Senior Year

*Naval Machinery (NS 411)	3	—	—
*Naval Internal Combustion Engines (NS 412)	—	3	—
*Ship Construction and Stability (NS 413)	—	—	3
*Foundations of National Power (SSc 441, 442, 443)	3	3	3
*Approved courses	7	7	7
Electives	3	3	3
	16	16	16

*Approved courses are selected on either of two plans: (1) liberal emphasis—courses providing a strong minor in Business and Technology, Science, or other suitable school; (2) technical emphasis—courses providing a strong minor in Engineering.

*Beginning with the winter term of the junior year, Marine Corps students take the following courses in place of the Naval Science courses listed: Military History (NS 322), Military Principles (NS 323), Marine Tactics (NS 421), Combat Technique (NS 422), Amphibious Operations (NS 423).

*Credit hours earned on the third-year cruise count toward the 24 upper-division hours required for a Naval Science major. They will not satisfy elective requirements in any other curriculum.

*SSc 441, 442, 443 may be taken either in junior or senior year.

DESCRIPTION OF COURSES

LOWER-DIVISION COURSES

- NS 111. Naval Orientation and Seamanship. 3 hours.
NS 112. Seamanship and Communications. 3 hours.
NS 113. Ship Control and Naval Justice. 3 hours.
NS 211. Ordnance. 3 hours.
NS 212. Fire Control. 3 hours.
NS 213. Applied Naval Electronics. 3 hours.

UPPER-DIVISION COURSES

- NS 311. Piloting. 3 hours.
NS 312. Navigation. 3 hours.
NS 313. Tactics. 3 hours.
NS 322. Military History. 3 hours winter.
Offered for candidates for U. S. Marine Corps or U. S. Marine Corps Reserve.
NS 323. Military Principles. 3 hours spring.
Offered for candidates for U. S. Marine Corps or U. S. Marine Corps Reserve.
NS 331, 332. Third-Year Cruise. 3 hours each period.
Cruise on board Navy combatant ships during summer between junior and senior years. Two periods covering 3 hours credit each. Junior Officer of the Watch standing. Practical application of training received in previous Naval R.O.T.C. courses; further instruction in naval subjects; gunnery, navigation, seamanship, and engineering experience and training.
NS 411. Naval Machinery. 3 hours.
NS 412. Naval Internal Combustion Engines. 3 hours.
NS 413. Ship Construction and Stability. 3 hours.
NS 421. Marine Tactics. 3 hours fall.
Offered for candidate for U. S. Marine Corps or U. S. Marine Corps Reserve.
NS 422. Combat Technique. 3 hours winter.
Offered for candidate for U. S. Marine Corps or U. S. Marine Corps Reserve.
NS 423. Amphibious Operations. 3 hours spring.
Offered for candidate for U. S. Marine Corps or U. S. Marine Corps Reserve.

Division of Physical Education

Faculty

CLAIR VAN NORMAN LANGTON, Dr.P.H., Ed.D., Director of the Division of Physical Education.

ELIZABETH HEATH, B.S., Secretary to the Director.

Physical Education for Women

PROFESSOR SEEN (department head).

ASSOCIATE PROFESSORS MORRIS, THOMPSON.

ASSISTANT PROFESSORS MCALLESTER, BRAUNS, HUPPRICH.

INSTRUCTORS SCULLY, WEIR, GILL, MILLIKIN, BYERS.

Physical Education for Men

PROFESSORS LANGTON (director of division), KEENE (director of intercollegiate athletics), COLEMAN (head coach of baseball).

ASSOCIATE PROFESSORS ALLMAN, ADRION, BEGELMAN.

ASSISTANT PROFESSORS SWAN (head coach of track), STEVENS (coach of rowing), DIXON (assistant coach of football), RAABE (director of intramural sports).

INSTRUCTORS STINER (head coach of football), GILL (head coach of basketball), FLOOD, ANTONACCI, COX, DAILEY.

General Statement

ALL instruction and related activities in the fields of physical education and hygiene are administered by the Division of Physical Education. Close cooperation is maintained with the Student Health Service and other student-welfare agencies of the State College.

Lower-division and service courses in physical education are offered at the State College. By action of the State Board of Higher Education on March 7, 1932, all major work in the Oregon State System of Higher Education leading to baccalaureate and advanced degrees in physical education was confined to the School of Physical Education at the University, and lower-division work (instruction in the freshman and sophomore years) was assigned to both the University and the State College.

The lower-division work in physical education is essentially the same at both institutions. While it is recommended that students intending to major in physical education enter the institution at which major work is offered at the beginning of their freshman year, they may, if they wish, spend their freshman and sophomore years at the State College, and transfer to the University for their major work at the beginning of the junior year, without loss of credit and with fundamental requirements for upper-division standing fully met.

At both institutions, the lower-division program is intended not only to lay the foundation for specialization in physical education, but also to serve the needs of students majoring in other fields. In addition to the lower-division

work, the State College offers upper-division service courses in physical education.

Students who plan to minor in physical education at the State College or major at the University should confer with advisers in the office of the Department of Physical Education for Women or for Men, respectively.

Intramural Sports. Intramural sports are conducted by both Physical Education departments. The department for women has charge of all women's athletics, conducts for the students a broad program of intramural sports, and offers a recreational program for men and women. The department for men carries on extensive organized sports programs that are separate and apart from intercollegiate athletics.

The function of the program of intramural sports is to give every student the moral, social, physical, and educational values of competitive sports. Competition is organized between living organizations, clubs, individuals, classes, and institutional departments. The program of sports provides for both individual and team endeavor. "Athletics for all" is the purpose of intramural sports promotion.

Athletic Organizations. Athletic organizations for men include the Minor "O" and Varsity "O" associations and the honor societies, Sigma Alpha and Sigma Delta Psi. The Women's Athletic Association sponsors a program of competitive and recreational activities for women. The Orange "O" letter, the senior plaque, and election to Parthenia are honor awards.

Student Health Service. A medical examination is required of all entering students. The Student Health Service advises with the Physical Education departments 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.

Fees. The regular State College registration fee entitles every student to the use of gymnasium, pool, and showers, use of gymnasium 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.

Prerequisites for a Major. Students taking the first two years toward a major in physical education with the intention of transferring to the University of Oregon should take all prerequisite subjects and the freshman and sophomore technical subjects. On transfer to the University these courses are accepted and adjustments made so that requirements for a degree in physical education can be completed in the junior and senior years.

Minor in Physical Education. Students preparing for part-time teaching positions in physical education should take as a minor a minimum of 24-27 term hours of professional courses. On completion of the minor (see pages 269-270), the student may be recommended for a part-time teaching position in physical education in the high schools of the state.

Required Courses. All undergraduate men and women are required to take physical activity courses. Courses PE 114, 115, 116, PE 214, 215, 216 for women, and PE 151, 152, 153, PE 251, 252, 253 for men, are required

of all undergraduates. PE 150 (General Hygiene) is required of both men and women. For the Junior Certificate students are required to complete the following:

Freshman Year

Physical Education, 1 term hour each term for two terms. (Students in Nursing Education only, 1 hour each term for three terms.)

General Hygiene, 2 term hours for women, 1 term hour for men, for one term.

Sophomore Year

Physical Education, 1 term hour each term for three terms.

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, and all of the facilities of the department are at the student's disposal outside the regular class hours.

A broad program of physical-fitness recreation is emphasized. It involves the prevention of disease, the correction of remedial defects, good nutrition, muscular strength, endurance, basic motor skills, mental health, and morale.

The physical-activity courses for students taking a minor in physical education (PE 124-126, 224-226 for women; PE 174-176, 274-276 for men) may be considered as fulfilling the physical-education requirement for that year.

Elective Courses. Courses PE 314, 315, 316, PE 414, 415, 416 for women, and PE 351, 352, 353, PE 451, 452, 453 for men, may be taken to the amount of one hour per term for juniors and seniors and a total of not more than six term hours in addition to the regular physical-education requirement.

Description of Courses

SERVICE COURSES FOR WOMEN

LOWER-DIVISION COURSES

PE 150. General Hygiene. 2 hours any term.

Principles and practices of health promotion; individual and physiological hygiene; disease prevention and control; community hygiene and public health.

PE 250. Advanced Hygiene. 3 hours any term.

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.

PE 114, 115, 116. Freshman Physical Education. 1 hour each term.

Student is permitted to elect courses offered in basketball, volleyball, baseball, field hockey, soccer, field ball; archery, badminton, tennis, swimming, fencing, golf, riding; dancing; tumbling; mechanics of posture. Three periods.

PE 214, 215, 216. Sophomore Physical Education. 1 hour each term.

Same activities as in PE 114, 115, 116. Three terms required of all sophomore women. Three periods.

UPPER-DIVISION COURSES

- PE 314, 315, 316. **Junior Physical Education.** 1 hour each term.
Required of juniors. Same activities as in PE 114, 115, 116. Three periods.
Staff.
- PE 414, 415, 416. **Senior Physical Education.** 1 hour each term.
Required of seniors. Same activity as in PE 114, 115, 116. Three periods.
Staff.

SERVICE COURSES FOR MEN

LOWER-DIVISION COURSES

- PE 150. **General Hygiene.** 1 hour any term.
Principles and practices of health promotion, individual and physiological hygiene; disease prevention and control, community hygiene and public health.
- PE 250. **Advanced Hygiene.** 3 hours any term.
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.
- PE 151, 152, 153. **Elementary Physical Education.** 1 hour each term.
Physical activities taught not only for the acquisition of skill, but from the standpoint of their adaptation in the social life of the student. Student uses open hours and intramural sports for practice. Three periods.
- PE 251, 252, 253. **Advanced Physical Education.** 1 hour each term.
Required of sophomores. Three periods.

UPPER-DIVISION COURSES

- PE 351, 352, 353. **Physical Activities.** 1 hour each term.
A continuation of PE 251, 252, 253. Required of juniors. Three periods.
Staff.
- PE 451, 452, 453. **Physical Activities.** 1 hour each term.
A continuation of PE 351, 352, 353. Required of seniors. Three periods.
Staff.

PROFESSIONAL COURSES

LOWER-DIVISION COURSES

- PE 121, 122. **Introduction to Physical Education.** 3 hours fall and winter.
Modern developments of physical education in relation to general education; aims and objectives; history of physical education; practical considerations, program, physical plant, and personnel. Professors Coleman and Seen.
- SEd 123. **Introduction to Health Education.** 3 hours spring.
Historical background and underlying philosophy of health education; study of statistical facts that indicate need for health education; survey of modern practice in, and organization for, health education; opportunity for professional work in field. Associate Professor Morris.
- PE 124, 125, 126. **Physical-Education Laboratory.** 2 hours each term.
Intensive instruction in all the various activities that go to make up the physical-education program. Six periods.
- PE 174, 175, 176. **Technique of Physical Education.** 2 hours each term.
Laboratory course in methods, technique, and skills of activity usually found in a physical education program. Six periods. Staff.

- PE 224, 225, 226. **Physical-Education Laboratory.** 2 hours each term.
A continuation of PE 124, 125, 126 Six periods.
- PE 240. **Leadership of Party Games.** 2 hours fall or winter.
Study and practice of games for family recreation, parties, picnics, clubs, and community centers. Professor Seen.
- PE 274, 275, 276. **Technique of Physical Education.** 2 hours each term.
Laboratory course in methods, technique, and skills of activities usually found in a physical education program. Six periods. Staff.

UPPER-DIVISION COURSES

- PE 343, 344, 345. **Physical-Education Technique (Women).** 3 hours each term.
Technique of teaching dancing and sports; problems of directed teaching. Prerequisite: skill and knowledge standard in activities as determined by department. Five periods. Staff.
- PE 346. **Coaching of Basketball (Men).** 2 hours fall.
Coaching and training of basketball teams beginning with fundamentals, passing, dribbling, and pivoting; psychology of the game; various methods of defense and offense. Mr. Gill.
- PE 347. **Coaching of Football (Men).** 2 hours winter.
Football theory and practice, details of each position, training and managing, complete technique of developing offensive and defensive tactics, comparison of various systems in American intercollegiate football. Mr. Stiner.
- PE 348. **Coaching of Baseball (Men).** 2 hours spring.
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. Professor Coleman.
- PE 349. **Coaching of Track and Field (Men).** 2 hours spring.
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. Assistant Professor Swan.
- PE 350. **Organization and Administration of Intramural Sports.** 2 hours winter.
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. Professor Coleman.
- Ed 358. **Safety Education.** 3 hours.
Background and knowledge of all phases of safety; home, fire, industrial, water, rural, school, and traffic safety; elementary, secondary, and adult levels. Prerequisite: Ed 311, 312, 313. Assistant Professor Dixon.
- PE 358. **First Aid.** 2 hours any term.
Emergency treatment of all classes of injuries (until the doctor comes). Leads to standard Red Cross certificate. Open as a service course to all departments. Associate Professor Allman.
- PE 359. **First Aid.** 2 hours spring.
Continuation of PE 358. Leads to Red Cross advanced and instructor's certificates. Open as a service course to all departments. Prerequisite: PE 358. Associate Professor Allman.

- PE 361. Athletic Training and Conditioning (Men).** 3 hours winter.
Practical and theoretical aspects of massage, bandaging, treatment of sprains, bruises, strains, and wounds; diet and conditioning. Prerequisite: Z 210. Associate Professor Allman.
- Ed 361, 362, 363. Camp Education.** 3 hours each term.
Camp activities including handicrafts, camp crafts, nature, safety, waterfront, music, and dramatics with practical experience; counselor training including history, camp program, and problems; camp management, organization, and administration. Miss Millikin.
- PE 421. Principles of Physical Education.** (g) 3 hours fall.
General philosophy and principles of physical education and its relation to general education. Professors Langton and Seen.
- PE 422. Tests and Measurements in Physical Education.** (g) 3 hours winter.
Survey of the field; special study of typical tests, methods of scoring, principles of test building. Associate Professor Begelman.
- PE 423. Organization and Administration.** (g) 3 hours spring.
Administrative problems; organization of departments, organization of instructional and recreational programs, supervision of both teaching and physical plant and routine administration. Professors Langton and Seen.
- Ed 425. School and Community Club Work.** (G) 3 hours winter.
A survey of youth serving organizations; organization and leadership of school and community clubs. Professor Seen.
- Ed 426. Community Recreation.** (G) 3 hours.
Aims to give an understanding of the developing philosophy of recreation, trends, problems in organization and administration of a recreation program in large, small, and rural communities. Prerequisite: senior or graduate standing or consent of instructor. Professor Seen.
- Bac 425, 426. Community Health Problems.** (g) 3 hours each term.
Application of the principles of hygiene to sanitary, statistical, governmental, epidemiological, sociological problems. Prerequisite: junior or senior standing. Professor Langton, Associate Professor Morris.
- SEd 431, 432, 433. School Health Problems.** (G) 3 hours each term.
Maintenance of health of school children; communicable diseases; school sanitation; planning of school buildings; health of school child; hygiene of instruction. Prerequisite: Ed 311, 312, 313 and one year of upper-division biology. Professor Langton.
- PE 435. Nature, Function, and Organization of Play.** 3 hours spring.
Nature and function of play; adaptation of activities; program making. Playground instruction management and supervision.
- SEd 441, 442, 443. Health Education.** (G) 3 hours fall.
Philosophy and principles of health education; organization and administration; health instruction and its use in secondary schools and in adult health education. Prerequisite: Ed 311, 312, 313 and one year upper-division biology. Associate Professor Morris.
- Bac 453. Epidemiology.** 3 hours spring.
Causes and behavior of communicable diseases in general population; factors influencing occurrence of epidemics; basic principles underlying control. Prerequisite: Bac 205 or equivalent. Professor Langton.

GRADUATE SERVICE COURSES

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

Graduate School

WILLIBALD WENIGER, Ph.D., Dean of the Graduate School.

IRVA TIDD, Secretary.

Graduate Council

WILLIBALD WENIGER (chairman), C. H. BARNES, FLORENCE BLAZIER, P. M. BRANDT, R. COLBY, J. F. CRAMER, G. E. CROSSEN, S. H. GRAF, D. C. MOTE, E. A. YUNKER, F. R. ZERAN.

Graduate Committees

Science: D. C. MOTE (chairman), W. B. BOLLEN, S. M. DIETZ, E. J. DORN-FELD, E. C. GILBERT, W. E. MILNE, W. D. WILKINSON, S. E. WILLIAMSON, E. A. YUNKER.

Agriculture: P. M. BRANDT (chairman), D. B. DeLOACH, HENRY HARTMAN, E. H. WIEGAND.

Education: F. R. ZERAN (chairman), O. R. CHAMBERS, R. J. CLINTON, G. B. COX, H. R. LASLETT.

Engineering and Industrial Arts: S. H. GRAF (chairman), G. W. GLEESON, F. O. McMILLAN, C. A. MOCKMORE.

Forestry: G. H. BARNES (chairman), J. B. GRANTHAM, H. R. PATTERSON.

Home Economics: FLORENCE BLAZIER (chairman), VERA H. BRANDON, GEORGIA C. BIBEE, MAY DuBOIS, MARGARET L. FINCKE, ALMA C. FRITCHOFF.

Pharmacy: G. E. CROSSEN (chairman).

General Studies: E. A. YUNKER (chairman), R. E. DIMICK, K. J. GORDON, H. R. PATTERSON, J. W. SHERBURNE, W. D. WILKINSON.

Graduate Minors in Nonmajor Fields: RALPH COLBY (chairman), R. K. CAMPBELL, G. A. BAKKUM, J. W. ELLISON, M. N. NELSON, J. A. PFANNER.

Graduate Faculty

DEPARTMENTS OFFERING MAJORS FOR MASTER AND DOCTORAL DEGREES*

Agricultural Economics: PROFESSORS DeLOACH, POTTER; ASSOCIATE PROFESSOR UPCHURCH.

Agricultural Education: PROFESSOR GIBSON.

Agricultural Engineering: PROFESSORS PRICE, RODGERS, SINNARD; ASSOCIATE PROFESSORS CROPSEY, LUNDE; ASSISTANT PROFESSOR WOLFE.

Animal Husbandry: PROFESSORS BOGART, MCKENZIE, NELSON; ASSOCIATE PROFESSORS OLIVER, WEIR.

* All major departments offer graduate minors as well as majors.

- Bacteriology and Hygiene:** PROFESSORS COPSON, ELLIKER, LANGTON, SIMMONS; ASSOCIATE PROFESSORS BOLLEN, MORRIS.
- Botany:** PROFESSORS ATWOOD, HANSEN, DIETZ, GILKEY; ASSOCIATE PROFESSORS ROTH, SANBORN, SMITH; ASSISTANT PROFESSOR PHINNEY.
- Chemical and Metallurgical Engineering:** PROFESSORS CALDWELL, GLEESON, WALTON; ASSOCIATE PROFESSOR SCHULEIN; ASSISTANT PROFESSORS CLAPP, ROSS.
- Chemistry:** PROFESSORS BUTTS, CALDWELL, CHRISTENSEN, FRIEDMAN, GILBERT, GILFILLAN, JONES (emeritus), KURTH, MEHLIG, PEASE; ASSOCIATE PROFESSORS CHELDELIN, SPITZER; ASSISTANT PROFESSORS SCOTT, WILLIAMS.
- Civil Engineering:** PROFESSORS GLENN, HOLCOMB, MERRYFIELD, MOCKMORE, WANLESS; ASSOCIATE PROFESSOR WATERMAN.
- Commercial Education:** PROFESSOR YERIAN; ASSOCIATE PROFESSOR STUTZ.
- Dairy Husbandry:** PROFESSORS BRANDT, JONES, WILSTER; ASSISTANT PROFESSOR WOLBERG.
- Education:** PROFESSORS CLINTON, CRAMER (General Extension Division), GOODE, LASLETT, WARRINGTON, ZERAN; ASSOCIATE PROFESSORS L. KAPLAN (Oregon College of Education), STEVENS (General Extension Division); ASSISTANT PROFESSORS REICHART, WELLS; VISITING LECTURER M. A. STEINER; CURRICULUM DIRECTOR H. B. JOHNSON (Salem Public Schools).
- Electrical Engineering:** PROFESSORS ALBERT, McMILLAN, STARR; ASSOCIATE PROFESSORS COCKERLINE, FEIKERT, KOFOID, NICHOLS; ASSISTANT PROFESSORS WITTKOPF, WOOSTER.
- Entomology:** PROFESSORS MOTE, SCULLEN; ASSOCIATE PROFESSORS CHAMBERLIN, MARTIN.
- Extension Methods:** PROFESSORS MORRIS (General Extension Division), TEUTSCH (Federal Cooperative Extension).
- Farm Crops:** PROFESSORS FORE, HILL; ASSOCIATE PROFESSOR FINNELL.
- Farm Management:** PROFESSOR MUMFORD; ASSOCIATE PROFESSORS BLANCH, KUHLMAN.
- Fish and Game Management:** PROFESSOR DIMICK; BIOLOGIST EINARSEN; INSTRUCTOR KUHN.
- Food Technology:** PROFESSOR WIEGAND; ASSOCIATE PROFESSOR ONSDORFF; ASSISTANT PROFESSORS LITWILLER, NIVEN, WORTHINGTON.
- Foods and Nutrition:** PROFESSORS FINCKE, WILLIAMS (emeritus); ASSOCIATE PROFESSORS KOLSHORN, STORVICK; ASSISTANT PROFESSORS GARRISON, MACPHERSON.
- Industrial Engineering and Industrial Arts:** PROFESSOR COX; ASSOCIATE PROFESSORS ENGESSER, MEYER; ASSISTANT PROFESSORS DAHLBERG, HAHN, ROBLEY.
- General Science:** PROFESSOR HANSEN.
- Geology:** PROFESSORS ALLISON, HODGE, PACKARD, WILKINSON.

Home Economics Education: PROFESSORS BLAZIER, SAGER; ASSOCIATE PROFESSOR DUBOIS.

Home Economics Research: PROFESSOR WILSON.

Horticulture: PROFESSORS BOUQUET, DURUZ, HARTMAN; ASSOCIATE PROFESSORS HANSEN, ZIELINSKI.

Household Administration: PROFESSORS BRANDON, MILAM, PRENTISS, READ; ASSOCIATE PROFESSOR VAN HORN; ASSISTANT PROFESSORS WIGGENHORN, WISE.

Industrial Education: PROFESSOR COX.

Institution Economics: PROFESSOR BIBEE; ASSISTANT PROFESSORS CLEVELAND, MULHERN.

Mathematics: PROFESSORS BEATY (emeritus), MCALISTER (emeritus), MILNE, WILLIAMS; ASSOCIATE PROFESSORS CLARK, HOSTETTER, KIRKHAM; ASSISTANT PROFESSORS LI, POOLE, SAUNDERS.

Mechanical Engineering: PROFESSORS GRAF, HUGHES, MARTIN, PAUL, RUFFER, SLEGEL, THOMAS; ASSOCIATE PROFESSORS BAKER, HEATH; ASSISTANT PROFESSORS PAASCHE, POPOVICH.

Physics: PROFESSORS BOYNTON (emeritus), BRADY, WENIGER, YUNKER; ASSOCIATE PROFESSORS DEMPSTER, VARNER, VINYARD; ASSISTANT PROFESSORS GARMAN, MORGAN; INSTRUCTORS CHURCH, DAY, DECKER.

Poultry Husbandry: PROFESSORS PARKER; ASSOCIATE PROFESSORS BERNIER, COONEY; ASSISTANT PROFESSOR HARPER.

Science Education: ASSOCIATE PROFESSOR WILLIAMSON.

Soils: PROFESSORS POWERS, RUZEK, STEPHENSON.

Veterinary Medicine: PROFESSORS DICKINSON, SHAW; ASSOCIATE PROFESSOR SCHNAUTZ.

Zoology: PROFESSORS GORDON, WULZEN; ASSOCIATE PROFESSORS ALLMAN, DORNFELD, OSBORN (emeritus), PRATT; ASSISTANT PROFESSOR HILLEMANN.

DEPARTMENTS OFFERING MAJORS FOR MASTER DEGREES ONLY*

Clothing, Textiles, and Related Arts: PROFESSOR FRITCHOFF; ASSOCIATE PROFESSORS GATTON, PATTERSON, STRICKLAND.

Forest Engineering: PROFESSOR PATTERSON; ASSOCIATE PROFESSOR DAVIES.

Forest Products: PROFESSOR PROCTOR; ASSOCIATE PROFESSOR GRANTHAM; ASSISTANT PROFESSOR WEST.

Forest Management: PROFESSORS DUNN, McCULLOCH; ASSOCIATE PROFESSORS BARNES, NETTLETON; ASSISTANT PROFESSORS DILWORTH, KENISTON, ROBINSON; INSTRUCTOR HAYES.

Pharmacy: PROFESSOR CROSSEN.

* All major departments offer graduate minors as well as majors.

DEPARTMENTS OFFERING COURSES APPLICABLE TOWARD
GRADUATE MINORS ONLY*

Business Administration: ASSOCIATE PROFESSORS CAMPBELL, PFANNER;
ASSISTANT PROFESSORS CHRISTIANSEN, CRAIG, NEWTON; INSTRUCTOR HUN-
DERUP.

Economics: PROFESSORS DREESEN (emeritus), NELSON; ASSOCIATE PROFESSOR
VATTER; ASSISTANT PROFESSOR BOWEN.

Philosophy and Religion: PROFESSOR WARRINGTON; ASSISTANT PROFESSOR
WELLS.

Physical Education: PROFESSORS LANGTON, SEEN; ASSOCIATE PROFESSOR
BEGELMAN.

Political Science: ASSOCIATE PROFESSORS SWARTHOUT, SWYGARD.

Psychology: PROFESSORS CHAMBERS, SHERBURNE.

Sociology: PROFESSOR BAKKUM.

COLLEGE CURRICULUM STUDIES

Supervised by Curriculum Council (see page 402): PROFESSORS COLBY,
DELOACH, GOODE, MILNE, ORDEMAN, PRICE, SHERBURNE; ASSOCIATE PRO-
FESSORS LARSE, VAN HORN.

General Statement

IN the disciplines of undergraduate education the primary aim is to prepare the student for cultured living and intelligent citizenship, and in techniques leading to a professional career. In graduate study the dominant aim is the development of the scholar, capable of original thinking and of creative achievement in the advancement and extension of knowledge. Hence a graduate degree indicates more than the mere completion of a prescribed amount of advanced study; it indicates that the student has shown both promise and performance in the field of independent scholarship. All study beyond the bachelor's degree 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 faculty includes all faculty members who have been authorized to conduct courses carrying graduate credit.

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. To the Graduate School was also assigned the administration of general research (see page 403).

* All major departments offer graduate minors as well as majors.

Advanced Degrees

Oregon State College offers graduate work leading to advanced degrees in the biological sciences, the physical sciences (including mathematics), and the professional and technical fields of agriculture, education, engineering, forestry, home economics, and pharmacy. The degrees granted, and the fields in which programs of study leading to the respective degrees are offered, are listed below:

Doctor of Philosophy: Agriculture, Bacteriology and Hygiene, Botany, Chemistry, Engineering, Entomology, Geology, Home Economics, Mathematics, Physics, Zoology.

Doctor of Education: Education.

Master of Arts (Departmental): Bacteriology and Hygiene, Botany, Chemistry, Education, Engineering, Entomology, Geology, Home Economics, Mathematics, Pharmacy, Physics, Zoology.

Master of Arts (General Studies).

Master of Science: Agriculture, Bacteriology and Hygiene, Botany, Chemistry, Education, Engineering, Entomology, Forestry, Geology, General Science, Home Economics, Mathematics, Pharmacy, Physics, Zoology.

Master of Education: Education.

Master of Forestry: Forest Engineering, Forest Management, Forest Products.

Engineer:

<i>Degree</i>	<i>Department</i>
Chemical Engineer (Ch.E.)	Chemical and Metallurgical Engineering
Civil Engineer (C.E.)	Civil Engineering
Electrical Engineer (E.E.)	Electrical Engineering
Forest Engineer (F.E.)	<div style="display: inline-block; vertical-align: middle;"> <div style="display: inline-block; vertical-align: middle;">{</div> <div style="display: inline-block; vertical-align: middle;"> Forest Engineering Forest Management Forest Products </div> </div>
Mechanical Engineer (M.E.)	Mechanical Engineering
Metallurgical Engineer (Met.E.)	Chemical and Metallurgical Engineering
Mining Engineer (Min.E.)	Chemical and Metallurgical Engineering

A major may be selected from among several fields within a department or may involve two or more related departments. The scope of the departments and schools is indicated in the descriptions on earlier pages.

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 in the fourth class register for the courses they desire and for which they are prepared, with the understanding that the institution is under no implied obligation to accept credit earned as credit toward a degree.

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) an admission blank 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. 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 the Graduate Record Examination 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.

Admission to Candidacy for an Advanced Degree. Admission to candidacy for an advanced degree is granted only after the student has demonstrated, by passing qualifying examinations, the thoroughness of his previous preparation and his ability to do work of graduate character.

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 toward a master's degree at this institution by petitioning for this privilege when applying for graduation in their senior year.

Preparation Required for Graduate Study. 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.

Study Program and Load. Graduate students beginning studies toward a degree will be expected to work out, in tentative form at least, a complete program leading toward the degree desired. This program should allow sufficient time for completion of the thesis. Work on the thesis should be begun as early as possible.

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 is 15 term hours.

The graduate program of each candidate should include a substantial amount of work with at least three faculty members offering graduate instruction.

Grade Requirement. A grade-point average of 3.00 (a B average) is required for every graduate degree. Grades below C are not accepted for graduate credit.

Graduate Courses. All courses numbered in the 500s carry graduate credit, as do those in the 400s which have been approved by the Graduate Council. Approved courses in the 400s are designated in the catalog by (G) or (g) following the course title. Courses designated (G) may form a part of either a major or a minor; courses designated (g) may be taken toward a minor only. Graduate students taking courses in the 400s are expected to do work of a higher order than the work of undergraduate students in the same courses.

Fees and Deposits. Graduate students do not pay the nonresident fee, but if registered for seven term hours of work or more pay a fee of \$39.00 a term. If registered for six term hours or less, they pay the regular part-time fee (see page 75), which varies according to the number of term hours for which the student is registered. Payment of the graduate fee entitles the student to all services maintained by the State College for the benefit of students.

Graduate students must make a \$5.00 deposit once each year at the time of first registration. See page 75.

Master of Arts and Master of Science

Credit Requirement. For the departmental Master of Arts or Master of Science degrees, 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.

Of the 45 term hours a maximum of 6 hours earned under "in absentia" registration may be included; not to exceed 15 term hours earned through the General Extension Division may be included (except in the case of the Ed.M. and the M.A. in General Studies as described under GRADUATE WORK AT THE PORTLAND CENTER, page 401); no correspondence credits may be included.

Residence Requirement. For all master degrees the residence requirement is one academic year of full-time study, or equivalent. Work taken in summer sessions will count toward the satisfaction of the residence requirement. Students who have taken graduate work at another institution may lighten their load by transferring credit; but transferred credit will not shorten the residence requirement to less than one academic year. 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 of 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. (See also "Time Limit," page 397.)

Language Requirements. For the Master of Arts degree, the student must show, by examination or by adequate undergraduate courses, a reading

knowledge of one foreign language, preferably French or German. By petition to the Graduate Council, a student may be permitted to substitute another language, if it is equally relevant to his program of graduate studies. For the Master of Science degree there is no foreign-language requirement, unless a language is needed in the individual student's program.

Course Requirements. For the Master of Arts (departmental) and Master of Science degrees at least one year sequence in the 500-599 series (normally of seminar or research nature and for approximately 3 hours of credit per term) is required.

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) must be completed within a period of ten years, but work taken more than seven years before the program is completed must be validated under the supervision of the department, usually by assigned readings or examination, or both.

Qualifying Examination. A student wishing to become a candidate for a master's degree is given a qualifying examination designed to test his basic training and his ability to pursue studies at the graduate level in his chosen field. This examination may be oral or written or both. It must be taken before the student has completed 15 term hours of graduate work. In lieu of their own qualifying examination, departments may accept a satisfactory showing in the Graduate Record Examination. If satisfactory knowledge and ability are demonstrated, the student is formally advanced to candidacy for the degree sought, subject to the approval of the dean of the Graduate School.

Qualifying examinations are scheduled jointly by the department or school and the graduate office; a list of scheduled examinations is compiled at the beginning of the fall term and the beginning of the summer session, and is available at the graduate office.

A graduate of Oregon State College who has maintained a grade-point average in his major and minor fields of at least 3.25 throughout his undergraduate work may be exempted from taking the qualifying examinations.

Thesis. Every candidate for a master's degree must file in the office of the Graduate School three copies of an accepted thesis, and five copies of an abstract of the thesis not less than two weeks before the date of the final examination. Every thesis for a master's degree must have the approval of the major professor and the graduate committee of the school in which the candidate is majoring, before being filed with the Graduate School.

The credit allowed for the thesis, including the research and the preparation of the manuscript, varies from 6 to 12 term hours.

The three copies of the thesis are filed unbound. Two are bound at the expense of the State College and are deposited in the Library. The third copy becomes the property of the major department. One of the Library copies is available for general circulation (unless it contains restricted material).

Full information concerning the prescribed style for theses may be obtained on request at the office of the Graduate School.

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 examination 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 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 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 for his program.

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 nine term hours of course work. A committee may, on recommendation of the student's adviser, waive the foreign-language requirement.

The general-studies program at the 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 State College schools and departments, the following courses are available for the general-studies student:

GSt 501. Research in General Studies. 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.

Master of Education. The Master of Education is a professional degree, and satisfactory teaching experience is required. Prior to the completion of 15 term hours of graduate work the student must pass a qualifying examination. 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 credit through the General Extension Division, but a minimum of 8 term hours must be earned on the Corvallis campus; this can be done in one summer session.

With the assistance of the graduate committee the candidate must select courses in the following areas: the learner and the learning process, 9 hours; administrative or personnel aspects, 3 hours; history or philosophy of education, 3 hours; evaluation techniques and devices, 3 hours; a minor in a special area of education or in a subject-matter field, 15 hours.

In addition the candidate must qualify under either of the following plans: (a) He submits a thesis dealing with some applied or professional aspect of education. The thesis must meet all the standards for a master's thesis. For the thesis from 6 to 12 term hours of credit are allowed. (b) He completes a course in Research and Scientific Method, 3 term hours; he submits two acceptable papers on assigned or approved topics, 6 term hours. Two copies of each paper, prepared according to thesis form, will be deposited in the Graduate Office for transmission to the Library and one in the office of the School of Education.

Master of Forestry. The general requirements for the professional degree of Master of Forestry are the same as those for the Master of Science. The program of study is designed, however, not primarily for the research worker, but for the administrator. The thesis for the M.F. degree must be an original study showing the application of professional knowledge to the accomplishment of a specific practical objective.

Engineer

For the degree of Chemical Engineer, Civil Engineer, Electrical Engineer, Forest Engineer, Mechanical Engineer, Metallurgical Engineer, and Mining Engineer, the candidate must hold a baccalaureate or master's degree in the corresponding field of engineering from Oregon State College, must have had at least five years of successful professional practice following graduation, and must present a satisfactory thesis. Before January 1 of the academic year in which the degree is desired, the candidate submits to the head of the department in which his major interest lies a complete statement of his professional experience since receiving the bachelor's degree. If the statement is approved, after it has been examined by the head of the department, the school graduate committee, and the Graduate Council, the candidate is instructed to prepare and submit his thesis. The thesis must be of high order and is subject to the same scrutiny and regulations as other graduate theses. Upon acceptance of the thesis the candidate is recommended for the degree in the usual manner. The candidate registers for the degree with the State College Registrar, either in person or by mail, not later than March 1, and pays the thesis examination fee of \$10.00. After his thesis has been accepted he pays the usual graduation fee of \$6.50.

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.

The Ed.D. degree requires three years of graduate study and is granted primarily for attainments and proved ability. Successful teaching experience is essential. There is no rigid credit requirement, but the total number of term hours of graduate credit including thesis will 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. Foreign languages are required if necessary in the dissertation problem.

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.

The student working toward the Ph.D. degree chooses a major and, subject to the approval of his major professor, two minor lines of study. If the major department offers several distinct lines of study, one minor may lie in that department. With the assistance of an advisory committee nominated by the major school or department and approved by the dean of the Graduate School, the student outlines a program devoting approximately sixty per cent of his time to the major, including thesis, and approximately forty per cent to the minors.

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 are required, of which at least one year (usually the last) must be spent in residence at Oregon State College.

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 one academic year before he expects to receive the degree. Advancement to candidacy is contingent on passing these examinations.

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. Another foreign language may, with the approval of the Graduate Council, be substituted for either French or German if, in the opinion of the student's advisory committee, it will be of more value in his program.

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 investigations. 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.

Three copies of the thesis and five copies of an abstract must be deposited, unbound, in the graduate office not less than one week before the time set for the final examination.

Final Examination. The final examination for the degree of Doctor of Philosophy may be written in part, but must include an oral examination, usually of three hours' duration. The oral examination is open to all members of the faculty and to advanced graduate students. The 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 and other members, including at least one not directly connected with the major and minor departments. The committee is nominated by the major department or school, subject to the approval of the dean of the Graduate School. Five members of the examining committee are designated to read the thesis and determine its acceptability. 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.

Assistantships, Scholarships, and Fellowships

AVARYING 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 positions are expected to register in the Graduate School, and to become candidates for advanced degrees. Assistants and fellows pay

fees amounting to \$17.50 per term, which admits them to all services maintained by the State College for the benefit of students. Application should be made before March 15. Application blanks are furnished, on request, by the Graduate School.

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 for a graduate assistant varies from \$660 to \$810. Reappointment may be made for one additional year.

A part-time graduate assistant receives half the stipend and has half the duties. He may register for 15 term hours of work.

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 \$900 to \$1,200.

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 the State College, on official blanks furnished by his office, and must be filed before April 1.

Other Scholarships and Fellowships. A number of scholarships are available for graduate students. These are described under SCHOLARSHIPS AND FELLOWSHIPS, pages 88-94.

Graduate Work at the Portland 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 the Portland Center. Of the 45 term hours of work required for the Master of Education degree, 37 hours may be earned in Portland. In a number of fields, one-third of the work for the Master of Arts (departmental) or the Master of Science degree may be earned in Portland. Graduate work beyond the master's degree is not offered at the Portland Center, except that in some instances arrangements may be made for a limited number of hours credit toward the Ed.D. degree. 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.

College Curriculum Studies

Supervised by College Curriculum Council

RALPH COLBY, DANIEL BARTON DELOACH, DELMER MORRISON
GOODE (secretary), LLOYD Q LARSE, WILLIAM EDMUND MILNE
(chairman), DANIEL THOMAS ORDEMAN, FREDERICK EARL
PRICE, JAMES WILSON SHERBURNE, EDNA MARJORIE VAN
HORN.

COLLEGE curriculum studies are a part of the effort of Oregon State College to improve its educational program. Certain studies are carried on under the general supervision of the Curriculum Council, composed of members appointed by the President; in addition, each dean of a school or other division of instruction, ex officio, sits as a member of the council whenever matters affecting his school or division are under consideration.

The appointed members are responsible for initiating and promoting studies and projects designed to further the interests of Oregon State College as a whole; the ex officio members aid in relating studies and projects to the interests of the schools.

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.

These courses are carried on under the immediate charge of coordinating committees of three or more members selected according to the nature of the studies and the personnel of the group. A member of the Curriculum Council is ex officio chairman of each coordinating committee.

DESCRIPTION OF COURSES

GRADUATE COURSES

CC 505. Reading and Conference. 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.

Research

ADVANCEMENT of human knowledge and technical and technological service to the commonwealth are recognized functions of institutions of higher learning. Research at Oregon State College is encouraged and assisted by several institutional agencies, including the General Research fund, the Agricultural Experiment Station, the Engineering Experiment Station, and the Oregon Forest Products Laboratory. Problems for the Government, for industry, or other sponsors, are undertaken on special contract.

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 (see page 390) 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 assistant or fellow. 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 during the last month of each term. Productive problems may receive assistance for several years.

Agricultural Experiment Station

WILLIAM ALFRED SCHOENFELD, M.B.A., Director of the Agricultural Experiment Station.

RALPH STEPHEN BESSE, M.S., Assistant Director of the Agricultural Experiment Station.

ROBERT WESLEY HENDERSON, B.S., Assistant to the Director.

ROBERT M. ALEXANDER, B.S., Assistant to the Director.

MARY HOLTHOUSE, B.S., Accountant, Agricultural Experiment Station.

DIVISION OF AGRICULTURAL ECONOMICS

ERMINE LAWRENCE POTTER, M.S., Agricultural Economist; In Charge, Division of Agricultural Economics.

Agricultural Economics

DANIEL BARTON DELOACH, Ph.D., Agricultural Economist.

HAROLD FULLER HOLLANDS, Ph.D., Agricultural Economist.

GEORGE BALFOUR DAVIS, M.S., Assistant Economist.

CHARLES MEREL FISCHER, M.S., Research Assistant.

CHARLES WILLIAM VROOMAN, M.S., Research Assistant.

JOHN DAVID ROWELL, B.S., Experiment Station Fellow.

Farm Management

DWIGHT CURTIS MUMFORD, M.S., Economist in Charge.
 GUSTAV WESLEY KUHLMAN, Ph.D., Associate Economist.
 GRANT E. BLANCH, Ph.D., Associate Economist.
 EDGAR A. HYER, Ph.D., Assistant Economist.
 MANNING H. BECKER, M.S., Research Assistant.

DIVISION OF ANIMAL INDUSTRIES

PHILIP MARTIN BRANDT, A.M., Dairy Husbandman; In Charge, Division of Animal Industries.

Animal Husbandry

FREDERICK FRANCIS MCKENZIE, Ph.D., Animal Husbandman in Charge.
 ORAN MILTON NELSON, M.S., Animal Husbandman.
 RALPH BOGART, Ph.D., Animal Husbandman.
 ALFRED WEAVER OLIVER, M.S., Associate Animal Husbandman.
 WILLIAM CARL WEIR, Ph.D., Associate Animal Husbandman.
 JOE BONNER JOHNSON, B.S., Assistant Animal Husbandman.
 WALTER GEORGE CADMUS, M.S., Research Assistant.
 CHARLES C ADAMS, JR., B.S., Experiment Station Fellow.
 SZU HSIAO WU, B.S., Experiment Station Fellow.
 WILLIAM OUSTERHOUT, B.S., Experiment Station Fellow.

Dairy Husbandry

GUSTAV HANS WILSTER, Ph.D., Dairy Husbandman.
 IDWAL RALPH JONES, Ph.D., Dairy Husbandman.
 GEORGE ARTHUR RICHARDSON, Ph.D., Dairy Husbandman.
 FLOYD BYRON WOLBERG, M.S., Assistant Dairy Husbandman.

Fish and Game Management

ROLAND EUGENE DIMICK, M.S., Wildlife Conservationist in Charge.
 †ARTHUR SKOGMAN EINARSEN, B.S., Biologist, United States Fish and Wildlife Service.
 †FREDERIC FORWARD FISH, Sc.D., Chief, Western Fish Culture Investigations, U. S. Department of the Interior, Fish and Wildlife Service, Aquatic Biologist.
 ROBERT W. MORRIS, A.B., Research Assistant.

Poultry Husbandry

JESSE ELMER PARKER, Ph.D., Poultry Husbandman in Charge.
 WILBUR TARLETON COONEY, M.S., Associate Professor and Associate Poultry Husbandman.
 PAUL EMILE BERNIER, Ph.D., Associate Poultry Husbandman.
 JAMES ARTHUR HARPER, M.S., Assistant Poultry Husbandman.

† U. S. Government investigators stationed in Oregon.

Veterinary Medicine

JAMES NIVEN SHAW, B.S., D.V.M., Veterinarian in Charge.

ERNEST MILTON DICKINSON, D.V.M., M.S., Veterinarian.

OTTO HERBERT MUTH, D.V.M., M.S., Veterinarian.

JOHN OTTO SCHNAUTZ, A.B., D.V.M., Associate Veterinarian.

†J. A. ZIMMERMAN, Veterinarian Livestock Inspector, Bureau of Animal Industry.

PAUL BROWN BARTO, D.V.M., Research Assistant.

EDWARD DONALD STODDARD, D.V.M., Research Assistant.

DIVISION OF PLANT INDUSTRIES

WILLIAM ALFRED SCHOENFELD, M.B.A., In Charge, Division of Plant Industries.

Farm Crops

DONALD DAVID HILL, Ph.D., Agronomist in Charge.

†HARRY AUGUST SCHOETH, M.S., Senior Agronomist, Division of Forage Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering.

ROBERT ESTES FORE, Ph.D., Agronomist.

†HENRY HARDY RAMPTON, M.S., Associate Agronomist, Division of Forage Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering.

†ELTON NELSON, M.S., Associate Agronomist, Division of Cotton and Other Fiber Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering.

*LOUISE AMES KANIPE, B.S., Associate Seed Technologist (Associate Botanist), Production and Marketing Administration.

VIRGIL HAVEN FREED, B.S., Associate Agronomist.

JOHN RITCHIE COWAN, M.S., Assistant Agronomist.

HERMAN ELDON BIERMAN, B.S., Research Assistant.

HAROLD SCHUDEL, M.S., Research Assistant.

Food Technology

ERNEST HERMAN WIEGAND, B.S.A., Food Technologist in Charge.

THOMAS ONSDORFF, M.S., Associate Food Technologist.

EDWARD WINSLOW HARVEY, Ph.D., Associate Food Technologist, Seafoods Laboratory, Astoria.

EARL MILO LITWILLER, Ph.D., Associate Food Technologist.

HO-YA YANG, Ph.D., Associate Food Technologist.

OLIVER JACKSON WORTHINGTON, Ph.D., Associate Food Technologist.

RUSSELL O. SINNHUBER, M.S., Assistant Biochemist, Seafoods Laboratory, Astoria.

CURTIS WILDER, M.S., Assistant Food Technologist.

CLIFFORD ELROY SAMUELS, B.S., Assistant Food Technologist.

* Employed by both State and Federal Government.

† U. S. Government investigators stationed in Oregon.

THOMAS BLANEY NIVEN, Ph.D., Assistant Food Technologist.
RUTH MILLER, B.S., Research Assistant.
GEORGE JOHN LORANT, B.S., Experiment Station Fellow.
JEAN LORANT, B.S., Experiment Station Fellow.
KEN ARTHUR DEVLIN, B.S., Experiment Station Fellow.
EDWARD CHARLES BUBL, M.S., Assistant Chemist and Assistant Food Technologist.

Horticulture

HENRY HARTMAN, M.S., Horticulturist in Charge.
†GEORGE FORDYCE WALDO, M.S., Horticulturist, Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering.
ELMER HANSEN, Ph.D., Horticulturist.
QUENTIN BLISS ZIELINSKI, Ph.D., Associate Horticulturist.
STANLEY ELLIOT WADSWORTH, B.S., Associate Horticulturist (Floriculture).
ALFRED NATHAN ROBERTS, M.S., Assistant Horticulturist.
HAIG BRUCE AROIAN, B.S., Assistant Horticulturist.
OLIVER CECIL COMPTON, Ph.D., Assistant Horticulturist.
‡CARL ARTHUR BOLLER, B.S., Research Assistant.
GLORIA CROSTIC, B.S., Experiment Station Fellow.

Soil Science

WILBUR LOUIS POWERS, Ph.D., Soil Scientist in Charge.
CHARLES VLADIS RUZEK, M.S., Soil Scientist (Fertility).
ROSCOE ELMO STEPHENSON, Ph.D., Soil Scientist.
ALBERT WILLIAM MARSH, Ph.D., Associate Soil Scientist.
†RAY A. PENDLETON, Ph.D., Associate Soil Technologist, Division of Sugar Plant Investigations, Bureau of Plant Industry, Soils and Agricultural Engineering.
LAWRENCE ALBAN, M.S., Experiment Station Fellow.

OTHER DEPARTMENTS

Agricultural Chemistry

JOSEPH SHIRLEY BUTTS, Ph.D., Chemist in Charge.
REGINALD HEBER ROBINSON, M.S., Chemist (Insecticides and Fungicides).
JOSEPH ROY HAAG, Ph.D., Chemist (Animal Nutrition).
DELOSS EVERETT BULLIS, M.S., Chemist.
PAUL HENRY WESWIG, Ph.D., Associate Biochemist.
LEMAR FRED REMMERT, Ph.D., Assistant Chemist.
RUTH SIMMONS, B.S., Research Assistant.
BARBARA STEARMAN, B.S., Research Assistant.
LEON C. TERRIERRE, B.S., Experiment Station Fellow.
RAYMOND TRUSSELL PIERCE, JR., B.S., Experiment Station Fellow.

† U. S. Government investigators stationed in Oregon.

‡ On leave of absence.

Agricultural Engineering

- JEFFERSON BELTON RODGERS, M.S., A.E., Agricultural Engineer in Charge.
 †JESSE E. HARMOND, B.S., Senior Agricultural Engineer, Division of Agricultural Engineering, Bureau of Plant Industry, Soils and Agricultural Engineering.
 HERBERT REEVES SINNARD, M.S., R.A., Agricultural Engineer (Farm Structures).
 MYRON GEORGE CROUSEY, M.S., Associate Agricultural Engineer.
 RALPH NICHOLAS LUNDE, B.S., Associate Agricultural Engineer.
 †LEONARD MARTIN KLEIN, B.S., Associate Agricultural Engineer, Division of Agricultural Engineering, Bureau of Plant Industry, Soils and Agricultural Engineering.
 †IVAN BRANTON, B.S., Associate Agricultural Engineer, Division of Agricultural Engineering, Bureau of Plant Industry, Soils and Agricultural Engineering.
 WILBUR LEWIS GRIEBELER, B.S., Assistant Agricultural Engineer.
 DALE EARL KIRK, B.S., Assistant Agricultural Engineer.
 JOHN WILLIAM WOLFE, M.S., Assistant Agricultural Engineer.
 DAVID ROBERT LONG, B.S., Research Assistant.

Bacteriology

- GODFREY VERNON COPSON, M.S., Bacteriologist in Charge.
 JOSEPH ELLSWORTH SIMMONS, M.S., Bacteriologist.
 WALTER BENO BOLLEN, Ph.D., Bacteriologist.
 PAUL REUBEN ELLIKER, Ph.D., Bacteriologist.

Entomology

- DON CARLOS MOTE, Ph.D., Entomologist in Charge.
 BENJAMIN GARRISON THOMPSON, Ph.D., Entomologist.
 *SIDNEY CARROLL JONES, M.S., Associate Entomologist; Agent, U. S. Bureau of Entomology and Plant Quarantine.
 *HERMAN AUSTIN SCULLEN, Ph.D., Apiculturist; Agent, U. S. Bureau of Entomology and Plant Quarantine.
 HUGH ENGLE MORRISON, M.S., Assistant Entomologist.
 HAMBLIN HOWES CROWELL, Ph.D., Assistant Entomologist.
 ROBERT G. ROSENSTIEL, M.S., Assistant Entomologist.
 SAMUEL EBB CRUMB, JR., B.S., Research Assistant.

Home Economics

- MAUD MATHES WILSON, A.M., Home Economist in Charge.
 CLARA A. STORVICK, Ph.D., Home Economist.
 ANDREA OVERMAN, Ph.D., Associate Home Economist.

* Employed by both State and Federal Government.
 † U. S. Government investigators stationed in Oregon.

Plant Pathology

SHERL MELVIN DIETZ, Ph.D., Plant Pathologist in Charge.

SANFORD MYRON ZELLER, Ph.D., Plant Pathologist.

HELEN MARGARET GILKEY, Ph.D., Botanist.

*FRANK PADEN MCWHORTER, Ph.D., Plant Pathologist; Agent, Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering.

†BLISS F. DANA, M.S., Plant Pathologist, Division of Fruits and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering.

†FLOYD DOUGLAS BAILEY, M.S., Associate Pathologist, War Food Administration, Office of Marketing Service, Livestock and Meats Branch, Insecticide Division, U. S. Department of Agriculture.

†PAUL WILLIAM MILLER, Ph.D., Associate Pathologist, Division of Fruits and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering.

†JOHN ROBERT HARDISON, Ph.D., Associate Pathologist, Division of Fruits and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering.

JOHN A. MILBRATH, Ph.D., Plant Pathologist.

ADIN PETER STEENLAND, B.S., Assistant Plant Pathologist.

ROY A. YOUNG, Ph.D., Assistant Plant Pathologist.

GEORGE WILLIAM DEWEY, B.S., Research Assistant.

*HORACE HANNA MILLSAP, Research Assistant; Agent, Division of Fruits and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering.

Publications and News Service

DELMER MORRISON GOODE, M.A., Editor of Publications.

EDWIN THOMAS REED, B.S., A.B., Litt.D., Emeritus Editor of Publications.

JOHN COLE BURTNER, B.S., Director of News Bureau.

ETHEL E ALLEN, B.S., Assistant Editor of Publications.

SAMUEL HALL BAILEY, M.S., Experiment Station Writer.

ARLAND RITCHIE MEADE, M.S., Experiment Station Editor.

DONALD THOMAS CARLSON, B.A., Assistant to the Editor of Publications.

BRANCH STATIONS*John Jacob Astor Branch Experiment Station, Astoria*

HERBERT BADOLLET HOWELL, B.S., Superintendent.

ELMER DENT, M.S., Research Assistant.

CHESTER CLARKSON DIXON, B.S., Research Assistant.

Squaw Butte-Harney Cooperative Range and Livestock Branch Station

WILLIAM ARTHUR, B.S., Superintendent.

* Employed by both State and Federal Government.

† U. S. Government investigators stationed in Oregon.

Umatilla Branch Experiment Station, Hermiston

*CARL A. LARSON, Ph.D., Superintendent; Division of Western Irrigation Agriculture, Bureau of Plant Industry, Soils and Agricultural Engineering.

DAVID GRAHAM, B.S., Research Assistant in Horticulture.

DONALD HENRY SHERWOOD, B.S., Research Assistant in Livestock.

†EVERETT L. SCHLAFFER, Scientific Aide.

Hood River Branch Experiment Station, Hood River

LEROY CHILDS, A.B., Superintendent, Entomologist.

GORDON GEORGE BROWN, B.S., Horticulturist.

†J. R. KIENHOLZ, Ph.D., Associate Pathologist, Division of Fruits and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering.

VERNON WILLIAM OLNEY, B.S., Research Assistant in Entomology.

WILMER ABELE MEYLE, B.S., Research Assistant.

Southern Oregon Branch Experiment Station, Medford

*ELLIOTT STANFORD DEGMAN, Ph.D., Superintendent and Pomologist, Division of Fruits and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering.

FRANK CHARLES REIMAN, M.S., Superintendent Emeritus.

LOUIS GUSTAV GENTNER, M.S., Entomologist.

HAROLD H. WHITE, M.S., Associate Agronomist.

†WILFRED TUTTLE FROST, A.B., Associate Hydraulic Engineer, Soil Conservation Service, U. S. Department of Agriculture; Irrigation Water Forecasting.

Sherman Branch Experiment Station, Moro

*MERRILL MAHONRI OVESON, M.S., Superintendent and Agent, Division of Cereal Crops and Diseases and Division of Dry Land Agriculture, Bureau of Plant Industry, Soils and Agricultural Engineering.

WILLIAM HALL, B.S., Research Assistant in Farm Crops.

Pendleton Branch Experiment Station, Pendleton

†GEORGE ADAMSON MITCHELL, B.S., Superintendent and Assistant Agronomist, Division of Dry Land Agriculture, Bureau of Plant Industry, Soils and Agricultural Engineering.

†FRANCIS HARRISON McNEAL, M.S., Agent, Division of Dry Land Agriculture, Bureau of Plant Industry, Soils and Agricultural Engineering.

Eastern Oregon Branch Experiment Station, Union

HARRY GRANT AVERY, B.S., Superintendent.

RUSSELL McKENNON, B.S., Assistant Superintendent.

* Employed by both State and Federal Government.

† U. S. Government investigators stationed in Oregon.

SEAFOODS LABORATORY, ASTORIA, OREGON
(Branch of Food Technology Department, Corvallis, Oregon)

ERNEST HERMAN WIEGAND, B.S.A., Food Technologist in Charge.

EDWARD WINSLOW HARVEY, Ph.D., Associate Food Technologist, Project Leader.

RUSSELL O. SINNHUBER, M.S., Assistant Food Technologist, Seafoods Laboratory.

AGRICULTURAL EXPERIMENTAL AREAS

ALVIN EUGENE GROSS, M.S., Superintendent, Klamath Experimental Area, Klamath Falls.

JACK T. McDERMID, B.S., Superintendent, Red Soils Experimental Area, Oregon City.

ELBERT NEIL HOFFMAN, B.S., Superintendent, Malheur Experimental Area, Ontario.

HENRY JAMES O'REILLY, M.S., Superintendent, The Dalles Experimental Area, The Dalles.

HERBERT BADOLLET HOWELL, B.S., Superintendent, Northrup Creek Grazing Area, Birkenfeld.

MALCOLM JOHNSON, M.S., Project Leader, Deschutes Experimental Project, Redmond.

OREGON State Agricultural Experiment Station was organized July 2, 1888, in accordance with the Act of Congress of 1887 known as the Hatch Act. The Experiment Station includes the central station at Corvallis and eight branch stations and five experimental areas advantageously located in such a way as to cover the varying agricultural conditions of Oregon.

The Central Station. At the central station about 1,177 acres of land are used by Experiment Station workers engaged in the scientific investigation of problems presented by the different branches of agriculture. The Station includes the following departments: Agricultural Economics; Agricultural Engineering; Animal Husbandry; Bacteriology; Chemistry; Dairy Husbandry; Entomology; Farm Crops; Farm Management; Food Technology; Fish and Game Management; Home Economics; Horticulture; Plant Pathology; Poultry Husbandry; Soils; and Veterinary Medicine.

Much of the research program of the Station is cooperative with the U. S. Department of Agriculture, and a number of federal scientists are located in Oregon working on problems of a regional nature.

The scientific investigations of the station staff strongly support the instruction given in the classroom and through the Extension Service. Aside from the original investigations of economic significance to agriculture, the work affords daily object lessons in modern farm methods. To the students in the various fields of study the value of the investigative work can hardly be overestimated. To the state, from the point of view of economic progress, its value has been greater, in the estimation of many people, than the entire cost of the State College to the commonwealth. The work of the Experiment Station is fundamental in the agricultural development of the state. Oregon's soil and climatic conditions present many problems that are unique and that must be solved before the state can develop its great potential agricultural wealth.

The Branch Stations and Experimental Areas. The eight branch stations located at Astoria, Burns, Hermiston, Hood River, Medford, Moro, Union, and Pendleton and the five experimental areas located at Birkenfeld, Klamath, Ontario, Oregon City, and The Dalles conduct experiments on the major agricultural problems of their respective agricultural sections of the state.

The John Jacob Astor Branch Experiment Station has as its major problems of investigation: dairying; improvement of forage crops; soil fertility; soil management for Coast conditions; and the drainage, improvement, and cultivation of tidelands.

The Umatilla Branch Experiment Station at Hermiston, conducted cooperatively with the United States Department of Agriculture, is studying problems of agriculture under irrigation on the Umatilla Reclamation Project and similar lands of the Columbia River Basin.

The Hood River Branch Experiment Station deals with orchard pests, pollination, varietal testing, fertilizing, soil management, and other problems to reduce cost of producing fruit in this important orcharding section.

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 dry land 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 Experiment Station at Medford, conducted cooperatively with the United States Department of Agriculture, Bureau of Plant Industry, is centering attention on problems of fruit production and general farming in the Rogue River Valley.

The Eastern Oregon Branch Livestock Experiment Station at Union is conducting experiments in fattening, wintering, grazing, breeding, and management of livestock; in the production of home-grown livestock, feeds, and cash crops; and in developing proper land utilization, soil conservation, and fertility maintenance in the Blue Mountain region.

The Pendleton Branch Experiment Station conducted cooperatively with the United States Department of Agriculture is equipped with 160 acres of land in an important wheat-growing belt for the purpose of establishing and maintaining crop rotation and soil conservation investigations and developing new varieties.

The Squaw Butte-Harney Cooperative Range and Livestock Station consists of 16,000 acres of intermountain arid range lands used for experimental, grazing work under controlled conditions with the object of rehabilitating depleted and wornout ranges; 183 acres of irrigated land used in conducting experiments in the production of alfalfa hay, legumes, and forage for livestock feeding and in introducing, testing, and developing cash crops adapted to the high altitude areas of the Harney Basin; 661 acres of native meadow land used for experimental fall and winter pasture and for the production of native hay for feeding experimental livestock. The combination of range and meadow land makes a complete experimental unit conducted cooperatively and jointly by the Oregon Agricultural Experiment Station and Bureau of Land Management, Department of the Interior.

The Northrup Creek Experimental Area located near Birkenfeld, Oregon, is conducting investigations in the utilization of logged-off timber lands by experimenting with sod-forming grasses on such lands and the utilization of the forage by livestock.

The Klamath Experimental Area is conducting research in the control of nematodes and other pests and diseases of potatoes and in developing economic uses for class 5 lands, of which there are 12,000 to 15,000 acres in the Klamath irrigated basin.

The Malheur Experimental Area is devoted to experiments in the economic production of vegetable and crop seeds and forage under the irrigated conditions of the Vale-Owyhee project, and in the production and utilization of forage crops for livestock.

The Red Soils Experimental Area is centering attention on rebuilding wornout red hill soils, of which there are approximately 800,000 acres in the Willamette Valley.

The Dalles Experimental Area is concerned with problems affecting the stone fruit industry of that area. Principal fields of research are virus disease and insect control, and soil management and cultural practice improvement.

Engineering Experiment Station

Administrative Officers

EDGAR W. SMITH, President, Oregon State Board of Higher Education.
PAUL C. PACKER, Chancellor, Oregon State System of Higher Education.
AUGUST LEROY STRAND, President, Oregon State College.
GEORGE WALTER GLEESON, Dean, School of Engineering.
DELMER MORRISON GOODE, Editor of Publications.
SAMUEL HERMAN GRAF, M.E., M.S., Director.

Station Staff

ARTHUR LEMUEL ALBERT, M.S., E.E., Communication Engineering.
WALTER CLIFFORD BAKER, B.S., Air Conditioning.
PAUL MILLARD DUNN, M.S.F., Forestry.
GRANT STEPHEN FEIKERT, M.S., E.E., Radio Engineering.
GEORGE WALTER GLEESON, M.S., Ch.E., Chemical Engineering.
BURDETTE GLENN, M.S., Highway Engineering.
GLENN WILLIS HOLCOMB, M.S., Structural Engineering.
CLAIR VAN NORMAN LANGTON, Dr.P.H., Ed.D., Public Health.
FRED ORVILLE McMILLAN, M.S., Electrical Engineering.
WALLACE HOPE MARTIN, M.E., M.S., Heat Engineering.
FRED MERRYFIELD, M.S., Sanitary Engineering.
CHARLES ARTHUR MOCKMORE, C.E., Ph.D., Civil and Hydraulic Engineering.
WILLIAM HOWARD PAUL, M.S., Automotive Engineering.
PHIMISTER BAYARD PROCTOR, Ph.D., Wood Products.
BENJAMIN FRANKLIN RUFFNER, Aero.E., M.S., Aeronautical Engineering.
MILTON CONWELL SHEELY, B.S., Shop Processes.

LOUIS SLEGEL, Ph.D., Mechanical Engineering.
EUGENE CARL STARR, E.E., Electrical Engineering.
CHARLES EDWIN THOMAS, M.M.E., Engineering Materials.
JESSE SEBURN WALTON, A.B., Chemical and Metallurgical Engineering.

Technical Counselors

R. H. BALDOCK, State Highway Engineer, Salem.
R. R. CLARK, Designing Engineer, Corps of Engineers, Portland District, Portland.
DAVID DON, Chief Engineer, Public Utilities Commission, Salem.
CURTISS M. EVERTS, JR., State Sanitary Engineer, Portland.
J. A. HALL, Director, Pacific Northwest Forest and Range Experiment Station, United States Department of Agriculture, Forest Service, Portland.
PAUL B. MCKEE, President, Portland Gas & Coke Company, Portland.
BEN S. MORROW, Engineer and General Manager, Department of Public Utilities and Bureau of Water Works, Portland.
F. W. LIBBEY, Director, State Department of Geology and Mineral Industries, Portland.
JAMES H. POLHEMUS, President, Portland General Electric Co., Portland.
S. C. SCHWARZ, Chemical Engineer, Portland Gas & Coke Company, Portland.
J. C. STEVENS, Consulting Civil and Hydraulic Engineer, Portland.
CHARLES E. STRICKLIN, State Engineer, Salem.

BY ACT of the Board of Regents of the 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:

- (1) To serve the industries, utilities, professional engineers, public departments, and engineering teachers by making investigations of significance and interest to them.
- (2) To stimulate and elevate engineering education by developing the research spirit in faculty and students.
- (3) To publish and distribute through bulletins, circulars, and technical articles in periodicals the results of such studies, surveys, tests, investigations, and researches 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 investigation 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. Many cooperative projects have been carried through in past years and such projects are always under way. Inquiries concerning cooperative projects are welcomed.

The dean of engineering, the director of the station, and the heads of the various major departments function as a council *ex officio*. The director acts as chairman of the council, technical adviser upon investigations, and as engi-

neering editor of publications. The active staff is composed of members of the instructional staff who may be interested in various specific research projects, and 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 upon the investigations in certain fields have been appointed to the staff as special technical counselors. Some technical assistants have been supported by manufacturers and industrial associations interested in working out specific problems.

Oregon Forest Products Laboratory

Staff

PAUL MILLARD DUNN, M.S., Director.
 PHIMISTER BAYARD PROCTOR, Ph.D., Technical Director.
 WILLIAM JENNINGS BAKER, M.S., Forest Products.
 WILLIAM ALBERT DAVIES, M.F., Forest Engineering.
 LEIF DEDRICK ESPENAS, M.F., Forest Products.
 LEO FRIEDMAN, Ph.D., Chemistry.
 ROBERT DOUGLAS GRAHAM, M.S., Forest Products.
 JOHN BERNHARD GRANTHAM, M.S., Forest Products.
 ERVIN FREDRICK KURTH, Ph.D., Chemistry.
 MORTIMER DEFOREST MACDONALD, M.S., Forest Products.
 DAN D. ROBINSON, M.S., Forestry.
 JOHN DARYL ROSS, M.S., Chemical Engineering.
 JAMES DODD SNODGRASS, B.S., Forest Products.
 HUGH EDWARD WILCOX, M.S., Forest Products.

Cooperating Departments and Divisions

Forest Products Department	Agricultural Experiment Station
Chemistry Department	Engineering Experiment Station
Chemical Engineering Department	Forest Management Department
Mechanical Engineering Department	Forest Engineering Department
Agricultural Engineering Department	

BY SPECIAL Act the 1941 Oregon Legislature authorized a program of research in the utilization of forest products to be carried on through the State Board of Forestry in cooperation with the School of Forestry. This Act was revised in 1945, establishing a forest products laboratory on the campus of Oregon State College under the directorship of the Dean of the School of Forestry and authorizing cooperation with public agencies and private industries.

The law created an advisory committee to guide the policy of the program. The committee is composed of representatives of the following agencies: West Coast Lumbermen's Association, Willamette Valley Lumbermen's Association, Western Pine Association, Oregon Plywood Association, Pacific Northwest Forest and Range Experiment Station, and the School of Forestry. The Governor of Oregon is chairman and the State Forester is secretary.

Extension

THROUGH extension services the benefits of all the Oregon state institutions of higher education are brought to the people of the state in their own communities. All divisions of the Oregon State System of Higher Education seek through every means possible, so far as resources and facilities permit, to serve the entire state. All extension activities of the several institutions are administered through two coordinated extension services: 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

Administration

JOHN FRANCIS CRAMER, Ed.D., Dean and Director of General Extension; Professor of Education.

HENRY EUGENE STEVENS, Ed.D., Assistant Director of General Extension; Associate Professor of Education.

DOROTHY DOERING SMITH, B.A., Eugene Office Manager; Instructor in Extension Teaching.

Correspondence Study

MOZELLE HAIR, B.A., Head of Correspondence Study; Assistant Professor of Sociology.

ARLETTA S. PENNY, Secretary.

State-Wide Extension Classes

VIRON A. MOORE, M.A., Head of State-Wide Classes; Assistant Professor of Education.

JAMES CARL CAUGHLAN, Ph.D., Assistant Professor of Education.

RUTH HOPSON, Ph.D., Instructor in General Science.

ELSIE M. ISOTOFF, B.A., Secretary; Instructor in Extension Teaching.

Portland Extension Center

MARGARET MORRISON SHARP, Director; Assistant Professor of Extension Teaching.

MAURINE W. CHURCHILL, Secretary.

ALFRED POWERS, B.A., Professor of Journalism.

PERCY M COLLIER, B.A., LL.B., Associate Professor of English.

HOYT C. FRANCHERE, M.A., Associate Professor of English.

PHILIP WOOD JANNEY, B.A., C.P.A., Associate Professor of Business Administration.

JACK R. PARSONS, M.S., Assistant Professor of Sociology and Social Work.

CLARK PAUL SPURLOCK, M.A., Veterans' Counselor.

Radio Station KOAC

JAMES M. MORRIS, B.S., Program Manager; Associate Professor of Radio Speech.

LILLIAN SCHLOEMAN, B.S., Acting Director of Women's Programs; Instructor in Home Economics Extension.

*ZELTA FEIKE RODENWOLD, M.S., Director of Women's Programs; Assistant Professor of Home Economics Extension.

JAMES S. NELSON, Production Manager; Instructor in Radio Speech.

ARNOLD EBERT, B.S., Director of Agricultural Programs; Assistant Professor of Agricultural Extension.

LANA LU BOUSKA, A.B., Director, KOAC School of the Air.

JAMES MARTIN JACKSON, Ed.B., Director of Music; Instructor in Radio Speech.

DORICE WILLIAMS, Secretary.

Visual Instruction

WILLIAM CURTIS REID, Ph.D., Head of Department; Associate Professor of Visual Instruction.

RUSSEL M. ADAMS, M.S., Specialist in Visual Aids; Assistant Professor of Visual Instruction.

EVELYN DEMPSEY, Secretary.

Vanport Extension Center

STEPHEN E. EPLER, Ph.D., Director; Assistant Professor of Education.

PHIL S. PUTNAM, M.S., Assistant Director; Instructor in Economics.

KATHERINE MARY RAHL, M.A., Women's Adviser.

RICHARD B. HALLEY, M.A., Men's Adviser.

JOSEPH V. HOLLAND, M.A., Athletic Director.

MARGARET C. HOLLAND, B.A., Office Manager.

THE General Extension Division of the Oregon State System of Higher Education serves the people of the state through adult education by means of extension classes, correspondence study, visual instruction, and radio. Its work is organized into the following departments: At Corvallis: Visual Instruction; Radio Station KOAC. At Eugene: Correspondence Study; State-Wide Extension Classes. At Portland: Portland Extension Center, Vanport Extension Center.

A State-Wide Campus. Through the General Extension Division the curricula, personnel, and facilities of all the state institutions of higher education are made available in some degree to every citizen, group, and community in Oregon. The activities of the General Extension Division are closely coordinated with those of the Federal Cooperative Extension Service and all other organized service agencies in the state.

* On leave of absence.

Portland Extension Center. General extension in Portland is carried on through the Portland Extension Center. More than two hundred evening, late afternoon, and Saturday morning courses in thirty-five different departments and professional schools were offered during the academic year 1947-48. The work of these classes is of standard college or university grade. Resident credit at the State College, the University, or the state colleges of education may be earned through these courses. Courses may be taken at the Portland Extension Center for graduate credit toward a master's degree at the State College or the University. Detailed information is published in the Portland Extension Center Announcements.

State-Wide Extension Classes. Through its program of state-wide extension classes, the General Extension Division provides the people of the state of Oregon with opportunities for college instruction and educational growth in their home communities. Courses will be organized in any community which can furnish a suitable meeting place for a class and can give assurance of an enrollment large enough to pay, through course fees, the cost of providing an instructor. The state-wide extension program includes both courses for college credit and noncredit courses.

Correspondence Study. Study at home under competent supervision is possible for any adult through carefully organized courses of instruction prepared by members of the faculties of the Oregon State System of Higher Education. These lesson outlines take the place of lectures and class exercises given to students in residence. More than two hundred courses in a wide variety of subjects are offered. Courses may be taken without credit by persons who enjoy the intellectual stimulus of organized, directed study, or they may be taken for credit toward a college degree. There are no special entrance requirements to correspondence courses; any adult who has sufficient preparation to profit from them may enroll. Complete information is published in a special Correspondence Study Catalog.

Visual Instruction. The Department of Visual Instruction of the General Extension Division provides glass and film slides, microscope slides, and motion picture films suitable for educational use by schools, community clubs, and other organizations. A special catalog is published listing the material available. This department is maintained jointly by the General Extension Division and the Federal Cooperative Extension Service.

Radio Station KOAC. Radio Station KOAC is Oregon's public-owned station of which the State Board of Higher Education is the managing agency. The station is located at Corvallis, Oregon, on the campus of Oregon State College, the licensee and operator of the physical plant. The General Extension Division of the State System of Higher Education directs the program service. Program talent is drawn from Oregon State College, the University of Oregon, the Oregon colleges of education, and from various departments of the state government. In addition, many other public agencies, organizations, and individuals contribute frequently to broadcasts from the station. The station, established in 1925, is operated in the interest of the Oregon public. The programs are free from commercialism. KOAC operates with 5,000 watts power on a frequency of 550 kilocycles by authority of the Federal Communications Commission. Announcements of radio programs are issued periodically, and will be furnished on request.

Vanport Extension Center. To meet congested conditions in institutions of the State System, the Board of Higher Education established the Vanport Extension Center in the summer of 1946. Designed to provide for the overflow from the institutions, Vanport Center offers freshman and sophomore courses in a wide variety of fields. Course work is closely integrated with campus instruction, and credits earned are transferable to Oregon State College, the University of Oregon, and the colleges of education.

Federal Cooperative Extension Service

Extension Staff at Corvallis

Administration

WILLIAM ALFRED SCHOENFELD, M.B.A., Director, Extension Service.
FRANK LLEWELLYN BALLARD, B.S., Associate Director, Extension Service.
WILLIAM LEROY TEUTSCH, B.S., Assistant Director, Extension Service.
CHARLES WESLEY SMITH, B.S., Assistant Director and County Agent Leader.
JAMES RALPH BECK, B.S., Acting Assistant Director, Extension Service.
JEAN WILLARD SCHEEL, B.S., Assistant to the Director.
AZALEA LINFIELD SAGER, M.A., State Home Demonstration Leader.
LEONARD JOHN ALLEN, M.S., State 4-H Club Leader.
CLIFFORD LOVEJOY SMITH, M.S., Assistant County Agent Leader.
FRANCES ANN CLINTON, M.S., Assistant State Home Demonstration Leader.
MABEL CLAIR MACK, M.S., Assistant State Home Demonstration Leader.
CAL GRAHAM MONROE, B.S., Assistant State 4-H Club Leader.
BURTON SEYMOUR HUTTON, B.S., Assistant State 4-H Club Leader.
WINNIFRED KEIL GILLEN, M.S., Assistant State 4-H Club Leader.
ESTHER ADELIA TASKERUD, M.A., Assistant State 4-H Club Leader.
GERALDINE DANZL, B.S., Assistant State 4-H Club Leader.
JOHN MYERS CLIFFORD, Extension Auditor.

Professors

LEROY BREITHAUPT, B.S., Extension Agricultural Economist (Statistics, News and Outlook).
EDWIN RUSSELL JACKMAN, B.S., Specialist in Farm Crops.
PAUL CARPENTER, B.S., Extension Agricultural Economist (Marketing).
ROGER WILLIAM MORSE, B.S., Extension Dairyman.
HARRY ARTHUR LINDGREN, B.S., Extension Animal Husbandman.
ARTHUR SOLOMON KING, M.S., Specialist in Soils.
LUCY ROCENA LANE, M.A., Specialist in Clothing and Textiles.
NOEL LINDSAY BENNION, M.S., Extension Poultryman.

Associate Professors

REX WARREN, M.S., Specialist in Farm Crops.
*WILLIAM CURTIS REID, Ph.D., Specialist in Visual Instruction.
HAROLD ETHAN FINNELL, M.S., Seed Certification Specialist.

* Part time, Federal Cooperative Extension.

MILON GEORGE HUBER, M.S.M.E., Extension Agricultural Engineer.
JAMES CECIL MOORE, M.S., Assistant Extension Economist, Marketing.
CECIL OTIS RAWLINGS, M.S., Extension Horticulturist.
ROBERT RALPH CLARK, M.S., Extension Horticulturist.
MARGARET HUSTON TULLER, M.S., Specialist in Rural Housing.
MARION DAWS THOMAS, B.S., Extension Agricultural Economist.
*GODFREY RICHARD HOERNER, M.S., Specialist in Hop Production.

Assistant Professors

*ARNOLD CHRISTIAN EBERT, B.S., Agricultural Program Director, KOAC.
HAROLD PLYMPTON EWALT, B.S., Assistant Extension Dairyman.
MYRTLE MAE CARTER, M.S., Specialist in Clothing and Home Furnishings.
ROBERT WILSON EVERY, B.S., Extension Entomologist.
CHARLES ROBERT ROSS, M.S.F., Extension Forester.
MARY BETH MINDEN, M.A., Specialist in Home Management.
ROBERT GREY FOWLER, JR., B.S., Specialist in Information Methods.

Instructors

ELVERA CHARLETTE HORRELL, Junior Extension Statistician.
LEROY ELDON WARNER, B.S., Soils Specialist.
BERTON ELMER BLACK, B.S., Assistant Extension Statistician.
BOB WALLACE COYLE, Assistant Extension Statistician.
GEORGE WILLIAM DEWEY, B.S., Specialist in Seed Certification.
ELMER CARL JOHNSON, B.S., Specialist in Seed Certification.

County Extension Agents

Professors

GEORGE ALLEN NELSON, B.S., County Agent Emeritus, Columbia County.
CHARLES ALBERT HENDERSON, B.S., County Agent, Klamath County.
OTTIS SCHULER FLETCHER, M.S., County Agent, Lane County.
ROBERT GREY FOWLER, B.S.A., County Agent Emeritus, Jackson County.
JOHN JERRY INSKEEP, M.S., County Agent, Clackamas County.
GEORGE HERRICK JENKINS, B.S., County Agent, Coos County.
WILLIAM SAMUEL AVERILL, B.S., County Agent, Multnomah County.
VICTOR WALDEMAR JOHNSON, B.S., County Agent, Umatilla County.
WALTER CHRISTIAN LETH, B.S., County Agent, Polk County.
ARCHIE LEE MARBLE, B.S.A., County Agent, Hood River County.
ROLAND WILLIAM SCHAAD, B.S., County Agent, Union County.
HARRY RUDOLPH SANDQUIST, B.S., County Agent, Malheur County.
PALMER STANLEY TORVEND, B.S., County Agent, Washington County.
WILLIAM BENJAMIN TUCKER, County Agent, Jackson County.

Associate Professors

DAVID HONORE KENNEDY, B.S., Club Agent, Tillamook County.
WILBUR WRAY LAWRENCE, B.S., County Agent at Large.

* Part time Federal Cooperative Extension.

JAMES ROLAND PARKER, M.S., County Agent, Douglas County.
ELFRED LOREN SHANNON, Ph.D., Club Agent, City of Portland.
STONEWALL ANDREW JACKSON, B.S., County Agent, Benton County.
OSCAR EDWIN MIKESELL, B.S., County Agent, Linn County.
LEROY CLINTON WRIGHT, B.S., County Agent, Sherman County.
MAUD CONWAY CASSWELL, B.S., Home Agent, Columbia County.
ELGAR MAURICE NELSON, B.S., B.A., County Agent, Wasco County.
GARNET DOUGLAS BEST, B.S., County Agent, Wallowa County.
HOWARD GEORGE SMITH, B.S., County Agent, Tillamook County.
CLIFFORD BERNARD CORDY, M.S., County Agent (Horticulture), Jackson County.
CLIFFORD DEVERE CONRAD, B.S., County Agent, Baker County.
EDITH JEFFERS FREEMAN, Ph.D., Home Agent at Large.
WALTER JOHN JENDRZEJEWSKI, B.S., Assistant County Agent, Klamath County.
WILLIAM GERALD NIBLER, B.S., County Agent, Columbia County.

Assistant Professors

CLAY CARL MILLER, B.S., Club Agent, Multnomah County.
ROBERT MYRON KNOX, B.S., County Agent, Curry County.
HARRY LABARE RICHES, B.S., County Agent, Marion County.
ETHAN LINDEN WOODS, B.S., County Agent, Crook County.
ERNEST MILLARD HAUSER, B.S., Club Agent, Malheur County.
MARIAN FARRELL CHRISTESON, B.S., Home Agent, Jackson County.
GENE MAURICE LEAR, B.S., County Agent, Deschutes County.
ELIZABETH JANE KNAPP, B.S., Home Agent, Baker County.
JENS FREDERICK SVINTH, B.S., County Agent, Josephine County.
WILLIAM KING FARRELL, B.S., County Agent, Grant County.
LOUIE HENRY GROSS, B.S., County Agent, Yamhill County.
ELGIN MAC CORNETT, B.S., County Agent, Lake County.
OLA FAYE NICHOLS, B.S., Home Agent, Washington County.
JOHN GORDON HOOD, B.S., County Agent, Clatsop County.
JANET CAROLINE TAYLOR, B.S., Home Agent, Clackamas County.
VIOLA KAREN HANSEN, B.S., Home Agent, Linn County.
AUBREY LLOYD PULLIAM, B.S., County Agent at Large.
NELSON CHRISTIAN ANDERSON, B.S., County Agent, Morrow County.
VIOLA BRAINERD SHAFFER, B.S., Home Agent, Polk County.
LEEDS CRIM BAILEY, B.S., Assistant County Agent, Malheur County.
BEN ALLEN NEWELL, B.S., Assistant County Agent, Marion County.
CLIVE WINTON COOK, B.S., Assistant County Agent, Multnomah County.
ROY ALAN HUNT, B.S., County Agent, Jefferson County.
ELEANOR TRINDLE, B.S., Home Agent, Marion County.
LESLIE JACK MARKS, B.S., County Agent, Wheeler County.
DORA BRAUGHTON COOPER, B.S., Home Agent, Deschutes County.
THELMA ELIZABETH SMITH, M.A., Home Agent, Josephine County.

DOROTHY EVELYN TOLLETH, B.S., Home Agent, Multnomah County.
BETH WOOD WILEY, B.S., Home Agent, Lane County.
JENNIE IDELLA CLARK, M.A., Home Agent, Hood River County.
LEE RUSSELL FOSTER, B.S., Assistant County Agent, Umatilla County.
KATHERINE MONAHAN, B.S., Home Agent, Umatilla County.
HELEN PEARL STINE, B.S., Home Agent, Klamath County.
DOROTHEA PARKER BOLING, B.S., Home Agent, Douglas County.
ALDENE N. ROBERTS, M.S., Home Agent, Curry County.
MURLE SCALES, M.S., Home Agent, Yamhill County.
JAMES FRANKLIN BISHOP, B.S., Club Agent, Umatilla County.
KENNETH CLAYTON MINNICK, B.S., Club Agent, Benton County.
RONALD WILLIS DAVIS, B.S., County Agent, Harney County.

Instructors

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EPHRAIM ALFRED DANIELSON, M.S., Club Agent, Lane County.
NIELS JOHN HANSEN, B.S., Club Agent, Linn County.
EARLE FRED JOSSY, B.S., Assistant County Agent, Jackson County.
MARYOLIVE SNARR MADDOX, B.S., Assistant Club Agent, City of Portland.
RUFUS HENRY CATE, JR., B.S., Club Agent, Jackson County.
ROWENA BLANCHE THOMPSON, B.S., Home Agent, Benton County.
SCOTT PHILLIP CLEVINGER, B.S., Club Agent, Lake County.
MARGARET JEAN STARKER, B.S., Home Agent, Clatsop County.
WILLIAM MCGUIRE PERRY, B.S., Club Agent, Yamhill County.
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JOHN KENNETH BEESON, B.S., Assistant County Agent, Coos County.
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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 the State College, 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 the 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 a project basis, all projects being approved by the appropriate administrative officers.

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 therefore 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 State College authority and the Secretary of the

United States Department of Agriculture before federal and state funds appropriated for the work may be expended.

The several district 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.*

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; rodent eradication; land use planning; entomology; farm forestry; seed certification; and plant pathology.

Home Economics—nutrition; home management; clothing and textiles; community social organization; and family relationships.

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 agricultural development.

* Supported jointly with General Extension Division.

Summary of Enrollment—1946-47

ENROLLMENT BY CURRICULUM AND CLASS, REGULAR SESSION, 1946-47

Curriculum	Fresh- man year	Soph- omore year	Jun- ior year	Sen- ior year	Grad- uate	Spe- cial	Sub- total	Total
<i>Liberal Arts and Sciences</i>								
Lower Division								
Arts and Letters	344	114	-----	-----	-----	3	-----	-----
Social Science	414	88	-----	-----	-----	-----	-----	-----
Total, Lower Division	758	202	-----	-----	-----	3	963	-----
School of Science								
General Science	111	114	31	41	4	-----	-----	-----
Bacteriology and Hygiene	26	21	7	6	1	-----	-----	-----
Botany	4	4	1	2	5	-----	-----	-----
Chemistry	45	43	9	20	40	1	-----	-----
Entomology	2	6	-----	3	11	-----	-----	-----
Geology	18	22	4	1	5	1	-----	-----
Mathematics	8	13	6	5	6	-----	-----	-----
Physics	24	26	3	4	13	-----	-----	-----
Zoology	6	8	4	3	12	-----	-----	-----
Total, School of Science	244	257	65	85	97	2	750	-----
Total, Liberal Arts and Sci- ences, excluding duplicates	1,002	459	65	85	97	5	-----	1,713
<i>Professional Curricula</i>								
School of Agriculture	454	278	146	87	87	3	1,055	-----
School of Business and Tech- nology	623	389	155	108	-----	1	1,276	-----
School of Education	124	175	102	85	53	-----	539	-----
School of Engineering	705	595	232	217	69	5	1,823	-----
School of Forestry	259	127	63	57	9	2	517	-----
School of Home Economics	202	179	136	108	36	-----	661	-----
School of Pharmacy	88	61	33	22	-----	1	205	-----
Lower-division professional, unclassified	28	1	2	1	32	-----	64	-----
Totals (excluding duplicates)	3,485	2,264	934	770	333	17	7,853	7,853
Auditors								49
Total Students, Regular Session								7,902

DISTRIBUTION OF ENROLLMENT AS TO SEX AND RANK 1946-47

	Men	Women	Total
Total Graduate Students	302	81	383
Total Undergraduate Students	5,485	1,985	7,470
Total Auditors	8	41	49
Totals	5,795	2,107	7,902

ENROLLMENT IN SUMMER SESSION, 1946

	Men	Women	Total
First Session	1,066	451	1,517
Second Session	137	26	163
Auditors	5	21	26
4-H Club Short Course	577	1,050	1,627
Totals	1,785	1,548	3,333

ENROLLMENT IN GENERAL EXTENSION DIVISION

July 1, 1946—June 30, 1947

Classes	Under-graduate	Graduate	Total
Extension Classes:			
Portland Center	3,852	338	4,190
State-wide:			
Albany	96	11	107
Aloha	26	.....	26
Astoria	20	.....	20
Baker	50	.....	50
Bend	14	.....	14
Clatskanie	17	.....	17
Coos Bay	56	.....	56
Coquille	19	.....	19
Corvallis	141	17	158
Eugene	750	39	789
Forest Grove	32	.....	32
Grants Pass	49	.....	49
Hillsboro	41	.....	41
Hood River	52	.....	52
Klamath Falls	172	.....	172
Lakeview	7	.....	7
Lebanon	55	7	62
McMinnville	29	.....	29
Medford	69	.....	69
Milton	23	.....	23
Newberg	45	20	65
Newport	26	.....	26
North Bend	13	.....	13
Nyssa	36	.....	36
Oregon City	114	.....	114
Pendleton	51	.....	51
Prineville	30	.....	30
Redmond	30	.....	30
Roseburg	27	.....	27
Salem	168	4	172
Seaside	19	.....	19
St. Helens	47	.....	47
Taft	22	.....	22
The Dalles	33	.....	33
Tillamook	33	.....	33
Westport	12	.....	12
Total, State-Wide Classes	2,424*	98	2,522*
Correspondence Study:			
New Registrants	2,554	.....	2,554
Continuing Students	2,530	.....	2,530
Total, Correspondence Study	5,084*	.....	5,084*
Grand Total Extension Classes and Correspondence Classes	11,360*	436	11,796*

* Includes 232 duplicates, persons who took combination class and correspondence study course.

SUMMARY OF DEGREES GRANTED 1946-47

<i>Advanced Degrees:</i>		
Doctors of Philosophy	8	.....
Doctors of Education	3	.....
Masters of Arts	4	.....
Masters of Science	49	.....
Masters of Education	7	.....
Masters of Forestry	3	.....
Professional Degrees	2	.....
Total Advanced Degrees .....	.....	76
<i>Bachelors' Degrees:</i>		
Bachelors of Arts:		
Science	13	.....
Business and Industry	8	.....
Education	5	.....
Engineering	1	.....
Home Economics	1	.....
Bachelors of Science:		
Science	76	.....
Agriculture	115	.....
Business and Industry	86	.....
Education	81	.....
Chemical Engineering	14	.....
Civil Engineering	42	.....
Electrical Engineering	23	.....
Mechanical Engineering	82	.....
Industrial Arts	15	.....
Forestry	33	.....
Home Economics	99	.....
Nursing Education	15	.....
Pharmacy	15	.....
Bachelors of Education	2	.....
Bachelors of Forestry	5
Total Bachelors' Degrees	731
Total Degrees Granted 1946-47	807

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